Digital Tech

Industry Transformation Plan

Skills Workstream

Report and Draft Plan

IT Professionals NEW ZEALAND

Te Pou Hangarau Ngaio

NZTech

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Introduction

Skills are critical to the growth of any sector, especially in high-skill and high complexity sectors such as digital and information technology.

There are long-standing gaps of specific skills within the digital technologies sector. One key factor is a *mismatch* between the skills industry needs vs the skills available in New Zealand.

Some of these gaps have previously been filled via immigration; while at the same time graduates from tech/digital courses, and other professionals with skills outside the areas of greatest need, are often struggling to find jobs. Immigration will always be part of the answer, but we need a stronger domestic talent pipeline for this to be sustainable and to support the growth of the overall New Zealand economy.

The pipeline isn't just about increasing the numbers and skills of those entering the digital tech profession; but also the career flow-through to the areas of greatest need. So addressing the skills mismatch, including soft skills and the slow rate of career progression, must form part of the solution.

Given the huge disruption to New Zealand's labour market as a result of COVID-19, there is also a significant opportunity for the digital technologies sector to absorb displaced workers from other industries and good pathways will be necessary to smooth this transition.

This document contains the basis for the skills plan, to enable significant scaling up and transformation of the state of skills in the digital tech industry.

The evidence paints an optimistic picture. While there is no silver bullet, it's clear that there are 10 actions that will enable the transformation of skills in Aotearoa New Zealand. 10 steps that must be taken to open up the skills pipeline and enable the scale that's needed for Digital Technologies to become the top export earner in New Zealand.

What is an Industry Transformation Plan?

In June 2019, the Government launched its Industry Strategy, outlining its approach to growing strong and innovative industries in New Zealand. The Industry Strategy was updated in June 2020.

At the core of the Industry Strategy is the development of Industry Transformation Plans (ITP) for selected sectors of the economy, where there are opportunities to lift productivity and growth or where significant transition is required.

ITPs are long term plans developed in partnership with Government and industry, articulating a vision and an action plan for a sector.

For more information about the New Zealand Government's Industry Policy visit Ministry of Business, Innovation and Employment's industry policy page.

The Skills Workstream

The development of the Skills Plan of the ITP has been overseen by a Steering Group under the guidance of *IT Professionals NZ*, the professional body of New Zealand's digital tech profession.

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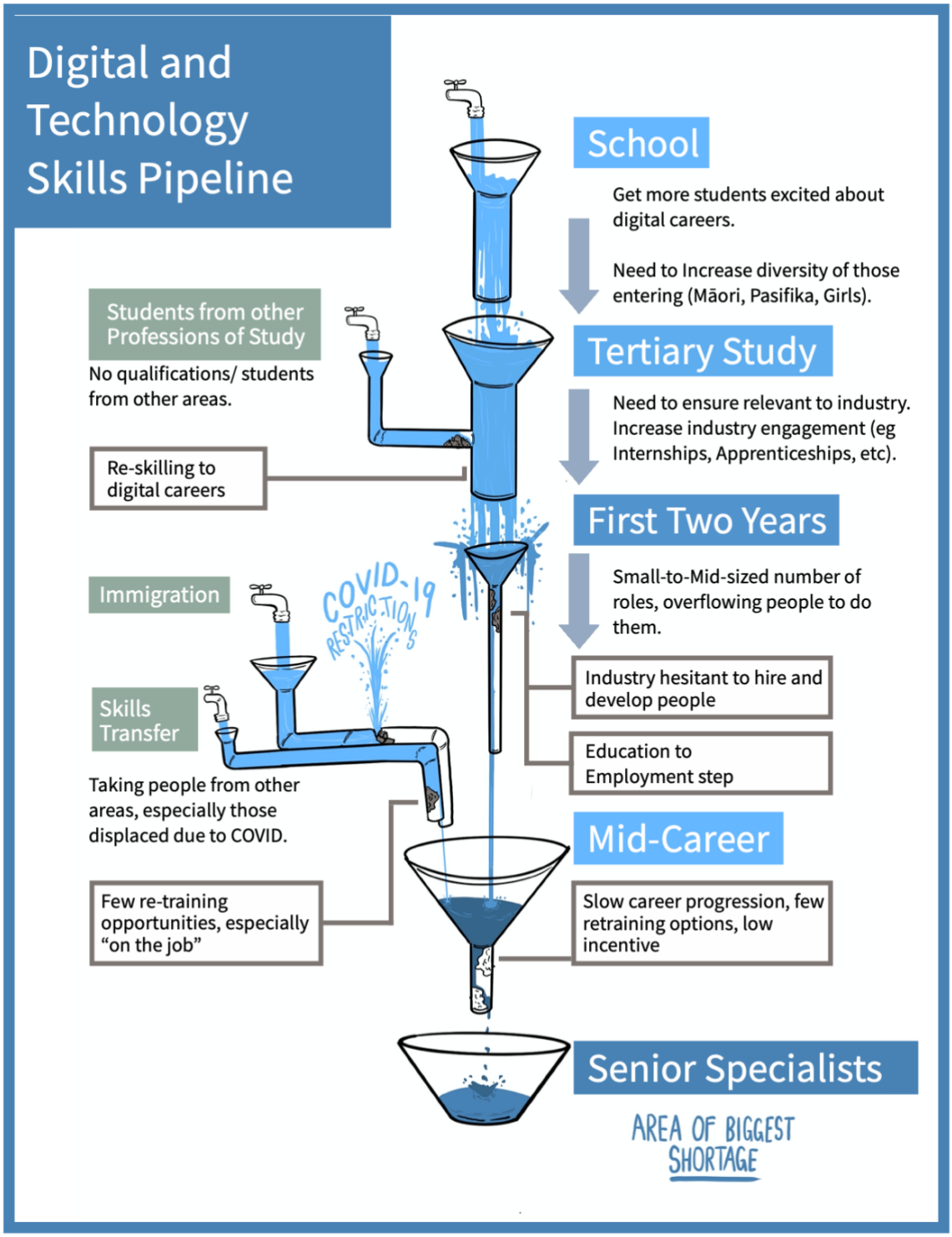
With input from hundreds of individuals and organisations, the Steering Group has taken a strong evidential approach; ensuring that all assumptions were tested thoroughly and all work based on statistics and evidence.

