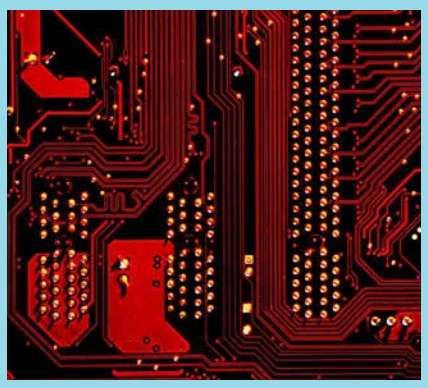
GROWING INNOVATIVE INDUSTRIES IN NEW ZEALAND

Digital Technologies Draft Industry Transformation Plan 2022-2032

JANUARY 2022









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MINISTERIAL FOREWORD

These are exciting times for the Digital Economy.

I recently released a discussion document on a Digital Strategy for Aotearoa, highlighting just how important digital technologies are economically and socially, how they underpin so much of what we currently do and will be doing in New Zealand over the next few decades.

This document is a companion piece – a draft Industry Transformation Plan (ITP) for the Digital Technologies sector.

It puts some flesh on the bones of the Digital Strategy, particularly its pillar on Mahi Ake, Growth. It's an opportunity for co-ordinated and effective action, a chance to generate real momentum that ensures our Digital Technologies sector can realise its potential and be world-leading when it comes to emissions reductions, inclusion and innovation.

This sector is unlike most other areas of the economy. It is not weighed down by an industrial base. Its limiting factor is often people. It's an enabler and value multiplier of other industries and a great source of innovation and start-ups, with the creative elements of the sector requiring just a keyboard and a good internet connection.

Based on engagement with industry, the time is right to capitalise on our recent history of success, burgeoning global markets and New Zealand's growing international reputation as a great place to live and do business. The draft ITP will ensure strong sector foundations – especially skills and talent – and increased Māori participation. In the short term, however, the key to the Action Plan is creating additional high-value jobs and export revenue from accelerated growth in highly scalable sub-sectors.

I, as Minister, see significant potential in Software as a Service and Interactive Media. But executing the vision must, first and foremost, come from industry.

The success of this ITP requires us to form a consensus view on the scope of our ambition and how this can be achieved with actions and initiatives that are sufficiently realistic to bring about meaningful change – both short and longer term. By providing a framework and forum for leadership, co-operation and collaboration, the processes we set up together over the next 12 months will give us a chance to embed Digital Technologies as a major contributor to our future transformed economy.

If you haven't already, this is a chance for all within the sector to get involved.

I want to congratulate those in the industry who have contributed in different ways during this initial phase, including NZTech, IT Professionals New Zealand, the New Zealand Game Developers Association, the AI Forum, NZRise and many others, for your energy and leadership. It's exactly the type of partnership approach we need in these increasingly complex economic times.

I encourage you to offer your views and get behind the Action Plan as it is rolled out.

Hon Dr David Clark
Minister for the Digital Economy and Communications

INDUSTRY FOREWORD

Thirty years ago, the digital technologies sector was recognised as a potential competitive advantage for New Zealand. By 1996, the first sizing of the sector tallied $3.2 billion in revenues and a contribution of $292 million in exports.

Despite the economic turbulence since, including Y2K, the Global Financial Crisis and the COVID-19 pandemic, the tech sector has continued relentless growth. Today, it contributes billions of dollars in exports.

Since 2015, the fastest growing part of New Zealand's diverse tech sector, the digital technologies sector, has been growing at an annual compound growth rate of 10.1 per cent. Though this vastly outpaces the rest of the economy, it hasn't all been tail winds. The sector's dramatic growth has come during tough economic times, major ongoing skills shortages, years of capital constraints and no cohesive domestic policy framework.

Imagine what the future might hold, if we could work together to reduce some of these head winds?

This draft of the Digital Technologies Industry Transformation Plan (ITP) has become a mechanism for strong collaboration and alignment. During its development, multiple tech communities, organisations and people have come together to identify common opportunities and challenges. Together with Government, we have used the ITP as an opportunity to create co-ordination for some of the sectors most significant ongoing challenges.

This collaborative process has also highlighted a range of diverse opportunities for growth that can provide benefits for all New Zealanders. We look forward to the next steps, receiving feedback, reviewing and continuing with initiatives to help support transformational growth of the digital technology industry.

Graeme Muller
Chief Executive
NZTech

EXECUTIVE SUMMARY

Industry Transformation Plans support our ongoing efforts toward accelerating the economic recovery and rebuild from COVID-19 towards the goal of advancing a high wage, low emissions economy.

The ITP has been developed via a collaborative process designed to strengthen existing partnerships and establish new ones across the Digital Technologies sector. The ITP will underpin a robust ecosystem that can address existing barriers and deliver new employment, and economic and social opportunities for all New Zealanders.

During the last two years, industry and government have facilitated numerous roadshow events, interviews, stakeholder workshops, surveys and a series of hui, in order to identify the key issues facing the Digital Technologies sector.

While the sector has continued to grow over recent years, even through lockdowns, there are a number of barriers that are constraining it from reaching its full potential. These include steady and predictable access to skills; how New Zealand businesses can supply their services into the government sector which is the biggest single purchaser of ICT products and services in New Zealand; how to ensure a more diverse representation of New Zealanders is welcomed into the sector to succeed; and provision of advice and guidance that is applicable to a digital technologies business looking to expand.

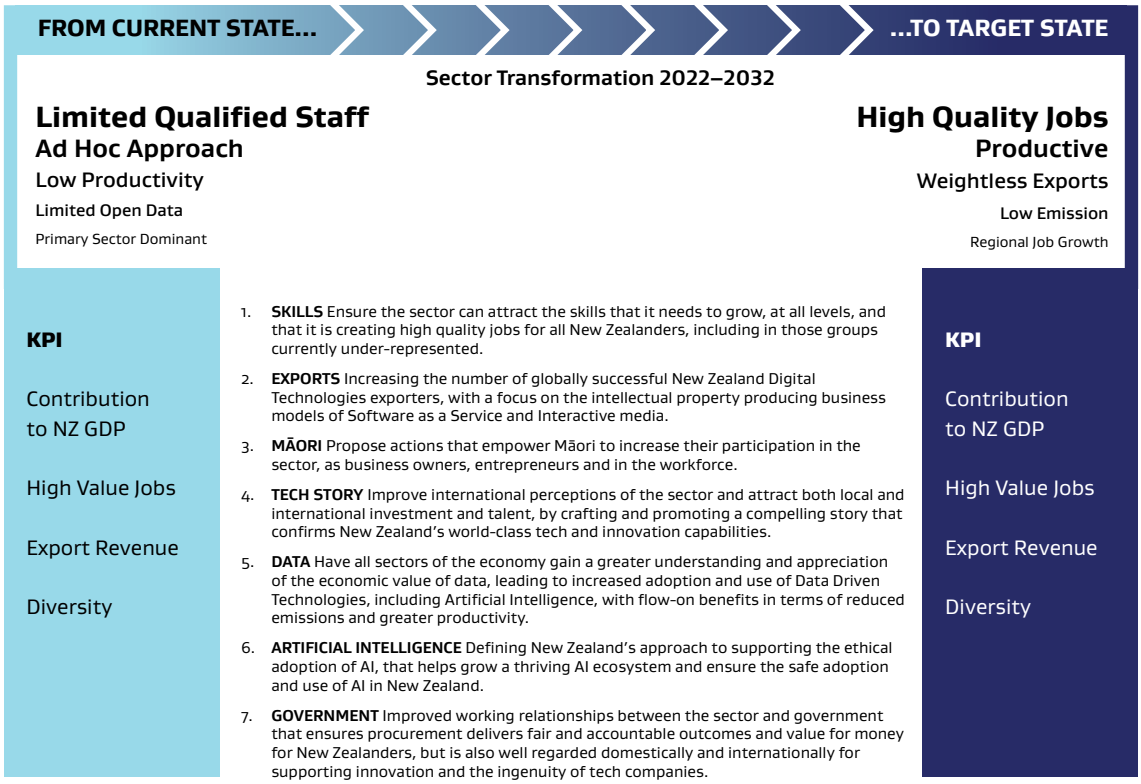
The draft ITP presents a suggested long-term vision for the sector with specific workstreams to drive actions and initiatives capable of bringing this vision to fruition. As shown in the diagram opposite, each workstream seeks to address existing barriers and opportunities and, once implemented, will play an active role in bringing about the overall transformation of the sector. To track performance, a set of KPIs will be agreed and incorporated into the final ITP.

This sector supports our economic recovery and rebuild from COVID-19 by offering significant employment opportunities for all New Zealanders, if we get the setting right.

The industry has made a commitment to work with government to develop an inclusive and balanced skills pipeline that supports the right talent at the right level using the right pathways, whether that be better co-ordinated internships, short courses for school leavers or people displaced from other sectors, or post graduate degrees. The initiatives proposed in the ITP present an opportunity to engage with young New Zealanders on jobs for the future and how they can be part of our digital future. An effective skills pipeline will be a means for welcoming a variety of new talent from different groups and people from different backgrounds, into the sector. To support this, the industry has acknowledged that it needs to take action to better welcome and support people from groups currently underrepresented, such as Māori, Pacific Peoples, and women.

Another key focus for the draft ITP is accelerated growth.

The sector already has strong historical growth, with numerous examples of New Zealand firms succeeding both domestically and overseas. While this is projected to continue, there is a unique additional opportunity with cloud-based sub-sectors that are highly scalable and weightless. With targeted support, Software as a Service and elements of Interactive Media can lead the transformation process by producing an immediate increase in high-value jobs and export revenue.



Longer-term, Artificial Intelligence or AI, which is already in wide use, will be an engine for accelerated growth. While AI has the potential to drive innovation and productivity across multiple industries, it also brings risks that need to be managed through an explicit social license. With a highly trusted government, a collaborative culture, high education standards and a commitment to biculturalism that respects different worldviews, New Zealand is well positioned to ensure this happens.

The sector is of particular interest to Māori, who continue to be under-represented. Apart from offering employment, business ownership and investment opportunities, the sector is an excellent fit with a young, tech savvy Māori population and provides locational flexibility, which supports regional iwi development. Digital technologies can help express indigenous values and offer opportunities for the entrepreneurial mind-set that is often associated with Māori. The story-telling elements of Interactive Media are particularly applicable.

Supporting all of this, the draft ITP also includes work on developing a New Zealand Tech & Innovation Story that will shift global perceptions about our technology and innovation capabilities; initiatives that promote better understanding and appreciation of the economic value of data; and increased attention on the government procurement process and how it should support the sector's transformational goals.

While the ITP is focusing on the sector itself, it will nevertheless generate important spill-over benefits. Digital Technologies will play a critical role in our Emission Reduction Plan and around environmental management more generally. They also enable productivity improvements in many other sectors, and a strong digital technologies sector means we can create solutions that meet the needs of New Zealanders.

Following feedback on this document and its draft Action Plan (see Annex 1), we intend to publish a final ITP, with firm actions and initiatives, in 2022.

INTRODUCTION

New Zealand is experiencing a period of rapid and unprecedented change, driven in large part by transformational forces relating to decarbonisation, ongoing technological disruption and the implications of COVID-19.

While the economic reforms of the last few decades have delivered a level of material success, there is a growing expectation our wellbeing should be considered in more holistic terms, in the spirit of te ao Māori, in a way that acknowledges the interconnectedness and interrelatedness of all things. This is reflected in the current policy framework which aims for a more productive, sustainable and inclusive economy.

This shift, including greater emphasis on social and cultural values, presents new and unexpected challenges for government, policy makers, businesses and the broader community.

Already part of New Zealand's economic and social life, Digital Technologies have the potential to play an increasingly important role in how all this plays out.

A REFOCUSSED INDUSTRY POLICY

There is no pre-determined solution for how to best manage the change, as it unfolds.

What is clear, however, is that increasing complexity and the dynamic nature of our economy demands greater reliance on collaborative processes, as a means of staying abreast of the transition and co-ordinating how policies and levers can achieve balanced outcomes. It is important, for example, the economic and social transformation give renewed emphasis to community wellbeing, meaningful work and a sense of people and place, without losing sight of the continued need for economic efficiency and a competitive trading sector.

Industry policy is a means by which the Government can shape the direction of economic development in a way that contributes to the wellbeing of New Zealanders. The government is taking a partnership-led approach that builds a strong evidence base for action, uses specific sector strategies and roadmaps, leverages international connections, and provides clear and consistent signals on the direction of travel.[1]

This commitment includes developing an Industry Transformation Plan (ITP) for Digital Technologies, Agritech, Construction, Advanced Manufacturing, Food and Beverage, Tourism, and Forestry and Wood Processing.

An ITP is a sector-based development plan, jointly produced between government, industry, workers, academia and Māori, as a Te Tiriti partner. The parties consider all the key elements of an industry ecosystem (e.g. innovation, skills, investment) before agreeing a vision and a set of supporting actions. To enhance its durability and relevance, ITPs are designed to evolve over time, their long-term focus helping New Zealand adapt to future work challenges.[2]

DEFINING THE SECTOR

Measurement of the digital economy is still maturing across OECD countries. Given this, there is no commonly agreed definition of the "tech sector". MBIE and NZTech agreed to adopt the following definition of the Digital Technologies sector:[3]

1 www.mbie.govt.nz/dmsdocument/5949-refocusing-our-approach-to-industry-policy-proactiverelease-pdf

2 The future of work is being shaped by four broad global megatrends: technology change, demographic change, globalisation and climate change. These global trends create both risks and opportunities for New Zealand. www.mbie.govt.nz/business-and-employment/employment-and-skills/future-of-work-tripartite-forum/

3 It is important to note that the definition adopted for the ITP does not exclude multinational tech firms who sell IT services and software in New Zealand. International firms play important roles in the success of the local sector, providing global cloud networks, global e-commerce platforms and international innovations.

A DIGITAL TECHNOLOGY BUSINESS IS A BUSINESS WHOSE PRIMARY PURPOSE IS TO BOTH CREATE AND SELL DIGITAL TECHNOLOGY PRODUCTS, SERVICES OR SOLUTIONS.

Digital Technologies is part of a broader grouping of industries that includes telecommunications and certain manufactured products. For data purposes in the ITP, the sector is defined as a collection of statistical sub-sectors: data processing service, computer system design and software publishing.[4]

This ITP is therefore focusing on the vertical measurement, the sector itself – and not the application of digital technologies across the economy.

The Digital Technologies sector is significant. Based on statistical data, its annual value add is over $6 billion, while the government expects to spend more than $7 billion on ICT and digital services over the next five years.

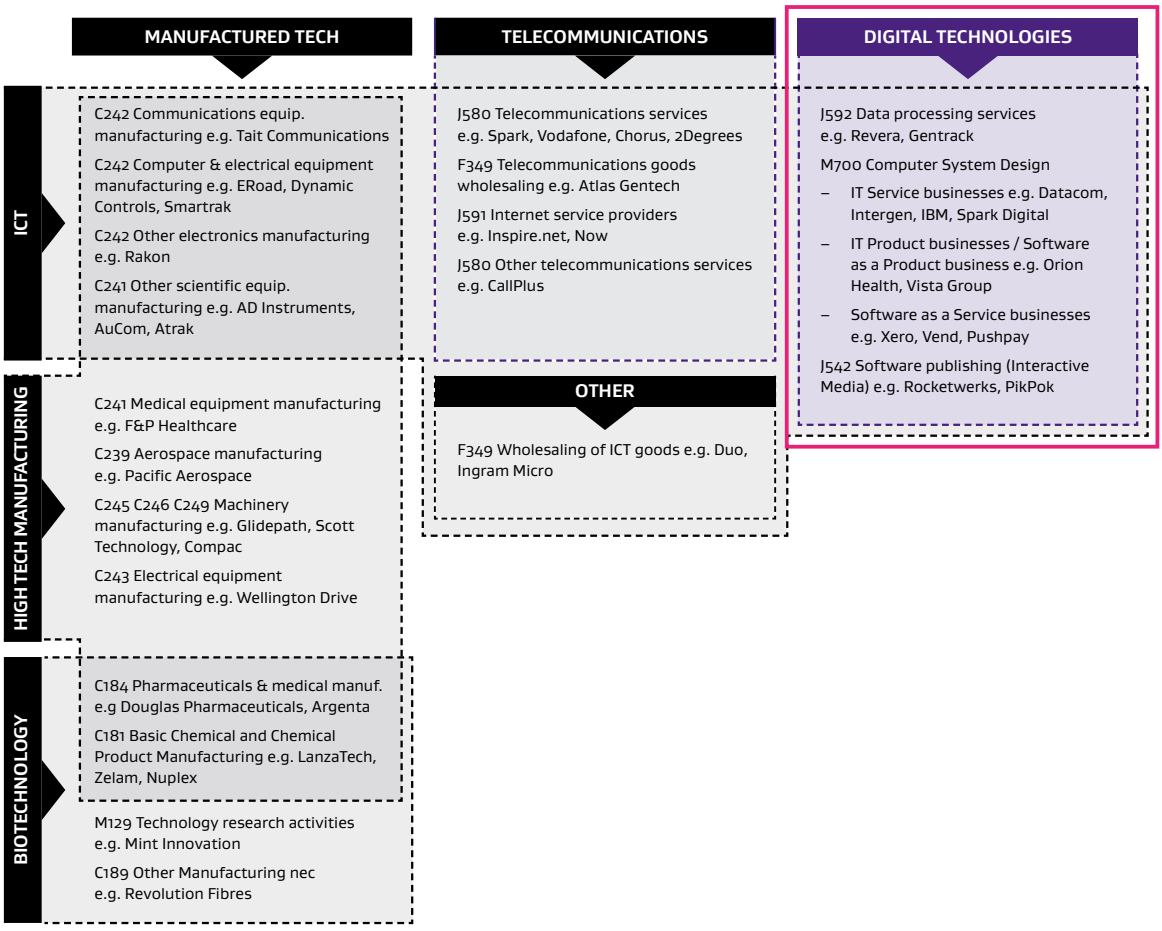
The historical data and projections used in this draft ITP will be refined and updated for the final ITP.

In recognition of the importance of the digital economy and how it fuels innovation and enables change, the government has begun to engage on a Digital Strategy for Aotearoa, based on three pillars: mahi tika (trust), mahi tahi (inclusion) and mahi ake (growth).[5]

This draft ITP is a key initiative in the Growth pillar.

Work on the Digital Strategy for Aotearoa will also include a focus on how we can improve our measurement of the digital economy.

Statistical Definition of Sector



4 Stats NZ is working on the definition of the sector and the development of appropriate metrics for assessing the performance of the ITP over time.

5 The discussion document for a Digital Strategy for Aotearoa can be found at www.digital.govt.nz/Aotearoa

THE ITP PROCESS

The ITP is a vehicle to bring together industry, with its knowledge, drive and understanding of the Digital Technologies ecosystem, and government, who is responsible for broad economic settings. It is a living document that combines a top-down view of the emerging sector, as reflected in its vision, and a bottom-up work programme based on evidence and business insights.

