

2017 Manifesto

A COLLABORATION WITH INPUT FROM NZ'S LEADING TECHNOLOGY SECTOR BODIES

New Zealand's Digital Future

About this Manifesto

The leading associations and professional bodies in New Zealand's technology sector have collaborated on this manifesto to make a meaningful contribution to the agenda of political parties. As a sector, we don't take a partisan stance. The local technology sector is invested in our nation's success and we believe sharing our perspective on how government can help achieve that success is worthwhile.



A COLLABORATION WITH INPUT FROM NZ'S LEADING TECHNOLOGY SECTOR BODIES





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Introduction to our Digital Future

It is our strongly held belief that the prosperity of New Zealand is inextricably linked to how we embrace our future as a digital nation.

Through the collaboration of leading associations and professional bodies in New Zealand's technology sector, our industry presents this manifesto for New Zealand's digital future.

As we approach the 2017 election, we strongly encourage all political parties to embrace this manifesto and commit to bringing life to its recommendations.

The manifesto focuses on three key areas, providing a series of core recommendations for each.

Only through a comprehensive and focused programme of change across these areas can New Zealand's digital potential be fully realised.

The three key areas of focus are:

The Future of our People.

The Future of our Economy.

The Future of our Government.

Prior to the 2017 election, we will reconvene to examine the election manifestos and policies of each political party. We will then present a public scorecard based on the compatibility of each party's policy promises.

Graeme Muller
CEO, NZTech



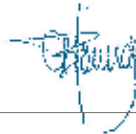
Jordan Carter
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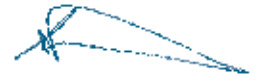
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James Everett
Chair, Game Developers Association



Craige Mackenzie
Chair, Precision Ag Association



Stuart Christie
Chair, AI Forum



Michael Gregg
Chair, VR/AR Association



Goals for the Digital Future

Throughout this manifesto we will discuss the following goals, explain why they are important and explore key roles the New Zealand Government and industry leaders will play in achieving positive outcomes needed to make New Zealand prosperous in a changing world.

GOAL New Zealand equips every child with the digital technology skills needed to be safe and successful in a digital world through comprehensive Digital Technology education.

GOAL New Zealand is recognised as a world leader in equipping its citizens for the changing economy, through in-work training, career transition support, and public sector leadership in the use of new technologies.

GOAL New Zealand remains open for business, welcoming genuine skilled migrants in areas of strong need in the digital and technology sector while significantly improving the process of matching the skills of potential immigrants with areas of un-met need.

GOAL New Zealanders have affordable access to reliable, high-speed Internet, coupled with the skills and equipment to use it. As part of this, there should be parity between urban and rural areas with regards to speed/quality and cost.

GOAL New Zealand is recognised as having one of the most digitally savvy economies in the world, with tech product and service exports being our top export sector. The majority of New Zealand businesses either sell or engage in business online.

GOAL New Zealand continues to be a world leading nation to do business in and with whilst maintaining privacy and data security. This is achieved through a world leading approach to cyber security including education, policy and preparedness.

GOAL New Zealand develops world leading technology by increasing the proportion of digital tech related public research and improving indirect incentives for industry R&D.

GOAL New Zealand develops a transparent framework for buyers and sellers through Government wide pre-qualification standards and low cost, easy to use procurement processes.

GOAL New Zealand fully embraces open standards and provides a level playing field for technology in general, and IT services in particular.

GOAL New Zealand continues to be recognised internationally as a bastion for privacy, a country which values and protects the privacy of its citizens through policy whilst still allowing economic growth.

GOAL New Zealand embraces online digital tools to provide efficient, consultative and inclusive policy-making process or allowing for rapid updating of legislation.

GOAL New Zealand establishes a dedicated, Ministry for the Future, focusing on positioning New Zealand and all Government agencies and society to take best advantage of a technologically enabled future.

Welcome to our
Digital Future...



The Future of our People

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The Future of our People

Digital technology has redefined almost every facet of the modern world and become ubiquitous at work, home and in the community. This transformation has empowered people by changing the way we do business and live within society.

