Te Wao Toi Whānui

TOI MAI
Workforce
Development
Council

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The Toi Whānui Forest

Photo by Nexionly from Pexels

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Te kano ki te rau
Summary

Government investment in technology education has declined at the very time the digital technology industry needs more skilled workers. The lack of investment has contributed to a domestic workforce shortage that is unable to meet the skills and labour needs of the growing digital technology sector, currently on track to overtake the primary industries as New Zealand's largest export sector.

The sector's response has been to fill immediate gaps with imported global tech talent. While doing so helps to drive innovation and foster international diversity, it also puts pressure on New Zealand's capacity to absorb a large immigrant workforce, and develop more fit-for-purpose domestic training. At the same time, the industry has a domestic diversity deficit, with serious underemployment of Māori, Pacific peoples, women and tāngata whaikaha (disabled peoples). These peoples are missing out on the education and work opportunities that are so critical for the social and economic wellbeing of their whānau and communities.

To ‘Thrive by ’35’ (the Toi Mai goal for all our workforces), the digital technology sector needs a concerted effort by industry, funders and higher education providers to nurture an inclusive, innovative and globally competitive ecosystem that empowers its diverse workforce with skills and opportunities to thrive in the digital economy.

This workforce development plan is the result of engagement with learners, workers, education providers and businesses, combined with research and data to produce insights on what is needed to ensure a thriving workforce and productive industry. Our recommendations are heavily informed by what we have learned from this process.

To help contextualise the situation of the digital technology workforce, we have drawn inspiration from our beautiful environment here in Aotearoa and called this workforce development plan "Te Wao Toi Whānui," the Toi Whānui Forest. Being able to walk through a thriving forest, full of kauri, tōtara, kōwhai and mānuka, bursting with the birdsong of tūī and korimako, while being followed by a cheeky pīwakawaka is one of the things that makes Aotearoa special. However, when we look at the landscape of our digital technology sector, we don't see a forest full of native trees and thriving birdlife. To create a place full of kai to sustain our manu (birds), we need to encourage, nourish and protect the forest to grow and flourish.

This report's recommendations suggest ways in which we can reverse this trend, focusing on bridging the diversity gap and creating safe and nurturing glass house environments (training pathways) where the next generation of local tech workers can be allowed to develop from kākano (seeds) to pihinga (young shoots) to tipuranga (mature trees), until finally reaching pūāwaitanga (full blossom).

As a workforce development council, the role of Toi Mai in this ecosystem is to create a nutritional, rich environment for our new generation of native tech workers to be transplanted, so they can become the thriving Te Wao Toi Whānui of the future.

Photo by Tim Mossholder from Unsplash

Mawhiti wao
Snapshot

Snapshot

Mawhiti wao
Snapshot

For generations, Aotearoa New Zealand's economy has been tied to the land, its wealth rising and falling with the fortunes of agriculture. Our visible agrarian narrative has dominated our global presence, and while farming will continue to be a major export earner for the country, the future of Aotearoa is a digital one.

Unlike traditional exports, digital products and services are not limited by distance, physical transportation or energy costs. They are weightless, have a low carbon footprint (especially compared to other domestic export industries), can become a global success almost instantly, and can create high-paying jobs with vast potential to grow more. New Zealand's primary sector at its current capacity can only feed 40 million global consumers each year (NZTE). The digital sector has the potential to reach billions. The sector is on track to supplant primary industries as New Zealand's largest export sector.

By 2040, Māori and Pacific peoples will make up half of Aotearoa New Zealand's population, meaning the country's digital future must include a strong Māori and Pacific digital technology workforce from start to finish. We must equip young people, regardless of race, ethnicity and cultural background, with the tools they need to thrive in the digital world: internet access, devices, inspiring role models, clear paths into tech careers, and the ability to build international companies that reflect the values of Aotearoa. Doing so will allow us to grow our collective wealth and share our values with the world.

This workforce development plan is focused on digital technology workers, but an inclusive digital economy with access and digital literacy empowers everyone to succeed, no matter their background or ethnicity, where they live, or whether they have land or resources. The potential for shared prosperity in a digital future is enormous.

In February 2023, the overall digital technology sector employed

120,000

people.

Of those,

46,300

were those with advanced technology skills – 'technologists'

– spread across

15,345

businesses (Infometrics).

Firms in this part of the sector often scale quicker than other businesses and require a well-educated and agile workforce to maintain growth.

Despite this need, domestic training in the sector declined by

33% ↓

between 2010 and 2023 (Ngā Kete 2023)

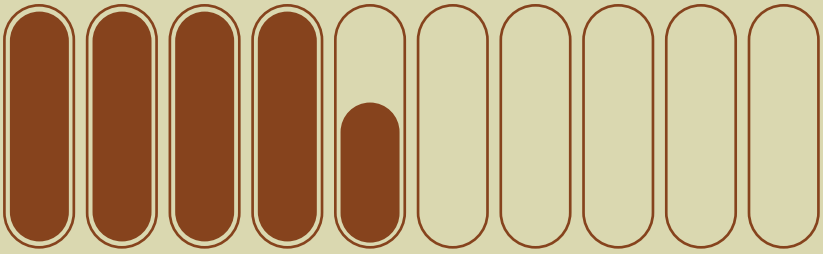
and provision investment declined by

$22M

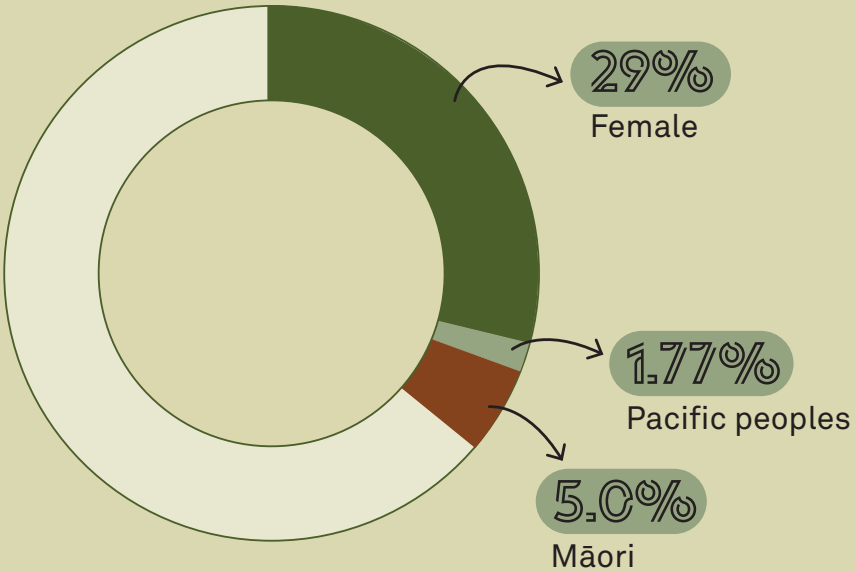
between 2012 and 2022 (Ngā Kete 2023).

The sector is reliant on a large imported international workforce.

Currently,

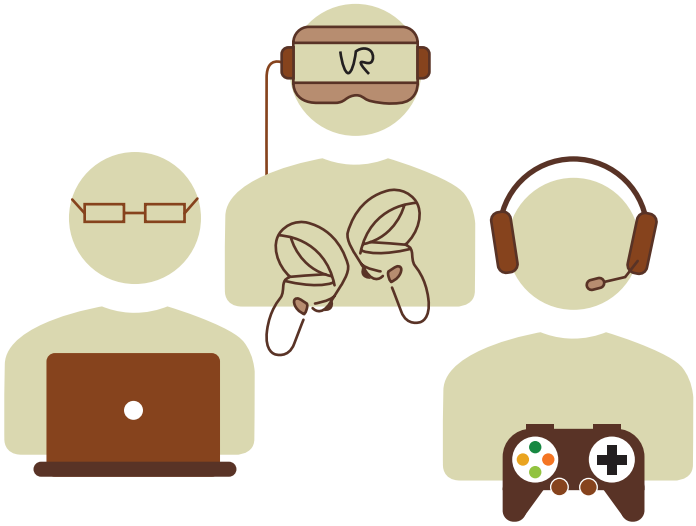


45% of technology roles are on a work or resident visa, and these roles are typically at intermediate and senior levels (Stats NZ).



Demographically, 29% of the sector is female, 1.77% Pacific peoples and 5.01% Māori. All three categories are below population parity (Stats NZ 2022).

For tāngata whaikaha, it is more difficult to know true participation as information is often not recorded nor disclosed. However, the consensus among stakeholders is that the whaikaha community represents a large untapped talent pool.

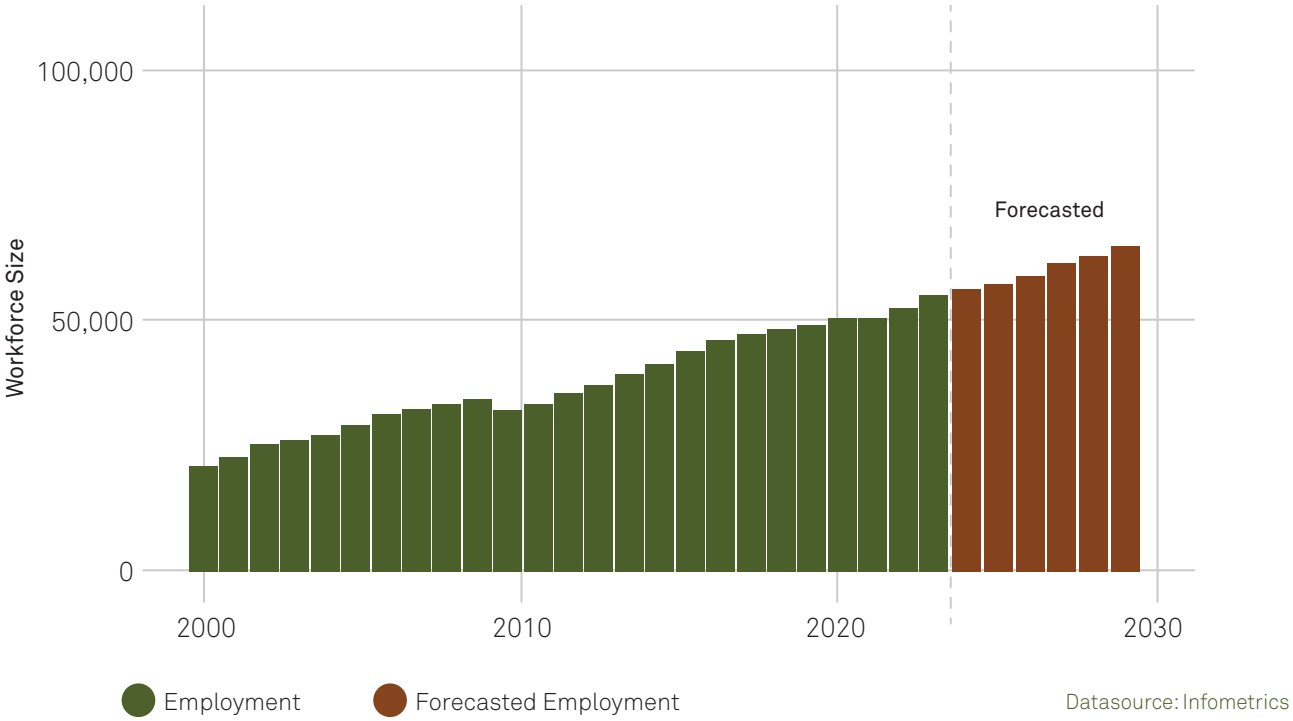


Infometrics projects year-on-year growth in employment to reach a further

20,000 people in technologist roles by 2030 (Infometrics).

Without any changes in training, many of these roles would need to be filled by overseas recruits.

Digital Skills Workforce Size



Datasource: Infometrics

Kia korihi tahi ai
Bridging the Digital Divide: A Workforce Development Plan for Te Wao Toi Whānui

KAIKORI KAI

Kia korihi tahi ai
Bridging the Digital Divide: A Workforce Development Plan for Te Wao Toi Whānui

This plan lays the foundation for empowering Te Wao Toi Whānui[1], Aotearoa New Zealand's digital technology sector, to build a high value, more inclusive and future-proof workforce.

The plan addresses the projected growth in the sector's demand for talent, highlighting the growing disparity between domestic talent supply and industry growth. It discusses the overreliance on global talent to fill intermediate and senior positions, which in turn hinders the development of a robust domestic workforce and restricts opportunities for existing domestic talent.

The plan unveils key themes from in-depth research with learners, workers, education providers and businesses. It spotlights current hurdles faced by the Toi Whānui workforce and proposes actionable recommendations to bridge the skills gap and foster diversity.

A central focus in the plan is on achieving greater participation of women, Māori, Pacific peoples and tāngata whaikaha, all of whom are currently underrepresented and face barriers to entry into the sector.

The plan examines how to better align current training programmes to meet the sector's evolving skills requirements. It identifies knowledge and skill gaps and proposes ways to bridge them, especially around transferable skills. It also proposes alternative training models, such as fit-for-purpose workplace-based learning, digital apprenticeships, and support for Māori-led and Pacific-led training initiatives. The exponential potential of the Toi Whānui sector hinges on building a diverse, culturally capable and skilled workforce equipped to grow the digital future of Aotearoa.