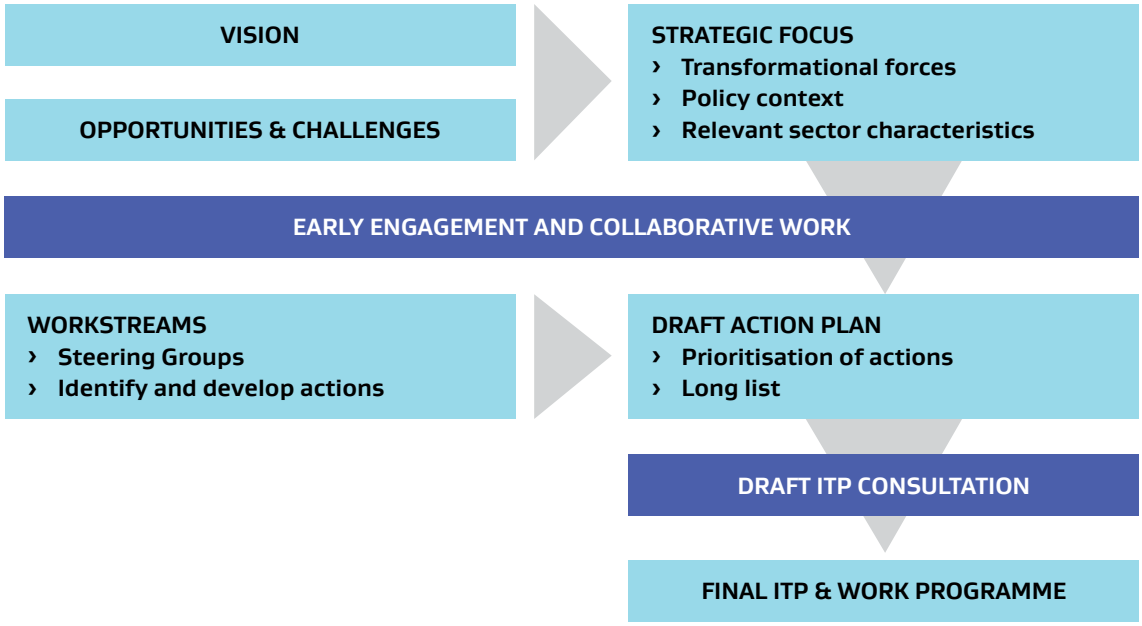
Various workstreams and steering groups, supported by industry bodies and government officials, were set up to identify and develop actions and initiatives for the Digital Technologies sector.

This advice has now been distilled into a longlist Action Plan over different time horizons for this draft ITP. We have also formed a view on which actions are priorities, based on the greatest potential to contribute – either directly or indirectly – to the long-term performance of the sector and its transformative role in the economy. This initial assessment will be reviewed prior to the release of a final ITP.

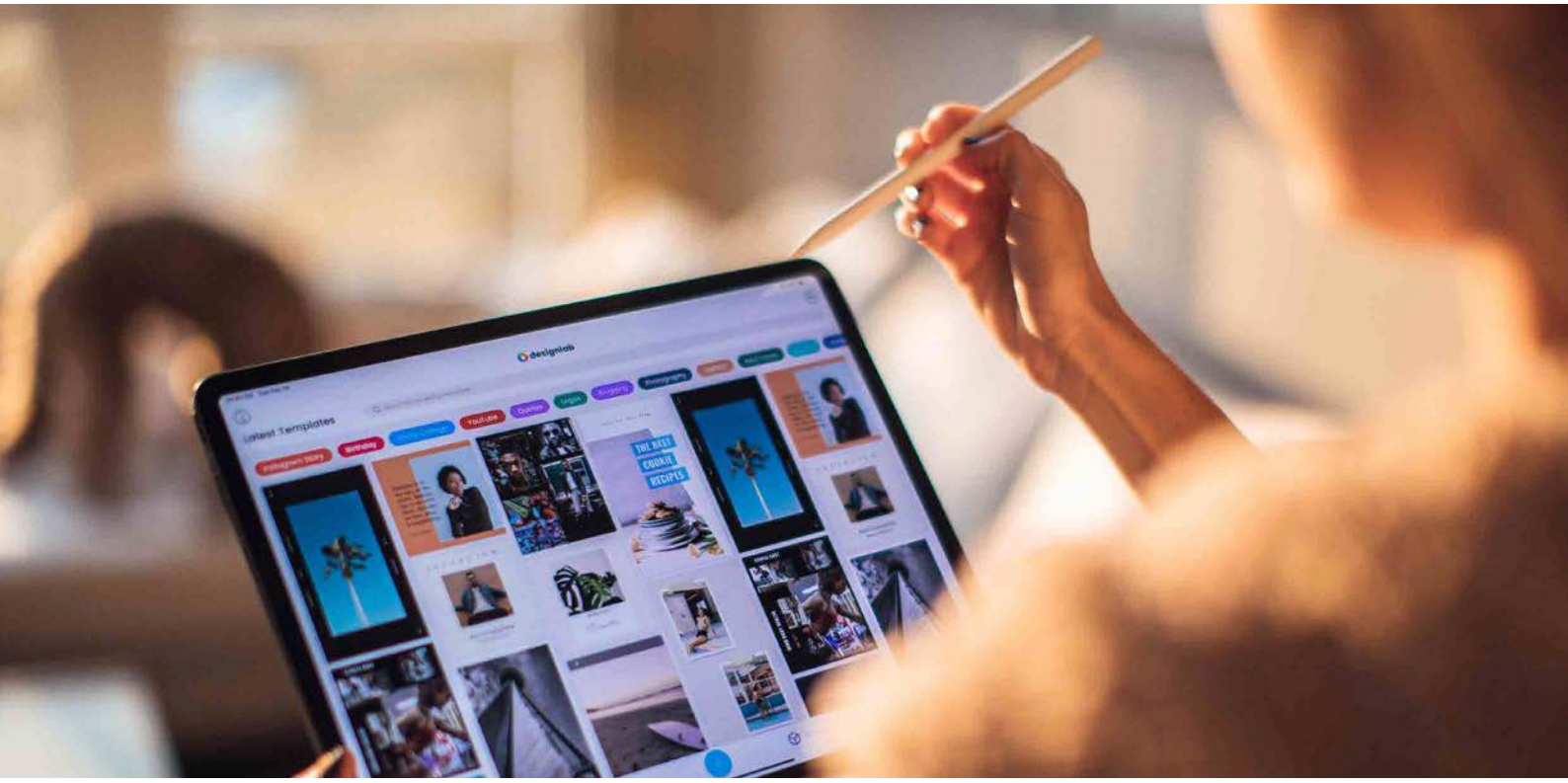
The ITP will evolve over time into an integrated, single point of reference for the sector and other stakeholders. Co-owned by industry and the Ministry of Business, Innovation and Employment (MBIE), as the lead government agency, the document will be supported by a governance structure that provides appropriate transparency and ensures co-ordination between industry and a number of government entities, including MBIE, New Zealand Trade Enterprise, Callaghan Innovation and the Ministry of Education.[6] The ITP will also include monitoring frameworks for individual initiatives to ensure impact can be assessed over time.

The Digital Technologies ITP will stay connected to the other ITPs, to benefit from the insights they provide and cross-cutting opportunities.

Overview of the ITP Process



6 Though the timeframe for ITPs is generally out to 2050, we believe a shorter, 10-year period to 2032 is more appropriate for the first Digital Technologies ITP.



LAYOUT

The draft ITP has three sections:

- **Overview** – discussion on the vision and the high-level opportunities and challenges for the sector, the reasoning behind our strategic framing of the ITP and a snap-shot of proposed priority actions
- **Sector Analysis** – additional information on the sector and the key workstream issues identified through the engagement process
- **Draft Action Plan** – details on the actions proposed under each workstream and cross-cutting issues.

NEXT STEPS

Publication of the final ITP will be timed to reflect the outcomes of the 2022-23 Budget process.

The purpose of this document, the draft ITP, is to provide all stakeholders with an opportunity to comment on a set of possible actions and initiatives. None of its content should therefore be considered government policy.

While feedback and suggestions on all aspects of the ITP are encouraged, we are particularly interested in:

- views on the strategic framing of the draft ITP
- the potential for the SaaS and Interactive Media sub-sectors to lead sector growth with a significant increase in high-quality jobs and export revenue over the next 10 years
- whether the draft Action Plan is targeted at the right areas and is of sufficient scale to address the opportunities and challenges ahead
- any further evidence and justification that supports the funding of initiatives for the sector.

A relatively short consultation period is considered appropriate, given the extent of engagement already conducted. In addition to our continued targeted engagement, stakeholders are invited to send written responses on the draft Digital Technologies ITP to industrytransformationplans@mbie.govt.nz. This feedback channel will remain open until 31 March 2022.

In the meantime, the sector, MBIE and other agencies will continue to progress key projects and complete the preparatory work that will be needed to successfully implement the final ITP.

OVERVIEW

From early companies such as Datacom, Orion Health and Weta Digital, to newcomers like Sharesies and Rocketwerkz, New Zealand's Digital Technologies sector is dynamic and internationally connected.

It is estimated Digital Technologies contributed $6.6 billion to the New Zealand economy in 2019.[7]

The value add has increased at an annual compound rate of 10.1 per cent since 2015. This is greater than the overall economy, which experienced 6.3 per cent growth over the same period.

Employment in the sector is trending upward, and at a rate faster than the national average. Compound annual employment growth, from 2015-2020 was 4.5 per cent. The national average over this period was 2.4 per cent.

The 38,100 people employed in the sector in 2020 work mainly in Auckland, Wellington, and Christchurch. Digital firms in urban centres also represent higher shares of their respective labour markets. Enterprise numbers have been increasing for the Digital Technologies sector at a rate of 3.3 per cent annually from 2015-2020. This is also higher than the national average of 1.9 per cent.

Fuel50

Fuel50 is an AI-driven New Zealand company that helps clients create career pathways within their organization that match to the wants and needs of their people.

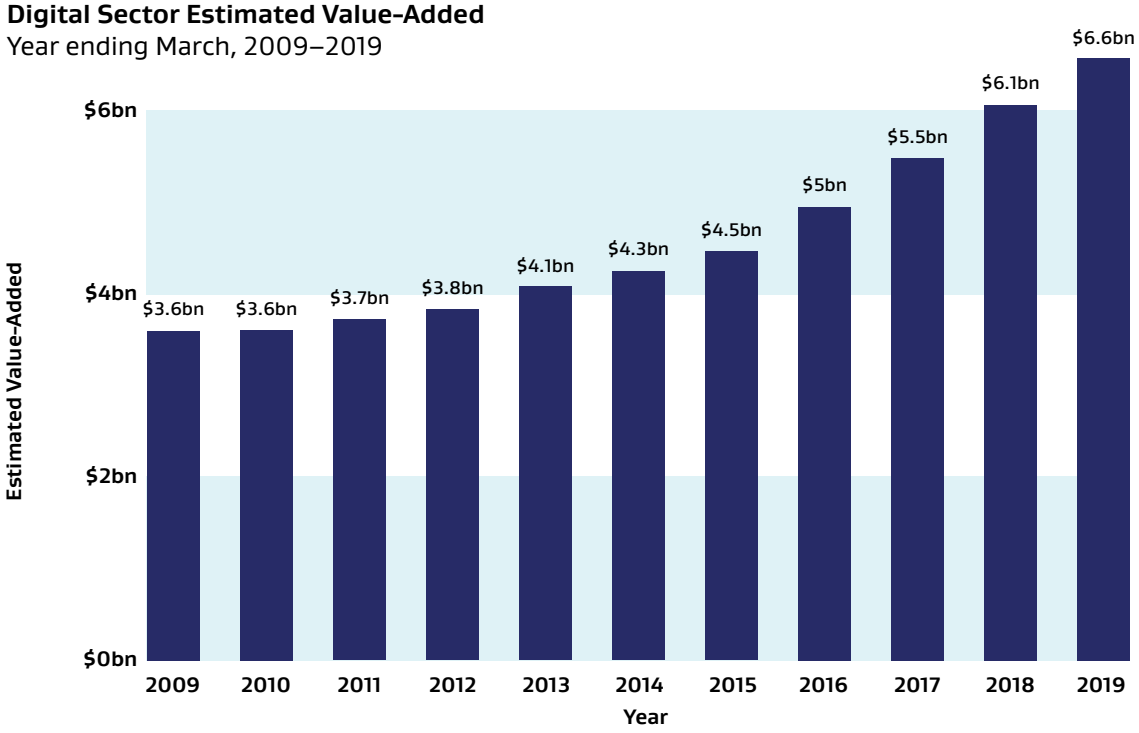
In 2016, after local development of a Career Pathing product that provides a unique way of improving HR programmes for large companies, Fuel50 achieved strong success in the Australian market. With backing from NZTE, Co-founder and Co-CEO Anne Fulton established a base to navigate the size and complexity of the American market. A number of Fortune 500 companies are now clients of Fuel50.

Fuel50 is currently expanding operations in the United Kingdom and Europe, following additional International Growth Fund support from NZTE.

Total revenue for Fuel50 has grown from $700,000 in 2015 to $7 million in 2020. It currently employs around 60 people. As with other firms in the Digital Technologies sector, COVID-19 has led to increased interest in its business products.

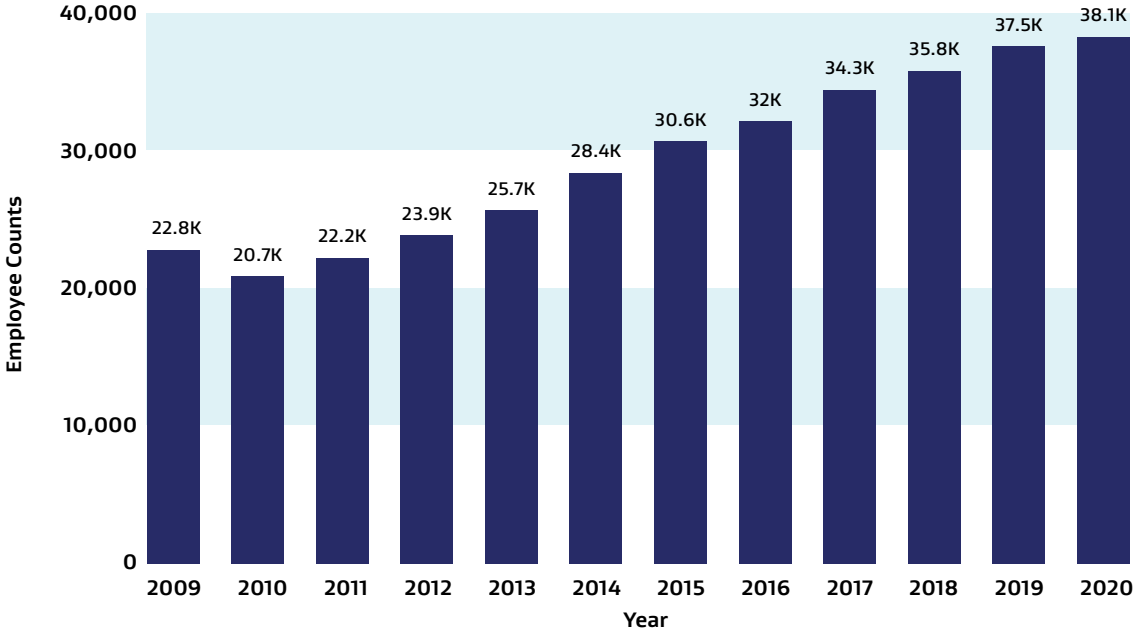
7 This estimate is based on value-added which is a proxy for nominal GDP. The economic contribution was estimated using data from Stats NZ and the Annual Enterprise Survey. The $11 billion estimate used in the Digital Strategy Aotearoa includes ICT. Data will be updated as part of the work on developing an improved understanding of the sector.

Digital Sector Estimated Value-Added
Year ending March, 2009–2019



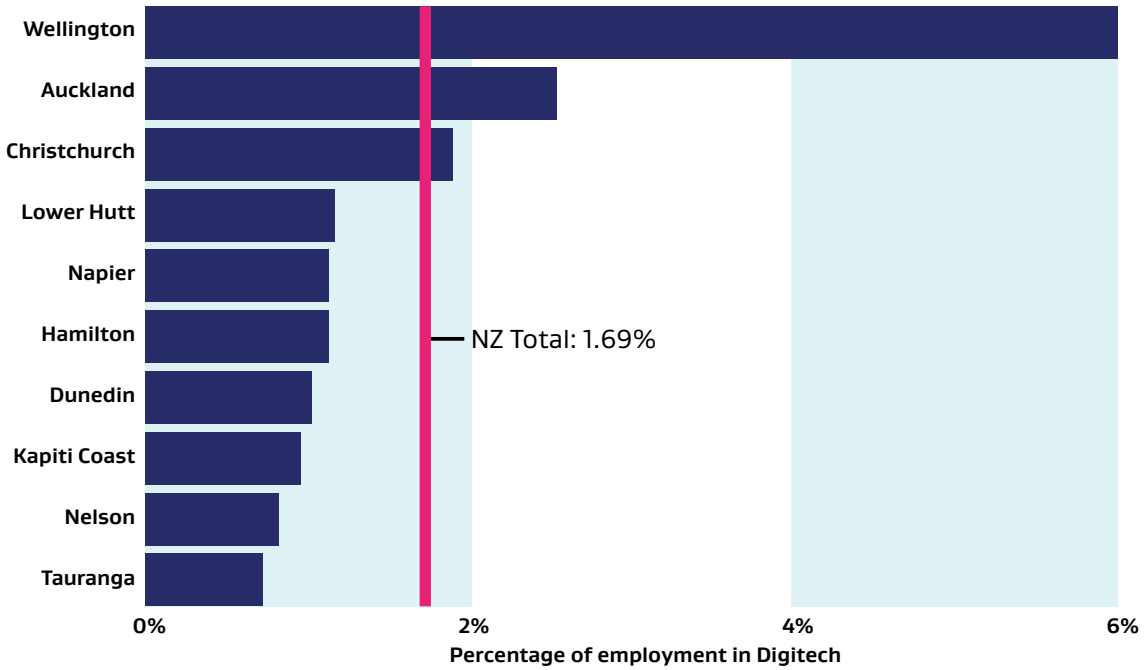
Source: Stats NZ, Annual Enterprise Survey, 2019

Digital Sector Employee Counts
2009–2020

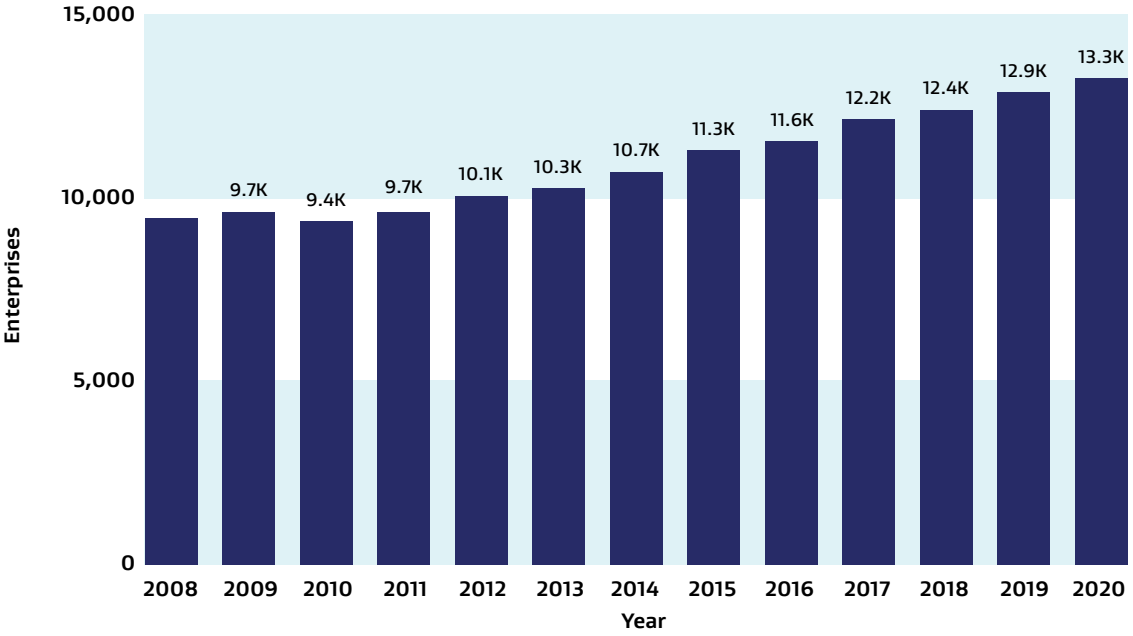


Source: Stats NZ, Business Demography Statistics 2020.