At work, the relatively young tech sector employs a rapidly growing number of people, is frequently found to be amongst the highest paid professions and has the potential to redefine the economic development of New Zealand.

Digital technology has the potential to not only propel our economic position on the world stage, but also to make New Zealanders everyday life better. However, this can only happen if we equip and empower our people with the skills and knowledge they need for the digital world.

Future of Education

Computing skills are no longer the sole domain of those working in the tech industry. Regardless of career field, strong computing skills are now essential and those without digital skills are significantly disadvantaged. In today's world, any learner in school without access to comprehensive digital technologies education will not have the same opportunities as those who do. Accessing digital skills has become an equity issue and New Zealand must act to keep pace. While some positive change is underway, vision and scale is lacking. True transformational change is required in what and how we teach our kids about technology. The pace of this change must also be significantly accelerated.

GOAL New Zealand equips every child with the digital technology skills needed to be safe and successful in a digital world through comprehensive Digital Technology education.

Government's role

Embrace the urgent need for true transformational change through the introduction and integration of Digital Technologies throughout the education system. Invest in the necessary resources and tools to achieve this goal by 2020. This includes:

- Give Digital Technologies significant focus, profile and standing as a core and central component of the New Zealand Curriculum, and in every child's education pathway.
- Invest more in teaching resources, professional development and support for the teaching of Digital Technologies in schools.
- Require every school to teach, and report on, the Digital Technologies curricula up to Year 10, and encourage all schools to provide Digital Technologies at years 11-13 (NCEA level).
- Address the significant shortage of teachers with strong digital technology skills by substantially increasing the

number of TeachNZ scholarships available for aspiring digital technology teachers, and requiring all Initial Teacher Education providers to provide compulsory coverage of this area.

- Invest heavily in upskilling existing teachers with skills and knowledge to confidently teach Digital Technologies.
- Investigate the international use of alternate teaching methods such as leveraging student led learning to further enhance Digital Technology capabilities in schools.

Industry's role

- Encourage local professionals and firms to engage with local schools and teachers as their teaching and learning evolves.
- Continue to support the evolution of Digital Technologies education through Ministry of Education working groups and curriculum design groups.
- Help promote (directly and via funding) the Digital Technologies education pathways in schools.

The Changing World of Work

New digital technologies are driving economic and social change. This disruption affects all sectors of the economy and is dramatically changing how we work. Not only will we be working differently, we will also be doing different work, with many of today's jobs vanishing and the creation of new roles, many of which we haven't yet imagined.

The changing work landscape poses many challenges for the organisation of our economy and how workplaces function. The notion of a static workplace is likely to fade, transport infrastructure will need to adapt as places of work move and ubiquitous connectivity will be paramount. The tech sector will contribute greatly with the creation of new jobs and innovative technology for use at home and in export markets.

GOAL New Zealand is recognised as a world leader in equipping its citizens for the changing economy, through in-work training, career transition support, and public sector leadership in the use of new technologies.