The outcome is clear. Together, New Zealand's Government, Industry and Education sector can create a digital sector with a more streamlined and inclusive system of industry-aligned education and skills pathways, that addresses every stage of the pipeline from school to senior professionals.

We believe that, if given life, this Skills Plan, within the Digital Technologies Industry Transformation Plan, will transform skills and our industry.

The Digital Technology Skills Pipeline

This diagram illustrates the areas of significant challenges in the skills system:



The Future State

As per the pipeline graphic and outlined in the following sections, there are a number of challenges in the skills system for digital technologies.

The Pipeline illustrates a mismatch in supply and demand for skills at various stages, a significant over-reliance on Immigration and lack of investment in developing domestic talent – resulting in a significant mismatch in skills and slower and less coordinated career progression.

The solution: It's all about balance.

Immigration is essential for a high-skills industry such as Tech, however it's currently at an unsustainable level – more than 50% of new roles are filled via immigration. A level of around 20-25% would likely be sustainable in NZ.

Industry needs to invest in domestic skills development, not just expect they can just keep buying skills in. Government needs to support initiatives and help drive change, and the Education Sector needs to support this transformation.

The future state balances skills and immigration to unblock the talent pipeline and help Aotearoa New Zealand's tech industry thrive.

Skills Workstream Research Conclusions

The following Research Conclusions form the foundation on which the plan was developed. These were derived from a broader set of assumptions, some based on the Pipeline Model and others from elsewhere.

Each of these 24 research conclusions has been supported by strong evidence, much of which was compiled in the *Digital Skills Aotearoa* report from multiple Government and Industry sources and supplemented by additional research.

Here are the 24 core conclusions:

General Conclusions	1.	Positive scaling up and transformation of the Digital Tech sector is not possible unless the overall skills pipeline issues are resolved.[1]
	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.[2]
	3.	Where possible and proven effective (in terms of reach and outcomes), supporting and scaling up existing initiatives is preferable to starting from scratch.[3]
	4.	Industry, Government and the Education Sector have a joint responsibility to address the challenges in skills and each must invest in the transformation.[4]
	5.	This must be in partnership with Māori, and with engagement with the Pasifika and disabled communities.[5]

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.[6]
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.[7]
	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.[8]
	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.[9]
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.[10]
	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.[11]
	12.	There is insufficient Māori, Pasifika and gender diversity amongst those entering tertiary study for digital careers leading to insufficient diversity in industry.[12]

	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.[13]
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.[14]
	15. The needs and aspirations of under-represented communities are not being addressed adequately thus helping cause this under-representation.[15]
Upskilling and Reskilling	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.[16]
	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.[17]
	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.[18]

Immigration	19. Immigration is a pipeline widely used to fill highly skilled positions in preference to investing in developing domestic talent.[19]
	20. The immigration pipeline into the digital technology industry is important in the short-term, however has been significantly disrupted by Covid-19.[20]
	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.[21]
Skills Definitions Framework	22. Tech Professionals often have a slower career progression than in other comparable industries.[22]
	23. The highest level of demand is amongst senior specialists with more complex skills.[23]
	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.[24]

Summary of Evidence Sources

The following is a summary of evidence gathered to validate the above Research Conclusions. Note that much of the evidence is contained in the Digital Skills Aotearoa Report, a summary of the past and present state of the industry and released by the NZ Digital Skills Forum and NZTech in 2021.

Full reference details are at the end of this document.

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[1] NZ Digital Skills Forum, 2021; Conclusion of the Skills Workstream Steering Group following analysis of all evidence.

[2] NZ Digital Skills Forum, 2021; Conclusion of the Skills Workstream Steering Group following analysis of all evidence.

[3] Conclusion of the Skills Workstream Steering Group following analysis of all evidence. There are a number of programme with proven success that are identified as scalable.

[4] Conclusion of the Skills Workstream Steering Group following analysis of all evidence. Many of the Actions require joint Government, Industry and Education sector solutions.

[5] Conclusion of the Skills Workstream Steering Group following analysis of all evidence.

[6] NZ Digital Skills Forum, 2021, pp. 23, 30–32, 52–58, 90–93; OECD, 2019; Ministry of Education, 2021; other information sourced from Ministry of Education and Education Review Office.

[7] NZ Digital Skills Forum, 2021, pp. 32, 58-63, 66; Summer of Tech, 2020; other information sourced from Ministry of Education and Education Review Office.

[8] NZ Digital Skills Forum, 2021, pp. 32-55, 58-62, 64-66; Summer of Tech, 2020; NZ Qualifications Authority, 2017; NZ Qualifications Authority, 2013.

[9] NZ Digital Skills Forum, 2021, pp. 35, 47-49, 66; LinkedIn, 2020; Ministry of Business, Innovation and Employment, 2020b;

[10] NZ Digital Skills Forum, 2021, pp. 24, 29, 50-51; Sax et al., 2016; Diversity Works NZ, 2020; Te Kawa Mataaho Public Service Commission, 2019.