Proportion of employment in Digital firms
by Territorial Authority: Top 10, 2020



Digital Sector Enterprise Counts
2009–2020



Source: Stats NZ, Business Demography Statistics 2020.
Note that Digital firms are not mutually exclusive of other firm categories.

OUTCOMES OF EARLY ENGAGEMENT

The draft ITP is the product of a substantial collaborative process (see box below).

Early engagement began with regional consultations in late-2019 and involved a number of workshops and seminars, which confirmed the ITP needed a structure based on the key areas of work. Several workstreams were then identified.

Early engagement also produced the following vision for the Digital Technologies sector:

> **THE WORLD LOOKS TO AOTEAROA NEW ZEALAND AS A LEADER IN ETHICAL, INNOVATIVE, INCLUSIVE AND SUSTAINABLE DIGITAL TECHNOLOGIES.**
>
> **THESE TECHNOLOGIES ENABLE OUR ECONOMY TO PROSPER, HELP OUR BUSINESSES TO GROW STRONGER AND COMPETE INTERNATIONALLY, AND CONTRIBUTE TO THE WELLBEING OF ALL NEW ZEALANDERS.**

Industry engagement also highlighted a number of opportunities and challenges for the sector to be taken into account when developing actions and initiatives for the ITP.

Workstream Engagement

Skills – a steering group, led by IT Professionals, sought input from large and small digital technology companies, from senior executives, HR professionals and digital workers. Feedback was also provided by tertiary education providers, work experience and internship providers, recruitment firms, industry bodies, NGOs and a number of government agencies. This input came from a series of roadshow events, online workshops, surveys, direct interviews and a series of hui.

Exports – over 70 interviews were conducted with local and international entrepreneurs and executives to gain advice on the potential of areas within the Digital Technologies sector capable of generating export revenue and what would be required to build a community of support.

Māori – over 20 structured interviews were held with stakeholders on how the ITP could assist Māori.

Data – 10 stakeholder interviews were undertaken and a discussion paper produced to better understand the role of data in the sector transformation process.

Artificial Intelligence – extensive consultation occurred on developing an AI strategy and centre, with the steering group engaging with AI forum members, universities (e.g. Waikato University, University of Otago) and overseas experts, including the World Economic Forum.

Government – a steering group conducted a number of workshops and discussions with procurement stakeholders.

Tech Story – development of a story for the sector involved stakeholder interviews with around 80 business leaders, founders, senior executives and influencers, with a further 40 international interviews. NZTech also facilitated a number of stakeholder workshops, drawing on the feedback provided by over 300 respondents to an industry survey.

Key opportunities	Key challenges
› The sector can capitalise on proven export performance and strong year-on-year growth, which is largely unconstrained by natural resource limits or economic downturns › New Zealand demonstrates a comparative advantage in IP development and creative design › Need to fully exploit New Zealand's global reputation for innovative digital solutions and ethical application of technologies › New jobs will pay, on average, twice the median New Zealand wage › A people-based industry means a growing sector presents an opportunity to build a more diverse workforce, including for Māori and Pacific Peoples › Consuming approximately 30 per cent of sector output, improvements in the government procurement process would be a significant stimulus to the sector › Presence of large data centres (e.g. Microsoft and AWS announced, DataGrid proposed) will further facilitate cloud-based technologies and local storage of data › Because exports are "weightless", growth in the sector does not compromise our climate change objectives › While there are large clusters in our cities, digital technology firms are present right across New Zealand, allowing for the potential to create new regional jobs and businesses	› Strong growth within the sector, and other sectors impacted by Digital Technologies, increases demand for digital skills, making it difficult to acquire suitably experienced and qualified talent › Industry believes immigration settings are not aligned to sector needs › Global perceptions of New Zealand are dominated by natural landscapes and agriculture, with relatively low awareness of our innovation and technology capabilities › New Zealand does not generally take a planned or proactive approach to emerging technologies, which risks a slow uptake and greater reliance on global solutions › An industry culture that does not always promote a safe and welcoming work environment, is contributing to under-representation of Māori, Pacific and women › Industry believes government procurement systems hinder innovation and collaboration › Pathways into digital careers are difficult to navigate, and while Digital Technologies is now part of the school curriculum, uptake is lower than hoped, with many educators not yet well placed to deliver it › Open data is limited, while there has been little action to drive the critical importance of data to underpin transformational opportunities

STRATEGIC FRAMING

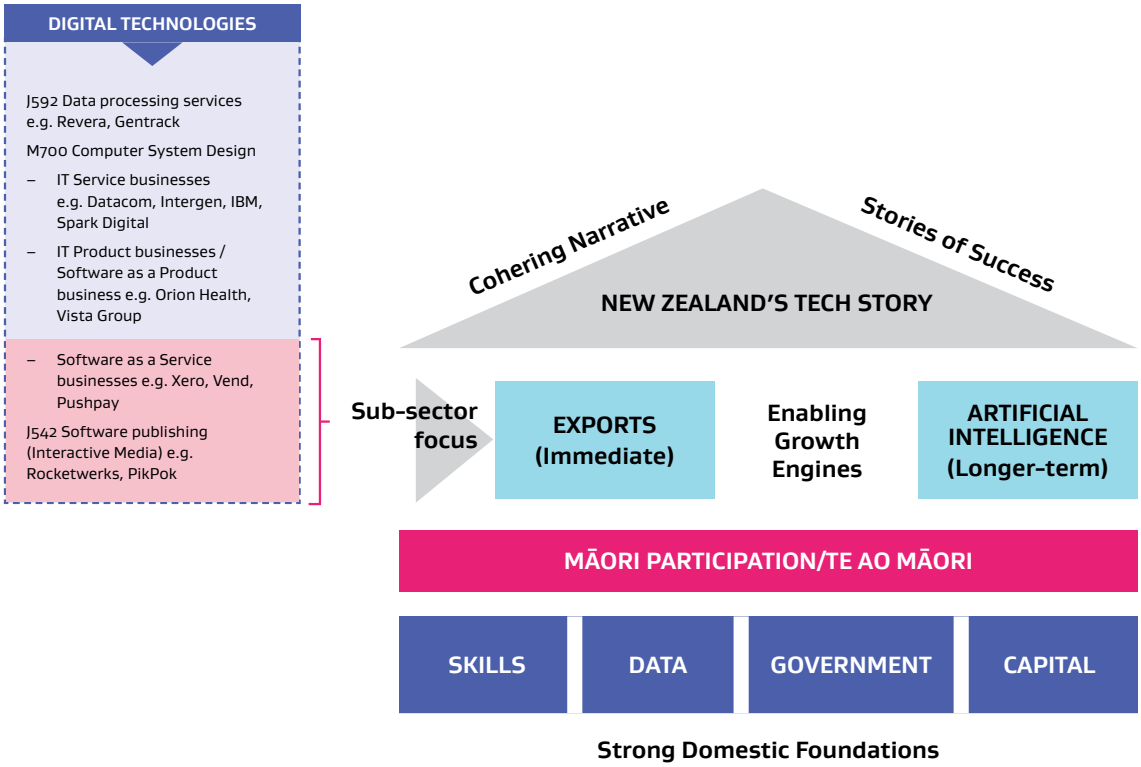
The Digital Technologies sector has a natural alignment with government plans to make the economy not only more productive, sustainable and inclusive, but also more diversified, resilient and knowledge intensive. The transformation story, however, is not a conventional one.

The sector is already highly dynamic, with strong organic growth. The use of cloud-based services, 5G, Internet of Things, blockchain and Artificial Intelligence (AI) have maintained their growth trajectory despite the disruptions and uncertainties arising from COVID-19. It is a source of high-value jobs and its product is "weightless", in the sense that output can often be scaled up without the use of additional natural resources. With the key capital input being people rather than physical assets, the sector, unlike many industries in the "old economy", does not face the same challenges of having to manage the transition away from a substantial industrial base. Being relatively agile, the sector should be well positioned to initiate the type of cultural change that is needed to promote wellbeing, diversity and inclusion.

In a broader sense, the sector is an enabler of economic activity and improved productivity. Though often a disruptive force itself, Digital Technologies can also promote resilience, assist with emissions reductions and help to manage the impact of other forces of change.

However, there are existing barriers hindering the sector to reach its full potential in the context of a global explosion of digital transformation. These include steady and predictable access to skills that will support businesses to grow and

Strategic Framing of the ITP



supply into global markets; how New Zealand businesses can supply their services into the government sector which is the biggest single purchaser of ICT products and services in New Zealand; how to ensure a more diverse representation of New Zealanders is welcomed into the sector to succeed; and provision of advice and guidance that is applicable to a digital technologies business looking to expand.

Based on the comparative advantages of the sector, trends and feedback from stakeholders during early engagement, the ITP and its workstreams are framed around three priorities: accelerated growth, strong foundations and Māori participation.

Accelerated Growth

While Digital Technologies are expected to continue to grow, two areas of the sector have significant potential to accelerate growth to the benefit of the sector as a whole.

Increased exports will be critical to New Zealand's recovery from the pandemic, while the recent Productivity Commission report on frontier firms highlights the link between international trade and improved productivity.[8] Several Digital Technologies firms already have a strong track record of international success, while start-ups in the sector are able to go global "overnight" with the right product.

The highly scalable and weightless nature of SaaS and elements of Interactive Media makes these cloud-based sub-sectors a focal point of the draft ITP. Their potential to generate accelerated growth can translate into an immediate increase in high-value jobs and export revenue.

Over the longer term, the ITP will also ensure AI is well placed to become a major driver of growth.

It's been estimated that AI could underpin $US15.7 trillion of global economic growth by 2030.[9]

While New Zealand's AI ecosystem is still immature, it continues to show strong growth, with the AI Forum now having over 190 member organisations. Research on AI readiness placed New Zealand in the "economies with strong

8 www.productivity.govt.nz/inquiries/frontier-firms/
9 www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html

comparative strengths" group, meaning we are well positioned to maximise our strengths and make the right strategic choices to grow AI.[10]

Cloud-based software export opportunity

SaaS and some Interactive Media companies create and sell software services that can be accessed anywhere and anytime over the internet. The software is hosted in the cloud, with users paying a subscription to access the digital tools or play games.

The cloud software industry is not your typical export growth opportunity. Able to scale up rapidly without substantial capital investment in hardware or raw materials, it is effectively invisible and weightless. It is a multi-billion dollar sector built around a collection of creative people with a keyboard and an internet connection, rather than an industry with a physical output (e.g. milk powder, timber) or one that generates noticeable economic activity (e.g. tourism).

Cloud software is also subject to "first mover" advantage. History suggests the window of opportunity for SaaS and Interactive Media companies to secure market share will be relatively short. Once established in a niche, firms are able to respond quickly to customer demand and expectations. These attributes are resulting in an intensifying global competition for talent and existing businesses.

New Zealand is well placed to capitalise on the situation and, in the process, ramp up export revenue and generate high-quality jobs. We have a number of local businesses who know what success requires, and there is an opportunity to share and grow this capability across more businesses.

Strong Foundations

It is important the ITP include actions and initiatives that also ensure strong foundations for the domestic industry. This includes skills, data, government and capital.[11]

Skills is a primary focus of the ITP. The required transformation will not be possible unless the skills pipelines, industry culture, talent investment and other skills-related challenges are addressed.

Māori

Given the increasing role of digital across the economy and society, it is vital Māori are empowered to be active participants in the sector, with government having a significant role as a Te Tiriti partner. The sector needs to do more to welcome and attract participation by Māori and other demographics. A te ao Māori approach, drawing on a diversity of thought, indigenous values, ways of being and a deep-seated entrepreneurial mind-set, can also be a valuable differentiator for New Zealand in global markets.

The actions identified in this draft ITP are intended to build Māori participation in the sector over time, while recognising the Waitangi Tribunal principle that Māori have the option to "walk in two worlds".

Our Tech Story

To ensure cohesion across the sector, the ITP is supporting work that promotes a consistent international message and encourages a common purpose at home. The sector will be able to draw on and contribute to a new shared story – our Tech Story – that takes New Zealand technology and innovation capabilities to the world.

ITP ACTION PLAN

Achieving accelerated growth, improved foundations and greater Māori participation will result in a higher level of growth, productivity and innovation for the entire sector. This will foster change across the industry. This will, in turn, have spill-over benefits to the wider

10 www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-modeling-the-impact-of-ai-on-the-world-economy

11 The ITP process will take a "watching brief" on the issue of capital. While early discussions with industry indicated access to capital was an issue, more recent feedback suggests this may not be a general concern. Targeted support is being considered with the proposed Interactive Industry Development Programme. Though there is no dedicated workstream for Capital, the governance process put in place for the ITP will ensure a joined-up approach with the wider work programme on enhancing New Zealand's capital markets.

New Zealand economy, given the enabling characteristics of Digital Technologies.

Each workstream has developed actions designed to promote a transformational shift within the sector. A longlist Action Plan is discussed in Section 3 and is tabulated in Annex 1.

A shorter list of current priorities has also been prepared. Some of these actions and initiatives are shown in the diagram at the end of this section. It includes an indication of the relative size of the task and whether it is targeted at growth or foundation-building.

A final set of actions and initiatives will be included in the final ITP, with implementation co-ordinated across industry and government.

RELATED WORK PROGRAMMES

Implementation of the ITP will have regard for numerous other work programmes.

Other ITPs

A final Agritech ITP was launched in July 2020, with a vision to develop a world-leading agritech ecosystem in New Zealand.[12] Implementation of agreed deliverables is underway, based on continued strong engagement from industry partners.

Many agritech solutions build on Digital Technologies, and the Agritech ITP is addressing barriers to their development and uptake, such as through its Data Interoperability and Regulations workstream. There are other interdependencies between the two ITPs, such as ensuring the sectors have the skills and workforce required to develop and use the technologies that they develop.

An Advanced Manufacturing ITP is currently under development.

The Steering Group, led by the tri-partite co-chairs, has developed a draft vision for the sector and has put in place working groups for each priority area: skills, innovation and investment, sustainability, and global connectivity. The next key phase of work will see these working groups support the Steering Group to identify long-term opportunities and barriers facing the sector, and what initiatives might be needed to help drive transformation.

The Construction Sector Accord seeks to address long-term challenges in the construction sector by building skills development, clarifying regulations, improving work pipelines and simplifying contracting.[13] It has a dedicated workstream on procurement and risk. The current Transformation Plan comes to an end in June 2022. Work is underway consulting with industry, agencies, and other ITPs on a second generation ITP.

Research, Science and Innovation

The Research Science and Innovation (RSI) system supports the Digital Technologies sector by providing access to advanced digital knowledge and skills, and opportunities to grow international connections. Connections between researchers and innovators and the digital sector provide opportunities for new ideas and technologies to be incorporated into novel digital products and services.

Government also provides direct support for RSI activities, such as via the Research and Development Tax Incentive, and various science funding mechanisms. Examples of relevant existing initiatives include the Strategic Science Investment Fund data science platform[14] and work to attract research intensive companies to New Zealand, including digital companies, such as the space and data analytics company Maxar Technologies.[15]

The Future Pathways Green Paper - Te Ara Paerangi - provides an opportunity to consider priorities for government investment in science

12 See www.mbie.govt.nz/dmsdocument/11572-growing-innovative-industries-in-new-zealand-agritech-industry-transformation-plan-july-2020-pdf

13 www.constructionaccord.nz/

14 Through the Strategic Science Investment Fund, government invested $49 M over seven years in three research programmes: www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/strategic-science-investment-fund/ssif-funded-programmes/te-hiku-media/; www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/strategic-science-investment-fund/ssif-funded-programmes/the-research-trust-of-victoria-university-of-wellington/; www.mbie.govt.nz/science-and-technology/science-and-innovation/funding-information-and-opportunities/investment-funds/strategic-science-investment-fund/ssif-funded-programmes/university-of-waikato/

15 www.mbie.govt.nz/science-and-technology/science-and-innovation/international-opportunities/new-zealand-r-d/innovative-partnerships/

and the RSI workforce, including how the science system supports the Digital Technologies sector.

Emissions Reduction Plan

The Emissions Reduction Plan will set out how New Zealand will meet its first emissions budget (2022-2025) and set the path towards meeting our long-term climate targets. It is a key step in the country's transition to a low emissions future. Digital technologies will play a key role in this transition.

Regional Strategies

A number of regions are putting in place strategies to support the growth or emergence of a vibrant regional Digital Technologies sector. It is important this work be aligned and co-ordinated with the ITP Action Plan.

Auckland

Auckland Unlimited has recognised tech and digital – including screen, creative tech and Interactive Media – as two of Auckland's three industries that will be economic and developmental drivers for the future. It is developing initiatives that foster cross-pollination between established and emerging technologies.

The industry-led Go Hard on Tech strategy is formed around the vision of Tāmaki Makaurau becoming a global epicentre of innovation, technology, and talent, embedded in tikanga Māori. It proposes three Kaupapa:

- **Manaakitanga** – creating a tech ecosystem that is a beacon for talent
- **Kaitiakitanga** – developing a tech sector that delivers a sustainable and equitable future for all
- **Kotahitanga** – growing Tāmaki Makaurau as a globally, connected, inclusive and collaborative tech city.

An industry group, and a government task force comprising MBIE, NZTE, Callaghan Innovation and Auckland Unlimited, is working collaboratively to pilot and implement a range of programmes that will deliver co-ordinated growth within the Digital Technologies sector.

Christchurch

Christchurch is progressing work on strategic strength sectors called Supernodes. These include high tech services and health tech, areas of activity that link back on the region's existing strengths and capabilities, and the existence of strong global growth opportunities. They are supported by progressive ecosystems connecting enterprise, education and government. Christchurch has catalysed strong ecosystems around each Supernode, aligning and connecting students, iwi, education providers, industry, and government to accelerate opportunities and growth.

Seequent

Seequent originated from Christchurch-based R&D firm ARANZ (Applied Research Associates NZ) that had developed 3D medical imaging technology. This technology was first applied to geoscience data in 2004 and in 2009 ARANZ was split into two, forming ARANZ Medical and ARANZ Geo, which was renamed Seequent in 2017.

In just over a decade, Seequent now has over 400 staff globally, with over 170 located in their Christchurch headquarters. The firm was recently acquired by Bentley Systems, a Nasdaq-listed engineering software business, for over $1 billion. The software engineering and product development teams will remain based in New Zealand.

Queenstown Lakes District

The Government has established a Queenstown Economic Transformation and Resilience Fund to support new industry development in the district and surrounding areas, based on the themes of technology, energy and film/screen. Digital Technologies will be relevant for these three areas of the fund.

Other initiatives with links to the draft ITP include:

- Queenstown Machine Learning Institute – expected to be launched in early-2022, a Level 5 Certificate will take students with no prior experience to a stage where they have the skills to be industry-ready upon graduation
- Queenstown Research & Innovation Centre – aims to drive the commercialisation and internationalisation of research output,

and assist firms and sectors to adopt productivity-enhancing technologies and practices. The government has provided $22.5 million in loans to assist with its development

- Queenstown Lakes Technology Taskforce – brings together senior figures from industry, academia, iwi, local and central government, and investors, to develop capability and create jobs across the info-tech, clean-tech and food-tech sectors.

Dunedin

The New Zealand Centre of Digital Excellence (CODE) is a Dunedin-based hub designed to progress the expansion of our growing online games development industry.

It aims to deliver new industry skills development and training pathways, national and global partnerships that grow digital capacity and knowledge, contestable funding for product development, higher growth in games sector employment, more diversity in the sector – particularly for youth, Māori and women – and growth in the number of gaming businesses and experts in Dunedin.

Waikato

The vision of the Digital Waikato 2025 strategy is a digitally connected region with a robust framework for supporting a collaborative approach to building digital capacity that enables business productivity, enhances community well-being and fosters ongoing innovation.

The strategy includes five workstreams: close the digital divide; build digital skills and capacity; digital transformation of small businesses; support regional smart cities initiatives; and foster regional technology innovation.

The Cyber Security Strategy

Cyber security is fundamental to the ability of Digital Technologies firms (and indeed all firms) to do business and protect themselves and their customers from cybercrime activity, and for individuals to feel confident and secure in maximising the opportunities digital transformation provides.