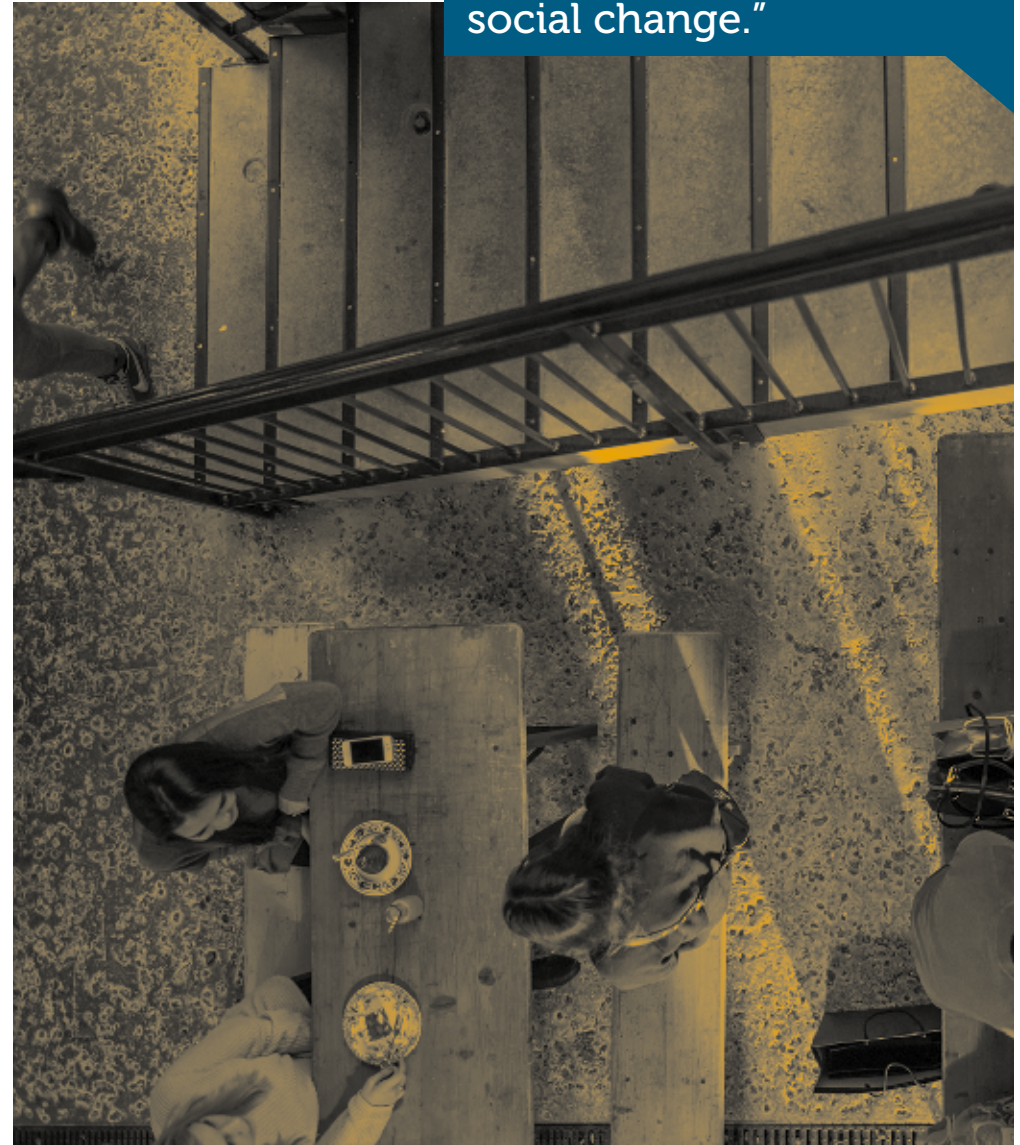
Government's role

- Commence positive conversations about change and encourage individuals and organisations to consider their options.
- Adopt and implement flexible approaches to work across Government.
- Develop and trial programmes to support better in-work and inter-job training for those working in Government and the private sector.
- Ensure people who face disruption and changes in their circumstances can access the best support, at the right time so they can continue contributing to society.
- Commission quality research into changing workplace trends and how New Zealand can win the race.

Industry's role

- Support modern and flexible approaches to both work and workplaces.
- Collaborate with Government on research into technology trends and their potential impacts on future jobs.
- Support programmes and practices to encourage diversity in tech workforces.
- Continue to generate new jobs for New Zealanders.

"New digital technologies are driving economic and social change."



Immigration and Skills

The IT industry continues to experience a significant shortage of individuals with specialist skills and expertise in New Zealand. This is the largest impediment to growth in our sector and is a significant issue for the economy as a whole. For example, PriceWaterhouseCooper's 2016 Annual CEO Survey found that 84% of New Zealand CEOs – of both tech and non-tech companies – are concerned about shortage of skills, primarily in the digital and IT arena.

Changes to the education system and elsewhere are necessary to meet New Zealand's skill needs in the longer-term, however bringing in skilled talent from overseas remains an essential short- and medium-term solution to ensure our industry and economy can continue to thrive.