[11] NZ Digital Skills Forum, 2021, pp. 50-51; Diversity Works NZ, 2020; Te Kawa Mataaho Public Service Commission, 2019.

[12] NZ Digital Skills Forum, 2021, pp. 24, 29, 50-51, 90-93; Ministry of Education, 2020; OECD, 2020; Gallup, 2016; Du & Wimmer, 2019; Williams, 2020; Other data sourced from the Ministry of Education including Tertiary Participation 2005-2019.

[13] NZ Digital Skills Forum, 2021, pp. 50-51; McKinsey & Co, 2020a.

[14] Statistics NZ, 2020.

[15] NZ Digital Skills Forum, 2021, pp. 50-51, 65; Diversity Works NZ, 2020; Williams, 2020.

[16] NZ Digital Skills Forum, 2021, pp. 47-49, 69-71; LinkedIn Learning, 2016; McKinsey & Co, 2020b.

[17] NZ Digital Skills Forum, 2021; Conclusion of the Skills Workstream Steering Group following analysis of all evidence.

[18] NZ Digital Skills Forum, 2021, pp. 47-49, 67-69; LinkedIn Learning, 2016; McKinsey & Co, 2020b; Statistics NZ, 2019; Lawson Williams, 2019.

[19] NZ Digital Skills Forum, 2021, pp. 28, 35, 38, 45-47, 67-69, 71, 106-107; LinkedIn Talent Solutions, 2020; Immigration NZ, 2020.

[20] NZ Digital Skills Forum, 2021, pp. 28, 35, 38, 45-47, 67-69, 71, 106-107; LinkedIn Talent Solutions, 2020; Immigration NZ, 2020.

[21] NZ Digital Skills Forum, 2021, pp. 28-29; Statistics NZ, 2019; Absolute IT, 2020; Immigration NZ, 2021; Trademe, 2021.

[22] NZ Digital Skills Forum, 2021; LinkedIn, 2020; Tech Industry Survey, 2020.

[23] NZ Digital Skills Forum, 2021, pp. 28, 35, 40-47, 49, 68-69; LinkedIn, 2020; Absolute IT, 2020; Krill, 2020; Immigration NZ, 2021; Ministry of Business, Innovation and Employment, 2020a.

[24] NZ Digital Skills Forum, 2021, pp.44-45; Sharman, 2019; Tertiary Education Commission, 2018.

The Plan for Skills

Through comprehensive research and consultation, the Skills Workstream has identified 5 Foundational Principles and 10 specific Actions to transform the digital skills system in Aotearoa New Zealand.

Foundational Principles of the Plan

There are five key foundational principles that sit alongside the Actions:

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a. We have a skills mismatch more than a shortage problem. Yes, we need more people and we certainly need a more diverse intake. But this in itself won't enable transformation and scale – the focus also has to be on greater development of the existing tech workforce, transfer of skills, etc.

b. There is no silver bullet. Transformational change is hard, and there is no big new shiny thing that will solve the skill problems. To take the pipeline analogy, fixing the pipe in one place won't do much on its own – it's a series of changes that must happen to enable scale and transformation.

c. Everyone must play their role. This isn't a challenge that Industry can expect the Government to "fix". The Government can't say it's Industry's problem and others can't blame the Education sector. All parts benefit from the transformation and must work together to make it happen.

d. The full plan needs to be implemented. As per (b) above, there's no point tinkering around the edges. The best chance of transforming the skills system is undertaking *all 10 Actions* in this plan in a coordinated plan.

e. It must be Action-focused and work on the ground. The plan has to be realistic and meaningful, with clear Actions that will actually make a difference "on the ground" across Aotearoa New Zealand. It's about achieving real outcomes, not fluff.

The 10 Skills Actions

The following are the 10 core Actions, each of which must be achieved if we are to truly transform skills to enable industry transformation.

Details of each of these actions are on the following pages, including the what, why, and how. A summary of the core initiatives is in the next section.

The 10 Skills Actions

Action 1: A strong strategic focus on reskilling and upskilling

Action 2: Rapidly expand pathway options to industry

Action 3: Refine the Immigration system to be more targeted

Action 4: Industry must step up and lead the transformation

Action 5: Māori to be a crucial partner in skills

Action 6: Expand the Tech Story to a domestic audience

Action 7: An All-of-Government strategic approach to skills

Action 8: Increased support for digital tech learning in schools

Action 9: Radically re-defined standardised job "roles"

Action 10: Strengthen the tech sector through greater diversity

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These Actions are summarised in the following pages.

Each of these Actions will include a detailed timeline and measures of success as part of the next phase of work.

Action 1: A strong strategic focus on reskilling and upskilling

The evidence has clearly shown a skills mismatch rather than shortage issue is causing many of the challenges in the skills pipeline.

This is exacerbated by the fact that there is a lack of coordinated focus on either reskilling or upskilling in New Zealand's tech sector.

This problem is not unique to New Zealand. Many countries are looking at it, and work has been done to develop AI models to identify "adjacent skills" and map demand to enable the skills mismatch to be addressed.

Government and Industry must form a national strategy and a coordinated and specifically targeted approach to reskilling and upskilling.

This strategy needs to focus on:

- Options for reskilling of those already in industry with skills that are in less demand. This could take the form of encouraging short courses and micro-credentials designed to build on existing skills.

- Options for transfer from other industries, especially given the number of people displaced post-Covid who have skills that would transfer to Tech.

- Encouraging more rapid upskilling of industry talent. As outlined in other Actions, clearer pathways within industry are essential.