As the benefits of connectedness continue to increase, our dependence on a free, open and secure internet and trusted underlying infrastructure and technology also increases. And whilst the evolution of technology allows us to innovate and find efficiencies, it may also expose us to new risks. Cyber security threats grow ever more sophisticated and we have seen cyber attacks against New Zealand organisations increasing in number and impact. In this context, the role of cyber security will become all the more crucial in protecting New Zealand's economic and security interests.

At the same time, the New Zealand cyber security industry itself is a dynamic and innovative area, with significant scope for growth, and it holds potential to bolster the nation's digital transformation.

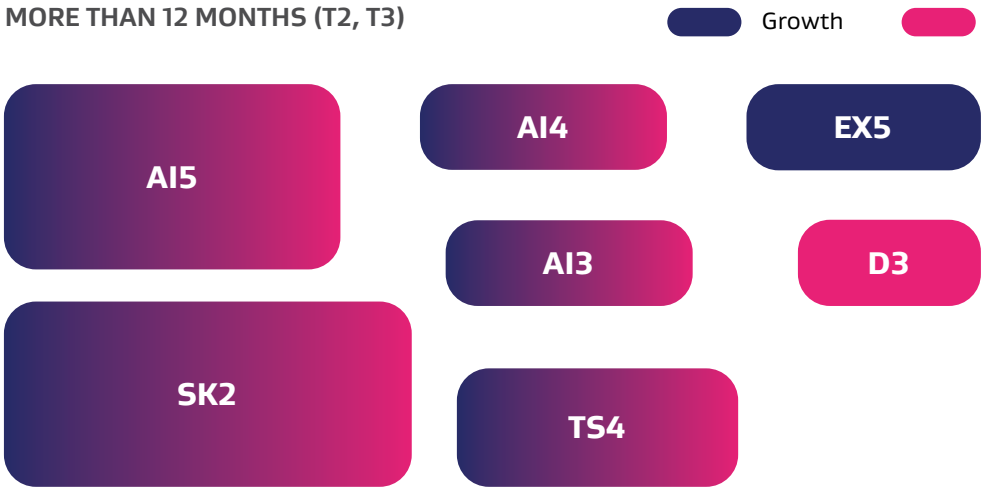
New Zealand's approach to cyber security is underpinned by the Cyber Security Strategy 2019[16], which sets out five priority areas, namely: cyber security awareness, resilience, a strong and capable cyber security workforce and ecosystem, proactive efforts to tackle cybercrime, and international engagement. Given the inseparable nature of digital transformation and cyber security, the ongoing implementation of the Cyber Security Strategy will be closely aligned and co-ordinated with the Digital Technologies ITP.

16 See dpmc.govt.nz/publications/new-zealands-cyber-security-strategy-2019

Possible Actions and Initiatives

CURRENT AND NEXT 12 MONTHS (T1)

MORE THAN 12 MONTHS (T2, T3)



SK 1 Skills Plan – Implementation plan and fund
SK 2 Skills Plan – Implementation
EX 1 SaaS – Establish community
EX 2 Interactive Media – Existing investment ecosystem
EX 3 SaaS – Capability, Cohesion
EX 4 Interactive Industry Development Programme
EX 5 SaaS – Develop community
M 1 Māori tech champions – Report
M 2 Māori tech champions – Implement
TS 1 Tech story – Definition and creation
TS 2 Tech Story – Scope Domestic story
TS 3 Tech Story – International activation
TS 4 Tech Story – Domestic activation
D 1 DDI Education – Implementation of pilot
D 2 DDI data trusts – Establish framework
D 3 National Digital Twin – High-level business case
AI 1 AI Strategy – Consult, finalise
AI 2 Centre for AI – Initial scoping
AI 3 AI Strategy – Implement
AI 4 Centre for AI – Develop business case
AI 5 Centre for AI – Establish
G 1 ICT Procurement Transformation Team
G 2 Broader Outcomes

SECTOR ANALYSIS

This section provides important additional background on the sector and further details on the issues raised during early engagement.

SKILLS AND TALENT DEVELOPMENT

Skilled workers are the key inputs for the Digital Technologies sector and are the backbone of its success. Digital businesses are in constant need of skills, with the median salary being around twice the national equivalent.

For many years, however, there have been concerns about available skills. *The Digital Skills for Our Digital Future* highlighted the major issues in its report from early-2021.[17]

The data from this report, along with other research, was analysed in depth through the Skills workstream of the ITP, with the Digital Skills and Talent Plan released in October 2021, based on significant industry input. The key findings of this report, which can be found at Annex 2, are reflected in this ITP and its Action Plan.

Both reports confirm a broken skills system and long-standing gaps of specific skills within the Digital Technologies sector, especially in senior specialist areas. The *mismatch* between the skills industry needs versus the skills available in New Zealand have led to an environment where graduates from digital tech courses, and other professionals with skills outside the areas of shortage, often struggle to find work. Yet the industry struggles to find people with the right skills.

Rather than developing longer and more structured pathways for upskilling existing staff, businesses have increasingly relied upon immigration to access the required skills at the required time. This has created high levels of employee turnover, as individuals actively seek new opportunities to advance within the sector.

The Digital Skills and Talent Plan calls for a rebalancing and investment at various levels, including a stronger domestic talent pipeline supplemented by immigration, to support the sustainable growth of the sector and the overall New Zealand economy.

The pipeline isn't just about increasing the numbers and skills of those entering the digital tech profession. It is also concerned with the career flow-through to the areas of greatest shortage (e.g. specialist roles).

The skills mismatch represents a huge opportunity for New Zealand to create quality jobs that pay well above the national average. Those from disrupted sectors, such as tourism and hospitality, or people uninterested or unable to gain a university qualification, may be able to be re-trained. Additionally, there are opportunities to increase the number of students aware of and interested in careers in the Digital Technologies sector and create new pathways to improve their employment readiness.

This boost to the pipeline of talent must have a focus on diversity and inclusion, with emphasis on pathways for Māori and Pacific Peoples, and also how the industry supports and welcomes people from these backgrounds. The pipeline should also ensure any new system-wide approach to retraining considers older workers (50+) and their potential to further diversity the sector.

COVID-19 has disrupted the sector's ability to bring large numbers of overseas workers into New Zealand, and while this has presented challenges, it has also reinforced the need for the sector to invest in the capacity of the domestic workforce to feed into a pipeline of talent.

17 Note the Digital Skills for Our Digital Future report uses a broader definition of the sector. Hence, the employment number of 98,583 is larger than the 38,100 figure referenced elsewhere in the Draft ITP. Also, the median salary of $92,250 is for ICT. The Productivity Commission used $105,000 for the sector, while the mean wage for computer system design, based on the 2019 Enterprise Survey, was $119,442.

Findings of Digital Skills for Our Future report

NEW ZEALAND'S DIGITAL SKILLS LANDSCAPE

Demand for digital skills is already high

114,450
people employed in the tech sector in 2019

98,583
people employed as IT professionals (across all sectors) in 2019

$92,250
national median salary for digital technology workers in 2019

4,462
new IT jobs created in 2019, growing at 4.7% CAGR over five years

4,948
new digitally skilled employees required in two years by 190 survey respondents

3,683
visas approved for IT professionals to immigrate to New Zealand in 2019

More focus needed on education, upskilling and reskilling

30%
of secondary school students took technology standards in 2019

-2%
declining numbers of students taking technology standards over the past five years

only 1,850
students moved into IT degree courses from secondary school in 2019

15,325
students were enrolled across all levels of tertiary IT courses in 2019

3,265
students graduated with computer science, IT or software engineering degrees in 2019

only 352
students were able to get internships in 2019 after 2,699 registered for the opportunity

<10%
of training budgets spent on digital technology upskilling

19%
of IT professionals changed jobs in 2019 primarily for career growth not salary growth

<200
people undertook reskilling into digital technology careers in 2019

Lack of diversity in digital technology roles starts at education

only 27%
of the IT workforce are female, starting from only 39% taking MCEA technology at school

only 4%
of the IT workforce are Māori, starting from only 14% taking NCEA technology at school

only 2.8%
of the IT workforce are Pacific peoples, starting from only 9% taking NCEA technology at school

= SKILLS MISMATCH

Given it will take several years to build this pipeline, the sector believes it is nevertheless essential the immigration settings be reviewed to ensure the right type and appropriate number of digitally skilled professionals can enter the country on a targeted basis, and at lower levels that pre-COVID.

While New Zealand borders remain closed due to COVID-19, Digital Technologies businesses who wish to have overseas workers and their family enter New Zealand, are required to make an online application to Immigration NZ for an Other Critical Worker exception.

Applicants are required to demonstrate, amongst other things:

- a salary greater than NZD $106,080 a year
- that the worker has unique experience and technical or specialist skills that are not readily available in New Zealand
- why it is not possible to re-deploy workers already in New Zealand
- what will happen to the roles if the workers are not admitted into New Zealand.

Latest figures from Immigration NZ show that 213 tech workers received an exception between June 2020 and September 2021, at a success rate of 43 per cent. Prior to COVID-19, between 3,500 and 4,500 visas per year were provided for tech workers.

Sector Feedback and Barriers to be Addressed

- There is a mismatch between the skills the industry needs and what is provided by the education system
- Immigration has been the main source of experienced talent for several years. While this allows direct access to needed skills, it has also reduced the incentive on industry to upskill New Zealanders
- With closed borders, overseas talent is currently near-impossible to secure, and it is unclear how and when this will change
- Businesses consider it costly and risky to take on interns, yet students often require access to work experience to develop
- Businesses often look for a combination of technical and soft skills. While many qualifications focus on the former and some new programmes target the latter, work experience is often the only way to develop soft skills
- The processes within the tertiary education sector to adapt to changing needs are typically slower than the pace of rapid changes in technology. Graduates are often viewed as lagging behind emerging industry requirements
- There is a particular lack of skills in emerging technologies (e.g. AI, Cyber Security and data science)
- In addition to technical skills, experienced management skills in growing and operating digital businesses at global scale are lacking in New Zealand
- Short courses or micro-credentials, which the private sector provides, can be just as important as academic degrees and offer an effective pathway for people who do not wish to undertake a degree
- Though having Digital Technologies in the school curriculum is a positive, teachers often lack the knowledge, tools and desire that is needed to have an impact
- Diversity and inclusion are significant issues for the sector, with low participation rates for Māori, Pacific Peoples and women. People from these groups note the industry does not always feel a welcoming employment choice
- Existing skills-based initiatives are often fragmented, small scale and under-funded

DATA DRIVEN INNOVATION

Data underpins innovation, while the use and analysis of data can provide better services to match customer needs, eliminate waste of resources and assist with business forecasting. It is therefore increasingly viewed as an economic asset.

Access to vast swathes of data, which is often proprietary, can be a market differentiator. Companies such as Google have developed economies of scale in data by curating large and authoritative datasets over a period of time.

Meanwhile, Netflix has capitalised on its data sources and maintained a dominant market share by exercising a sophisticated data strategy.[18]

DATA DRIVEN INNOVATION COULD EASILY DELIVER $4.5 BILLION IN ECONOMIC BENEFITS WITH HIGHER UPTAKE FROM BUSINESS AND ALSO GOVERNMENT.

18 www.forbes.com/sites/enriquedans/2020/01/15/netflix-big-data-and-playing-a-long-game-is-proving-a-winningstrategy/?sh=551094db766e. Netflix does not share data with its content providers.

A number of the businesses that were interviewed as part of the 2015 Innovation Partnership research, indicated that adoption of Data Driven Innovation (DDI) in New Zealand is around five years behind that in other leading countries, such as the United States.[19] A prominent theme was that, though New Zealand organisations have a reasonable understanding of data and its use, relatively few have embraced it as a basis for improved decision-making, at the upper management and board levels, where there remains a preference for "gut feel". Based on a recent report commissioned by the Productivity Commission, it is unlikely New Zealand businesses have made the cultural shift in the last five years.[20]

There are significant opportunities to support the growth of the Digital Technologies sector by raising awareness with other sectors and the community of data driven technologies, such as AI, 5G and Internet of Things. While the focus is on educating businesses on the value and uses of data, the greater uptake of DDI will, in turn, support the growth of the sector overall.

In addition to data awareness, it is widely acknowledged that enhanced access to and sharing of data is an economic driver, with the OECD estimating it can potentially add between 1 and 2.5 per cent to GDP.[21] Internationally, industries, cities and, in some cases, countries are developing digital twins to facilitate the sharing of data in a trusted way.

The industry has also raised the concept of New Zealand establishing a National Digital Twin (NDT) project designed to maximise the economic benefits of data. A digital twin can be described as a virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to provide insight and to aid better decision-making. Its data-driven capability delivers better, quicker and cheaper infrastructure and services.

The Committee for Digital Engineering in New Zealand, who come from a data rather than technology perspective, has provided the ITP process with advice on a NDT.[22] The Smart Cities Council is another group interested in supporting the development and sustainability of a NDT.[23]

Sector Feedback and Barriers to be Addressed

- In order to capture the benefits of DDI, more data must be made open and accessible
- There is a need for improved data literacy and education that ensures businesses know how to use it effectively and can safely and ethically derive value from it
- Data is currently undervalued, in both a financial and socio-economic sense, which means its full potential is not being realised
- The sector is supportive of the government funding ways to free up and expose more data for innovation through models such as digital twins

19 Data Driven Innovation in New Zealand outlines the economic benefits associated with the better use of data.
20 BRG Institute, New Zealand Frontier Firms: A capabilities –based perspective: August 2020.
21 OECD, (2019) *Enhancing Access to and Sharing of Data.*
22 CoDENZ includes organisations such as BECA, Kiwirail, Downer and NZTA.
23 Land Information New Zealand and other government agencies, alongside representatives from local government, academia and industry, have formed a group to discuss the potential for a National Digital Twin. The group includes Wellington City Council, University of Canterbury, and Smart Cities Council Australia New Zealand.

GOVERNMENT PROCUREMENT

The government has two key roles in the Digital Technologies sector: a provider of services to businesses and citizens and as a purchaser of ICT. The ITP focuses on the later.[24]

Government purchases approximately 30 percent of the output of the ICT sector in New Zealand.[25] Larger digital projects are delivered through All-of-Government (AoG) panels, while various smaller projects are procured directly by the relevant government agency directly. Of the 145 suppliers listed on AoG panels for the delivery of digital products and services to government, 74 per cent are New Zealand owned. Total annual AoG spend to 30 June 2020 was $577.9 million, with 57 per cent going to local firms.[26] The government is budgeted to spend $7.12 billion on digital services over the next five years, across 43 of its agencies.[27]

Government procurement policies and procedures can therefore have a significant impact on the success, or otherwise, of domestic Digital Technologies firms.

The ITP is an opportunity for government to better co-ordinate its ongoing efforts to address industry concerns by refining procurement rules, building capability and relationships. The engagement process has highlighted that more is required to streamline the current processes, provide more transparency, and develop tools and guidance in certain areas of the procurement process.

Progressive Procurement

Following a decision by Cabinet in November 2020, government agencies must increase the diversity of their suppliers, starting with Māori businesses.

A target of 5 per cent of the total number of procurement contacts for buyers (mandated government agencies) are to be awarded to Māori businesses (a Māori Authority as defined by IRD or a minimum of 50 per cent Māori ownership). A project team jointly led by Te Puni Kokiri and MBIE has been established to prototype approaches to reduce barriers for Māori businesses engaging with the government procurement process.

The policy is designed to support sustainable, long term behavioural change of government agencies and businesses.

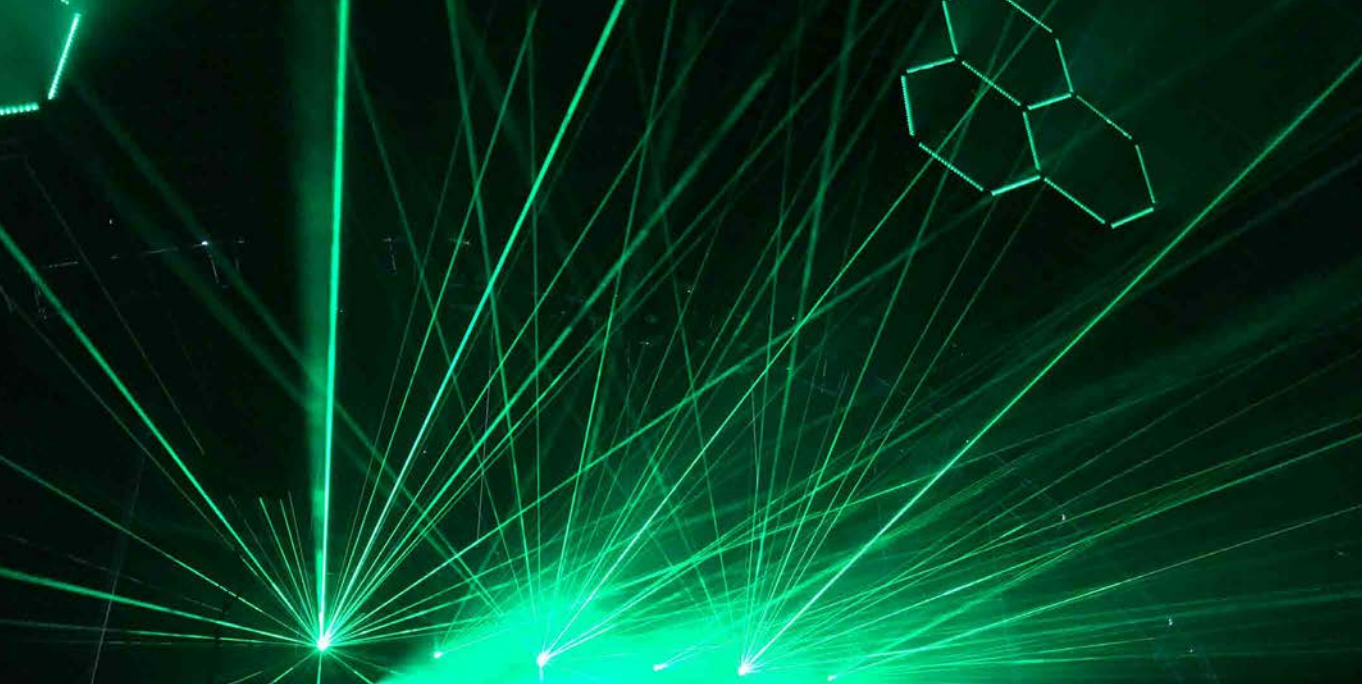
For more information, see www.tpk.govt.nz/progressiveprocurement

24 For more information on the digitalisation of government services, see Strategy for a Digital Public Service | NZ Digital government

25 International Data Corporation, 2020, New Zealand Government IT Spend.

26 This does not include expenditure on projects below the AoG threshold, which is $100,000. Further work is being conducted to determine the size and allocation of this funding.

27 DIA estimates.



Sector Feedback and Barriers to be Addressed

- Industry would like to work with government on co-designing processes and solutions
- Even though government has updated procurement rules over time, the process remains cumbersome, especially for smaller suppliers
- The procurement process is slow, expensive and onerous for companies
- The government is perceived as risk averse and lacking in the entrepreneurship and agility required for successful technology procurement
- New Zealand businesses consider it difficult to compete against large international firms
- Businesses consider the process should be more open and decisions more transparent
- Procurement could be used as a lever to support digital skills development and other identified needs, such as growth of SMEs and regional development of a Māori tech ecosystem

CAPITAL

Ensuring businesses have access to investment capital is critical for sector growth and expansion. A lack of access to finance can prevent entrepreneurs from starting up a business or growing it over time. Investment brings needed cashflow and access to knowledge and networks that can promote growth and productivity outcomes.

Businesses in the Digital Technologies sector exhibit characteristics that can make accessing capital difficult, particularly in the early stages of development. Apart from being disruptive and a challenge to conventional business models, these firms often seek to commercialise new processes that may not be widely understood, impacting their ability to access certain capital pools. In addition, they generally require large investments in people before producing a viable product.