While high immigration poses infrastructure and other challenges for New Zealand, ensuring the right people with the right skills can come here is essential for the future of our industry. This also includes strengthening the skills assessment and requirements for potential immigrants to ensure this isn't abused.

GOAL New Zealand remains open for business, welcoming genuine skilled migrants in areas of strong need in the digital and technology sector while significantly improving the process of matching the skills of potential immigrants with areas of un-met need.

Government's role

- Ensure there are minimal impediments to migration to New Zealand for individuals with specialist tech industry skills that can't currently be met by New Zealanders.
- Understand that immigration is crucial for economic growth in the tech sector, and ensure immigration policy does not reduce or restrict the number of genuinely skilled migrants able to come to New Zealand to support the growth of our sector.
- Implement a more robust assessment process for immigrant skills for digital and tech occupations, including independent assessment by experts with experience within these subject domains to ensure a close match with areas of genuine un-met demand.

- Understand that New Zealand's industry is competing for talent on an international stage and that clear, unambiguous and welcoming immigration policy is essential.

Industry's role

- Continue to partner with Government (central and local) on initiatives to attract skilled migrants to New Zealand.
- Don't abuse the immigration system. For example, seek to fill roles with people resident in New Zealand before looking to immigration.

Connectivity Everywhere

Underlying the changing world of work is the realisation that network technologies, the Internet, telecommunications, mobile networks, and the Internet of Things will be critical underpinning infrastructure. In recent years, Government has made major contributions throughout New Zealand to improved connectivity through the UFB and RBI programmes. It is imperative to continue investment, ensuring we remain at the leading edge of connectivity technologies. It is important for ongoing regional development, the needs of tomorrow's rural industry and social inclusion, that New Zealanders can access high performance Internet from anywhere.

GOAL New Zealanders have affordable access to reliable, high-speed Internet, coupled with the skills and equipment to use it. As part of this, there should be parity between urban and rural areas with regards to speed/quality and cost.

Government's role

- Set ambitious goals for affordable connectivity everywhere.
- Alongside the private sector, continue investment in infrastructure to achieve these goals.
- Make modest increases in investments that reduce the digital divide, both in terms of skills to allow access and the affordability of access.

Industry's role

- Continued investment in infrastructure rollout.
- Assist individuals and businesses in making the best use of the infrastructure to drive economic and social progress.
- Recognise the need for and help develop a sound regulatory framework to ensure parity.

A hand holding a pen pointing at a financial chart on a tablet. The chart shows a line graph with data points and a grid. The background is dark with a bokeh effect of yellow lights.

The Future of our Economy

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The Future of our Economy

A robust and growing economy underpins a healthy and happy society. While the New Zealand economy has been performing well, seismic shifts are on the horizon as technology disrupts employment and creates new economic opportunities.

Continued economic growth is required to ensure we have the resources available to look after our society and continually improve the standard of living for all New Zealanders. However, the relatively small size of our domestic market constrains the potential for New Zealand businesses to grow. The ability for businesses to sell their goods and services to customers in overseas markets is critical.

As a geographically isolated country like New Zealand, global connections are critical. Falling travel costs and greater connectedness, have helped reduce the negative impacts of being distant from global markets. This has also created new opportunities for trade in many diverse sectors.

Digital Exports

The global economy is no longer far away and we are successfully applying our natural resourcefulness to global problems, becoming tech leaders in all sectors. Never before has it been easier for us to connect to the world.

Ultimately, to significantly improve New Zealand's prosperity we need to increase exports. To take full advantage of the available opportunities we need to become known for more than simply hobbits, sheep, and beautiful scenery. We have to help all businesses become more digitally savvy.

GOAL New Zealand is recognised as having one of the most digitally savvy economies in the world, with tech product and service exports being our top export sector. The majority of New Zealand businesses either sell or engage in business online.

Government's role

- Increase investment in both direct and indirect R&D support and early-stage accelerators.
- Create programmes to support clusters of small firms to grow digital exports.
- Collaborate with industry to create an international positioning for New Zealand as a world class digital nation, providing tech exporters with the ability to leverage off each other's success.
- Continued development and improvement of our privacy and regulatory frameworks as a trusted nation for global enterprises to base themselves.
- Create an all-of-government (including local government) strategy for Foreign Direct Investment and relocation inquiries and evaluate our international competitiveness regarding incentives.