[1] Te Amokura and Toi Āria: Design for Public Good gifted the name Toi Whānui as part of the *The COVID-19 Recovery Baseline Engagement and Data Project* as "[f]ollowing an initial audience map, Te Amokura and Toi Āria determined the original sector titles used by Toi Mai did not account for their complexities. Five new working titles were designed, with a descriptor (instead of an English translation) aimed at providing a more holistic identification process. The new titles . . . embed Te Tiriti o Waitangi and Te Ao Māori across all titles to ensure growth of understanding with a collective responsibility, and to assist Toi Mai to prioritise Te Tiriti o Waitangi and Te Ao Māori" (7).

To undertake this workforce development plan, Toi Mai engaged with a range of stakeholders across

48

48 engagements, including
- rangatahi (young people),
- educators,
- STEM/STEAM institutions,
- employees,
- employers,
- government representatives and companies of all sizes,

including
- Māori tech businesses, from sole traders to multinationals.

2

Additionally, two tech talanoa were held in Tāmaki Makaurau and Te Whanganui-a-Tara

34

34 people attend the two tech talanoa

1

alongside a dedicated tāngata whaikaha hui in Ōtautahi

7

7 people attended the tāngata whaikaha hui

Data analysis played a crucial role, drawing insights from sources such as Stats NZ, Ngā Kete, Infometrics and Te Mata Raraunga.

The discussions were rich and informative, with many sharing their experiences and thoughts on the sector and the barriers and potential for the industry. There was a collective desire to have the sector be truly representative of Aotearoa and achieve its full potential by embracing those currently underrepresented. These insights have been distilled into common themes for the plan.

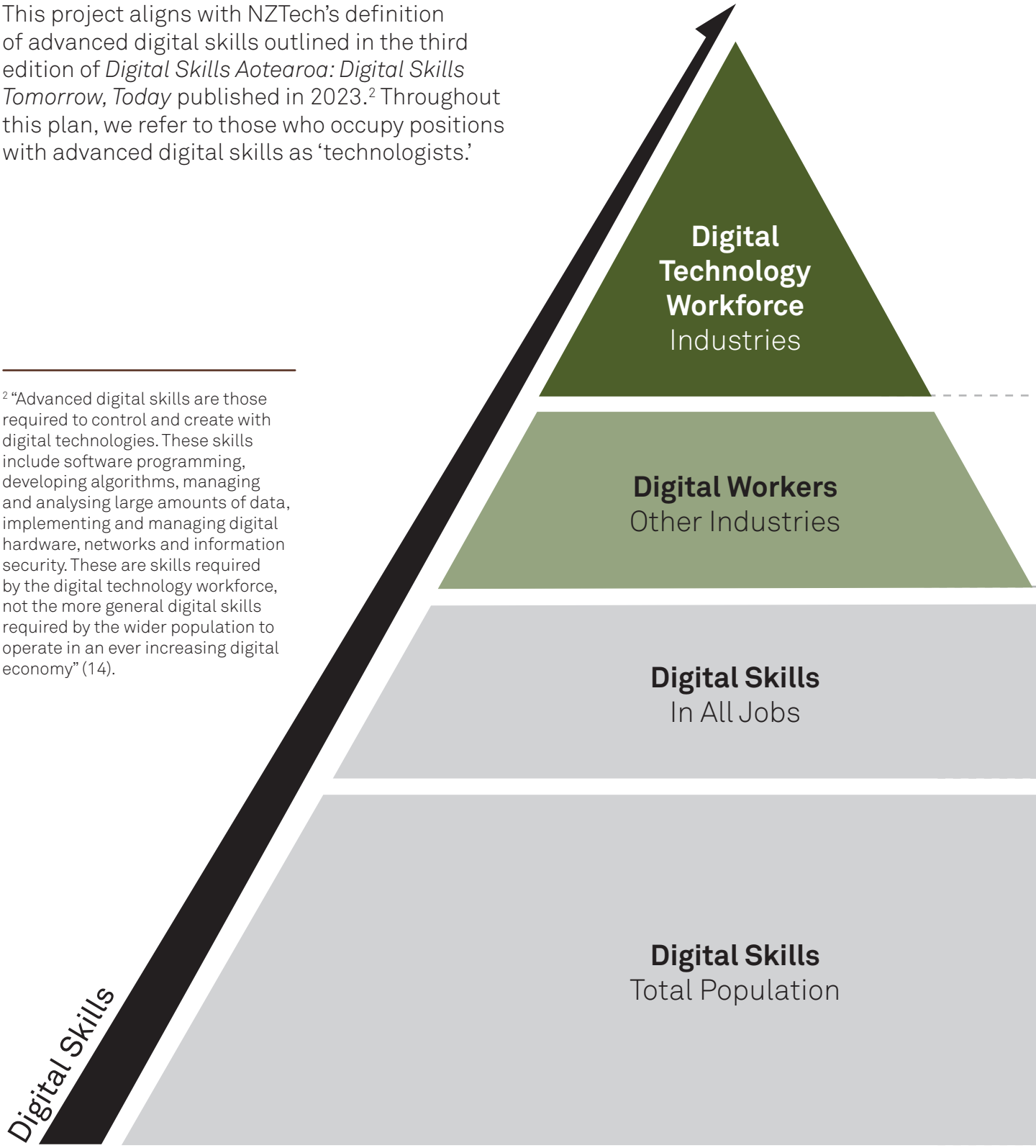
Toi Mai acknowledges the breadth and depth of research that has taken place previously including research conducted by NZTech, Toi Mai, ITPNZ, Tokona Te Raki, Pāua Interface, MBIE, Making Everything Achievable, Te Matarau and KiwiSaaS, among others. Where possible, this plan builds on recommendations previously developed in that research.

Te hōkai wao
Scope

ΤΕΧΝΑΟ

Te hōkai wao
Scope

This project aligns with NZTech's definition of advanced digital skills outlined in the third edition of *Digital Skills Aotearoa: Digital Skills Tomorrow, Today* published in 2023.[2] Throughout this plan, we refer to those who occupy positions with advanced digital skills as 'technologists.'



[2] "Advanced digital skills are those required to control and create with digital technologies. These skills include software programming, developing algorithms, managing and analysing large amounts of data, implementing and managing digital hardware, networks and information security. These are skills required by the digital technology workforce, not the more general digital skills required by the wider population to operate in an ever increasing digital economy" (14).

These levels represent:

Digital Technology Workforce
te puāwaitanga (the blossom): (e.g. software developers in a software company)

Digital Workers
te tipuranga (the growth / mature tree): (e.g. software developer in a bank)

46,300

Digital Skills All Jobs
te pihinga (young shoot): (e.g. using software in a workplace)

120,000

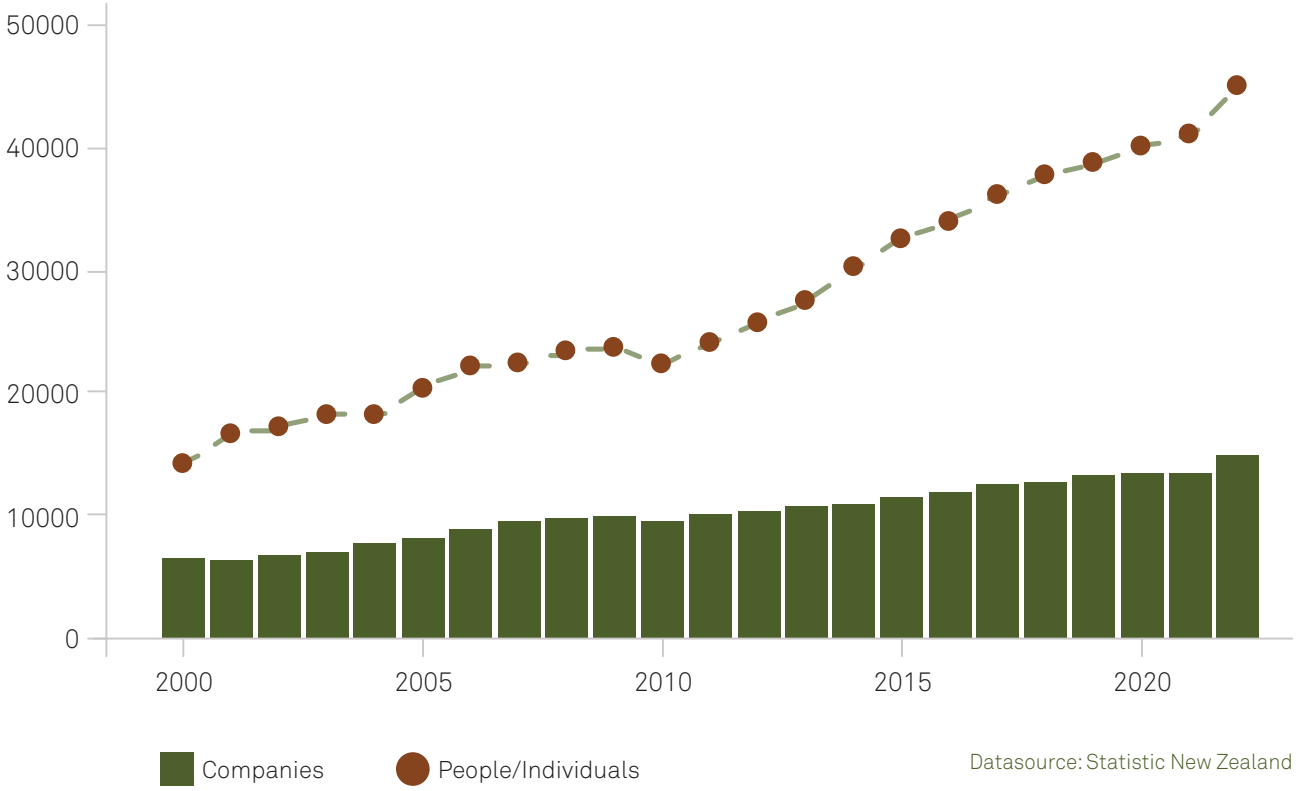
Digital Skills Population
te kākano (seed): (e.g. using a banking app / using a computer)

Photo by thisisengineering from Pexels

Toi Mai, and therefore this plan, covers the Digital Technology Workforce and Digital Workers in other industries only.

In February 2023, the overall tech sector employed 120,000 people, of which 46,300 were technologists, spread across 15,345 businesses. For the last 20 years there has been almost continuous growth in the sector both in terms of companies in the sector and technologist roles.

New Zealand Digital Skill Workforce Entity Count and Workforce Size by Year Nationwide



During our engagements, the term 'digital technology sector' was sometimes used interchangeably with the narrower definition of advanced technology roles and the wider industry, regardless of role. Throughout this document, unless otherwise clarified, digital technology refers to the specific definition outlined by NZTech.

We do, however, acknowledge the need for other skills and training within the sector, particularly in areas such as software-as-a-service (SaaS), for example sales, marketing, customer success and product management. Toi Mai will work with industry, providers and other workforce development councils who cover these areas in separate workforce development work.

Ngā kaupeka matua
Themes

NGĀ KAUPEKA MĀTUA

Ngā kaupeka matua
Themes

The following section delves deeper into these ideas and explains the reasoning behind the proposed actions, recommendations and strategic objectives outlined in the Toi Whānui Workforce Development Plan.

- Training hasn't kept up with industry growth or needs
- Aotearoa needs greater digital literacy
- Private Training Enterprises train nearly half of the sector
- Targeting and funding specific technology qualifications increases enrolments
- Over reliance on international workforce skews training
- Work-based Learning/Digital Apprenticeships would boost the number of Māori and Pacific peoples in the sector
- Better Care and Coordination needed to retain people entering sector
- Short-term initiatives limit our ability to develop a sustainable forest of talent
- Transferable skills are crucial for the workforce but need more emphasis
- Equity is important for the long-term sustainability of the sector and Aotearoa
- Setting targets will hold industry to account and provide guidance for provision
- For-Māori-by-Māori and for-Pacific-by-Pacific training models would increase the number of Māori and Pacific who enter and stay in the industry
- Hiring practices need to be reformed and more inclusive to attract diverse talent
- Tāngata whaikaha (disabled people) have super powers often overlooked by industry
- Pathways need to start at primary school and be integrated into the community
- Role models play a key role in inspiring rangatahi interest in technology