On the other hand, these qualities can mean that firms are rapidly scaleable, with very high growth potential that can be realised relatively quickly. Like New Zealand in general, the sector also has a vibrant "angel investment" network.

The ITP has a "watching brief" on the issue of capital, given it was a major issue in the recent past. The government also has a dedicated work programme for considering investment challenges, while there is work underway on investor migrant attraction and support for start-ups.

Where issues arising from gaps in access to capital can be identified, the ITP will consider particular projects, such as the proposed Interactive Industry Development Programme.[28]

28 The ITP supported the publication of a 2021 Investor Guide to the New Zealand Tech Sector. https://tin100.com/product/the-investors-guide-to-the-new-zealand-technology-sector-2021/

Capital Investment Programme

High-quality investment into New Zealand firms spurs innovation, drives productivity and underpins economic growth. Businesses need to conduct research and development, build scale, export and expand into new markets.

At a high level, capital markets in New Zealand operate reasonably well. The government successfully issues long-term bonds, banks are sufficiently capitalised and firms listed on the NZX are able to raise capital. Still, there are areas of the economy where businesses face real constraints on their abilities to attract investment.

In 2020, a new $300 million venture capital fund was set up, with a focus on attracting private sector investors to the domestic venture capital market and helping innovative, knowledge-intensive businesses to grow.

The New Zealand Growth Capital Partners Ltd (formerly New Zealand Venture Investment Fund Ltd) was established to support early-stage technology companies and to stimulate private investment in the sector. NZGCP manages two funds:

- The Aspire NZ Seed Fund is designed to support early (pre-Series A) stage high-growth companies and is a direct investment vehicle that co-invests alongside private investors
- The Elevate NZ Venture Fund is a $300m fund of fund programme, investing directly into venture capital funds; aimed at filling the Series A and B capital gap for high-growth New Zealand tech companies.

The sector also receives support from NZTE, in terms of preparing for investment and matching businesses with potential local and international investors. In the year to June 2021, 37 of the 73 investment deals concluded with NZTE assistance were in the tech sector.

BUILDING MĀORI PARTICIPATION

As a key sector in our future economy, there is a need to ensure that Māori are empowered to participate in the way that works best for them. That is, whether as SMEs and start-ups, Māori authorities, employees or rangatahi, Māori recognise the future-proofed potential of the Digital Technologies sector. As a further consideration, te ao Māori perspectives, values, language and purpose-driven approach to life also have significant potential to help grow and invigorate New Zealand's global success in this sector, though great care must be exercised with the marketing of mātauranga.

There are a number of prominent businesses and entrepreneurs in the sector, as well as programmes that are working to grow digital skills in Māori (and for Pacific peoples). Some iwi are also active in areas to increase skills and participation.

However, Māori continue to be under-represented in the Digital Technologies sector, comprising only around 4 per cent of the workforce. This is likely due to a range of factors, from how future career options are presented in schools, a lack of visible role models, and unclear or unattainable pathways into training. Given the increasing importance of Digital Technologies across the economy, and the diversification potential of this sector, it is critically important that Māori at all ages are empowered to be able to participate, as workers, business owners or as investors. Many Māori are currently employed in sectors that are more vulnerable to changes in the future of work, while a Te Puni Kōkiri-Stats NZ report from 2019, has highlighted the lower financial margins achieved by Māori businesses.[29]

It is often the case that programmes targeted at building skills for Māori or supporting Māori enterprise are disconnected, with limited overall awareness and ability for programme owners to learn from one another. This also makes it difficult for any individual to navigate the ecosystem and determine what might be appropriate for them. Larger companies in the sector, keen to support a pipeline of Māori and Pacific Peoples talent in the sector, also face challenges connecting and guiding cohorts of students or young Māori into their businesses.

29 Thousands of Māori businesses revealed through research (tpk.govt.nz)

Across all of this, there exist a handful of key "champions", individuals who have been successful in the industry, who have created businesses and jobs who support Māori or who recycle their capital returns into new ventures.

The Māori Technology Ecosystem is currently relying on these individuals to do the connecting, the inspiring and advising. They are relatively few in number and are increasingly stretched, given the demands and the lack of resourcing.

Equitable opportunities for tech careers

Under the Digital Waikato 2025, a pilot programme is being established to continue the region's commitment to inclusive innovation. It places the learner at the centre, with their individual needs determined at the outset and continuously assessed. Wrap-around support and services can be added as needed, based on the work of a Programme Navigator alongside support partners. The programme is also designed to be flexible and easily scalable so that the collective learnings can be used as a template to respond to the needs of any region in New Zealand and their unique communities, learners, industries, and employers.

The programme will leverage mātauranga Māori and represents an agile approach segmented into three phases over 15-months.

Phase 1 begins with three months of work designed to identify, engage with and prepare an inclusive cohort of 20-30 learners. Equally important will be similar work to engage tertiary providers and understand the needs of a diverse set of Digital Technologies sector employers. Critical to this phase is the establishment of desired outcomes and measures of success that thread the principles of wellbeing through manaakitanga and enhancing our learners' mana.

Sector Feedback and Barriers to be Addressed

- Māori continue to be under-represented in the sector, yet have much to offer
- There are limited role models for rangatahi to be inspired, while the pathways into Digital Technologies training and careers are often difficult to identify and navigate
- In spite of the challenges, Māori entrepreneurs are excelling in Digital Technologies businesses
- Given the increasing prominence of digital in all aspects of life, it is crucial that Māori are empowered to design and implement Digital Technologies in a way that responds to their culture, values and aspirations
- The ITP should be about taking practical steps to increase the number of Māori succeeding (economically, culturally and socially) through growth in the tech sector

GROWING EXPORT SUCCESS

Engagement work and analysis indicated the sub-sector of Software as a Service (SaaS) and elements of Interactive Media, both of which are highly scalable and can generate high-quality jobs, can provide the Digital Technologies sector with immediate accelerated growth opportunities.

SaaS is the largest and fastest growing digital technology sector world-wide. The global market is predicted to grow at a CAGR of 14.1 per cent from 2020 to 2025 to reach US$436 billion.

This will increase to US$714 billion by 2030 a compound rate of 10 per cent.[30] Likewise, Interactive Media is now the world's largest and fastest-growing media sector, increasing at 9 per cent annually, with the global market forecast to be worth $258 billion by the end of 2021.[31]

It is estimated New Zealand delivered $2.1 billion in ICT exports in 2019, which makes the industry New Zealand's 7th largest export earner.[32]

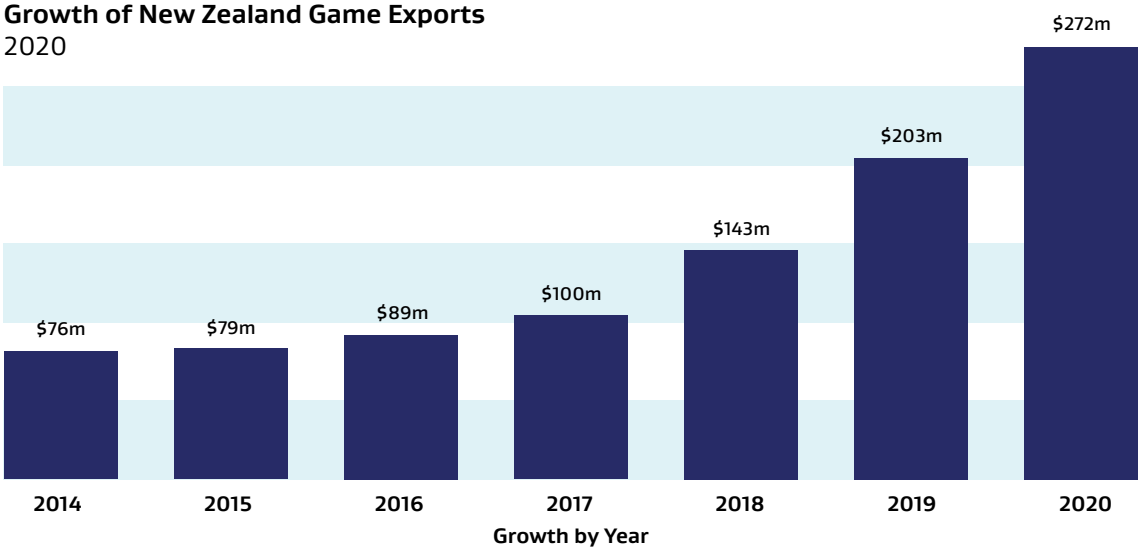
30 The Business Research Company, SaaS Global Market Opportunities and Strategies to 2030, September 2021
31 NewZoo, Quarterly Update
32 See www.stats.govt.nz/news/digital-overtakes-wine-exports. Figure is based on an ICT survey

Analysis conducted by Callaghan Innovation, based on data provided by over 500 businesses, estimated the SaaS sub-sector had revenue of $2.2 billion in 2020, with a CAGR of 16 per cent between 2016 and 2020.[33] It is further estimated the SaaS and Interactive Media subsectors have over 13,000 employees.[34]

As shown in the figure below, New Zealand's online games sector had total revenue of $272 million in 2019/20.[35] Over 90 per cent of this revenue is export based.

The business models for SaaS and some Interactive Media are typically high value, with users paying a recurring membership fee.[36] As they are cloud-based, these businesses do not require an end-user license or infrastructure to host the software.

Growth of New Zealand Game Exports
2020



Pushpay

The SaaS company Pushpay, for example, began as a three-person start-up 10 years ago in suburban Auckland. It now has over 400 staff and over 11,000 customers across the United States, Canada, Australia and New Zealand. In 2020, Pushpay processed more than US$6.9b billion in contributions, allowing churches and not-for-profit organisations to build loyal communities with people making once-off or ongoing donations, whenever they want, wherever they are.

While the vast majority of business is done in the US, where it is headquartered in Redmond, Washington, the company has maintained its software engineering and product development teams in New Zealand.

While New Zealand SaaS and Interactive Media exports are relatively small by international standards, there are many examples of local firms growing into successful businesses employing New Zealanders and generating predominately export revenue. Local and overseas growth examples include:

- Xero has averaged 34.5 per cent annual revenue growth for the past 3 years, with revenue of NZ$828 million for 2020-21
- Pushpay has averaged 41.4 per cent annual revenue growth for the past 3 years, with revenue of NZ$268 million for 2020-21

33 Note this estimate of revenue includes overseas sales that accrue to that country and is not captured in official NZ stats.
34 The analysis done by Callaghan is considered conservative. It includes only "pure" SaaS firms. Companies from sectors such as Agri-tech, Health-tech and those that have a SaaS venture were excluded. For example, Datacom, which is not a SaaS firm, has a large number of employees involved in payroll services, some of which involve SaaS.
35 NZ Game Developers Association annual industry survey.
36 Most of New Zealand's online games firms are not subscription based. They sell premium products as a once-off sale.

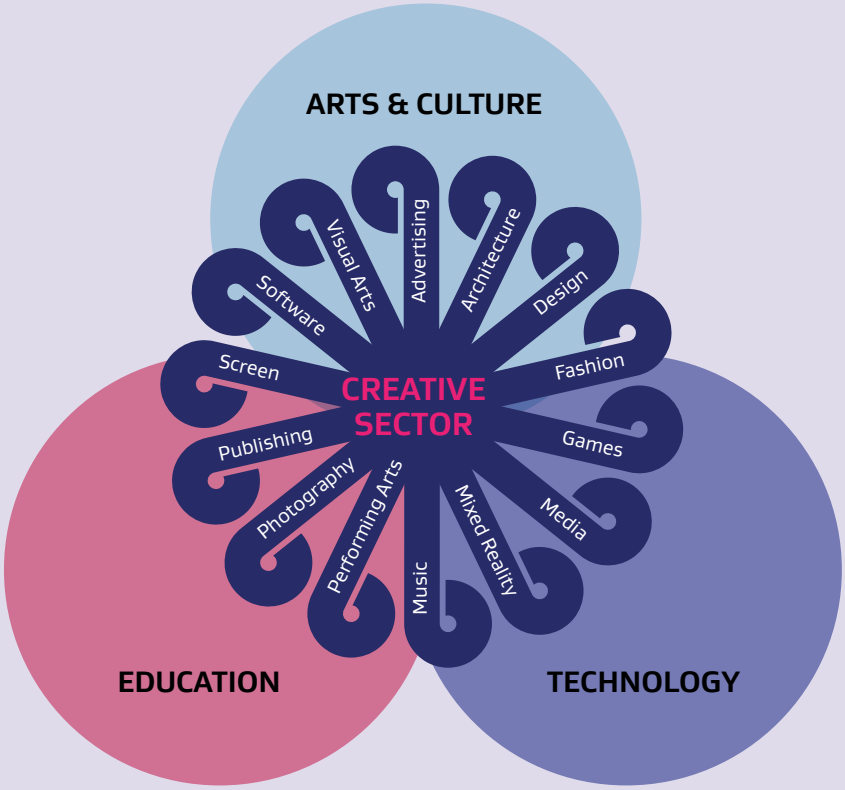
- Canva (Sydney-based SaaS graphic design platform) had revenue growth of 100 per cent in the year to 2020-21, with revenue of US$1 billion
- Atlassian (Sydney-based software development productivity tools platform) grew 38 per cent in 2020-21, with revenue of US$1.6 billion. It is now valued at around $100 billion
- Salesforce (San Francisco-based customer relationship management services platform) revenue has grown at a CAGR of 51.2 per cent over the last 20 years. Revenue for 2020-21 was US$26 billion

Though not as scalable as SaaS, there are a variety of New Zealand businesses in the Createch category that can provide additional export revenue.

Createch

Aotearoa's creative industries are at the forefront of technological innovation. Most are highly digital, and globally-focussed, in the way they produce, market, distribute, and earn revenues. Createch is the genre of activities in which technology enables creativity to produce new value-added products, services or experiences, and vice versa. Createch solutions are not limited to the creative sector as they are increasingly being applied to many other industries such as tourism, education, housing, health and elder care.

In Createch, a creative element such as storytelling, design, AV material or performance, is the key constituent in achieving the final output and its desired benefits. It includes SaaS and Interactive Media.



There are two predominant business models in Createch:

- Developing IP-based weightless products (e.g. Games, interactive media, music, screen content)
- Services or work-for-hire (e.g. game/ARVR development of third party IP, design, visual effects, screen and music production and post-production).

Sector Feedback and Barriers to be Addressed

- SaaS and some areas of Interactive Media are highly scalable. They are not constrained by land or the environment, only people. They are already multi-billion dollar export industries that require a keyboard, an internet connection and talented people
- The invisible nature of the sector makes it difficult for many to comprehend. There are no cows in the field, no cruise boats, no busy bars and restaurants, no manufacturing plants and buildings to be opened
- There are limited support mechanisms for business founders and leaders in these subsectors. Interactive media companies are not eligble for existing funding mechanisms like the R&D Tax Incentive and the New Zealand Screen Production Grant
- SaaS and Interactive Media companies can sell to a global market from day one. Market access is determined by the best product to address a customer problem or market demand
- Many companies are grappling with the same challenges as they expand into global markets yet are not able to easily learn from those that have gone before
- Additional revenue can be generated without creating or shipping an additional product. The weightless nature of the export, means there is no significant additional resource use and therefore additional carbon emissions
- New Zealand Sovereign funds have extremely low investment ratios into the sector and so the full benefits of the sector are not flowing back into the New Zealand economy
- Because new talent can be trained using both short courses and academic degrees, the economic barriers to high paying jobs are relatively low in the SaaS and Interactive Media sub-sectors
- Access to senior staff with relevant global experience is limited, and compounded by restricted immigration settings
- Employees and companies can be based anywhere with a quality internet connection. This includes regional centres such as Queenstown, Gisborne and Tauranga
- Other nations, including Australia, are introducing new incentives to attract Interactive Media firms
- Createch, including SaaS and Interactive Media sub-sectors, brings together a diverse range of skills: designers, developers, analysts, musicians, sales, marketing, story-telling, engineering, security, AI.

ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is increasingly used around the world by governments, businesses and individuals. Through the ITP development process, sector stakeholders identified AI as not only critical for future success of New Zealand Digital Technologies, but is also a significant growth engine in its own right.

In addition to being one of the fastest growing parts of the global sector, AI also enables technology, increasing the value of technological solutions. In terms of growth, it's expected that AI will impact all aspects of the value chain across global economies, with improvements to products and services increasing value and growing demand. It is estimated global GDP will be 14 per cent higher by 2030 with AI.[37]

Other research predicts AI could raise global GDP by 1.2 per cent per each year and provide $13 trillion in benefits per annum by 2030.[38] McKinsey also notes that the benefits will primarily accrue to front runners, with late adopters missing out on opportunities.

COVID-19 has also increased AI uptake and maturity across the world. Organisations have invested in AI to help with remote working, enhancing the customer experience and decreasing costs. One 2020 report showed that 41 per cent of companies had accelerated their AI strategies during the pandemic, while over three-quarters of the agencies surveyed said AI was critical to their success.[39] Significant benefits have accrued in the retail, education and healthcare sector, in particular.

37 www.pwc.co.uk/economic-services/assets/macroeconomic-impact-of-ai-technical-report-feb-18.pdf
38 www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-modeling-the-impact-of-ai-on-the-world-economy
39 https://appen.com/whitepapers/the-state-of-ai-and-machine-learning-report/

The draft ITP engagement process also noted, however, that while AI has the potential to drive innovation across multiple industries, it also brings risks that need to be managed through an explicit social license, underpinned by ethical standards.

New Zealand is well positioned to ensure this happens. It has a highly trusted government, a collaborative culture, high education standards and a commitment to biculturalism that respects different worldviews. It is also regarded as a secure place to do business, has world class internet speeds and excellent data infrastructure.

The sector in New Zealand has created popular open source tools for machine learning and AI. For example, the programming language "R", one of the top 10 programming languages in the world by usage, was developed in New Zealand, while Waikato Environment for Knowledge Analysis (or WEKA), a collection of machine learning algorithms for data mining tasks, has in excess of 10 million downloads and over 18,000 credited citations. In addition, books written by New Zealand researchers continue to be utilised to teach Machine Learning and AI in universities across the globe.

We currently lack a national AI strategy that can facilitate agreement on what is most important for New Zealanders, provide a co-ordinated approach to the adoption and use of AI in our country, while also showcasing the New Zealand brand on the international stage.[40] An AI strategy will promote a mātauranga Māori worldview and an ethical base in the development and implementation of AI, one that promotes New Zealand businesses as developers of safe, inclusive, innovative and creative AI products.

Soul Machines

Soul Machines is a New Zealand-based Artificial Intelligence company whose Human OS platform allows users to leverage the full capabilities of human and machine collaboration in a relatable way. It works with the world's leading organisations to reimagine and accelerate AI as a platform for changing the customer experience.

Soul Machines has the patented Digital Brain, a lifelike experience with dynamically interactive digital "people". Early on in the pandemic, Soul Machines created Florence for the World Health Organisation, their first ever Digital Health Worker, built on AI to counter misinformation around COVID-19. Florence operates as a behavioural change coach, speaking all 6 United Nations languages to help the world's 1.3 billion tobacco users quit the habit.

Sector Feedback and Barriers to be Addressed

- There is an opportunity to build on the existing foundations for AI, but overall the sector considers that New Zealand is lagging other countries in using AI applications
- Nevertheless, New Zealand has some companies and experts who are succeeding in a global context
- Other businesses are nervous about using AI, and opting not to incorporate it into their practices
- There are mixed views in the general public, with limited social licence in certain areas
- Government agencies are already using AI across a range of functions and services
- Without a national plan that addresses the risks and ethical issues, New Zealand risks following international trends, rather than charting its own course regarding the role of AI
- Application of AI can enable transformational growth of the Digital Technologies sector and the broader economy

40 Any AI story will link with the New Zealand Tech Story.

OUR TECH STORY

New Zealand has some of the most innovative people and businesses in the world. We create world-class products and services, contribute to the solving of global problems and generate value for shareholders through international success.