New Zealand Tech Sector



3rd

Largest Export Sector



9% (\$6.3b)

of New Zealand's Exports



8% (\$16.2b)

of New Zealand's GDP



Top 200

Tech firms growing at 7.5%

- Ensure an environment where business can flourish, grow and export.
- Recognise its role as the main influencer of domestic industry success, by making use of their products and services.

Industry's role

- Help create an international positioning as a world class digital nation and work together to expose the best of New Zealand tech to the world.
- Collaborate across the tech sector and with other industries to grow export opportunities for 'NZ Inc'.

Cyber Security

The effective and safe use of information technology has the potential to deliver incredible benefits to the New Zealand economy, enabling greater efficiency and productivity. In addition, the local tech industry is fast becoming a significant source of export revenues for the country.

Government, health providers and other agencies are also the guardian of both public and personal information. This data is held in trust and owned by individuals. There is significant responsibility to ensure this data is safe and secure, regardless of where it is stored. For New Zealand to grow its economy through

digital exports, it needs trusted, reliable and secure ICT environments. However, there is risk of a significant impact to the economy if individuals and organisations are reluctant to engage in the digital economy or avoid using technology to its full potential due to cyber security fears. SMEs, in particular, are seen as being most vulnerable to both actual threats and fears over perceived threats.

GOAL New Zealand continues to be a world leading nation to do business in and with whilst maintaining privacy and data security. This is achieved through a world leading approach to cyber security including education, policy and preparedness.

Cyber security and policy makers

How to make yourself indispensable as a policy maker: take part in cyber security training provided by experts to understand the basic elements, such as human factors, technological issues, threats and jurisdictional issues.

Government's role

- To ensure a safe cyber environment, the Government must invest in technology education, combining cyber security into the New Zealand curricula at all levels with education of SMEs.
- Regularly review and update the New Zealand Cyber Security Strategy and resource the Action Plan appropriately so relevant actions can be undertaken by Government agencies.
- The national CERT should be encouraged to develop community-wide reporting of cyber security incidents to help raise awareness and develop understanding of actual threats.

The Industry's role

- Actively work to increase IT governance and cyber security through inclusion

in executive teams in all sectors and capability at board level.

- Continue to partner with Government on initiatives to raise awareness of cyber security issues.

Research Funding

By almost any measure, New Zealand is seriously underfunding research in digital technologies, both within publicly-funded research institutions and as a result of a lack of incentives and support for industry R&D.

Digital technology related fields have been underfunded in public research institutes for some time. For example, the Government-funded Marsden Fund (designed to fund blue-skies research that may lead to significant discoveries and corresponding commercial opportunities) has funded an average of just 1.5 digital-tech related research projects per year over the last decade, less than 2% of overall research through the fund. By comparison, Australia averages 28x the number of research projects in digital technology related fields than New Zealand. This places our future economy at a significant disadvantage.

New Zealand languishes behind in industry R&D as well, averaging less than half of both Australia's per capita R&D and the OECD average. In 2015, 28 of the 34 OECD



“For New Zealand’s economy to thrive on the world stage, we must be serious about investment in computing and technology research”.

Photo Credit: Kieren Scott

countries and a large number of non-OECD economies gave preferential tax treatment to business R&D expenditures, however only two countries, New Zealand and Mexico, decided to halt their tax incentive programmes. Australia also employs 21% more researchers, as a proportion of employed people, than New Zealand.

For New Zealand’s economy to thrive on the world stage, we must be serious about investment in computing and technology research. While our Government’s direct funding of R&D through grants is high, public research in technology and indirect funding through R&D incentives needs to be addressed.

GOAL New Zealand develops world leading technology by increasing the proportion of digital tech related public research and improving indirect incentives for industry R&D.