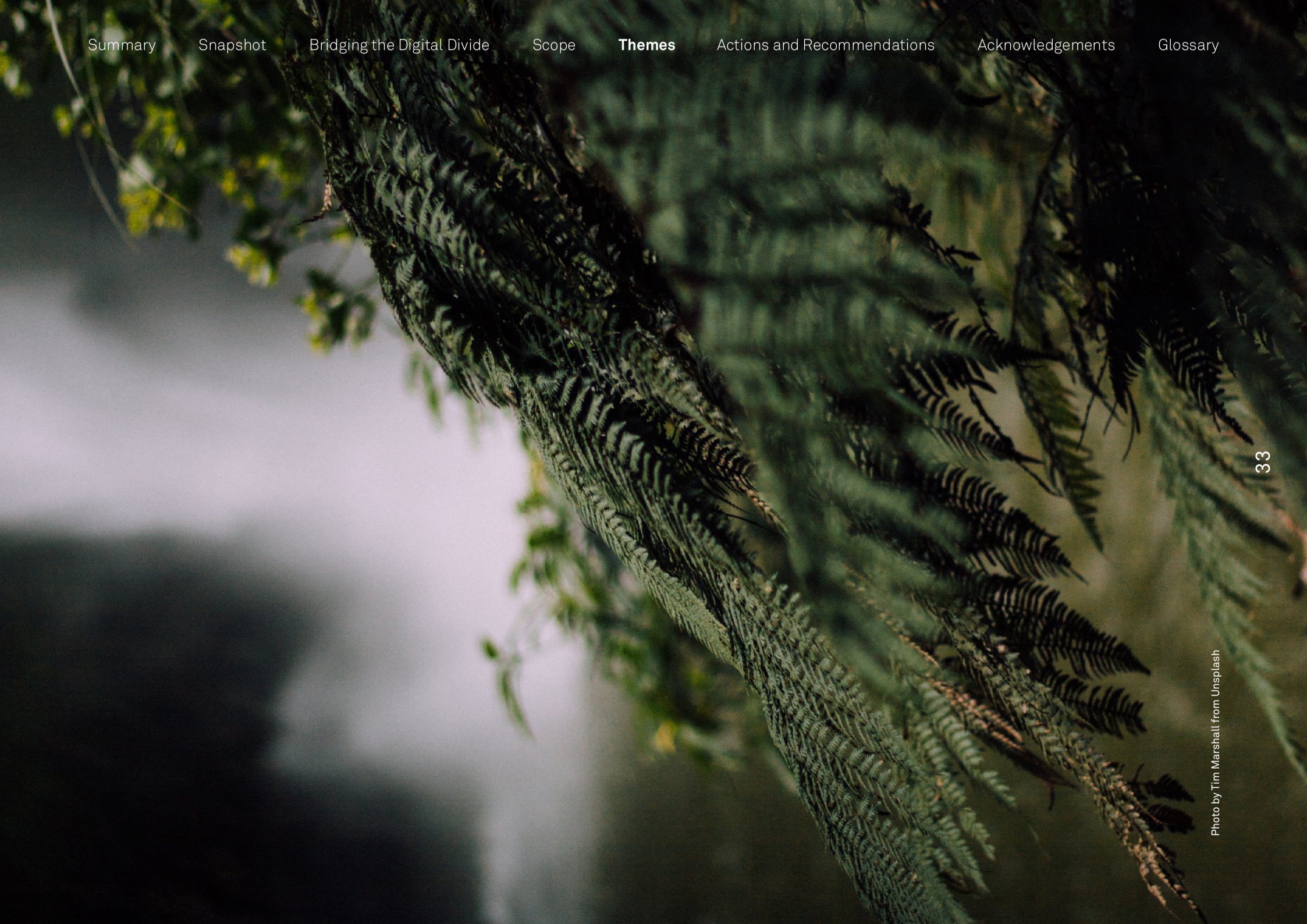


Photo by Tim Marshall from Unsplash

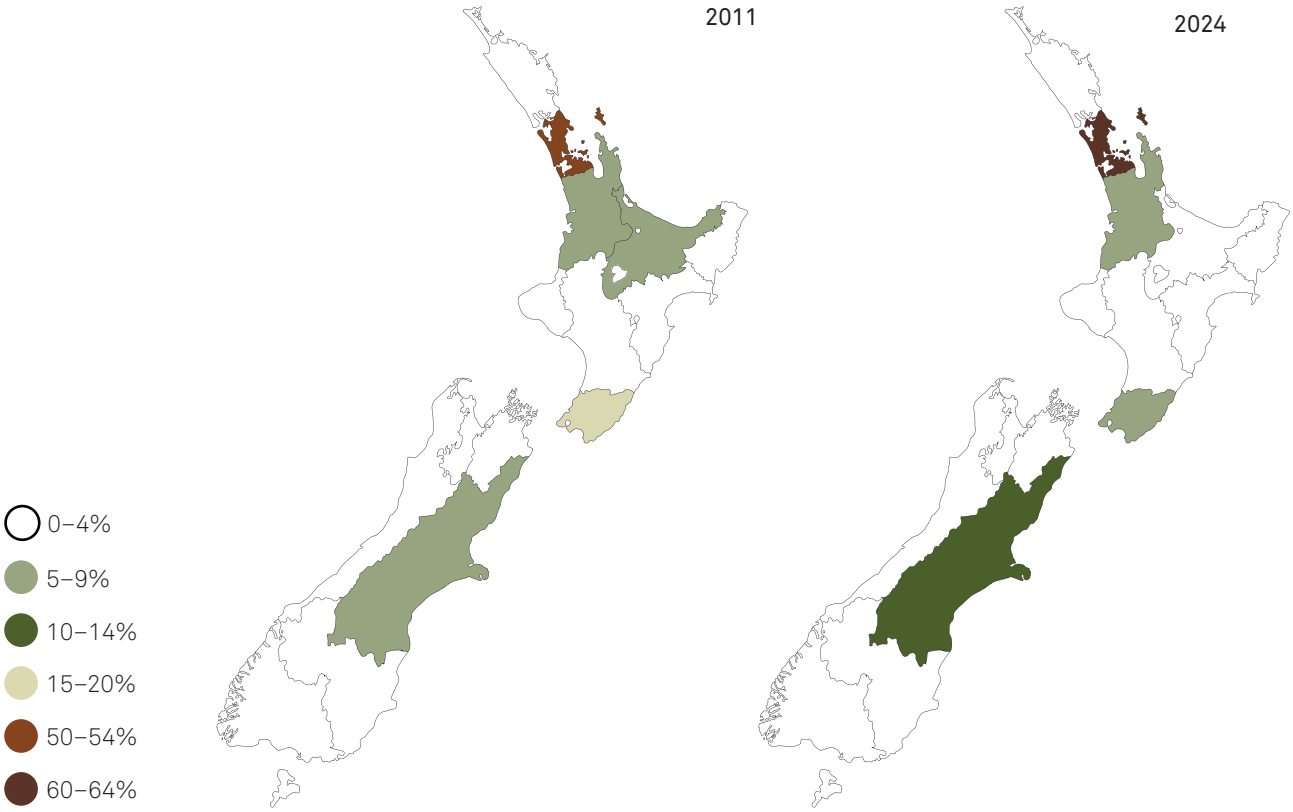
Kāore i rawaka te whakangungu ki te painga o ngā hiahia me te whanaketanga ā-ahurea

Training hasn't kept up with the industry growth or needs

Even as the sector has grown in size and value, investment in and training of domestic students has declined, and the lack of readily available training programmes is an obstacle to supplying qualified domestic workers to industry.

This is especially so when it comes to training in the regions. Regional training enrolment has decreased over the past ten years to the point where, in some regions, training options are scarce or non-existent, sometimes with only one provider. Areas like Marlborough, Tasman, and the West Coast currently have no formal training provision. Te Tai Tokerau and Tairāwhiti have low numbers. Our research found a relationship between the number of digital tech firms in a region and training provision. Re-incentivising regional providers to offer digital technology training will support the growth of technology firms outside the main centres, which in turn leads to the growth of regional incomes. Regional provision, aligned to meet local demand, also provides access to those who want to study and work in their community.

Total Enrolment of Information Technology Provision



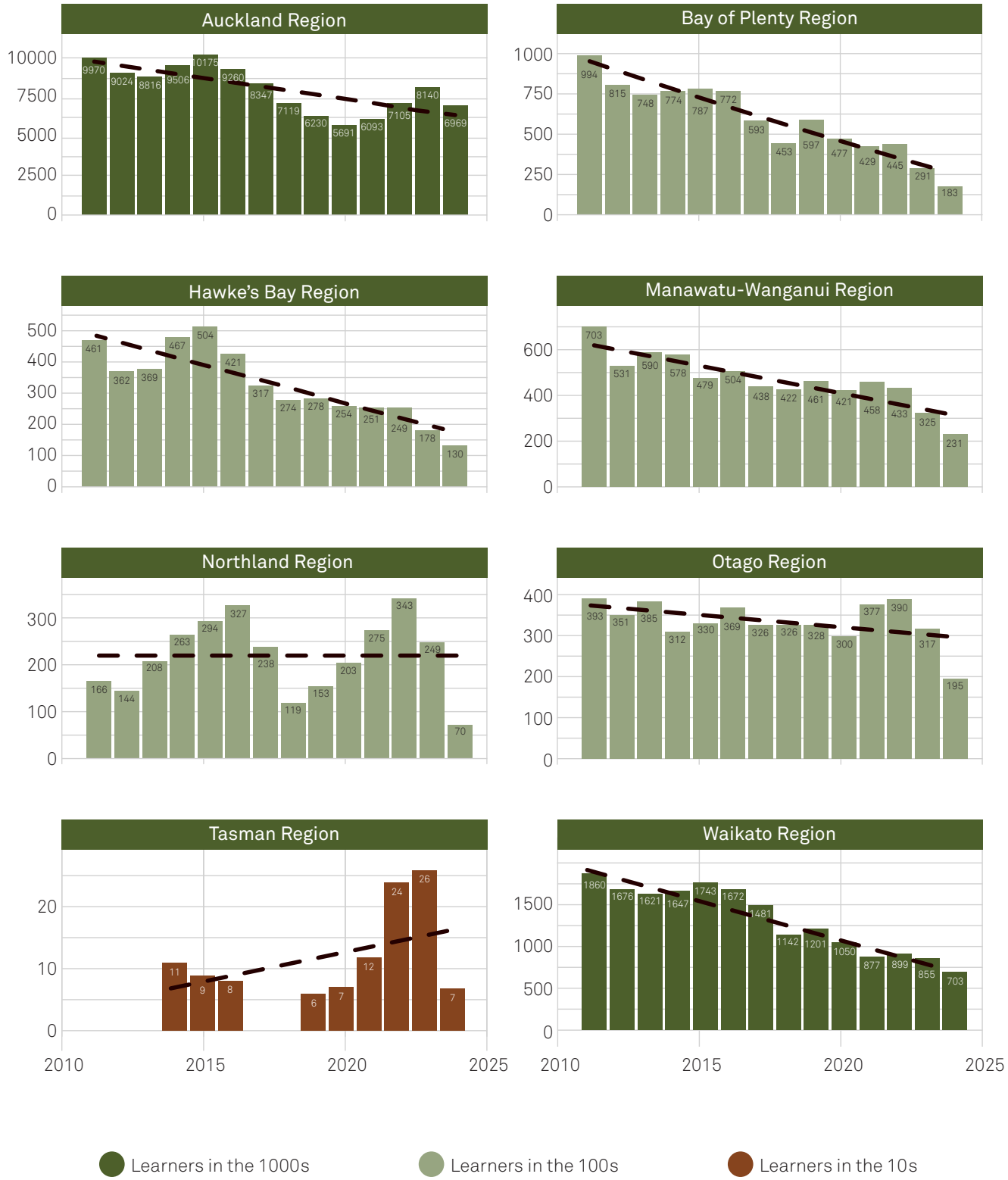
“

[T]here were some funds available for local people to do the course . . . so there were some really key success factors in that in my mind. One was obviously the cost of entry that was removed as a barrier. Secondly, it was a short course. So, it's not a three year, two year or even a year investment of your time. And the third is that it was supported by a physical location here [in Tairāwhiti].

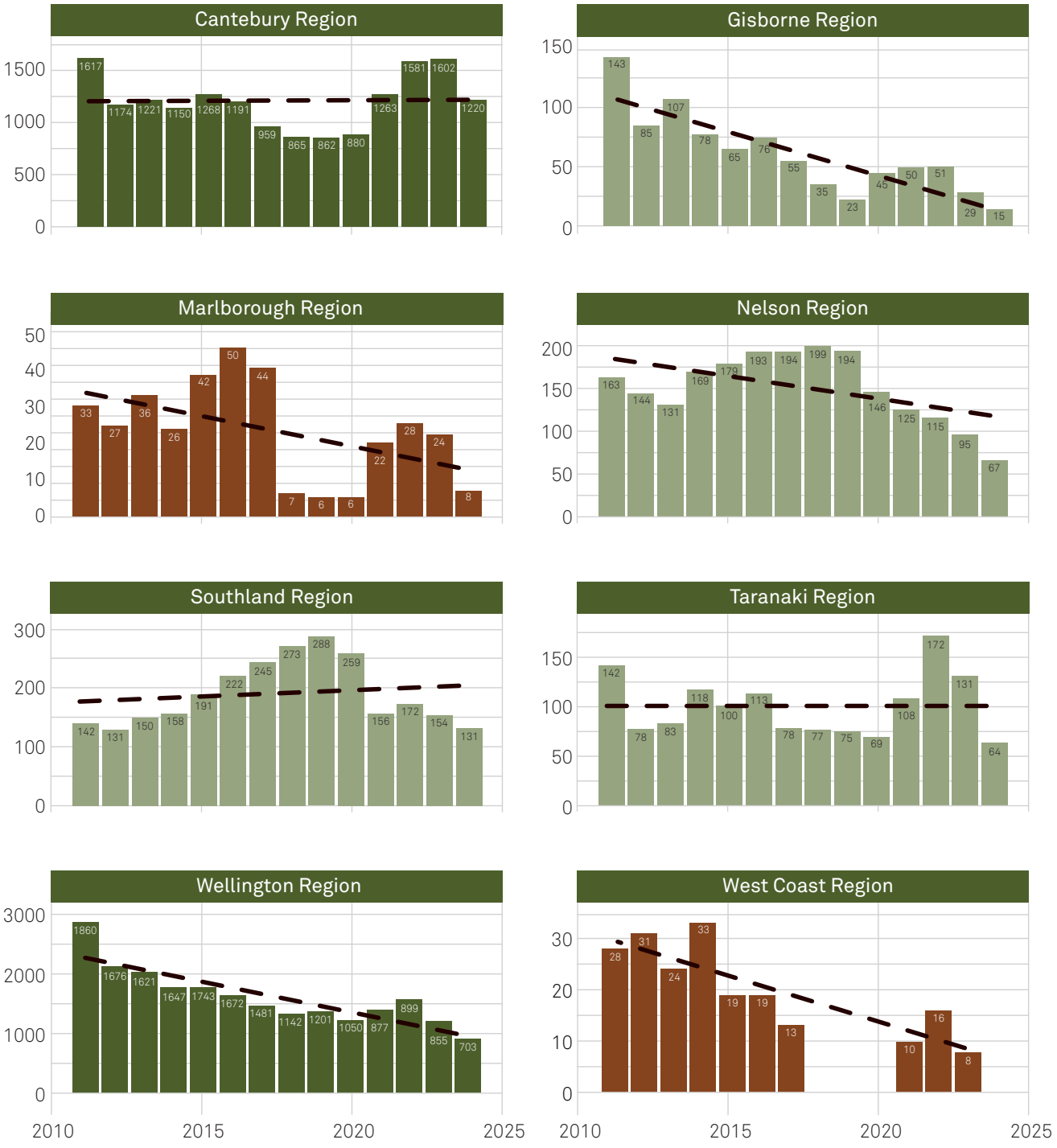
”