In spite of this, international opinion of New Zealand is largely shaped by its untouched landscapes and the success of agriculture and tourism. While this has served the nation well for many decades, the transformation of the New Zealand economy offers a chance to reshape how we are perceived internationally, with an updated and forward-looking story.

Digital Technologies businesses typically sell into global markets, with many looking to attract international investment, business connections and specialised talent. Much like our primary industries, who trade on a global reputation for quality, we want our technology businesses to be able to draw on an overseas awareness that New Zealand tech solutions are world-class. Furthermore, New Zealand's reputation around trust, low corruption and a certain straightforwardness provides a further selling point.

NZStory has been promoting New Zealand values of kaitiaki, integrity and ingenuity to key global markets, and is delivering the "Made with Care" campaign around our food and fibre sectors.[41]

Feedback on developing the Tech Story

There is a clear opportunity to tell our Tech Story to the world to the benefit of all Kiwis. As a country, we're really good at using tech to solve problems the world needs solving and this is a great platform for telling those stories – Tim Nichols (Director & vCMO, Proxi)

We now live in a different world. One where everything is changing and that creates opportunity. Being involved in developing New Zealand's Tech Story narrative has been an engaging, collaborative process. I feel excited for the future of New Zealand's tech companies and the potential is huge if we can adapt and learn – Greg Cross (Founder & CBO, Soul Machines)

Having an inspirational pitch about why New Zealand tech is worth considering and investing in or working with, is priceless ... not just for its ability to cut through the noise of so many around the world looking for talent and capital, but also for ensuring our values align, which is critical for amplifying our outcomes and progress – Suse Reynolds (Executive Chair, Angel Association New Zealand)

41 www.nzstory.govt.nz/about-us

However, there has been no specific campaign in place for the Digital Technologies sector.

This led to the development a new Tech and Innovation Story for New Zealand as part of the ITP. Our Tech Story will complement the work of NZStory and speak specifically to the attributes of the sector and its positioning in overseas markets. It also incorporates the insights from the Upstarters work that was developed by NZTech and NZTE in 2019.

Domestically, the Tech Story can also help promote the local Digital Technologies sector as a growth area with rewarding career opportunities. This could impact young New Zealanders considering their futures and those facing career disruptions in COVID-impacted sectors.

Sector Feedback and Barriers to be Addressed

- There is a growing importance for businesses to be purpose based and "good for the world"
- International investor awareness of New Zealand tech businesses is improving but remains relatively poor, with an over-emphasis on tourism and agriculture
- Trust and ease of doing business are seen as strengths for business in New Zealand
- Certain tech sub-sectors are more engaged with their "New Zealandness" than others
- Distance from markets remains a challenge

DRAFT ACTION PLAN

The draft ITP includes a draft Action Plan, presented as a longlist table at end of this section.

This longlist of actions will be trimmed and re-prioritised following stakeholder feedback on the draft ITP, the outcomes of Budget 2022 and the level of resources industry and other areas of government can commit to the work.

The governance arrangements will also be reviewed as a part of the short-listing process.

SKILLS AND TALENT DEVELOPMENT

Ensure the sector can attract the skills that it needs to grow, at all levels, and that it is creating high quality jobs and careers for all New Zealanders, including in those groups currently under-represented

The Skills workstream is well progressed and ready to move into an implementation phase.

The Skills Steering Group has been led by IT Professionals New Zealand, with a wide range of industry representation. It has produced a detailed Digital Skills and Talent Plan, with over 20 recommendations.

The priority for the next 12 months will be developing and then implementing a combined government and industry response to the Digital Skills and Talent Plan. The Steering Group believes it should be implemented as a package. Work will need to be done to cost the actions and flesh out the projects and co-ordinate resources across industry bodies and government.

The work of the Skills workstream is concerned with all aspects of the ITP: accelerated growth, strong foundations and greater Māori participation.

A key challenge for the implementation phase will be ensuring close and effective co-ordination between industry and key government agencies, such as the Ministry of Education, the Tertiary Education Commission and the Toi Mai Workforce Development Council.

INITIAL WORK

Initial industry consultation identified an immediate need for better analysis and data to help inform discussion between the industry, the education system and government. With this information, partners could then identify areas of immediate opportunity for improvement and more complex areas where additional insights and discussion would be required.

There were also a number of important initiatives already being progressed in the education sector, such as the new Workforce Development Councils, Te Pūkenga, a refreshed Data and Digital Strategy for Learning and the review of Achievement Standards.

Workforce Development Councils

As part of the Reform of Vocational Education, six Workforce Development Councils (WDCs) have recently been established. These bodies will set standards, develop level 2-7 qualifications (i.e. sub-degree) and help shape the curriculum of vocational education, to ensure it meets industry needs.

The Toi Mai (Creative, Cultural, Recreation and Technology) WDC considers, amongst other sectors, graphic, creative and web design, Ngā Toi Māori, game and software development, and information and communications technology and systems. It will be working closely with the Skills workstream to support the development of new digital career pathways.

At least three members of the Toi Mai Council must be both Māori and representative of industry. In addition, the Council as a whole, as far as is reasonably practicable, must have a deep knowledge of, and networks within, te ao Māori; and skills in te ao Māori, te reo Māori, and mātauranga Māori; and an understanding of, and commitment to upholding Te Tiriti o Waitangi.

Digital Skills Report

NZTech, with support from MBIE, the Ministry of Education, Google and other industry partners, updated the 2017 research on digital skills, with the publication of *Digital Skills for Our Digital Future,* in January 2021.

The report and its findings created an evidence base to help inform the direction of the Skills workstream. The report aggregated data across the entire digital skills pipeline, including data from the Ministry of Education (NCEA participation), Tertiary Education Commission (tertiary qualifications), MBIE (employment) and Immigration. This was complemented with several industry surveys. The diagram, prepared by the Skills Steering Group, highlights the key challenges identified in the report.

Digital Skills and Talent Plan

Following eight months of work, the Skills Steering Group produced a Digital Skills Plan in July 2021. Following broad consultation and input, the final *Digital tech industry plan for Skills and Talent* was released in October 2021.[42]

It includes 10 action areas and 23 recommended actions, which are proposed to be implemented as a package. The Plan is based around the need for a balanced approach, with industry investing in domestic skills development, government supporting initiatives and helping to drive change, while the education sector will ensure its work programmes support the overall transformation.

A number of core conclusions drawn from evidence and analysis underpin the recommended actions. These touch on the current state of the sector's workforce (e.g. a mismatch issue, lack of diversity) and the roles of industry (e.g. improving culture to encourage diversity, investing in internships and apprenticeships) and government (e.g. aligning the education system towards work-ready graduates). A complete list of findings from the Digital Skills and Talent Plan, is at Annex 2.

The industry and government will continue to work together to review and implement agreed actions. This will include securing input from education agencies, including the Ministry of Education, the Tertiary Education Commission and the Toi Mai WDC. Some recommendations from the Digital Skills and Talent Plan, such as the establishment of a National Digital Skills Agency within an existing department, will require Cabinet approval.

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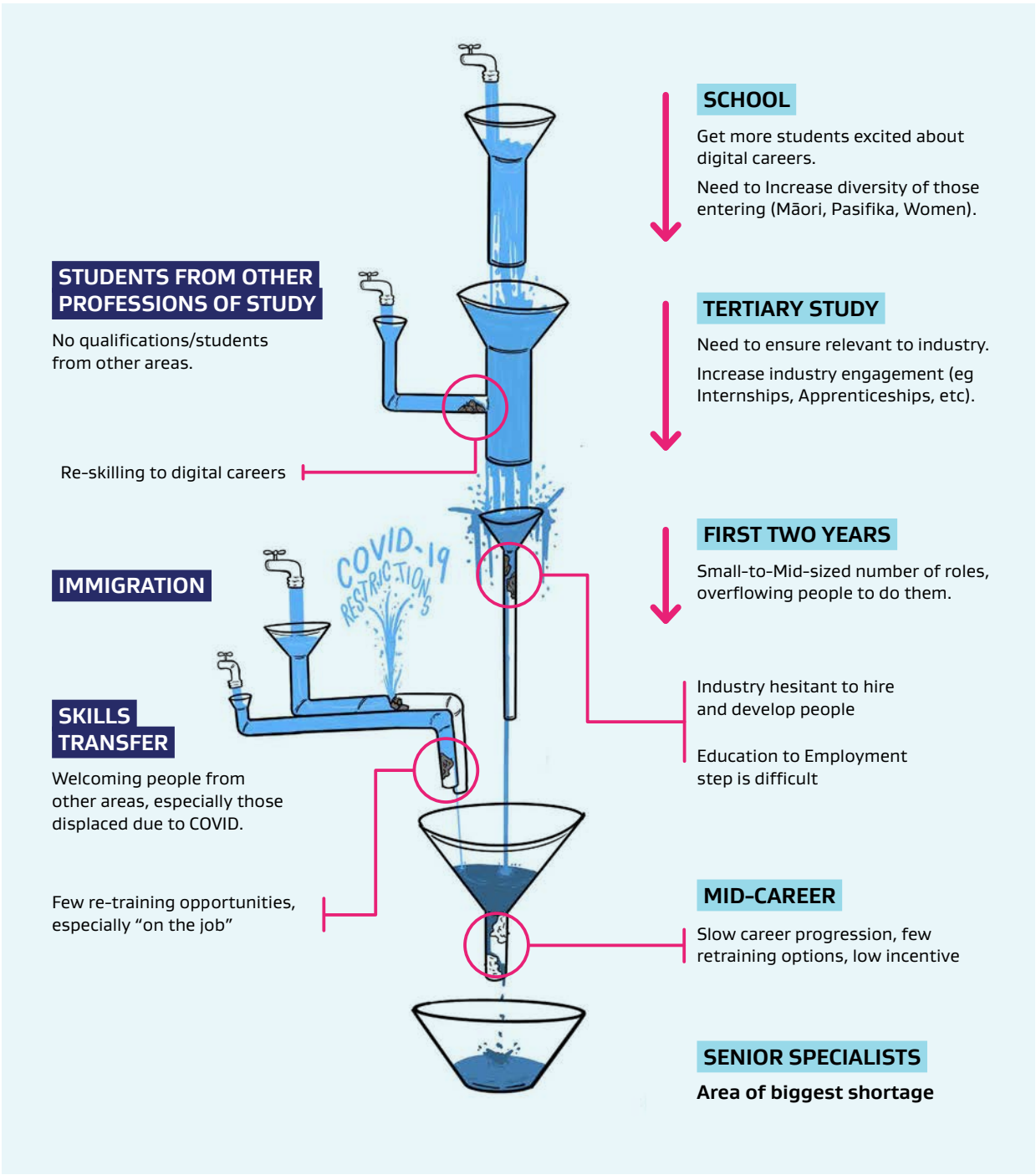
42 The members of the Steering Group were: Paul Matthews (Chair) CEO, IT Professionals NZ; Andrew King, Principal, Oropi School; Chandra Harrison, Managing Director, Access Advisors; David Glover, Director Partnerships, Unitec Institute of Technology; Emily Fry, Digital Trust lead, Mattr; Kate Pearce, Head of Security, TradeMe; Kim Connolly-Stone, Policy Director, InternetNZ; Malcolm Fraser, The Industry 4.0 Accelerator / Massey University; Rata Kamau, IRD (on group as an individual); Robyn Henderson, Policy Director, MBIE; Ruth Green-Cole, Managing Director, Developers Institute; Sunit Prakash, Principal Consultant, SunIT Ltd; Will Koning, Chief Data Officer, Kantar.

Digital and Technology Skills Pipeline



Digital Skills and Talent Plan – 10 areas of action:

1. A strong focus on reskilling and upskillng
2. Rapidly expand pathway options to industry
3. Refine the immigration system to be more integrated
4. Industry must step up and lead the transformation
5. Māori to be a crucial partner in skills
6. Expand the Tech Story to a domestic audience
7. An All-of-Government strategic approach to skills
8. Increased support for digital tech learning in schools
9. Redically re-defined standardised job "roles"
10. Strengthen the tech sector through greater diversity

ACTIONS

MBIE will work with the Skills Steering Group and other agencies on a government response to the Digital Skills and Talent Plan. An implementation plan will be developed in conjunction with the Budget 2022-23 process.

However, it may be possible to progress some actions in the short-term, that are not inconsistent with the principles and general direction of the Digital Skills and Talent Plan. Some actions, however, can get underway immediately. We are progressing actions that support stronger pathways into the industry, and that can provide deeper insights to inform longer term actions.

Reskilling/Upskilling

Given the potential for the Digital Technologies sector to create new careers for people looking to shift from another industry, we plan to do more work to investigate what is underway, and how any gaps around reskilling/upskilling can be addressed to ensure that there are appropriate avenues for New Zealanders to access training and guidance on the skills needed to join the sector.

IT Professionals NZ will undertake this work for completion in early 2022.

Adopting the Skills Framework for the Information Age to drive for greater consistency of roles

The Skills Framework for the Information Age (SFIA) is a globally accepted benchmark for the skills and competencies related to ICT, digital transformation and software engineering. The most recent version gives individuals and organisations a common language to define skills and expertise in a consistent way.

MBIE and DIA will co-fund a country licence for SFIA in order to help address the challenge of many ill-defined employment role titles in New Zealand, across both the public and private sectors. Supporting work to document best practice, and provide tools and training to support effective uptake and use will also be progressed, with IT Professionals taking the lead on behalf of the sector, and DIA in relation to government IT roles.

Internship/Apprenticeship – platform to match interns with placements

At present, tertiary education providers – including universities, ICT Graduate Schools, Polytechs and private providers – approach industry seeking work experience placements or internships for their students, on an ad hoc basis. The lack of co-ordination across different platforms that students use adds to the difficulty and the risks perceived by industry.

We will work to scope an open access digital platform for the digital tech internship and work experience market. This initiative will overcome a barrier in how companies search for and find appropriate interns, as well as benchmark best practice on the part of employers. It will include work to encourage companies to offer internships and also for all education providers to promote their students in the marketplace. The platform aims to be a one-stop-shop for industry.

This proposed initiative could be an industry joint venture involving a stakeholder co-design process to agree on best practice. This could be followed by the adoption and licensing of the platform to provide one single New Zealand wide marketplace for tech interns and work experience.

Internship/Apprenticeship – Ngai Tahu pilot

The Skills workstream will look to support initiatives to develop Digital Technologies apprenticeship models that work for learners, their whānau and industry. For example, Ngai Tahu is leading work to develop a suite of work-based learning products, using an apprenticeship model that can be delivered in a modular way. The work is designed to create a set of digital tech products based on the needs of industry, rangatahi and whānau, and will involve meaningful consultation with tech companies.

MBIE has agreed to support this work, given its alignment with the objectives of the Digital Technologies ITP. It is expected that documenting the insights and lessons obtained will benefit other groups looking to implement Digital Technologies apprenticeships.

Education/Attraction – Leveraging Techweek

Techweek is New Zealand's only national festival of tech and innovation and is held throughout the country each May.

It seeks to inspire, inform and educate business, community, educators and government. Given its profile and track record of attracting substantial domestic and international audiences, the event is an opportunity to profile career opportunities in the sector, as well as efforts to grow diversity of the workforce. Techweek22 will be used to showcase actions in this draft ITP that support the Skills and Talent Development and Māori Participation workstreams.

KEA network to identify critical digital skills

KEA is a global network of offshore citizens that gives New Zealanders living overseas the opportunity to engage and remain connected.[43] The network can contribute positively to the aims of the Digital Technologies ITP.

We plan to ask KEA to survey ex-pat New Zealanders in its network and create a report providing evidence and data relating to individuals with digital skills. This work will enhance the immigration pipeline of critical digital skills.

Immigration – ensuring that settings support targeted immigration of highly skilled roles that are not available in New Zealand

An immediate priority for many businesses in the sector is how they can secure approval to bring targeted experienced executives – both as employers and founders/mentors – into New Zealand, while international borders are partially or fully closed.

The Government recognises that globally experienced digital talent will be required to support the transformation and growth of our Digital Technologies sector. It will therefore be vital the immigration settings reflect this need.

In addition to a class exception for the sector, work has begun on being more precise about the roles that qualify for visa exceptions and on helping to improve the efficiency and success of digital related visa applications.

The needs of the industry are consistent with the government's objective to reset the immigration system towards facilitating higher skilled workers into the country to support economic growth.

This work will be aligned with the SaaS Capability work.

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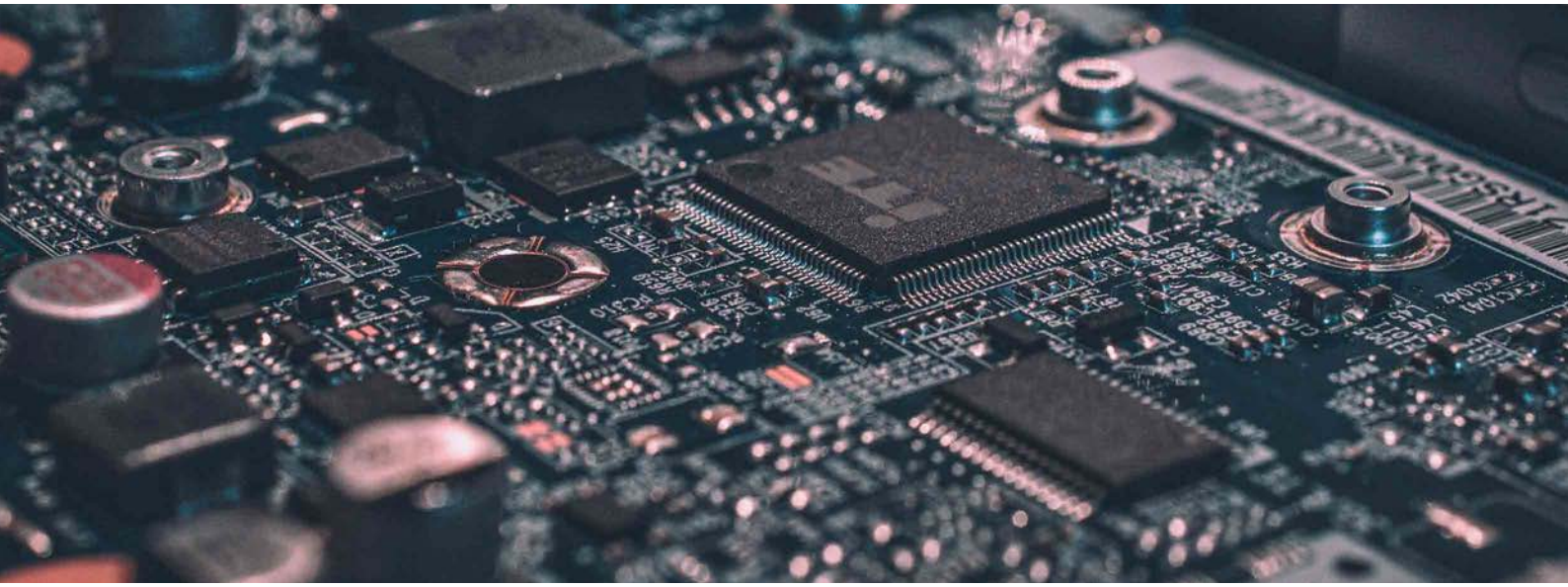
43 It is estimated 800,000 New Zealanders live overseas, the vast majority in Australia.



All of Government Approach – role of the public sector as a large employer of digital skills

Public sector organisations are typically the largest employer of digital skills across regional New Zealand.

DIA is responsible for the Digital Public Service Strategy, which includes a focus on digital capability and skills in the public service. One of the relevant programmes is GovTech, a digital graduate programme that exposes graduates over a two-year period to experiences in multiple agencies. It takes around 20 new graduates per year. This could be expanded to 40 or 60 graduates. There is also scope to increase the number of digital apprenticeships for Māori and Pacific peoples in the public sector by mainstreaming an apprenticeship pilot and potentially expanding its scope and scale to a wider range of disciplines.[44]

Public sector CEs are observing shortages of digital/ICT staff and an increasing demand around digital skills across the public sector. Work is underway within the Digital Government Leadership Group to investigate actions to grow the pipeline. Given the tightening labour market for Digital Technologies skills, it is important that government and industry are aligning efforts to grow the overall talent pipeline.