Government’s role

Government has the opportunity to make cost neutral changes to the structure of Marsden and other funds to significantly lift the proportion of research funding focused on future technologies. The Government should also re-introduce incentives for New Zealand-based private R&D. This includes:

- Review research funding across all of government, with an aim of better coordinating between agencies.

- Allocate significant investment in digital technology related public research, through the Marsden and other research funds, to ensure a greater proportion of research spend is focused in this area.
- Stimulate and support private R&D activities in New Zealand by re-introducing indirect incentives, for example R&D tax credits.
- Continue investment in commercial R&D research, support and grants via Callaghan Innovation.
- Update Callaghan Innovation’s Ministerial Direction to enable grants for design-led innovation and research in addition to technical stretch.
- In keeping with New Zealand’s commitment under the Digital 5 Charter (see page 15), ensure data created through Government funded research is freely available online in a readily usable format.

Industry’s role

- Proactively align collaborative research between industry and research providers.
- Given the sector itself undertakes the most R&D, promote the successes and benefits of doing so to encourage ongoing projects.



The Future of our Government

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The Future of our Government

New Zealand has a hard-won reputation for transparency and very low levels of corruption. We need to ensure that transparency in Government and across society is continually protected and further developed.

Our Government has joined with the United Kingdom, Estonia, Israel, and South Korea to develop and commit to the Digital 5 Charter. The principles of the Charter are ambitious goals for digital government and they have strong support in New Zealand's technology community because they serve to make our society more open, fairer, more compassionate, and more efficient.

Improved Procurement

The D5 Charter states that government procurement should create true competition for companies regardless of size, and that governments should encourage and support a start-up culture and promote economic growth through open markets.

The cost of doing business with Government is currently too high. A recent industry survey suggests that a year's worth of Government IT procurement engagements drained our economy of at least \$33 million. This distorts the marketplace and creates an uneven playing field.

The Government is the largest client in the New Zealand services market. It has a responsibility to ensure its procurement process is transparent and fair to all firms. With the right domestic conditions, there is a growing opportunity for the digital services sector to help diversify New Zealand's economy and improve its long-term sustainability.

Collectively, D5 governments are leading the way in encouraging a start-up culture and diversity in procurement from the digital sector. A good example of this is the United Kingdom Government, which has made substantial savings through improving its procurement process, breaking down "mega projects" into more manageable components and creating opportunities for a diversity of suppliers.

Changes made in the United Kingdom since 2010 have made it far more feasible for smaller companies to bid for Government work. The development of the Digital Marketplace, a platform

The Principles of the D5 Charter

- 1. User needs** – the design of public services for the citizen.
- 2. Open standards** – technology requires interoperability and so a clear commitment to a credible royalty free open standards policy is needed.
- 3. Open source** – future Government systems, tradecraft, manuals and standards are created as open source and are shareable between members.
- 4. Open markets** – in government procurement create true competition for companies regardless of size. Encourage and support a start-up culture and promote economic growth through open markets.
- 5. Open government (transparency)** – be a member of the Open Government Partnership and use open licences to produce and consume open data.
- 6. Connectivity** – enable an online population through comprehensive and high quality digital infrastructure.
- 7. Teach children to code** – commitment to offer children the opportunity to learn to code and build the next generation of skills.
- 8. Assisted digital** – a commitment to support all its citizens to access digital services.
- 9. Commitment to share and learn** – all members commit to work together to help solve each other's issues wherever they can.

for Government buyers and suppliers to connect, reduced paperwork and vet requirements has generated estimated savings in the hundreds of millions.

GOAL New Zealand develops a transparent framework for buyers and sellers through Government wide pre-qualification standards and low cost, easy to use procurement processes.

Government's role

- Support open pre-qualification marketplaces and panels to reduce the burden on smaller providers.
- Promote greater innovation in digital products and services, embrace a partnership rather than fixed requirement model.
- Measure and report regularly on firms supplying Government.
- Break down large contracts into smaller components and promote competition through transparent procurement processes.
- Improve flexibility in Government procurement, and explicitly support agile approaches to procured software projects.

- Encourage innovation both from suppliers and within government.

Industry's role

- Proactively engage with Government to help improve procurement processes.