– Chief Technology Officer/Head of Technology Māori Tech Company

Total Enrolment to Information Technology Provision by student type and year
16 New Zealand Regions



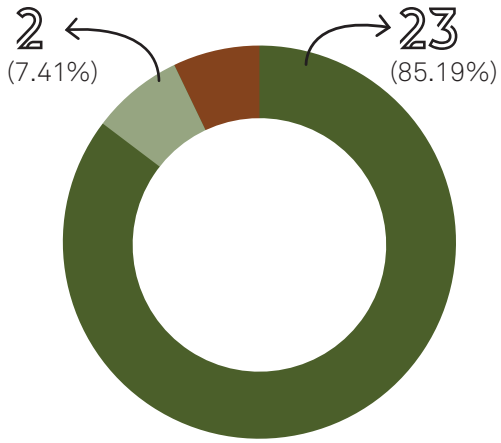
Datasource: Teritary Education Commission



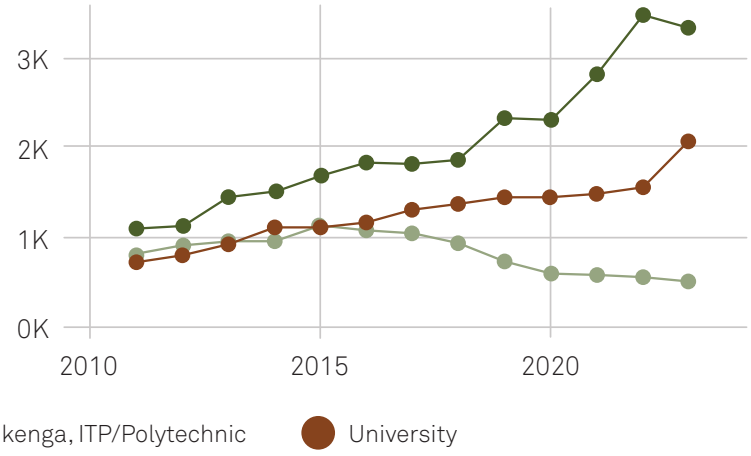
*note there is currently very low or no provision for West Coast, Tasman and Marlborough regions.
**Developers Institute, based in Northland, was placed into liquidation in September 2023.

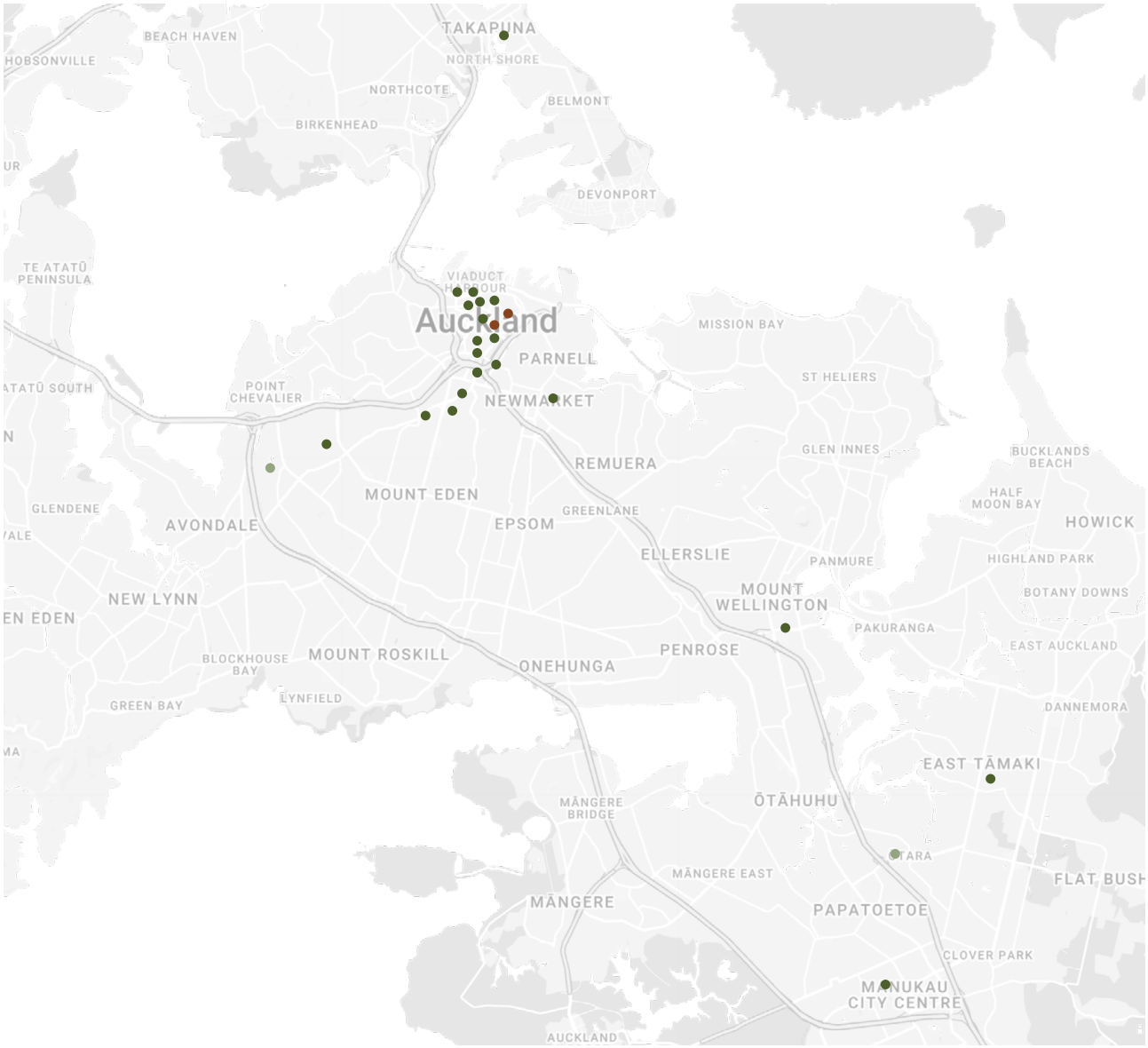
While Auckland dominates digital technology training in Aotearoa, with almost two-thirds of providers concentrated there, training is centralised within the Auckland CBD.

Number of Provider by Category



Volume of Delivery by Reporting Year and Provider Categor





“

[In Franklin] there’s no AUT, MIT and all that. And we have 300 students that miss out on further education because of our geographic location.

”

– Pacific Tech Talanoa Participant

This high concentration reinforces training separation as it is not near Māori and Pacific population centres, and therefore access is more difficult for those communities to undertake training.

Increasing provision in regions and outside central Auckland would help increase the number of people able to train for IT qualifications. This change could help improve participation of underrepresented groups.

Photo by Isaac from Unsplash

Me kaha ake te mātau matihiko ki Aotearoa
Aotearoa needs greater digital literacy

We can also see the changes over the past decade in both the number of training providers and completion of qualifications in vocational training (Levels 4–6) and foundation digital skills (Levels 1–3).

In foundation training, Te Wānanga o Aotearoa notably withdrew from training technology qualifications. Previously, these programmes provided a significant pathway to learning basic tech skills and potentially staircasing towards vocational IT training.

Scotland's *Digital Economy Skills Action Plan 2023–2028* identifies a need for greater digital literacy across the population as "[t]here is a near universal demand for basic digital skills across all jobs, and the demand for more sophisticated digital skills is permeating across almost every sector" (12).

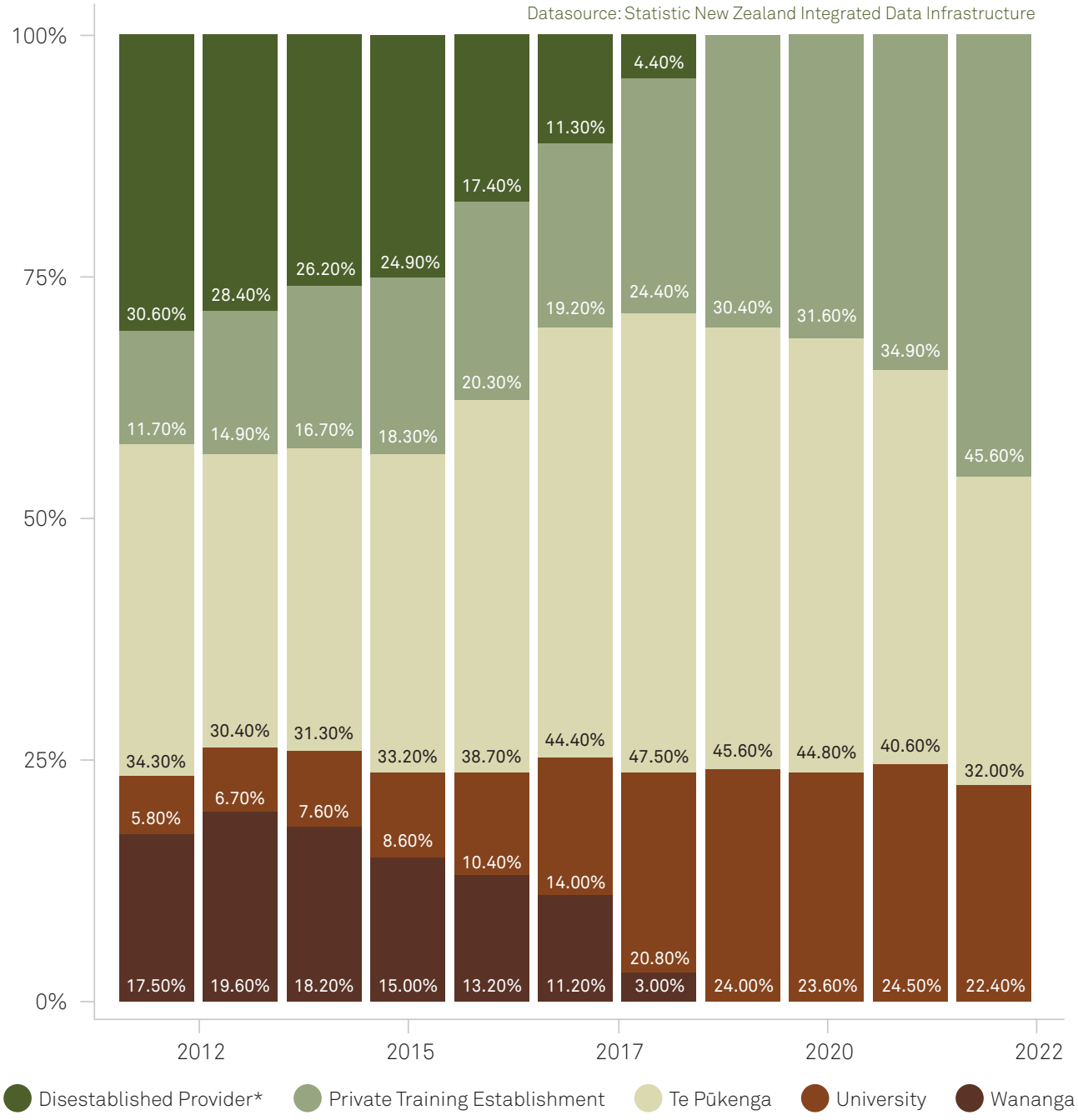
Likewise, Singapore has introduced the "SkillsFuture Level-Up Programme", targeted at workers over 40 years-of-age, to provide financial support for mid-career workers who wish to train for new career pathways – such as AI, data analytics and cyber security – as the country seeks to lead in upskilling and reskilling its workforce rather than follow the disruptions brought on by AI and automation.

Foundational digital skills are the gateway to wider technology training and a technology workforce. Like Scotland and Singapore, in order for Aotearoa to create a digitally literate population, we need uptake of digital skills by the wider population. To increase the number of people becoming technologists in Aotearoa, we need to invest more in training, including at the foundational level. Shorter and more directed training, such as through micro-credentials and skills standards, may provide more accessible alternatives to the current qualifications inputting basic technology skills at the centre of learning.

Kua tata haurua te rāngai e whakangungua ana e Ngā Hinonga Whakangungu Herekore
Private Training Enterprises train nearly half of the sector

Private Training Establishments have grown market share, as have universities, which now account for about one quarter of training. Completions are predominantly at bachelors Level 7 (and above).

New Zealand Tech Related Qualifications Completion
By Provider Type and Year



Further, most provision and resulting completion is now at Level 4 and above, with just over half completions at vocational level and 35% at Level 7 (bachelors) and above.