Examples of Existing Initiatives

ITPNZ's CareerAdvance initiative supports an individual in the industry to create a Skills Portfolio and then partners them with a one-on-one mentor and the resources to create a Career Plan.

Mission Ready HQ helps individuals plan out a change to the tech industry and plot out a pathway to get there including in-work training.

Faethm.AI is working with the Australian government to address re-skilling of the workforce across a number of sectors including tech.

Action 2: Rapidly expand pathway options to industry

The tech sector often gives the perception of undervaluing education. However Tech is a high-skills industry that involves complex learning to achieve the most success. In many cases this means a tertiary degree, however the lack of flexibility of learning options makes this not a suitable option for some.

While the current models are appropriate for many, additional pathways must be provided urgently to enable alternative options. These alternative options will disproportionately benefit Māori, Pasifika and lower-income families.

Apprenticeships and Apprenticeship Degrees are Essential

An Apprenticeship model enables "Learn while you Earn" options that open up a pathway to industry for many who are not in a position to take time out to study. For example, we heard from leaders in the Māori community that this is a core need for many Māori.

In addition, Apprenticeships provide the healthy mix of crucial conceptual learning and practical application that the tech industry values.

> Ngai Tahu, along with CanterburyNZ, Ara Institute and industry partners, are working towards an Apprenticeship model, primarily (but not exclusively) for Māori learners. This needs strong support.

> Whitireia and WelTec have indicated a desire to implement an Apprenticeship Degree model in Tech. ITPNZ is supporting this initiative and industry partners like Datacom have indicated initial support. This model should be piloted as a matter of urgency.

Other Apprenticeship-style learning should also be supported urgently.

There are also many in our industry who are self-taught or have undertaken a pathway to industry without formal education. In many cases, they do well; and a tertiary degree is not always seen as a prerequisite for working in the tech industry. However greater use of *Assessment of Prior Learning* would help those in this category to both credentialise and identify gaps in learning.

Internships are important, but poorly supported

Internships such as the popular *Summer of Tech* programme provide a crucial bridge between study and industry. However these don't receive the level of support they need; often only a small proportion of students who apply are able to receive internships within the industry.

There are a number of reasons for the lack of industry support for internships, including a perception that it's *too hard* to take on interns, that it's too expensive (in time and money) and that the internship period, over the summer holidays, is often when many staff are on leave.

Callaghan Innovation provides financial support for Summer R&D Interns, however their criteria are often seen as rigid.

> Alternative Internship models, such as "Friday Interns" (where University, Polytech and Private providers don't schedule classes on Fridays to enable year-long one-day-a-week internship opportunities) should be piloted.

> The number of internship spaces funded by Callaghan for tech students should be increased significantly, and the R&D definition loosened. Callaghan should investigate providing a set number of internship funding opportunities to organisations like Summer of Tech rather than requiring a lengthy, rigid process for each intern.

> Through the Industry Transformation Plan funding, operational funding for Summer of Tech should be provided to enable a lower-cost entry for companies taking interns.

Good pastoral care are essential to workplace-based learning initiatives.

There are other alternative educational pathways needed as well, however an initial focus on establishing Apprenticeships, Apprenticeship Degrees and expanding Internship opportunities will have the most benefit.

Action 3: Refine the Immigration system to be more targeted

The balance between immigration and domestic talent development is broken, with more than half of all new tech roles filled through an immigration pathway.

In 2019, 4,462 new IT jobs were created and 3,683 visas were approved for IT professionals to immigrate to New Zealand, more than the total number of students graduating from tertiary study in tech qualifications combined.

The evidence clearly shows that the Immigration system has become the first port of call for meeting skill needs for many companies in the tech industry. It is often seen as easier and cheaper than investing in upskilling domestic talent.

Immigration is essential for highly skilled industries such as digital tech, however the level of immigration has become unsustainable. Even accounting for those who left the country and industry, well over half of new tech roles are filled via immigration rather than developing domestic talent.

How can we fix it without damaging the industry?

Covid-19 has shown the susceptibility of the industry to global shocks as a result of an over-reliance on immigration. New Zealand's infrastructure challenges and housing crisis are also partly driven by immigration and it's clear that, post-Covid, immigration levels are unlikely to return to previous levels.

Conversely, the tech industry's growth in the short-term relies on access to immigration. Turning the immigration tap off to a great extent post-Covid would likely have a significantly damaging impact on the tech industry.

The answer has to be a balance.

The previous level of skills-based immigration was not sustainable and will need to change, and this will take a change in approach over the mid-term.

However this change needs to happen gradually, alongside the other skills pipeline Actions and increased investment and focus on domestic talent development. The reality is that a gradual sinking lid on immigration, alongside domestic development, is the only sustainable way of rebalancing.

Gradual rebalancing of Immigration crucial

We can't and should never turn the immigration tap off – our industry significantly relies on skilled workers from overseas. However the balance between immigration and domestic talent development must be repaired.

> Over time, our industry needs to become less reliant on immigration and more prepared to develop domestic talent.

> While a somewhat open immigration system exists, this rebalance will not occur and employers will find it cheaper and easier to "buy in" rather than develop talent – remaining at an unsustainable level.

> Therefore the tech industry needs to accept that immigration settings will change. However rather than tightening immigration immediately, this change needs to happen over 5 years to allow a change in approach and industry investment in domestic talent.

> From the Government's perspective, over this 5 year period tech immigration levels should gradually tighten and roles considered in significant shortage reduced – with greater expectation on domestic talent development in areas where this is feasible.

> It is essential that these changes are well signposted to industry, to enable investment in domestic talent development.