Open Standards

In 2014, the United Kingdom Government issued a policy change, mandating the use of open standard file formats for all information exchange between Government, the public and private sectors. This policy was designed for cost saving whilst improving innovation and information sharing.

As a party to the D5 Charter, the New Zealand Government has pledged to work towards open standards, particularly for the exchange of data and content between Government and non-government organisations and individuals. This needs to be accelerated to drive savings and innovation.

GOAL New Zealand fully embraces open standards and provides a level playing field for technology in general, and IT services in particular.

Government's role

- Undertake a comprehensive internal education campaign of Government agencies on the adoption of open standards.
- Mandate the adoption of open standards, particularly as a core part of the IT procurement process, and for formats used for file and data exchange.

Industry's role

- Continue to strengthen the development of open standards in products and tools procured by Government.

Privacy

To complement openness, a considered, well publicised position and Government policy on privacy, particularly related to online communications and data is essential. New Zealand's Privacy Commissioner does a great job of communicating the nuances of what is a highly complex area, but Government and industry must also thoroughly understand this area in order to function responsibly.

The Commissioner must be provided with both the tools and mandate to lead our Government more effectively towards sound practice. An open, responsive stance is required more than ever before given

the ever-changing and increasing threats to individual and organisational privacy.

For example, moving to an 'opt-in' rather than 'opt-out' approach to the collection and storage of personal data. Strong privacy rules are also required in recognising the risks related to triangulation, where seemingly innocuous data can, through combination with other data, be used to identify personal details and compromise privacy.

GOAL New Zealand continues to be recognised internationally as a bastion for privacy, a country which values and protects the privacy of its citizens through policy whilst still allowing economic growth.

Government's role

- The Government holds citizens' data in trust and must live up to that responsibility by being conscious of jurisdictional concerns and triangulation.
- Amend legislation to include mandatory reporting of significant privacy breaches.
- Ensure policymakers understand and work to the 'precautionary

principle', where they recognise a social responsibility to protect the public from exposure to harm if there is a plausible risk.

Industry's role

- Work in partnership with Government on privacy policy and best practice.
- Undertake best practice disclosure of privacy breaches in a prompt and appropriate way.

Open Policy

Along with many other sectors, the tech sector operates within a legislative process largely unchanged since well before the advent of digital technology. As a result, legislation often fails to keep pace with social, educational, technical, environmental and governmental implications it exists to moderate.

Part of Government's role is to explore new means for transparently developing policy and from it, legislation, which recognises

the unprecedented opportunities provided by digital technologies.

Rather than relying solely on the traditional 'call for submissions' approach, Government should consider consensus building tools and approaches to policy making.

GOAL New Zealand embraces online digital tools to provide efficient, consultative and inclusive policy-making process or allowing for rapid updating of legislation.

Government's role

- Make better use of technology to access private and public sector experts, using online tools to develop better policy, faster and with greater consensus from both policy makers and citizens.

- Engage across sectors in technical and other areas where current domain knowledge is limited within government, to assist in developing digitally-inclined policy processes.

Industry's role

- Encourage experts to participate in policy development, by recognising their contributions.

Along with many other sectors, the tech sector operates within a legislative process largely unchanged since well before the advent of digital technology.

A new way of Consensus Building

A recent initiative, which resulted in the "New Zealand Government Open Licensing and Access Framework - Software Extension", made use of online consensus building tool Loomio, developed in New Zealand.

Unlike the traditional 'submissions by interested parties' policy development process for canvassing opinions, the Loomio approach provided collaborative problem solving. The tool enabled a more collegial discussion in which all interested parties were able to discuss thoughts, concerns and implications with one another.

This led to rapid consensus building and development of policy and a great outcome.





Bringing it all together

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Bringing it all together: The Ministry of the Future

Technology is now evolving faster than ever before, with implications not just for the tech sector but for every part of Government and society.

As a country, we need to wholeheartedly embrace this change, installing a dedicated Ministry of the Future, and Chief Technology Officer, to consider the implications of change across social, economic, educational and all other areas of policy.