*Disestablished Provider = Defunct providers no longer operating

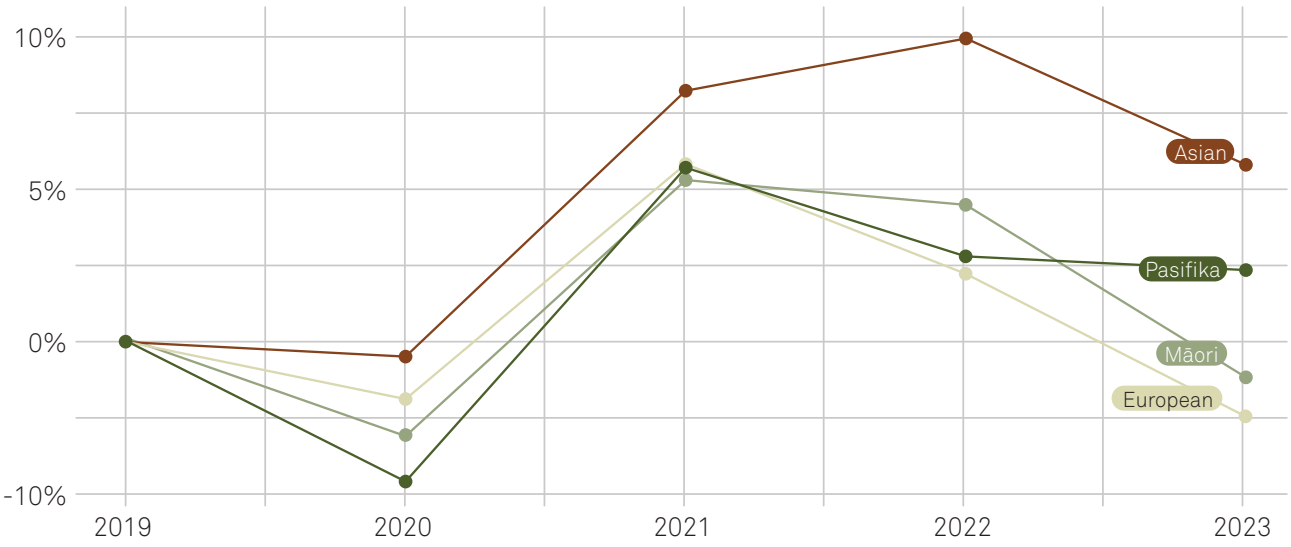
Photo by Djordje Pretrovic from Pexels

Mā te heipū me te whāngai ngā pūtea ki ngā tohu tautuhi ā-hangarau e nui ake ai ngā whakaurunga

Targeting and funding specific technology qualifications increases enrolments

The Targeted Trades Apprenticeship Fund (TTAF), introduced as part of the COVID-19 pandemic recovery, was expanded to include certain IT qualifications and micro-credentials in 2021 up to level 7 of the NZQF. TTAF had a sizeable impact on the number of students undertaking vocational study. The number of Māori and Pacific people choosing to study information technology also increased during the time TTAF was in effect.[3]

Change Percentage of Enrolment to ICT related programmes by Ethnic Group
2019–2023

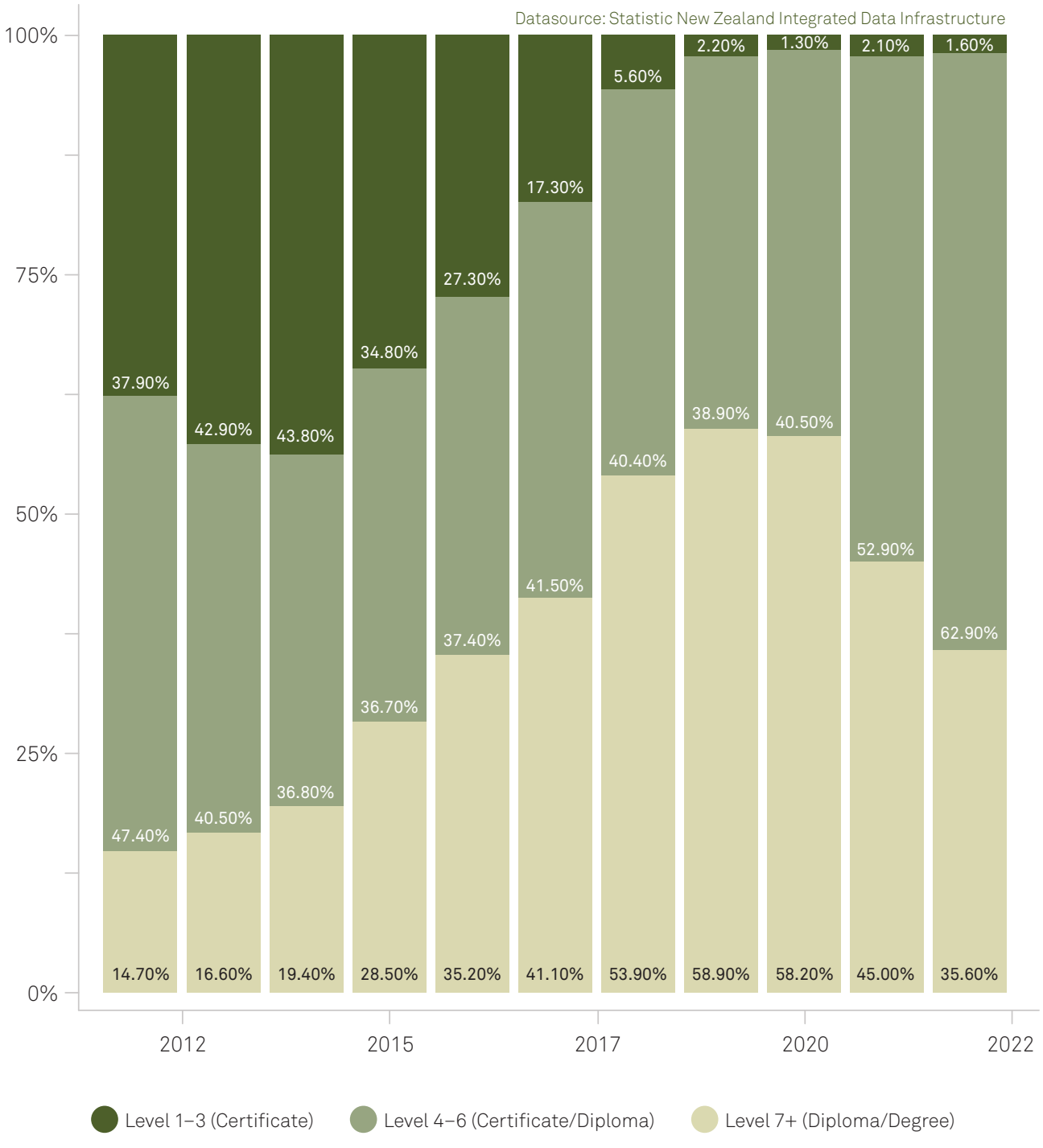


Datasource: Tertiary Education Commission Ngā Kete App

[3] Created in response to the COVID-19 pandemic "[t]he Targeted Training and Apprenticeship Fund (TTAF) – also known as free trades training – supported learners to undertake vocational education and training without fees." The programme "covered learners' fees from 1 July 2020 to 31 December 2022, which the TEC paid directly to tertiary education organisations (TEOs). This let TEOs provide a range of training and apprenticeship programmes at sub-degree level free for learners. It was targeted towards industry skills where demand from employers was strong, or expected to grow, during New Zealand's recovery from the impacts of COVID-19" (TEC).

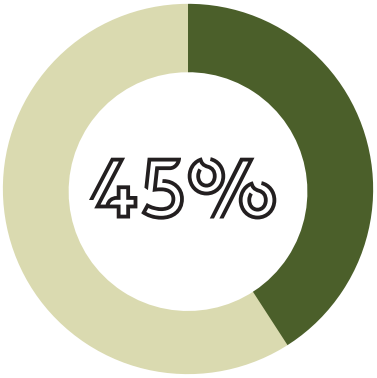
As students accessed fees free funding for these programmes, enrolment increased, and many students used the listed programmes to staircase into higher levels of study. However, after funding for TTAF ceased, enrolment in programmes also dropped.

New Zealand Tech Related Qualifications Completion
By Qualification Category and Year



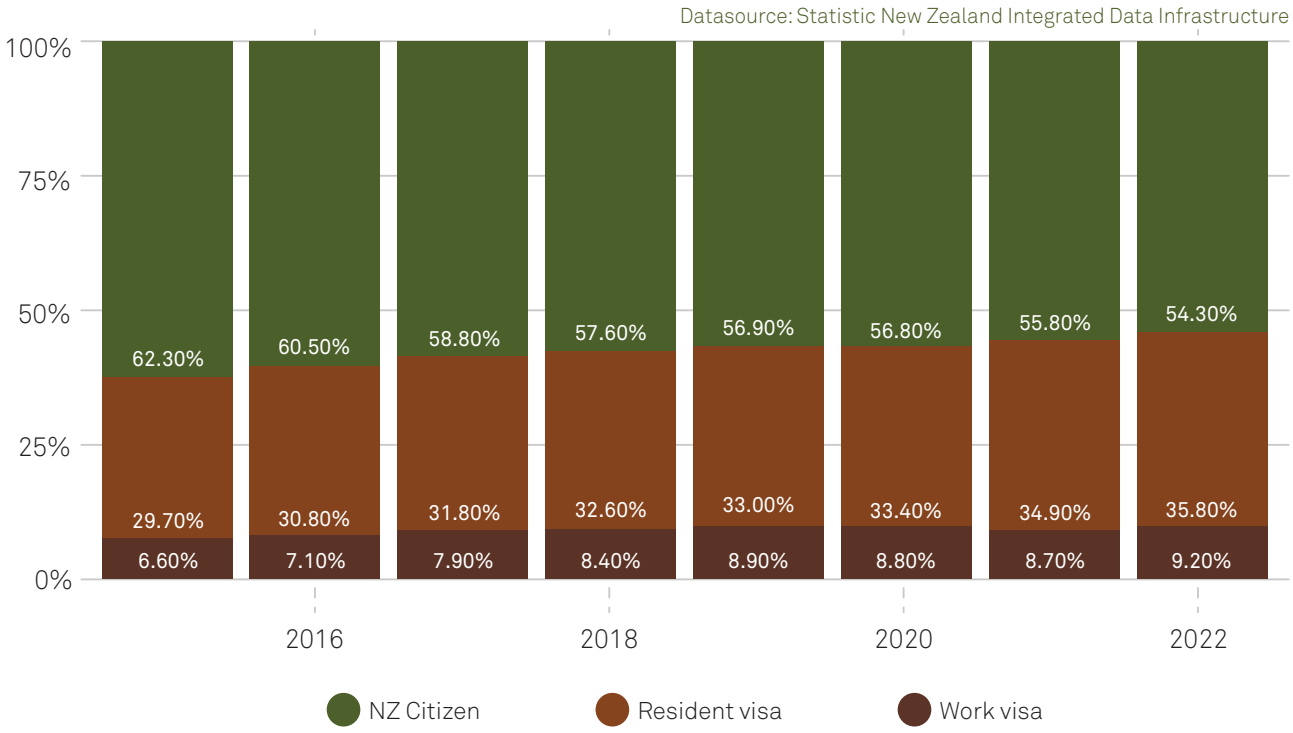
Ka nui rawa ana te whirinaki atu ki ngā kaimahi tāwāhi, ka haukume te whakangungu

Over reliance on international workforce skews training



The entire sector is also heavily reliant on an international workforce who reside in New Zealand, and currently 45% of the entire sector holds a work visa. There has been a decline in New Zealand citizens working in the sector since 2015, and a steady increase in visa holders, even during the COVID pandemic when the borders were closed.