Deep dive analysis of Pacific tech pipeline

Pacific people represent only 2.8 per cent of roles in the digital technology workforce. A companion report, drawing on the Digital Skills Report, will be developed to inform practical steps that will encourage more Pacific Peoples to enter the sector. The Pasifika In IT association is working with NZTech and the Ministry of Education on the project.

CROSS-CUTTING ISSUES

The Skills workstream has a strong connection with all other workstreams.

Appropriate skills will be a major issue for the Exports workstream. Many of the proposed reforms in the Digital Skills and Talent Plan will take time to produce positive results. The growth strategy for the SaaS and Interactive Media sub-sectors will require more immediate access to local and overseas talent, both in terms of personnel and access to industry experience that can be used to support the SaaS Community development.

44 See Māori & Pasifika in NZ Tech | Elevating Aotearoa's Future (eaf.kiwi)

GROWING EXPORT SUCCESS

Increasing the number of globally successful New Zealand Digital Technologies exporters, with a focus on the intellectual property producing business models of Software-as-a-Service and Interactive Media

The Exports Steering Group is led by NZTE and Callaghan Innovation.

Its emphasis so far has been identifying how the SaaS sub-sector can achieve accelerated growth. A number of actions consistent with its pillars of Community, Capability and Cohesion have been identified. The discovery stage of the community work is well progressed, with a focal point being the connection of SaaS business leaders, designed to encourage shared learnings on how they can speed up the growth of their companies.

MBIE is also working with the New Zealand Game Developers Association to identify initiatives that will support the growth of Interactive Media companies, including a proposed Interactive Industry Development Programme to develop early stage creative IP and talent.

Reflecting the importance of experienced software engineers and multimedia specialists to the export growth strategy, the Steering Group is also working closely with the Skills workstream.

A concern for the Export Steering Group is good quality data to assess the size of the opportunity. This is being addressed with a National data base and work with Stats NZ.

INITIAL WORK

Seventy interviews were conducted with business leaders in the SaaS sub-sector to help develop the actions for the Exports workstream. These interviews with local entrepreneurs and international SaaS leaders suggested a transformative growth rate requires addressing Community and Capability. In support, we also need Cohesion provided by relevant government agencies (e.g. Callaghan Innovation, NZTE, Immigration NZ).

To complement this process, modelling was undertaken using data provided by the sector and vetted by Stats NZ. Key assumptions and projections include:

- Current revenue and job growth is running at 14 per cent and 16 per cent, respectively.
- Historical growth translates into revenues growing from $2.2 billion to $9 billion by 2030 and 57,000 jobs up from the current 13,000.

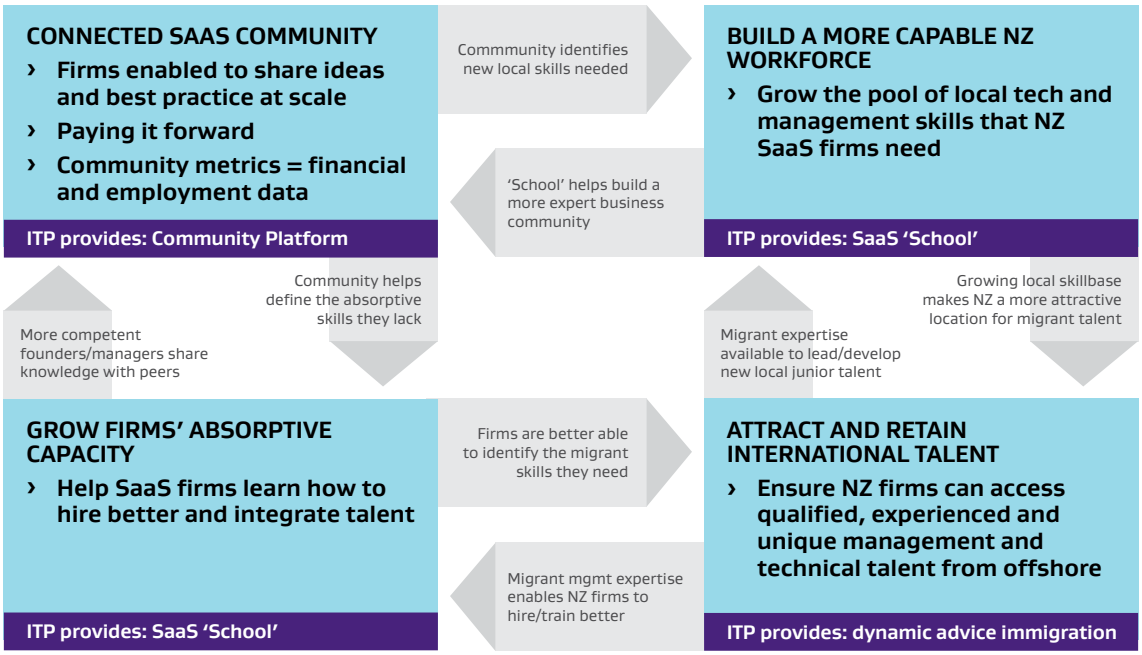
These estimates will be reviewed to inform the final ITP.

NZTE and Callaghan Innovation, as the Government's Crown entities tasked with supporting New Zealand businesses to export and innovate, have developed a plan of action around the Community pillar. The Community responds to the barrier that SaaS founders are often unable to learn from those that have gone before them and are therefore often repeating missteps on their journeys to become successful exporters. The goal is to build an active community of 500 companies and 5,000 individuals by 2023, creating a connected environment around content, forums and other resources that facilitate learning, shared ideas and advice.

Callaghan Innovation has completed the discovery phase for the Community work which addresses the scope of the programme, how it will operate, what and who will need support and details of what success will look like.

The goal is to integrate the Community and Capability work into a holistic programme.

Virtuous SaaS Ecosystem



ACTIONS

SaaS growth – Establishing a new Community for SaaS companies

The work on Community leverages the knowledge and experience of those in the sector, using member data and insights to attract like-minded people who can learn from one another and increase collective knowledge. It will have many activities (e.g. a website, networking events) designed to promote connection, common content and a sense of belonging.

MBIE has provided funding to Callaghan to enable the development stage of the SaaS Community. This includes the appointment of a dedicated project team within Callaghan and an interim Steering Group (comprising experienced SaaS leaders), the creation of a national database of SaaS companies and contacts and the fleshing out of a financially sustainable 3-year implementation plan.

The SaaS Community will work with existing events such as Southern SaaS and Techweek to ensure SaaS founders and leaders can share in a co-ordinated source of guidance and networking benefits.

SaaS growth – Capability and Cohesion

The Capability work seeks to address the skills and experience needed to drive scale, growth and international commercial success for SaaS businesses. These skills include:

- SaaS/Cloud-specific technical skillsets, which due to the nature of the industry, evolve faster than academia's ability to deliver training
- Management skills and experience, including knowledge of how to build an international SaaS business at scale, quickly
- Founder and manager "soft skills", including the skills to recruit or develop the right talent or their own businesses.

The two main development pathways are the role of immigration in accessing targeted overseas talent (which will support upskilling of New Zealand staff, and will be involved in the Community noted above) and a potential SaaS Tech School that provides a way to scale the training by practitioners in the skills sets needed. Though some will be sourced locally, the majority of these practitioners will be highly skilled migrants.

The Cohesion work will involve work with relevant government agencies to adopt the modern tools used by business to solve problems and move away from a siloed (individual agency) approach. It will also promote and improve transparency of government support by creating a "One Customer Pathway" across the export lifecycle.

Interactive Media – Investment ecosystem

Working with the New Zealand Game Developers Association, MBIE appointed Nordicity and Jason Della Rocca to complete a report on the gaps and opportunities in the existing investment ecosystem within New Zealand for small and medium-sized interactive game development studios.[45] The work:

- identifies where in the business (studio) and project (game) development cycle, investment gaps and opportunities exist and their approximate size (e.g. number of studios, dollar value)
- identifies any barriers for both New Zealand and international investors to invest in New Zealand's game development sector
- describes options, including the potential costs and benefits and any scope to scale or pilot opportunities
- makes recommendations.

The report was completed in late-2021.

Interactive Industry Development Programme

The Interactive Aotearoa report was published in 2019 by the New Zealand Game Developers Association.[46] The report highlighted a gap in early-stage start-up or development funding to foster investment-ready projects in the Interactive Media or game development sector.

In recognition of the growth potential of this sector, consideration is being given to a contestable fund to support early-stage, New Zealand-based studios to develop original intellectual property. This would support the development of a pipeline of small and medium sized studios, and also fill the gap in start-up support for game development studios which do not qualify for R&D or screen sector support.

A case for this new fund will be advanced as part of the draft ITP process.

We are also assessing the potential impact of Australia's recent announcement of a new 30 per cent tax credit regime for gaming companies, which will apply at a federal level from July 2022. This sits alongside some existing State level incentives of 10 per cent.

CROSS-CUTTING ISSUES

This workstream links closely with the Skills, Māori and the Tech Story workstreams. Many SaaS and Interactive Media companies are in continual need of additional talent to grow and produce export revenue. Resolving existing skills challenges and increasing Māori participation will support the achievement of the goals for this workstream.

45 Jason Della Rocca is a game industry entrepreneur, funding advisor, and cluster expert. He specializes in business/partnership development, pitching/funding, and ecosystem/cluster development.

46 Interactive-Aotearoa-Report-2019_email.pdf (nzgda.com)

BUILDING MĀORI PARTICIPATION

Empower Māori to increase their participation in the sector, as business owners, entrepreneurs and in the workforce

This workstream aims to ensure the ITP promotes activity that enhances Māori participation in the Digital Technologies sector, having regard for Te Tiriti and its three articles:

- kāwanatanga / government as steward (government has a responsibility to provide goods and services to citizens)
- tino rangatiratanga / self-determination (government has the responsibility to enable iwi/Māori to be self-determining, such as through partnering with iwi which increases the range of options for Māori to engage in the sector)
- ōritetanga / equity (Māori as citizens have the right to equitable outcomes)

All other workstreams have actions that aim to grow and reinforce a Māori presence in the industry.

At this stage, we have not favoured establishing a formal Steering Group. The focus has been on a series of interviews and workshops with Māori stakeholders, to ensure the right issues are being addressed.

Going forward, the workstream will likely focus on both progressing actions that directly promote Māori participation and also ensuring other workstreams are giving due consideration to Māori issues.

INITIAL WORK

Completed work includes:

- Interviews with Māori stakeholders to better understand views and experiences in the sector
- Development of a proposal to address the challenges facing the Māori Technology Ecosystem (MTE), including that its champions are not suitably connected, under-resourced and not set up to scale their work

ACTIONS

Actions for the workstream are directed towards understanding the barriers to boosting Māori participation across all capacities.

Workforce/careers	Business owners/entrepreneurs	Investment/Investors
› Understanding pathways into training from school level and beyond › Creation of job opportunities, especially "first job" level › Support for in-job learning	› Support for start-ups › Access to talent › NZTE/Callaghan support › Regional support via Economic Development Agencies	› Building investment into Māori tech firms › Building iwi/Māori capability to be investors in the tech sector (Māori and non-Māori firms)

The ITP is focusing on how to support on-the-ground partnerships that are advancing in these areas, and how we can learn about what is working well, and how to replicate and share the lessons. This includes how to better connect existing initiatives so they operate more as a whole, re-enforcing each other and leveraging different strengths. We are also developing an evidence base that will support possible system-level changes (e.g. within the education system).

Specific priority actions include:

- Supporting the development of a "by Māori, for Māori" insights report on the MTE. The report aims to provide the Māori Tech sector with a clear reference point of what is taking place for Māori, to provide insights for whānau, hapū and iwi, government and New Zealand's Digital Technologies sector generally. This report, which is planned to be completed in early-2022, will utilise a kaupapa Māori/mātauranga Māori framework and help to put together
  - a better understanding of what and who is the MET
  - why it is important for New Zealand
  - what is happening internationally across various indigenous populations in this space
  - what is happening throughout New Zealand (including high level ecosystem mapping, size and growth data, aggregated policy review, case studies)
  - what are the key opportunities and challenges
  - what recommendations can be suggested based on this information
- A companion action is "Whītiki", a new "champions" function to support the MTE. This role would focus on connecting, advising, supporting Māori in navigating the ecosystem, with KPIs to support growth in digital skills and business success. Initial scoping of this new role will be completed before the end of 2021, with set-up occurring early in 2022
- A further potential action is to create a Māori in Tech story linked to the Tech Story currently under development. It would have a specific focus on inspiring Māori to be active in the sector, either in education/training or in business enterprise.

CROSS-CUTTING ISSUES

All workstreams of the draft Digital Technologies ITP include a focus on the specific needs and interests of Māori. For example, in Skills, we are looking at how government, industry and Māori can work together to increase the diversity within the sector, while in the AI workstream, we are actively thinking about the indigenous considerations of how AI is adopted across different domains.

OUR TECH STORY

Improve international perceptions of the sector and attract both local and international investment and talent, by crafting and promoting a compelling and consistent story that confirms New Zealand's world-class tech and innovation capabilities

The Tech Story workstream is being led by NZTech, in collaboration with NZTE, New Zealand Story, MBIE, Callaghan Innovation and the Ministry of Education.

The New Zealand Tech and Innovation Story (Tech Story) is a marketing initiative designed todeliver a compelling and consistent way of promoting our tech and innovation capabilities. It enhances both the sector foundations and provides for accelerated export growth by taking the Tech Story to the world. Domestically, this initiative will help promote New Zealand's Digital Technologies sector as a growth area with rewarding career opportunities.

While the initial stages of the Tech Story have funding under the ITP, there will also be a need for ongoing work to ensure it becomes embedded with the industry and international audiences. Without funding for this extended support, the initial investment in the Tech Story will not deliver over the longer term and momentum gained in the industry for this initial period will be lost.

INITIAL WORK

The New Zealand Tech and Innovation Story (Tech Story) is an industry and government collaboration designed to produce a consistent and compelling message for shared use across the sector. In particular, it aims to address a fundamental barrier that technology capability and leadership does not come to mind when the world thinks of New Zealand. This lack of awareness constrains our ability to attract investment and talent from overseas sources. The specific objectives of the Tech Story are to:

- create a framework enabling multiple stakeholders to showcase New Zealand's strength in tech and innovation
- encourage Digital Technologies businesses to use the outputs of the Tech Story to help increase global sales and engage offshore
- achieve a positive shift in New Zealand's innovation perception in key markets
- attracting international talent.

The Discovery phase of the Tech Story have been completed. Building on the previous Tech Story - UpStarters, launched in 2018 by NZTE and NZTech, the programme has involved connecting with over 700 business leaders, investors, tech professionals and influencers in the New Zealand and international tech communities. This was done to understand current views on the international tech landscape and identify any knowledge gaps.

From these learnings, we have defined our story through development workshops to test and validate the Tech Story narrative, key messages and brand positioning.

Throughout the early work, several recurring themes emerged including:

- continued recognition that New Zealand is an open, stable and trusted economy that is easy to do business with
- New Zealand has a pool of well educated, creative, affordable, diverse talent
- Ensure the attractiveness of New Zealand's lifestyle, inclusion and stability is a key part of the Tech Story messaging.

Research internationally also showed that New Zealand was seen more favourably and had higher profile due to leadership on issues such as COVID-19 and humanitarian responses to tragedy.

The current draft of the Tech Story narrative, We See Tomorrow First, is as follows:

> **NEW ZEALAND MAKES PURPOSEFUL TECH FOR A BETTER TOMORROW THINKING ABOUT WHAT TOMORROW NEEDS. WE FEEL A RESPONSIBILITY TO CREATE A TOMORROW FUTURE GENERATIONS WILL THRIVE IN. THIS LEADS OUR PEOPLE TO MAKE THE KIND OF TECH THAT WILL CREATE A BETTER TOMORROW. INFORMED BY THESE VALUES, WE'RE CREATING A TECH INDUSTRY THAT'S GROWING LIKE NEVER BEFORE.**

ACTIONS

Definition and creation

The work conducted during the Discovery phase has been used to help develop the Tech Story and the assets needed to activate it internationally and in New Zealand. Upcoming key steps involve:

- **Story Collection** – identify and create case studies of New Zealand tech businesses
- **Brand Development and Testing** – create the brand essence to inform the creative direction of the campaign and material assets
- **Campaign Asset** – develop the campaign assets that will be used to promote the Tech Story
- **User Toolkit and Guidelines** – develop the guidelines and toolkit that will assist New Zealand businesses in leveraging the campaign
- **Digital Presence** – build an online experience to support the campaign objectives locally and abroad.

Activation

This phase involves widespread promotion of the Tech Story across industry, by way of nationwide information sessions and training. Digital Technologies businesses will be provided with the tools and assets needed to leverage the Tech Story in their own marketing and communications activities.

An integrated marketing campaign will be launched in priority markets to targeted

audiences. Co-ordination with government agencies, international channels and networks will increase the effectiveness of the campaign. The targeting of particular markets (e.g. North America, UK/Europe, Singapore, Australia) will be based on available information.[47]

Domestically, the Tech Story initiative will have a "halo effect", enhancing New Zealanders' understanding that they have an opportunity to be part of an innovative and vibrant Digital Technologies sector.

Ultimately, this work is intended to grow the sector, both in terms of investment and skills. It will underpin greater interest in the New Zealand industry and its capacity for innovation.

Domestic story

It is proposed to use the international-facing version of the Tech Story to inform and develop a domestic version. This would be consistent with a recommendation from the Digital Skills and Talent Plan to support the growth of our digital economy from within, and also aim to increase diversity through bringing more woman into Digital Technologies careers and lifting the number of Māori and Pacific Peoples. The work would be done in collaboration with, and in support of, any work underway by the sector, the Ministry of Education, Tertiary Education Commission, Te Puni Kōkiri and Ministry for Pacific Peoples.

This work would leverage the systems, process and learnings from the work done to date on the international Tech Story.

Extended support

It took many years to build and embed a strong tourism brand for New Zealand. *100% Pure New Zealand* is now over 20 years old but has been hugely successful in taking New Zealand to a global audience, using clear and consistent messaging. A similar sustained marketing effort will be required to shift market perceptions about New Zealand's Digital Technologies sector.

Further funding will be required to embed the Tech Story.

CROSS-CUTTING ISSUES

The Tech Story workstream has strong linkages with Exports, as well as the Skills and Māori workstreams, through the potential for it to increase interest in careers for New Zealanders, and to connect bespoke international talent to the New Zealand marketplace.

DATA DRIVEN INNOVATION

To enable all sectors of the economy to gain a greater understanding and appreciation of the economic value of data, leading to increased adoption and use of Data Driven Technologies, including Artificial Intelligence, with flow-on benefits in terms of reduced emissions and greater productivity

The Data Steering Group comprises members from the New Zealand AI Forum and MBIE.

The priority for the next 12 months will be oversight of the education pilot that is being rolled-out by i4 Accelerator.

In addition, we propose that a high-level business case for the establishment of a National Digital Twin for Aotearoa be advanced, subject to available resources and co-ordination with related projects.

The actions under the Data workstream are mainly concerned with improving foundations.

47 This includes NZTE export data, TIN200 Report (2020), Discovery Workshops and NZTech Industry Survey 2021. Final campaign target markets will be determined following NZTE global team interviews.

Initial Work

Engagement with the sector revealed the need for greater access to data in order to create new products and services, to drive innovation and to accelerate the application of AI across multiple sectors of our economy. This calls for a focus on driving the benefits of Data Driven Innovation (DDI) in the Digital Technologies sector itself.