The current pace of technology change is not expected to slow, with increasing data use, high speed internet access and mobility being enhanced by new developments in artificial intelligence, robotics, genomics and synthetic products.

These new advances will require rapid responses from the government in terms of policy, education, investment and regulation.

The implications of exponential technology growth

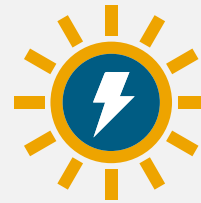
In 1965 Gordon Moore, founder of Intel, observed that approximately every two years computing power was doubling whilst also halving in cost. Ray Kurzweil studied this phenomenon and discovered that this exponential growth wasn't limited to processing power. As soon as you digitalise a process or domain it also starts increasing with a doubling effect.

Exponential growth is difficult to spot during its initial stages and very hard to predict as humans are more attuned to linear growth. With the convergence of technologies such as fast internet speeds, mobility, big data and cloud computing we are beginning to see a wave of technology change impacting almost every part of society and the economy.



Constant Connection

9% of the world had a smart phone in 2011, now more than 25% are connected to the internet via mobile.



Solar Power

In 1980, it cost \$30/kW for solar power in the US, now it is as low as 4c/kW.



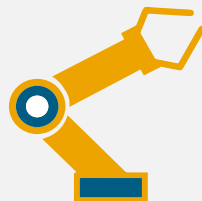
Autonomous Cars

In 2011 the sensors in an autonomous car cost \$350,000, they now cost less than \$1,000.



Genetic Sequencing

In 2007 it cost \$3 billion to sequence a human genome, it now costs less than \$1,000.



Robotics

In 2008 the average industrial robot cost \$500,000. They currently cost as little as \$20,000.



Synthetic Meat

In 2013 it cost \$325,000/kg to create synthetic meat, this has already dropped to \$12/kg.



Synthetic milk

Perfect Day Food add 3D printed DNA sequences to yeast to enable it to produce milk using no animals & 98% less water. In stores in 2018.



3D Printing

3D printers are already being used to print buildings, micro-organisms, machines, body-parts and rockets.

For New Zealand to remain competitive in the near future, it needs to plan and prepare for this unprecedented technology change today. To ensure broad implementation of the innovations envisioned in this Manifesto, a longer term dedicated focus is needed across Government. A number of other countries, including Sweden and the United Kingdom, have implemented or are considering a Ministry or Minister for the Future to lead their nation's policy and direction. In New Zealand, this role should consider future implications of technology change alongside other societal changes and opportunities. The mandate would include all areas impacted by future technology, including social, economic and educational.

While New Zealand has a Government Chief Information Officer as a functional lead for digital and ICT within Government, this proposed Ministry would be strategically focused and have a higher level broad scope. With the implications of dramatic technology change being all encompassing, this warrants dedicated Ministerial attention to ensure all of New Zealand is ready for the future.

To avoid a fragmented approach, New Zealand needs a whole-of-government focus with a dedicated team working on policy development to tackle the challenges of the future. This requires

top public servants, along with experts from the private sector, to come together, share research, apply best practice from around the world and continually challenge the Government to be more forward thinking.

GOAL New Zealand establishes a dedicated, Ministry for the Future, focusing on positioning New Zealand and all Government agencies and society to take best advantage of a technologically enabled future.

Government's role

- Commit to the development and resourcing of a Ministry for the Future.
- Select a diverse panel of non-government technology and civil experts to recommend the scope and structure of the Ministry of the Future. Retain this founding panel as a Board to ensure the Ministry has ongoing access to current and forward-looking technology thinking.
- Appoint, from outside of government, a Ministry CEO who will be the Government's Chief Technology Officer.

Industry's role

- Support the Ministry of the Future wherever possible and partner to consider a full 'NZ Inc' approach.

For New Zealand to remain competitive in the near future, it needs to plan and prepare for this unprecedented technology change today.



A COLLABORATION WITH INPUT FROM NZ'S LEADING TECHNOLOGY SECTOR BODIES



“The prosperity of New Zealand is inextricably linked to how we embrace our future as a digital nation.”

New Zealand's
Digital Future

2017 Manifesto