Immigration will always be an important part of high-skill industries such as the tech industry and this change should simply be a rebalance. There is an expectation that around 20% of new tech roles will continue to be filled via immigration over the longer term.

Another shorter-term source of talent is kiwis returning home. The KEA network has undertaken preliminary research and found a large proportion of their community have digital and technology skills. Government should support more comprehensive research with the objective of creating a catalogue of tech skills of New Zealanders overseas who may consider returning to take up roles.

Action 4: Industry must step up and lead the Transformation

The Actions outlined in this Plan are essential to enable the long-term sustainable scaling up of the tech industry in New Zealand and along with other components of the Industry Transformation Plan, ensure that kiwi tech firms can continue to take advantage of export opportunities.

As per the Foundational Principles, this transformation will need significant commitment, investment and contribution from Government, the tech industry, the education sector and in partnership with Māori.

To be successful, this transformation must be led by industry. The maturation of tech firms to a longer-term outlook and planning cycle, both individually and as a collective industry, is crucial to the success of the Plan.

Whether it be weaning off immigration and developing domestic talent, providing more diverse-friendly workplaces, providing graduate opportunities for those without experience, supporting disabled workers or providing opportunities for internships, a change in industry culture is clearly necessary to drive the transformation.

Industry's role in leading the Transformation

Employers in the tech sector will need to "buy into" leading the change, including a general call to support developing domestic talent.

We propose a combined campaign from the main tech industry bodies, supported and part-funded by Government, to encourage employers to step up and provide opportunities for graduates, interns and apprenticeships.

This campaign would include general information, case studies, videos and more and be supported by a physical and digital info pack sent to all tech employers in New Zealand.

Action 5: Māori to be a crucial partner in skills

As tangata whenua and in recognition of Te Tiriti o Waitangi, it's essential that Māori are a core partner in the skills plan for the Tech industry.

A future digital technology sector for Aotearoa New Zealand requires progressive thinking to realise Māori success. To achieve rangatiratanga in the digital sector, several factors need to be considered as critical:

- A recognition that the principles of te Tiriti must be fully incorporated in how the digital technology sector's skills and education systems work if it is ever to serve Māori well.
- A recognition that the current system has failed Māori. To remedy this failure, there needs to be significant changes in the way the digital technology sector skills pathways are designed and services delivered.
- An acceptance that remedying decades of under-performance by the digital technology education sector and pathways will require changes so that Māori expertise and more effective services can be designed and embedded into the system.

As well as ensuring authentic learning for Māori at all levels, integrating Tikanga (customs and values) and te ao Māori (Māori world view) across all components of the skills system benefits all New Zealanders.

Creating opportunities for Māori: The Māori Digital Skills body

It is essential any initiative to enhance rangatiratanga and mana motuhake opportunities, designed and progressed, are authentically led by Māori, within the context of by Māori for Māori.

Achieving this authentically requires the formation and operation of an independent Māori Digital Skills body focussed on the digital technology sector and ensuring that equitable funding allocations and expenditure properly reflect the higher needs of Māori communities.

The Māori Digital skills body would have the following functions:

- advising Government and the digital sector on all aspects of Māori
- partnering with all other parts of the system to ensure mātauranga Māori and other Māori issues are appropriately incorporated into all aspects of the system
- monitoring and reporting to the Minister on the performance of the Digital technology system with respect to Māori outcomes and equity
- investing in kaupapa Māori digital services and providers
- developing and leading the implementation of the Māori workforce strategy
- developing or supporting innovative Māori-specific digital initiatives

Other initiatives should also be supported in the meantime, including supporting Te Wānanga o Aotearoa, the largest Māori educational institution, to bring back a strong focus on teaching of Hangarau Matihiko (Digital Technologies) as a pathway into the tech industry.

Action 6: Expand the Tech Story to a domestic audience

The tech industry suffers greatly from an image problem. For example, the TEC's Drawing the Future Report found that only 0.5% of children aged 7 to 13 had IT roles as their primary aspiration – a rank of 45th out of all industry roles.

These aspirations are even worse for children in poorly represented groups in our industry, such as girls, Māori and Pasifika.

The Industry Transformation Plan includes the creation of the Tech Story, targeted at an international market. From a skills perspective, this needs to be accompanied by a domestic "tech story" focusing on careers: a shared brand to excite kids and the public about the opportunities of a tech career.

Telling the Tech Career Story should include:

- Creating a "Doing Tech" style brand to get children and others excited about the opportunities in tech, including positive role models.

- In addition, the main "big 4" national Industry initiatives in schools (123Tech, TechHub Talks, CodeClub Aotearoa and ShadowTech):
  - Need to become better coordinated and aligned;
  - Need to ensure a strong (but not exclusive) focus on girls, Māori and Pasifika, including diverse role models;
  - Need to operate alongside Māori-specific programme run by and in partnership with Māori organisations.
  - The resources available for these programmes needs to be increased significantly to enable a scaled-up approach.

- A focus on influencers such as parents and grandparents.

Suzy's Tech World

Suzy Cato has been enchanting kids for a generation through TV and other media. She's the ambassador for the industry's 123Tech programme and a great example of someone passionate about helping kids get into tech.

Action 7: An All-of-Government strategic approach to skills

Government is the largest employer of IT professionals in New Zealand. However the structure of Government – made up of a large number of somewhat autonomous agencies – has meant that the development of tech talent *within* Government has lacked a strategic or coordinated approach.

This must change. As well as being in a position to significantly support the development and transformation of digital tech skills in NZ, this will have significant positive flow-on benefits for Government agencies.