A series of interviews were conducted with data scientists and data practitioners to inform what initiatives should be undertaken for this workstream. Input has also been received from the AI Forum. Key pieces of completed work include:

- Feedback from the sector on a targeted discussion document
- Support for an Aotearoa Digital Alliance pilot and report on findings
- Engagement with potential providers of the education and awareness pilot, including how we might create adjunct frameworks to assist businesses in undertaking data governance (these frameworks will be developed as part of the i4 Accelerator work)
- Inter-agency discussions on advancing a National Digital Twin
- Engagement with Earthquake Centre at Canterbury University on data standardisation as a prerequisite to establishing an NDT.

ACTIONS

Data awareness

The ITP includes funding to establish an education programme to elevate the awareness of the value of data to business growth.

Through this work, the Digital Technologies sector will gain access to greater data assets that will further innovation, create new products and services and help drive export earnings. The i4 Accelerator has been selected as our partner to begin delivering the DDI education pilot to approximately 250 businesses across New Zealand. The pilot will also develop associated frameworks and will establish a Community of Practice with over 200 Data Stewards across key regional hubs.

Specific tasks or deliverables include:

- Working with i4 Accelerator on the roll-out
- Work with Stats NZ on access to government open data.

Aotearoa Digital Alliance

The objective of the proposed Aotearoa Digital Alliance (ADA) is to bridge the short-term R&D requirements of New Zealand businesses who do not have the necessary in-house capacity or resources to undertake R&D themselves. The ADA initiative responds to a barrier concerning how researchers connect with industry in a way that solves "real world" innovation challenges. It acts as a broker to match the needs of the business sector to the capabilities of the wider research/innovation community.

To pilot this concept, MBIE has sponsored the University of Otago to undertake a research programme to prototype an extended reality (virtual, mixed and augmented reality) demonstrator. The outcomes of the project will inform further work on collaborative R&D, with the potential for future commercialisation of the extended reality product. The insights from this pilot will help inform how the ADA could be implemented on a longer term basis.

Data access

Given the interest in, and potential of, a National Digital Twin, subject to resourcing, a high-level business case to assess the need for a NDT should be advanced as a first step. This would entail identifying the interested organisations, potential use cases, and a more detailed implementation plan.

CROSS-CUTTING ISSUES

Data sovereignty remains an important issue for Māori. The Data Steering Group will engage with i4 to ensure Māori aims and aspirations are reflected in their work, including consideration of the Te Mana Raraunga Data Sovereignty Network charter.

This workstream also has close linkages with the Agritech ITP and the Advanced Manufacturing ITP, as DDI is a critical element needed for future innovation and growth.

ARTIFICIAL INTELLIGENCE

Produce an ethically-based strategy and put in place appropriate institutions that enable New Zealand to adopt AI safely, protect New Zealanders from AI risks and supports sector transformation that contributes to domestic and export growth over the longer term

The AI Steering Group comprises members from the New Zealand AI Forum and MBIE. There is also a wider working group drawn from across government and academia.

The priorities for the next 12 months will be to deliver the AI Strategy for Aotearoa New Zealand and a roadmap of action, and gain Cabinet approval to proceed with a Centre for AI.

These actions will put the right safeguards in place to develop trustworthy AI in New Zealand, growing public trust in the technology and supporting businesses to realise the opportunities provided by AI. This will improve the foundations for AI in New Zealand and provide the right conditions for New Zealand's AI businesses to grow domestically and internationally.

INITIAL WORK

Work completed or presently underway, includes:

- Drafting of AI Strategy for Aotearoa New Zealand with targeted engagements
- Understanding New Zealand business views on the adoption of AI technologies
- Engagement with AI sector (domestically and internationally)
- AI Playbook on national conversations launched and a series of blog posts published (a project undertaken with the World Economic Forum)
- Work on initial scoping project for a Centre of AI.

ACTIONS

AI Strategy for Aotearoa New Zealand

The development and release of an AI Strategy for Aoteroa New Zealand will set the vision and direction for AI use in New Zealand, building a thriving AI ecosystem on a foundation of trust, equity and accessibility.

The Strategy will be structured around five cornerstones that provide a basis for action and a framework for priorities. They are:

- **Building trust** – AI must be a trusted technology. The willingness to use AI must come from a clear understanding of the benefits and implications of the technology and confidence that safeguards are in place to mitigate risks
- **Investment** – New Zealand's AI economy will help grow capability, stimulate entrepreneurship, boost competitiveness and attract global AI investment and talent. This will raise our productivity and position New Zealand's economy and society for the future
- **Preparing the workforce** – AI is going to have an impact on New Zealand's workforce and productivity. We will need to understand the implications of AI on New Zealanders, and equip our workers, present and future, with the necessary digital skills to be a part of the AI economy
- **Our place in the world** – understanding who we are as a country, what we stand for and what we value, will be key to our success. New Zealand's businesses should be internationally recognised as developers of safe, innovative and creative AI and for New Zealand to be a trusted and willing partner in global AI
- **Enabling foundations** – a flourishing AI ecosystem needs a set of solid foundations to support it. These foundations include supporting a collaborative, open and creative environment that prioritises innovative working, proper governance arrangements, connectivity, data and digital infrastructure, with security and privacy protections in place to support AI growth.

Each cornerstone will have a set of priority areas and projects, including developing and adopting ethical and regulatory frameworks and standards, understanding appropriate investment in strategic sectors, identifying skill needs and requirements, and ensuring the right infrastructure is in place for AI adoption.

Key focus areas, actions and timelines under each cornerstone will be set out in a roadmap.

Specific tasks that are planned include:

- Consultation on the draft AI Strategy
- Publishing the AI Strategy and Roadmap for Aotearoa New Zealand, following consideration by Cabinet
- Biannual Qrious survey to evaluate the effectiveness of the Strategy

Centre for AI

Overseas experience has shown that there are two main things holding back the use of AI. Wariness over the complex nature of AI and the risks this poses, and a lack of understanding of the technology.

Engagement with domestic and international colleagues suggests that a Centre of AI would provide an independent and visible focal point to grow understanding of AI and other data driven technologies.

Specific tasks to advance this project include:

- Working closely with other data driven ethics work underway in the government system, including with StatsNZ and DIA
- Consultation with key AI stakeholders around New Zealand
- Engagement with overseas AI experts and similar bodies
- Developing a business case for a new Centre, including roles, functions and funding needs

CROSS-CUTTING ISSUES

The AI stream is closely linked to all the other workstreams. The Skills workstream is particularly important, as accessing the right skills and talent is a priority area in the AI Strategy. Also, DDI is needed to fuel AI technology, while procurement is significant because many AI companies are involved in contracting with the government.

The success of the AI Strategy will depend on a co-ordinated approach between government agencies, with clear roles and responsibilities.

There are also close linkages with the other ITPs, as AI is the fastest growing technology fuelling innovation and growth.

GOVERNMENT PROCUREMENT

Changes to the government procurement process assist in achieving the transformational goals of the sector and ensure it is well regarded domestically and internationally for supporting innovation and the ingenuity of tech companies

The Steering Group for the Government workstream is made up of representatives from NZ Rise and the MBIE and DIA procurement teams.

It has focussed on understanding the issues and identifying areas where meaningful change can be made with the procurement process.

The key actions proposed under this workstream is the establishment of an ICT Procurement Transformation Team, which will then develop actions and initiatives in consultation with the sector.

The key risk for the workstream is maintaining effective participation across government, as the ITP does not have any direct levers.

Input on the Government Procurement workstream has come from large and small digital technology companies, from senior executives, government technology practitioners, industry bodies and a number of government agencies.

The ITP is an opportunity for government to better co-ordinate its ongoing efforts to deliver better outcomes for the sector. Given the scale of government investment in the ICT industry, government projects that are well managed can have a significant positive effect on the industry and can deliver greater public value for government. Similarly, poorly executed procurements can increase costs for businesses and risk for government.

The engagement process has highlighted that more work is required to ensure that procurement activities are getting the best out of domestic firms and to reduce barriers to participation, particularly for small businesses and new entrants. For example, government can right size processes, provide more transparency, promote alternative approaches to traditional, repetitive tendering (including related tools and guidance) and place a stronger emphasis on better planning and managing relationships with suppliers .

Procurement can also do more to contribute to the success of the ITP than just process and practice improvements. Subject to funding, the New Zealand Government Procurement branch within MBIE, alongside DIA, is looking to set up a new ICT Procurement Transformation Team that will work together with the digital technologies sector on how procurement can make a stronger impact on industry transformation. It will, for example:

- Look at how commercial expertise is distributed across the government system and how we can strengthen cross-government collaborative leadership, share knowledge and reduce duplication
- Review system settings and clarify mandates
- Develop digitally-focussed procurement approaches that are more responsive in a complex and fast-paced market and build market capability and resilience
- Scope, develop and oversee/implement transformative initiatives
- Consider alternative approaches to providing commercial support for high-risk projects or agencies that need support
- Identify leading practices and develop case studies.

The government is committed to long-term behavioural change in how agencies use procurement to deliver more equitable and sustainable outcomes for New Zealand. By working with industry, we can capitalise on opportunities, address challenges, ensure public value and build trust with the sector.

ACTIONS

In addition to setting up an ICT Procurement Transformation Team, other work for this workstream will include:

- Produce a guide for operationalising Broader Outcomes, with a focus on New Zealand ICT businesses accessing government procurement opportunities
- Facilitate an Open Contracting Data Standards workshop with industry, to enable procurement data to be made publicly available and usable by the sector
- Digital Nations project to use digital tools and data-driven technologies to revolutionise procurement.

CROSS-CUTTING ISSUES

This stream has strong connections with the work underway in the AI workstream, because a key component of the investment cornerstone of the AI Strategy is ensuing AI businesses can secure contracts with government.

ANNEX 1:

LONGLIST OF ACTIONS

	Work area	Action	Details	Timing
Skills	Digital Skills and Talent Plan	Government response	MBIE to work with Steering Group and other agencies on response, including implementation plan. Staged implementation in T1, T2, T3	T1-T3
		Fund	Develop a 2 to 3 year fund to support skills and talent initiatives in the implementation plan.	T1
	Reskilling and upskilling	Strategy	Create reskilling and upskilling plan	T2
	Expanded pathways	Apprenticeship Degree model	Pilot Apprenticeship Degree model	T2
		Education programmes	Development of Level 5 / Level 6 Apprenticeship-style education programmes	T1
		Internship platform	Support for a national co-ordinated internship programme or platform, to reduce the cost of internships and scale up provision nationwide	T1
		Internship programme	Scale up the level of internship funding through Callaghan Innovation	T2
	Immigration	Skilled visa	Refine the Skilled Visa requirement	T1-T3
		Class exception	Develop and administer a class exception for the sector based on priorities roles such as software engineers	T1
		KEA project	KEA project: Stage I and Stage II	T1-T2
	Cultural change	Programme	Create campaign and messaging for industry to “step up”	T2
	Māori	By Māori, for Māori	Establish and fund a Māori Digital skills body	T1
			Tech education for Māori, by Māori and in a Māori environment, such as Te Wānanga o Aotearoa and Ngāi Tahu’s apprenticeship initiative	T1
	Tech Story	Domestic element	Develop a parallel domestic “Tech Story” brand and campaign around tech careers	T2
		Scaling	Initiatives to access a wider audience	T2
			Scale up resources for main in-school outreach programmes (eg 123Tech) and ensure a (non-exclusive) focus on girls, Māori and Pacific Peoples	T1

	Work area	Action	Details	Timing
	Cross-Government approach	Digital Skills Agency	Create a dedicated group within an existing government department to take lead on guidance and initiatives to accelerate careers in government	T1
		GovTech Talent programme	Centrally fund and manage a scaled-up GovTech programme	T1
		GovTech Advance programme	Develop a programme similar to GovTech Talent but for mid-career professionals	T2
	Learning in schools	TeachNZ scholarships	Create dedicated TeachNZ scholarships to support those with tech qualifications or background to become teachers	T1
		Teaching of Digital Technologies	Fund additional ring-fenced PLD for teachers to enable the teaching of Digital Technologies, Hangarau Matihiko	T2
		Digital Readiness programme	Restore the existing Kia Takatū ā-Matihiko programme, Digital Readiness programme resources for teachers	T1
	Job standard	Redefinition	Create and share a broad set of redefined role descriptions	T2
		SFIA	Obtain a country license for the SFIA Framework and promote widespread adoption to create a common language when talking about tech skills	T1
	Sector diversity	Diversity training	Opportunities for diversity training	T2
		Disabled talent	Provide detailed guidance on hiring those with disabilities and preparing a workplace	T2
	Pacific	Tech pipeline	Report on involving more Pacific Peoples in the sector	T1
Export	SaaS growth	Community	Create a SaaS community that connects SaaS business leaders to enable them to learn from one another and from experts, advancing knowledge and networks. Key tasks includes appointing a project team, creating a national database of SaaS companies and contacts; establishing interim Steering Group; develop 3-year implementation plan	T1-T3; funding for T1
		Capability	Explore options to access international talent and build pathways to attract and/or retain new talent. Key tasks include connecting international scale experts to high growth companies; work with Skills workstream to improve to immigration settings. Saas Skills Programme/Tech School to train SaaS specific skills in leadership and coaching for founders and executives. The model is built around leveraging the knowledge and experience of immigrants and locals with scaling expertise	T2-T2 for Tech School

	Work area	Action	Details	Timing
		Cohesion	Promote and improve transparency of government support by creating a One Customer Pathway across the export lifecycle. Key task includes developing operating model for One Customer Pathway, led by NZTE and Callaghan Innovation	T2
	Interactive Media	Report	Examine options for addressing gaps and opportunities in existing investment ecosystem, including impact of Australian incentives. Key tasks include completion of commissioned report and developing and implementing options	T1, funded
		Fund	Assess proposal for an Interactive Industry Development Programme as a $5m pa fund to develop early-stage creative IP and talent	T1 not funded
Data	Data awareness	DDI education pilot	Develop a DDI education pilot that will include data case studies, frameworks and a Data Playbook. Create a Data Stewards Community of Practice. Key tasks include working with the i4 Accelerator; working with Stats NZ on government open data	T1-T2, funded
		Data trusts	Create a framework for establishing data trust/collaboratives through the DDI education pilot, that will assist the COP with implementation	T1
		ADA pilot	Consider finding for the Aotearoa Digital Alliance pilot	T2
	Data access	National Digital Twin	Progress a high level business case to determine the value in investing in the development of an NDT as a trusted data access platform	T2
	Data standardisation	National Digital Twin	Develop a data standardisation project, should the high-level business case support the establishment of a NDT. Key task is to identify partners for this project and who will run it	T3
Govt	Transformation	ICT Procurement Transformation Team	Establish team and develop a work programme in consultation with industry	T1
		Broader Outcomes	Produce a guide for operationalising Broader Outcomes, with a focus on New Zealand ICT businesses accessing government procurement opportunities	T1
		Open Contracting Data Standards	Facilitate an workshop with industry, to enable procurement data to be made publicly available and usable by the sector	T1
		Digital Nations	Digital tools and data-driven technologies to revolutionise procurement	T1
AI	AI Strategy	Develop strategy	Set out a vision and direction for AI in New Zealand. Key tasks will be to release document/roadmap, conduct consultation, develop story/brand and implement Strategy	T1,T2

	Work area	Action	Details	Timing
	Centre for AI	Establishment	Develop business case for supporting Centre of AI. Conduct consultation and establish, depending on outcome of business case	T1-T3
Māori	Participation	Enhancing visibility of activity	Prepare an accessible report on the sector ecosystem that will record all initiatives in train that are focused on building Māori participation in the sector (education and business)	T1
		Champions function	Develop initiatives to ensure Māori tech champions are active in key regions.	T1
		Māori story, Pacific peoples	Creating the spark in Māori in Tech Story	T1
Story	Tech Story	Definition and creation	Following engagement and discovery stage, define and create the Tech Story	T1, funded
		Activation	Activate the Tech Story	T1
		Domestic NZ Story	Design and produce a domestic Aotearoa New Zealand Tech Story that would leverage the narrative, marketing assets, systems, process and learnings from the work done to date on the international Tech Story	T1
		Extended support	Continued funding and support for sustained development and activation of the New Zealand Tech and Innovation Story beyond the current programme funding	T2

Note: T1 = next 12 months; T2 = 12-24 months; T3 = More than 24 months

ANNEX 2:

FINDINGS OF THE DIGITAL SKILLS AND TALENT PLAN

General conclusions

1. Positive scaling up and transformation of the Digital Tech sector is not possible unless the overall skills pipeline issues are resolved.
2. The Digital Tech profession primarily has a larger "skills mismatch" issue than an overall "shortage" issue. While the numbers coming through the education sector do need to increase, this won't resolve the underlying issues unless the system and culture is transformed to enable a greater level of skills development.
3. Where possible and proven effective (in terms of reach and outcomes), supporting and scaling up existing initiatives is preferable to starting from scratch.
4. Industry, Government and the Education Sector have a joint responsibility to address the challenges in skills and each must invest in the transformation.
5. This must be in partnership with Māori, and with engagement with the Pasifika and disabled communities.

Schooling system

6. An insufficient proportion of students are excited about digital careers in schools and this is resulting in fewer students with industry-desirable attributes choosing digital tech as a study and career option.

Workplace-based learning

7. Relevant industry experience is core to the transition from study to work. Work-integrated learning is one very important and effective way of gaining this experience however there are insufficient opportunities for students in New Zealand to do this.
8. More work-integrated learning opportunities, such as Apprenticeships, Degree Apprenticeships and short courses / certifications / micro-credentials, would result in more people with industry-desirable attributes getting a digital tech career.
9. There are often insufficient roles in industry for recent graduates and new industry entrants, with the industry's culture often leading to a hesitance to hire and develop those entering the industry.

Diversity and Inclusion

10. The tech industry often has:
    - a perception of a generally non-inclusive culture, resulting in people choosing not to enter the industry;
    - poor rates of retention for those in underrepresented groups, for the same reason.
11. The industry is perceived as not welcoming, or not safe for diverse individuals. There's a perception of not fitting in or it being an uncomfortable place to work.
12. There is insufficient Māori, Pasifika and gender diversity amongst those entering tertiary study for digital careers leading to insufficient diversity in industry.
13. Increasing this diversity would be advantageous for both the industry and New Zealand as a whole [this is a given], however a faster increase in numbers from these under-represented areas is needed.

Disability and Bridging

14. People with disabilities are much less likely to be employed in the tech industry as those without, even though they have the same education, skill or ability.
15. The needs and aspirations of under-represented communities are not being addressed adequately thus helping cause this under-representation.

Up-skilling and Re-skilling

16. There is a significant lack of cross- or re-skilling opportunities, nor a coordinated national approach, and this is preventing those without tech experience and/or qualifications transferring to digital tech.
17. With more re-skilling opportunities available in New Zealand, more people with industry-desirable attributes would transfer to the digital tech sector, including:
    - students/graduates of the other disciplines plus those without any formal qualifications or unrecognised skills in a digital context
    - workers in adjacent jobs with desirable underpinning skills and experience, but often not currently applied in a digital context.
18. The current Industry has a general unwillingness or inability to invest in upskilling and adapting existing employees, with industry instead often opting to "buy in" people with higher skills when needed.

Immigration

19. Immigration is a pipeline widely used to fill highly skilled positions in preference to investing in developing domestic talent.
20. The immigration pipeline into the digital technology industry is important in the short-term, however has been significantly disrupted by Covid-19.
21. In New Zealand, the perceived overall cost of immigration versus training is lower. There is evidence that a salary disparity between immigrants and New Zealand workers is a likely contributor, but not the primary reason, for employers choosing to bring in immigrants to fill roles.

Skills Definitions Framework

22. Tech Professionals often have a slower career progression than in other comparable industries.
23. The highest level of demand is amongst senior specialists with more complex skills.
24. Employers/HR and recruiters often think in terms of "roles" rather than "skills and capabilities". Having the capability to think more about the granular skills in specific roles would help resolve difficulty in filling some roles.

Te Kāwanatanga o Aotearoa
New Zealand Government

LSE 6508 JAN22