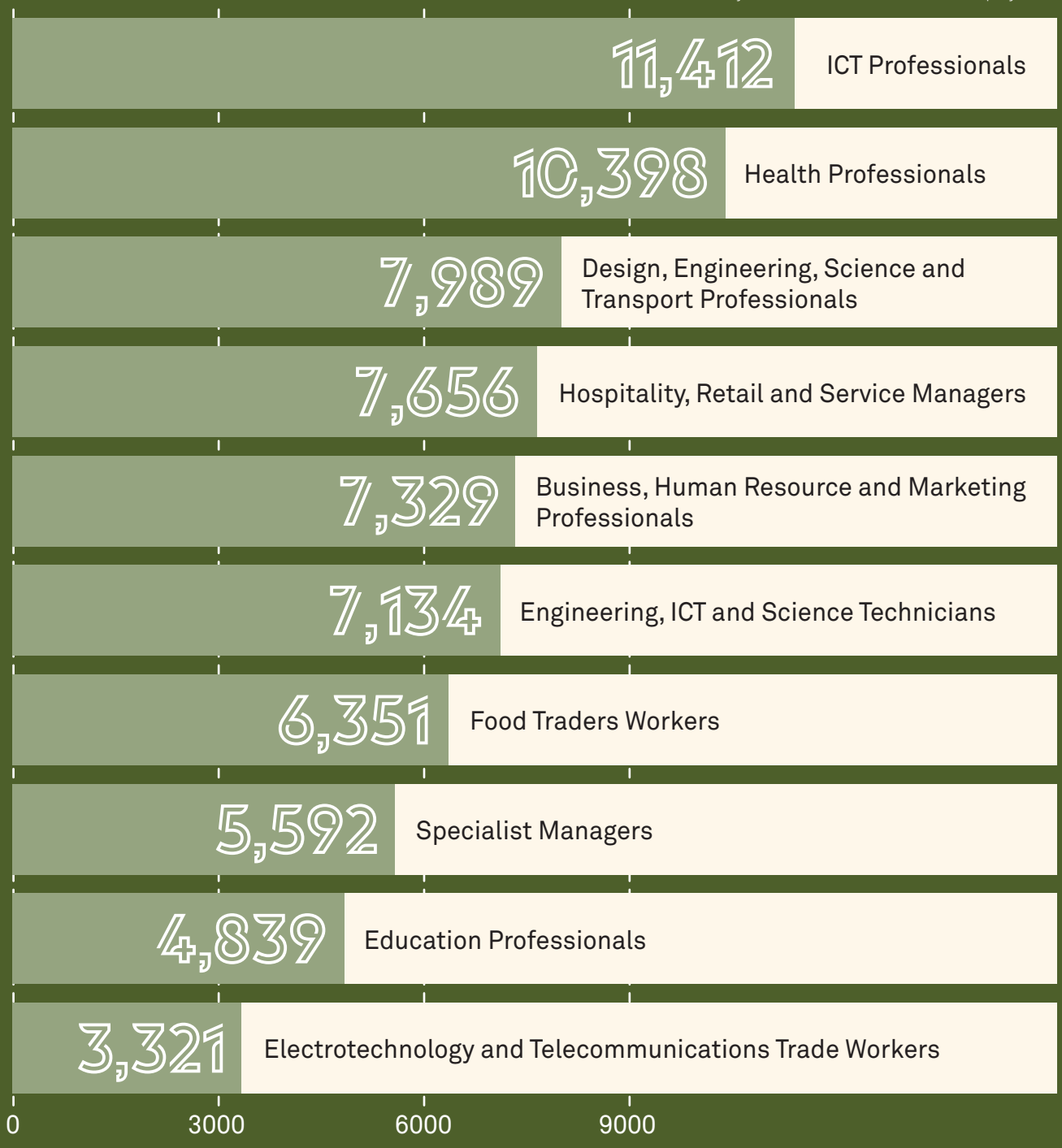
Proportion of Workforce by Visa Status Type and Reporting Year
2012–2023



Over the last decade ICT Professionals has been the largest approved category for residence visa approvals, with several other categories also including those in the digital technology sector.

Top 10 Residence Visa Approval by Occupation Submajor Group
2013–2024 Mar

Datasource: Ministry of Business, Innovation and Employment



By importing such a large amount of talent, often with significant experience, a twofold effect on domestic training has occurred: demand for local tech talent is artificially suppressed due to importing labour; education providers do not need to innovate and can maintain generalist education provision as specialised tech talent can be imported.

Toi Mai will investigate the ways in which training is affected by such a large reliance on imported talent.

Mā ngā Mahi Pia ā-Mahi mō te Akoranga/Matihiko e nui ake ai ngā taupori ngāi Māori, ngāi Moana hoki o te rāngai

Work-based Learning/Digital Apprenticeships would boost the number of Māori and Pacific peoples in the sector

A factor contributing to the skills gap is the perception that current training offerings are often seen as not producing work-ready graduates. Traditional training models are widely thought to be outdated, mono-cultural and failing to equip graduates with practical, work-ready skills. This perception may be exacerbated by the speed at which technology advances.

"[H]iring is definitely a challenge because a lot of the junior level aren't coming prepared for what we need, and there's basic questions we're asking, and they don't even know them. And these are fundamentals. It's just stuff like that, and we're quite gobsmacked that we ask them. Some of them, they're not even cutting edge. They've been around for probably ten years, but they're clearly not being taught . . . particularly the guys coming in with degrees. They are trained for the 2000s, about 20 years out of date."

– Government Agency ICT Lead

The concept of digital apprenticeships received broad support from participants. In digital apprenticeships learners spend time gaining experience with companies and earn credits towards a formal qualification. They enable workers to learn up-to-date skills in real time while also earning, which is a real attractor for our priority learners. One of the reasons Māori and Pacific peoples are attracted to the more traditional 'trades' has been the opportunity to earn while being trained. Developing new funded pathways and training models, such as work-based learning and digital apprenticeships, should attract more Māori into the digital technology sector. Pacific peoples also expressed wide support for work-based learning. Opportunities to earn while learning has a material flow-on effect for family and the ability to upskill.

Successful international models exist, demonstrating their effectiveness, but the approach in New Zealand has so far been piecemeal, and the current rules around apprenticeships are a major barrier to this being implemented. Apprenticeships are currently restricted to programmes that involve qualifications at Level 4 on the New Zealand Qualifications and Credentials Framework (NZQCF). This is insufficient to attain workplace proficiency in IT, which typically requires training to Level 6 to encompass key specialisations in information technology, such as cybersecurity, data analytics and software development. While programmes involving workplace-based training are still possible at Levels 5 and above, these are not eligible for government apprenticeship funding, which becomes a barrier to their development.

There is an urgent need to re-develop the current definitions and funding mechanisms of apprenticeships, which favour historical trades, but do

Photo by Makea Pokere from Tech Talanoa Wellington

not encompass new and emerging industries that also have a need for work-based learning.

Where there isn’t a focus, education providers also need to shift their focus from knowledge acquisition to developing practical skills that enable graduates to be effective in the workplace. With work-based training resonating strongly with both industry and employees, there is also a need for greater collaboration between employers and all education providers. This collaboration includes a need for more “hands-on” learning, considering the limitations of purely classroom-based approaches. Learning in a work environment provides learners with up-to-date knowledge. Moreover, rapid advancements in technology, particularly AI, further emphasise the need for work-based training. A three- or four-year degree can quickly become outdated without practical experience, and vocational training can often provide the necessary skills quicker. Hybrid and blended models with classroom teaching and learning and opportunities for meaningful work-based learning will prepare learners with good workplace practices and up-to-date knowledge.

Me pai ake te Manaakitanga me te Rurukutanga e noho tonu ai ngā tāngata e uru ana ki te rāngai

Better Care and Coordination needed to retain people entering sector

It is one thing to remove the barriers to apprenticeships; it is another to ensure internship and apprenticeship programmes have appropriate oversight to ensure sustainable career progression for participants. Currently many large technology employers run bespoke training initiatives in secondary schools to attract rangatahi to technology jobs. However, many firms (particularly multinationals) don't necessarily understand or have the coordinated wrap-around support and pastoral care that interns and apprentices need once they join these large firms. Workplace learning needs to be developed holistically with cultural capability, empathy and empowerment and strong oversight.

"[S]ome can come in from through these apprenticeship programmes and then there's all this hierarchy around how they're seen in the company, even from their own people. So, you're not a real worker. You've come in through this, kind of similar to what you hear in med school, right. I don't know again what is within scope around what can we protect? What are the levers?"

– Pacific Tech Leader

Larger companies, however, are able to offer entry-level roles like help desk/ service desk, which value and develop transferable skills and can act as stepping stones towards specialised areas like cybersecurity, cloud computing and software development.

Anecdotally we heard of some firms employing Pacific women in their call centres because they were good at customer relations, but then not offering them advancement into higher paid and skilled technology roles because they were too valuable to lose from the call centres. This can be a particular challenge in smaller companies that often prioritise immediate needs and may lack the resources to invest in training junior- and graduate-level employees for further advancement. Human Resource Development capability is often missing from startups and small companies.

“

I jumped into the Contact Centre for Apple, Apple Computers over in Sydney. And we were able to do work-based learning so they provided real good facilities to just learn on the job and you’re doing your job but in downtime you can do online course, online training, that sort of thing.

”

– Pacific Educator

Ka herea e ngā kaupapa pae tata tā mātou whakawhanake i tētahi wao parapara toitū

Short-term initiatives limit our ability to develop a sustainable forest of talent

Over the last ten years there have been many promising pilot training programmes for new entrants into the technology workforce in Aotearoa. However, they suffer from disjointed and short-term funding, often siloed from similar initiatives, and dispersed over multiple government funding agencies that fund them from 'programme funding' rather than from core vote funding. Although these piecemeal initiatives are well intentioned, they are unsustainable, uncoordinated and lack long-term strategic connection. New Zealand's propensity for 'short-termism' in such models hinders evaluation, refinement and long-term success. Combined, this government funding can be quite substantial, however. To ensure value for taxpayers, and that the funds are being spent where most needed, government agencies need to be brought together to develop a coordinated funding strategy for technology training.

Photo by Access Advisors

E waiwai ana ngā pūkenga whakawhitiwhiti ki te rāngai mahi engari me miramira ake

Transferable skills are crucial for the workforce but need more emphasis

'Soft skills' or 'transferable skills' was one of the most widely discussed aspects of our engagement, suggesting that while the sector is prone to disruption and new technologies, core transferable skills remain an important need for the sector. These skills include communication, teamwork, problem-solving, empathy and a human-centred approach to mahi.

"The data tells us that the skills that people have traditionally relied on are not necessarily the ones they will need in the future. As smart machines increasingly take over many of the more manual and routine aspects of jobs, enterprise skills e.g. communication, teamwork and problem-solving will become much more important."

– *Nau Mai Te Anamata* [Tokona Te Raki]

Technical skills are very important, but they change over time and can be acquired through training or self-learning and upskilling. Transferable skills remain valuable regardless of changes in technology. All the research on the future of work says it is vital the future workforce is equipped with skills that transcend a job role or qualification. With AI changing the digital technology landscape, transferable skills will increasingly be the key differentiator for technology professionals. The ability to collaborate, communicate effectively and understand user needs will be essential for success. The industry needs to move beyond just technical skills and value transferable skills like teamwork and communication as core skills. These will be crucial in the future regardless of specific technologies.

Work-based training can help with this as it can bridge the divide between transferable skills and industry-specific knowledge. Access to internships, workplace learning and digital apprenticeships are proven ways to teach learners how to work in teams, solve problems collectively and develop good work attitudes.

"So my mum always says, you only sit down when the last person sits down when you're all doing for feau. If someone's doing feau, just because you've finished your one, doesn't mean you sit down as well. You help, so that you all sit down together."

– Solutions Architect

In Nau Mai Te Anamata Tomorrow's Skills produced by Tokona Te Raki, valuing skills (as opposed to formal qualifications) is advocated as "[r]ecruiting based on skills is a more equitable approach to employment. It removes economic and social barriers such as the prohibitive cost of tertiary education for many, and the historic barriers that resulted in the lower number of Māori who gain University Entrance" (19).

The Skills for the Information Age (SFIA) framework currently being implemented across Aotearoa, led by the Department of Internal Affairs and supported by the Ministry of Business, Innovation and Employment and IT Professionals NZ, will help standardise the recognition of skills across the sector.

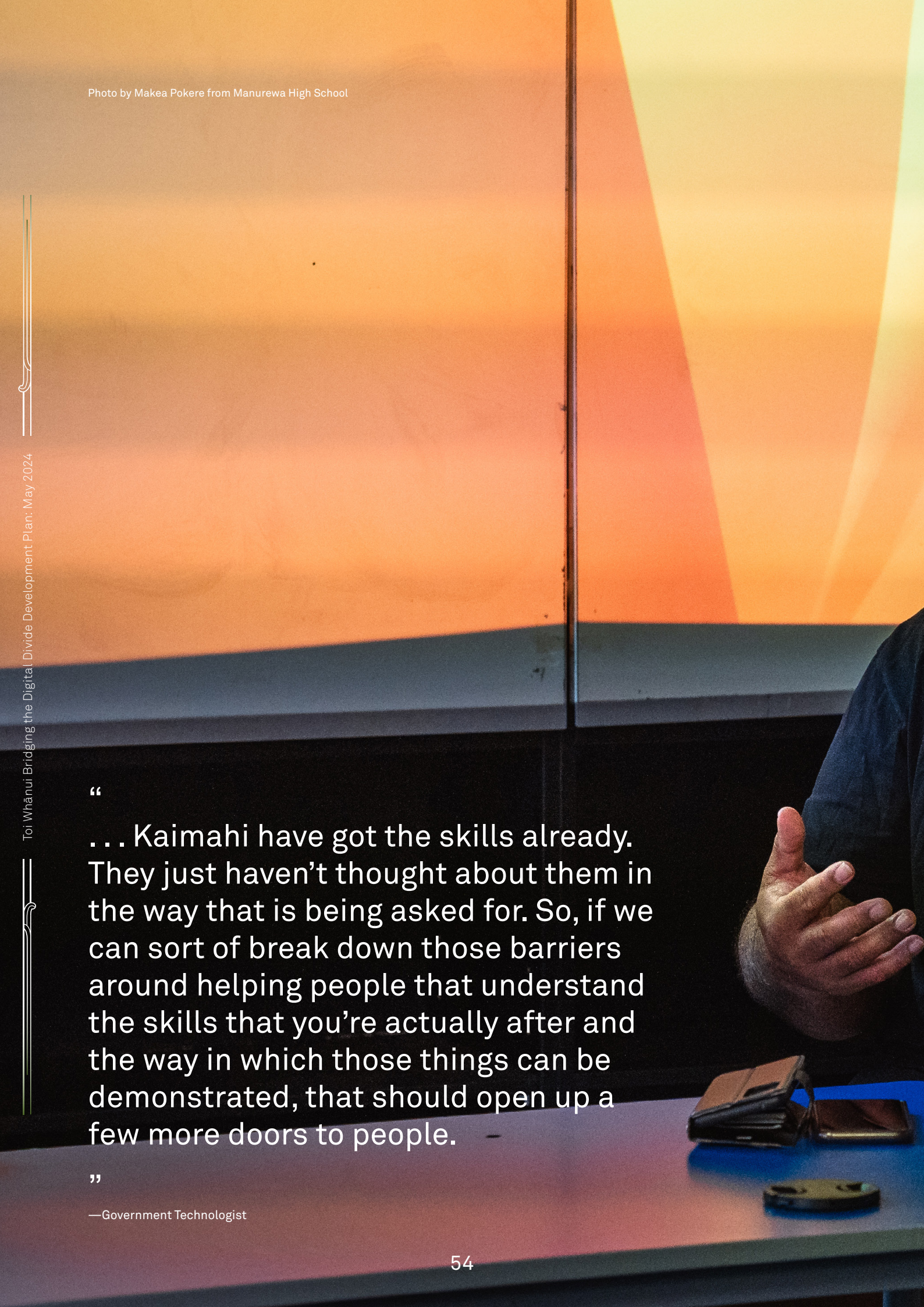


Photo by Makea Pokere from Manurewa High School

“

. . . Kaimahi have got the skills already. They just haven’t thought about them in the way that is being asked for. So, if we can sort of break down those barriers around helping people that understand the skills that you’re actually after and the way in which those things can be demonstrated, that should open up a few more doors to people.