The National Digital Skills Agency: A new home for digital tech skills management in Government

The National Digital Skills Agency would be a new centrally resourced and funded team within an existing Government department, focused solely on providing guidance, support and development of digital technology skills across *all agencies of Government*.

This Agency would provide clear guidance, tools, and initiatives to develop tech talent and accelerate careers of Government digital technology professionals. This would include leading the initiatives listed below, as well as providing good practice skills development guidance across govt.

It's essential that this team is resourced specifically for this role to ensure the purpose isn't lost in competing agency priorities.

The National Digital Skills Agency would assume responsibility for introducing scalable initiatives, delivered across Government, including a scaled-up GovTech Talent programme for those new to a tech career, and a new GovTech Advance programme for those looking to specialise.

The Agency would also produce and release guidance on best-practice skills management, manage role descriptions used across Government and license tools and frameworks for the use of all agencies.

GovTech Talent: Scaling up a successful programme

GovTech Talent is an existing 2-year programme that helps recent graduates experience 3 different agencies across Government. It's a successful initiative that helps develop careers within Government.

Currently, the funding model around GovTech Talent relies on the goodwill of multiple agencies. The programmes takes 15-20 graduates a year and is not especially scalable in its current form.

To scale significantly, the GovTech Talent programme needs to be centrally funded and operated from within the new Digital Skills Agency.

GovTech Advance: Advancing digital skills

GovTech Advance would take the concept of GovTech Talent and apply it to mid-career IT professionals looking to specialise – giving them experience in specialist roles across multiple agencies.

With a similar model to GovTech Talent but operating as a 12-month programme, GovTech Advance would help accelerate digital careers.

Action 8: Increased support for digital tech learning in schools

More than ever before, there are huge opportunities for school students to learn and experience tech. With the new Digital Technologies and Hangarau Matihiko curriculum, all students learn about tech across all year groups.

The tech industry delivers several initiatives into schools which make a difference and do need additional support. However the biggest barrier to uptake of digital tech learning in schools is teacher support and education.

Dedicated TeachNZ Scholarships

Our education system needs more teachers with a technology background to provide opportunities and inspire children about Tech.

The TeachNZ *Te Huawhiti Career Changer Scholarship* is designed to support those coming from another profession to become teachers, however these are untargeted and some with a tech background have been turned away.

Given the strong need to recruit teachers with a technology background, dedicated TeachNZ career changer scholarships for those with a qualification or background in technology would address the significant shortage.

Additional PLD for Teaching Digital Technologies

The current Professional Learning and Development (PLD) programme for teachers is excellent with many great opportunities for teachers to upskill and improve both pedagogy and knowledge.

Given the shortage of teachers with strong Digital Technologies knowledge and understanding, dedicated “ring-fenced” PLD for Digital Tech is needed.

The Kia Takatū ā-Matihiko | Digital Readiness programme resources

Many teachers were relying on the Kia Takatū ā-Matihiko (Digital Readiness Programme) resources to teach Digital Technologies.

Teachers have told us that these resources were hugely important to their teaching and were removed without warning. These should be restored urgently to assist teachers, especially those new to the subject.

Action 9: Radically re-defined standardised job "roles"

Job roles and descriptions are important, however they are often ill-defined, based on skills at the exclusion of outcomes, and alienate those in our less represented industry demographics.

We've heard that the style of job role titles and descriptions in the tech industry often alienate Māori and Pasifika workers. A change to how we define standard role titles and descriptions would create a more welcome and open industry.

Additionally, a more widespread focus on roles and development based on skills frameworks such as the Skills Framework for the Information Age (SFIA) would enable a more coordinated and joined up approach across the industry.

Government, as the largest employer of tech talent in New Zealand, should make this a priority focus, as provided for within Action 7.

A set of inclusive Role Descriptions for everyone

Government and the tech industry should work together to create meaningful outcomes-focused role descriptions that are community-oriented, use plain language to describe skills, and incorporate the Māori world view.

These descriptions should then be released under Creative Commons and promoted by both Government and Industry bodies.

This may seem like a minor project, however many people told us this would make a substantial difference for those looking to enter or progress in the industry, while helping those with compatible skills understand how these could be incorporated into tech roles.

Action 10: Strengthen the tech sector through greater diversity

The tech industry suffers from a significant diversity problem, with low numbers of women and atrocious stats on Māori and Pasifika involvement.

Additionally, while our industry is a great fit for many people with physical or other disabilities, many find entry to our industry particularly difficult – even with qualifications and experience.

There are two crucial reasons diversity of the tech workforce is important:

- The numbers – if the industry is only attracting talent from a pool of less than 50% of the population, it will not be possible to scale; and

- Strength – a diverse workforce is far stronger and ensures diversity of thinking that is more representative of the actual users of technology.

As outlined elsewhere, it's essential that a more diverse group of school students pursue a career in tech. However industry also has a more direct role to play.

It's important that tech workplaces are suitable and appropriate for different genders and cultures, and basic guidance on how to achieve this would be beneficial to the industry.

How do we provide for disabled workers?

Employers often choose not to hire disabled workers because they perceive that doing so is difficult, expensive and time consuming. Many don't realise there is support and funding to make workplaces more disability friendly.

The Skills Workstream started creating guidance on how to make a workplace more suitable for those with disabilities. It is proposed that more comprehensive guidance be produced and made available through industry bodies and Government.

Specific initiatives – who and when?

ACTION	WHAT?	WHEN?	WHO?	FUNDING
1	Create Reskilling- and Upskilling-specific strategy for the tech sector including incentivising and funding initiatives	Mid-term	ITPNZ, TEC	Specific funding for initiatives
2	Pilot Apprenticeship Degree model with WelTec and Whitireia, in partnership with industry	Mid-term	WelTec, Whitireia, TEC, ITPNZ, WDC	Ensure new funding model can support this
2	Support the development of Level 5 / Level 6 Apprenticeship-style education programmes	Now	TEC, ITPNZ, WDC	Similar to other Apprenticeships
2	Provide operational funding to *Summer of Tech*, the tech industry's dedicated internship process, to reduce the cost of participation and scale up provision nationwide	Now	MBIE, Summer of Tech Programme	Sufficient to cover the majority of operational costs
2	Scale up the level of internship funding through Callaghan Innovation, and loosen the criteria enabling easier uptake in tech	Mid-term	Callaghan Innovation, Summer of Tech	Via Callaghan

ACTION	WHAT?	WHEN?	WHO?	FUNDING
3	Gradually refine the Skilled visa requirement to become more precise about the tech roles that qualify.	Next 5 years	MBIE (Immigration)	N/A
3	Support a KEA project to categorise the tech skills and experience of kiwis living overseas, and the appetite for moving back to NZ.	Now	MBIE, KEA	Direct support
4	Create campaign and messaging for industry to step up, support workers and lead the transformation	Mid-term	ITPNZ, NZTech, NZRise, MBIE	Developed by industry bodies, funded by MBIE
5	Establish and fund a Māori Digital skills body to advise Government, partner with other components of the skills system, report to the Minister on the performance of the Digital tech system in relation to Māori, invest in Kaupapa Māori services, develop and lead a Māori workforce strategy and invest in Māori digital initiatives.	ASAP	MBIE, with engagement and support from industry bodies and others	Direct support
5	Support Tech education for Māori, by Māori and in a Māori environment, such as Te Wānanga o Aotearoa and Ngāi Tahu's apprenticeship initiative.	Now	TEC, Māori educational institutes and iwi	Supporting initiatives

ACTION	WHAT?	WHEN?	WHO?	FUNDING
6	Resource the development of a parallel domestic "Tech Story" brand and campaign around tech careers, open to use by everyone in the industry.	Mid-term	MBIE, NZTech	Funded as part of the ITP
6	Fund initiatives to get to a wider audience, for example a "Suzy's Tech World" YouTube and social media series to excite kids about tech and others.	Mid-term	MBIE, ITPNZ	Direct funding from MBIE
6	Scale up resources for the tech industry's main in-school outreach programmes (123Tech, TechHub Talks, Shadow Tech, CodeClub Aotearoa) and ensure a (non-exclusive) focus on girls, Māori and Pasifika.	Now	MBIE, MinEd, Industry	Partnership funding with industry
7	Create the National Digital Skills Agency, a unit within an existing Govt department, to take the lead on guidance and initiatives to accelerate digital careers in Government.	ASAP	Dept of Internal Affairs or Public Service Commission	Significant investment
7	Centrally fund and manage a scaled-up GovTech Talent programme	ASAP	Digital Skills Agency	Via new sub-agency funding

ACTION	WHAT?	WHEN?	WHO?	FUNDING
7	Create the GovTech Advance programme, similar to GovTech Talent however for mid-career professionals looking to specialise	Mid-term	Digital Skills Agency	Via new sub-agency funding
8	Create dedicated TeachNZ scholarships to support those with tech qualifications or background to become teachers	ASAP	Ministry of Education	Via existing TeachNZ programme
8	Fund additional ring-fenced PLD for teachers to enable the teaching of Digital Technologies | Hangarau Matihiko	Mid-term	Ministry of Education	Via existing PLD programme
8	Immediately restore the existing Kia Takatū ā-Matihiko | Digital Readiness programme resources for teachers	ASAP	Ministry of Education	Resources already exist
9	Create and share a broad set of role descriptions using plain language to define skills, and a focus on outcomes	Mid-term	ITPNZ, NZTech, Digital Skills Agency, TEC	Not significant
10	Provide more opportunities for diversity training, especially in creating a safe and welcoming workplace for everyone	Mid-term	Industry bodies and MBIE	Minimal
10	Provide detailed guidance on hiring those with disabilities and preparing a workplace	Mid-term	Industry bodies and MBIE	Development and distribution of resources

In Conclusion

The tech sector in New Zealand has a significant skills mismatch, resulting in an over-reliance on immigration vs domestic talent development. This needs to be rebalanced gradually by removing barriers in the domestic skills systems.

The Skills Plan includes a significant amount of work across a range of areas, each necessary to unlock the potential of the industry.

This will require a structured, strategic approach. One Government agency must take responsibility for implementing the Plan, with dedicated staff and encouraging both a cross-Government and industry-engaged approach.

The Skills Plan must be a collaboration between Industry, Government and the Education Sector and focus on every part of the skills pipeline by achieving the 10 Actions outlined.

Steering Group Members

The following came together as the Steering Group to oversee the development of the Skills Plan. We are hugely grateful for their significant contributions to this report and the advancement of this Skills Plan for Aotearoa New Zealand.