”

—Government Technologist

USA
PASIF
PDL

E hirahira ana te mana taurite e toitū ai te pae tawhiti o te rāngari me Aotearoa

Equity is important for the long-term sustainability of the sector and Aotearoa

Women, Māori, Pacific peoples and tāngata whaikaha (disabled peoples) are all underrepresented in the digital technology sector and the sector misses out on talent and innovation as a result.

"... the whole IT group level we're just over 50% female. And that's because we've got project managers, and B.A.s, which are strongly female, ... And then across the whole group, our Pasifika percentage matches the New Zealand demographic population almost exactly. It's within a percentage or two. But our Māori demographic is really low, like couple of percent. ... .I would say low, no, Pasifika or Māori in the pure technical teams."

– Government General Manager

Māori participation in Toi Whānui is 4.8%, compared with 17.3% of the overall population. The median age is also younger, 25.4 years, compared to 41.4 years for Pākehā (Stats NZ). By 2040, one in five working people in Aotearoa will be Māori. It is therefore critically important that Aotearoa has a well-educated and high-earning Māori population, as the country's long-term wealth will depend on a broad tax base.

Māori participants saw the potential of Toi Whānui to deliver economic benefits, enable tāngata whenua to uplift Māori cultural values, bring te Ao Māori ideas and values into the sector, and help the sector realise its potential to produce a more equitable future for Aotearoa.

Photo from Freepik

Photo by Libby Silson from Tech Talanoa Auckland

Mā te whakatau whāinga e noho haepapa ai te ahumahi, e arataki mai ai hoki

Setting targets will hold industry to account and provide guidance for provision

To increase Māori within the tech sector, NZTech in *Digital Skills for Tomorrow, Today*, proposes setting real numbers, rather than percentages, as employment targets. Toi Mai endorses this approach: "[A]ssuming the growth rate for digital technology jobs continues, and we hope Māori participation grows to be equivalent to population demographics, by 2040 there would need to be approximately 60,000 additional Māori in digital tech jobs. This means that over the next 17 years we need approximately 3,360 additional Māori completing relevant post secondary school training in digital technology every year." (NZTech)

For Pacific people to also meet similar targets based on population growth, Toi Mai estimates the need for an extra 601 Pacific people per year to complete post-secondary study in digital technology education and training.

These targets are not only essential for Māori and Pacific employment income, fulfilment and ensuring the sustainability of New Zealand's tax base, but they also align with the Crown's responsibility to Māori under te Tiriti o Waitangi, which is to achieve system-level equity in terms of patterns of participation and achievement for all tertiary learners. The current tertiary funding and training settings are very monocultural in the digital technology space. There are also barriers that prevent more rangatahi from choosing a digital technology career, including limited subject choices at schools, academic streaming, lack of access to teacher training and lack of visibility of pathways into the sector. Targeting specific funding for Māori entering the sector will improve equity in the digital technology workforce.

"I think it comes back to the funding models . . . how would we create space where [funding is] specifically for Māori or other indigenous folks? We tag funding . . . and then making that visible to our people so they can access it . . . The other part around approving the applications is making sure that board is diverse. They're not leaning towards one ethnic group over another. It's just making equity right up and down that process."

– Managing Director for Risk

3,360

Māori

601

Pacific people

Ina he tauira whakangungu mō-ngāi-Māori-nā-ngāi-Māori, mō-ngāi-Moana-nā-ngāi-Moana hoki, ka tokomaha ake te uru mai me te noho tonu a ngāi Māori me ngāi Moana ki te ahumahi

For-Māori-by-Māori and for-Pacific-by-Pacific training models would increase the number of Māori and Pacific who enter and stay in the industry

It is also important to develop training models that are by Pacific-for-Pacific and by Māori-for-Māori to incorporate and uplift Māori and Pacific worldviews. There is currently a lack of clear pathways and opportunities for rangatahi to see themselves in the sector. Incorporating more mātauranga Māori and values into training would be beneficial to attracting rangatahi when considering career pathways. Māori communities bring valuable problem-solving skills, a strong sense of community and a deep connection to Aotearoa, and these strengths could be valuable to the tech industry.

"So we come up with a set of principles that we overlay into the way that we work. And some of them are already in play, but it's bringing it from a Māori and a Pacific construct."

—Māori Pacific Tech Leader

For Pacific, there is an acute need to re-think current systems and build new ways, led by Pacific, that bring Pacific into the digital technology sector while upholding Pacific cultural values and practices to help achieve a thriving Toi Whānui sector.

Culturally appropriate education, training and mentorship are crucial for Pacific success in digital technology. Pacific communities also possess valuable problem-solving skills and a strong sense of community, and the fostering of teamwork, which are sought after skills in the sector.

Photo by Makea Pokere from Ormiston High School Girls in Tech programme

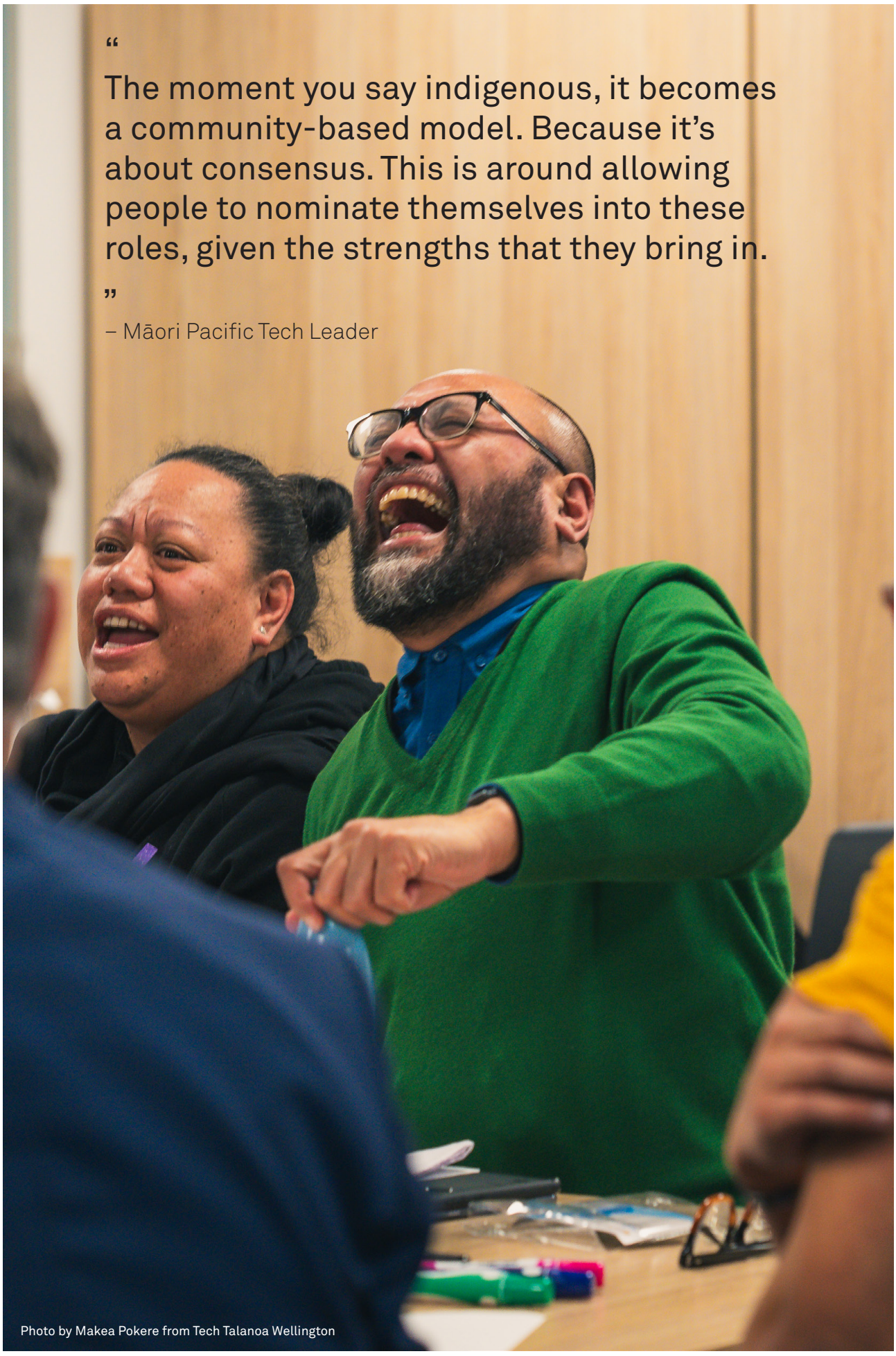
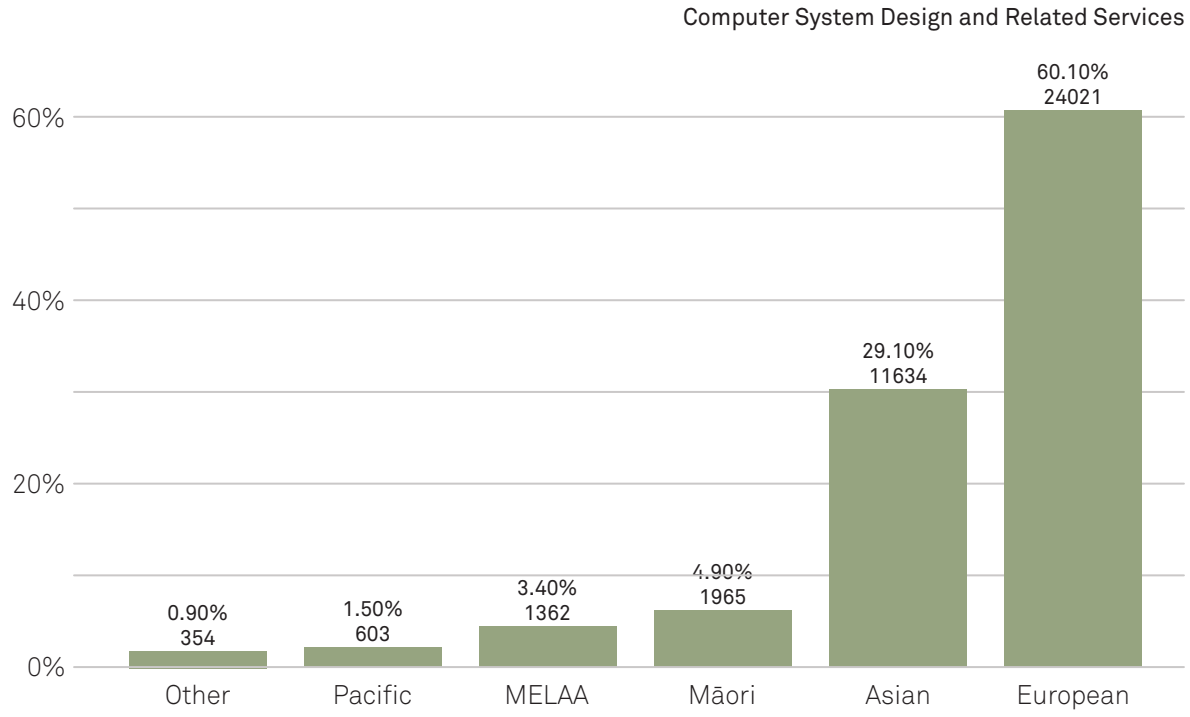
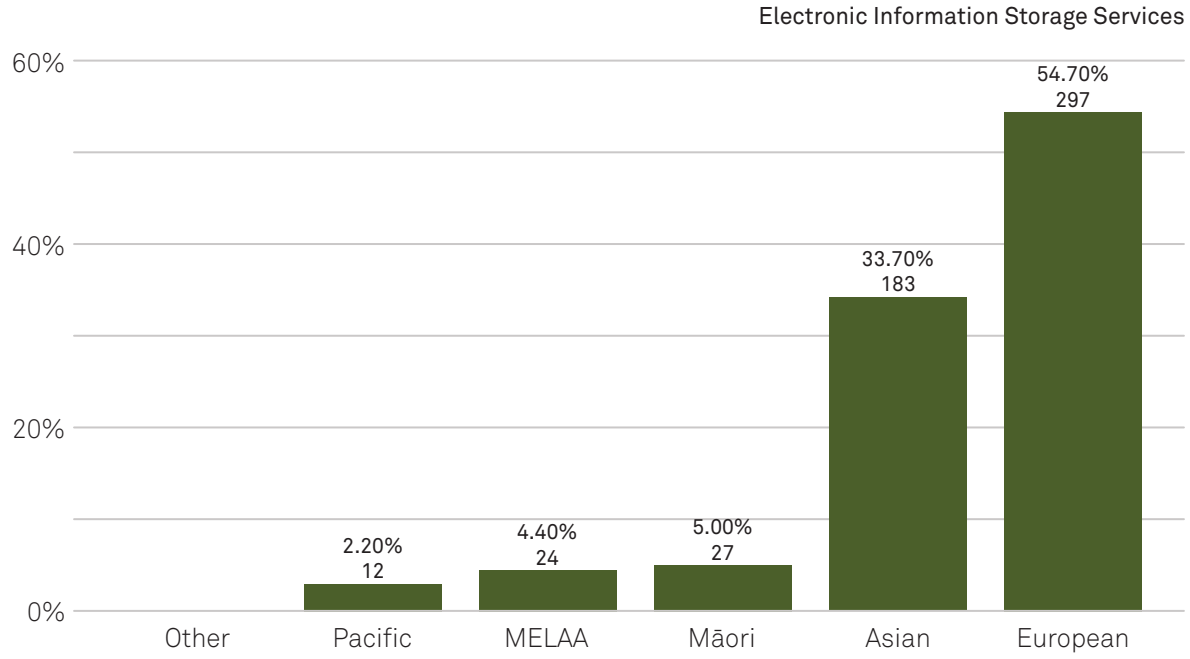