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 Manager, MBIE
Ruth Green-Cole	Managing Director, Developers Institute
Sunit Prakash	Principal Consultant, SunIT Ltd
Will Koning	Chief Data Officer, Kantar

Lead Researcher and Secretariat to the Steering Group:

Gina Chong	IT Professionals NZ

References

Absolute IT. (2020, July). *Tech & Digital Remuneration Report*. https://www.absoluteit.co.nz/wp-content/uploads/2020/07/Tech-Digital-Remuneration-Report-July-2020.pdf

Diversity Works NZ. (2020). *Aotearoa State of Workplace Inclusion 2020 Report*. https://diversityworksnz.org.nz/news-resources/aotearoa-state-of-workplace-inclusion-2020-report/

Du, J., & Wimmer, H. (2019). Hour of Code: A Study of Gender Differences in Computing. *Information Systems Education Journal (ISEDJ)*, *17*(4), 91–100. https://files.eric.ed.gov/fulltext/EJ1219536.pdf

Gallup. (2016). *Diversity Gaps in Computer Science: Exploring the Underrepresentation of Girls, Blacks and Hispanics*. Google / Gallup. https://services.google.com/fh/files/misc/diversity-gaps-in-computer-science-report.pdf

Immigration NZ. (2020, November). *Approved Work Visas*.

Immigration NZ. (2021, April). *Tech Industry Salary Data (Custom report)*.

Krill, P. (2020, January 21). *JavaScript is the most in-demand IT skill*. InfoWorld. https://www.infoworld.com/article/3515788/javascript-is-the-most-in-demand-it-skill.html

Lawson Williams. (2019). *NZ Staff Turnover Survey Report 2019*. https://www.lawsonwilliams.co.nz/cms/files/Lawson-Williams-National-Staff-Turnover-Survey-Full-Report-2019.pdf

LinkedIn. (2020, October). *Customised Talent Pool Report*.

LinkedIn Learning. (2016, November). *The Biggest Reason Tech Workers Switch Jobs (Hint: It Isn't Money or Their Boss)*. https://www.linkedin.com/business/learning/blog/leadership-and-management/the-biggest-reason-tech-workers-switch-jobs-hint-it-isnt-money

LinkedIn Talent Solutions. (2020). *COVID-19 fuels internal hires in Asia-Pacific*. https://business.linkedin.com/talent-solutions/recruiting-tips/thinkinsights/covid-19-fuels-internal-hires-in-asia-pacific

McKinsey & Co. (2020a, May). *Diversity wins: How inclusion matters*. https://www.mckinsey.com/featured-insights/diversity-and-inclusion/diversity-wins-how-inclusion-matters

McKinsey & Co. (2020b, August). *Building the vital skills for the future of work in operations*. https://www.mckinsey.com/business-functions/operations/our-insights/building-the-vital-skills-for-the-future-of-work-in-operations

Ministry of Business, Innovation and Employment. (2020a, December). *ICT Occupations Calculations (Custom Report)*.

Ministry of Business, Innovation and Employment. (2020b, December). *Jobs Online Quarterly Release*. MBIE. https://www.mbie.govt.nz/business-and-employment/employment-and-skills/labour-market-reports-data-and-analysis/jobs-online/

Ministry of Education. (2020). *Provider Based Graduates Predominant Field of Study 2010–2019*. Education Counts.

Ministry of Education. (2021). *NCEA Technology Standards participation*. Education Counts.

NZ Digital Skills Forum. (2021, January). *Digital Skills Aotearoa: Digital Skills for our Digital Future*. NZTech. https://nztech.org.nz/wp-content/uploads/sites/8/2021/01/Digital-Skills-Aotearoa-Report-2021_online.pdf

NZ Qualifications Authority. (2013, November). *Needs Analysis: Review of Information and Communication Technology (ICT) Qualifications*.

NZ Qualifications Authority. (2017, November). *Review of New Zealand ICT Qualifications - Proposed addition of Cybersecurity and IT Testing Qualifications*. NZ Qualifications Authority and IT Professionals NZ.

OECD. (2019, May). *OECD Skills Outlook 2019: Thriving in a Digital World*.

OECD. (2020, November). *Labour force participation rate by sex*. https://stats.oecd.org/Index.aspx?DataSetCode=lfs_sexage_i_r

Sax, L. J., Lehman, K. J., Jacobs, J. A., Kanny, M. A., Lim, G., Monje-Paulson, L., & Zimmerman, H. B. (2016). Anatomy of an Enduring Gender Gap: The Evolution of Women's Participation in Computer Science. *The Journal of Higher Education*, *88*(2), 258–293. https://doi.org/10.1080/00221546.2016.1257306

Sharman, A. (2019). *How many jobs do your skills prepare you for?* Productivity Commission. https://www.productivity.govt.nz/futureworknzblog/how-many-jobs-do-your-skills-prepare-you-for/

Statistics NZ. (2019, June). *Labour market statistics (working life): December 2018 quarter*. https://www.stats.govt.nz/information-releases/labour-market-statistics-working-life-december-2018-quarter

Statistics NZ. (2020, August). *Labour market statistics (disability): June 2020 quarter*. https://www.stats.govt.nz/information-releases/labour-market-statistics-disability-june-2020-quarter

Summer of Tech. (2020, January). *SOT2019 Report*. https://summeroftech.co.nz/blog/infographics/sot2019/

Te Kawa Mataaho Public Service Commission. (2019). *WeCount 2019: Inclusion & our Rainbow Public Service*. https://www.publicservice.govt.nz/assets/SSC-Site-Assets/Workforce-and-Talent-Management/Diversity-Inclusion/WeCount-2019-findings.pdf

Tertiary Education Commission. (2018, August). *Hidden Links, New Opportunities*. AlphaBeta. https://www.tec.govt.nz/assets/Reports/49efa6f071/Hidden-Links-New-Opportunities-Report.pdf

Trademe. (2021). *Trademe Salary Guide*. https://www.trademe.co.nz/c/jobs/product/salary-guide

Williams, W. (2020). *Digital Taniwha: Growing Māori participation in the IT industry (Thesis, Doctor of Philosophy (PhD))*. The University of Waikato, Hamilton, New Zealand. https://hdl.handle.net/10289/13842