Photo by Makea Pokere from Tech Talanoa Wellington

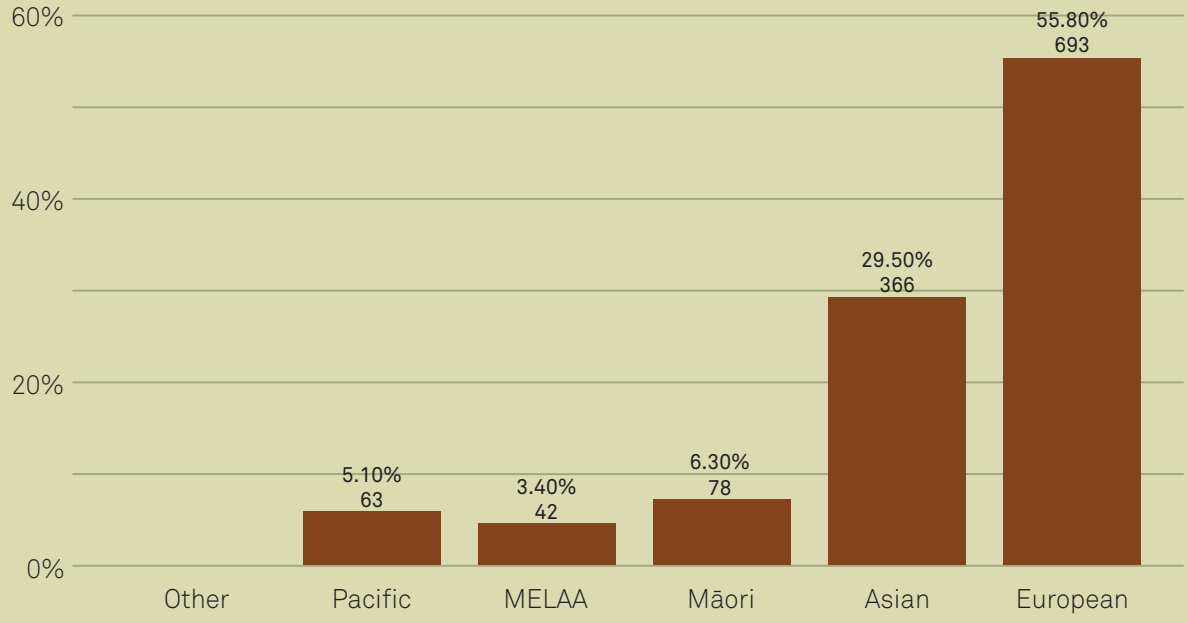
[diversity representation of four main types of technologist areas]

New Zealand Digital Skill Workforce Composition Percent
By Ethnicity and Industry

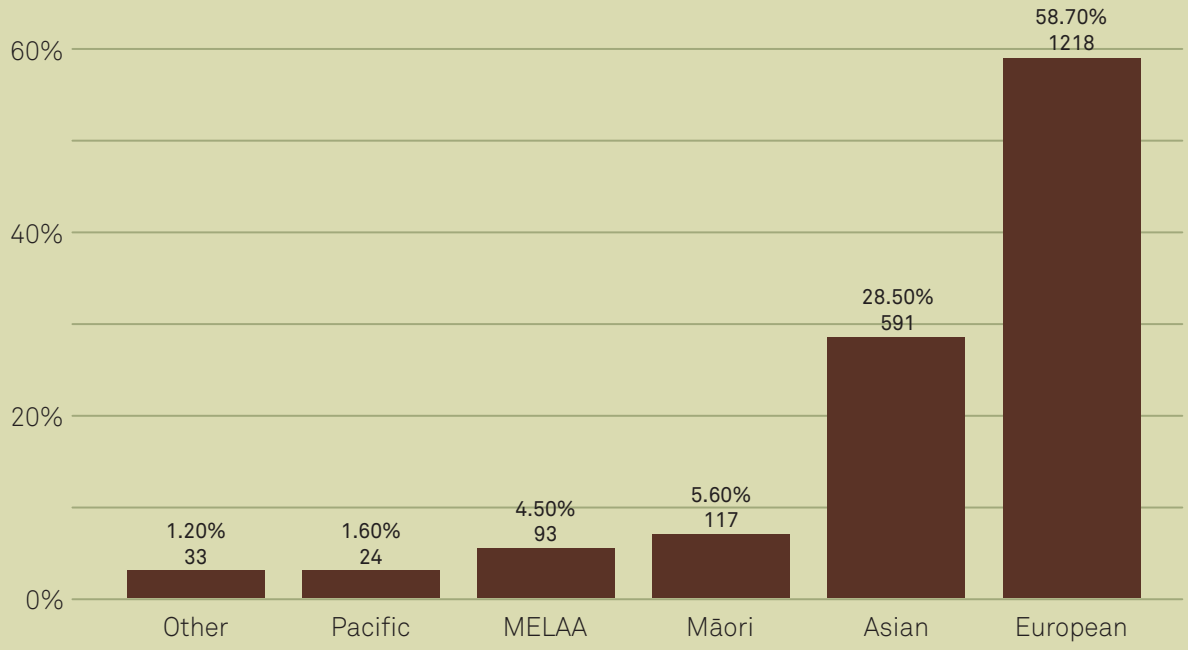




Data Processing and WebHosting Services



Software Publishing

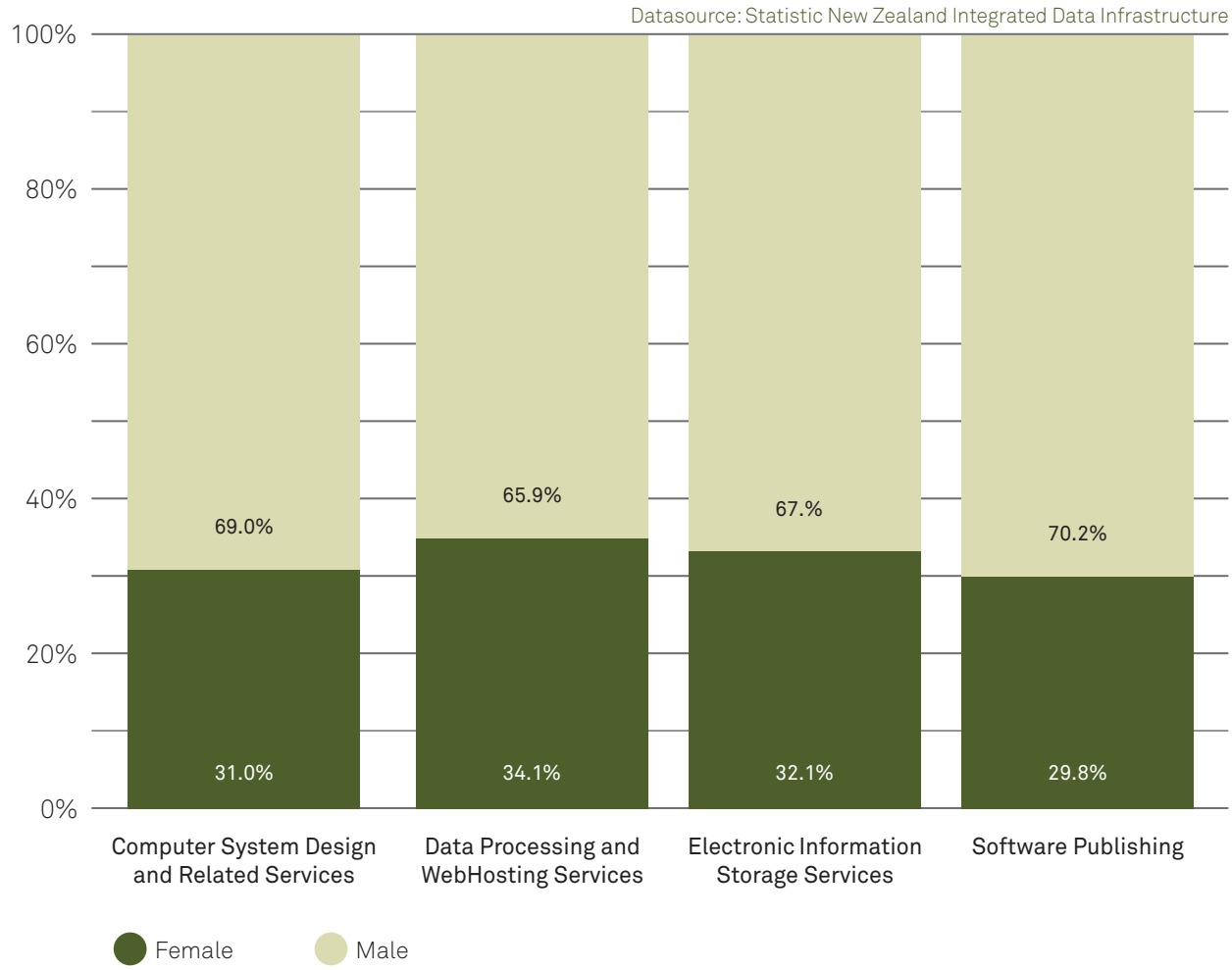


Datasource: Statistic New Zealand Integrated Data Infrastructure

Photo by Makea Pokere from Tech Talanoa Wellington

[representation of gender in technologist roles]

New Zealand Digital Skill Workforce Composition Percent
By Gender Category and Industry



> "But engineering roles, . . . it's quite very male dominated, very few Māori and Pasifika candidates. That's an area we really struggle with, I know. We did prioritise diversity a few years ago. . . . And I think we made good progress in terms of our gender diversity. But we are struggling to find ethnic diversity for sure."
>
> – HR Advisor

Me whakahōu ngā tikanga whakawhiwhi mahi e kauawhi ake ai, e whakapoapoa mai ai ngā parapara kanorau
Hiring practices need to be reformed and more inclusive to attract diverse talent

> “
>
> The growth that we’ve gone through in the last two and a half years and it’s the maturity of the people and the understanding even just the HR function around our appreciation and understanding around how we can support all diversity in our business, not just Māori and Pasifika and it has been a journey and it’s one that you have to really want to go on it. You have to really be prepared to support it . . . We have a massive opportunity ahead for us and I hope that it will be embraced and the people that we have supporting that are incredibly passionate about their Māori and Pasifika heritage and are really, really keen to see that appreciation grow across the business.
>
> ”
>
> — SaaS Company HR Advisor

Photo by Stephen Sorkin from Unsplash

Photo by Tiger Lily from Pexels

When it comes to attracting more Māori, Pacific people and women into the digital technology sector, firms need to re-think not only work practices, but also hiring practices, which contribute to discriminatory recruitment outcomes. Bias in recruitment practices, including language used for job advertisements and the interview process itself, is an impediment to attracting those currently underrepresented in the sector.

Standard hiring practices can often carry unconscious bias and may discourage different strengths and abilities. As part of re-evaluating hiring practices, the tech industry needs to re-define "best person for the job". In the past, this has been proven to be the male-dominated industry recruiting in its own image. It needs to instead consciously adopt recruiting techniques that place greater weight on indigenous cultural and gender diversity and transferable skills.

He pūkenga mīharo ō ngā tāngata whaikaha he rite tonu te whakatahangia e te ahumahi

Tāngata whaikaha (disabled people) have super powers often overlooked by industry

Despite playing a role in the Toi Whānui sector, many tāngata whaikaha choose not to disclose their disability publicly. This makes it difficult to collect data on their involvement and experiences within the sector, and so we lack a clear picture of how many tāngata whaikaha participate in the sector, their specific experiences, and the true demand for greater inclusion and resources. Nonetheless, we know that tāngata whaikaha wishing to enter the workforce are often overlooked or discriminated against.

"[D]igital accessibility in New Zealand is very immature. We do not have a lot of knowledge. There's not a lot of experts . . . but there is a gigantic need for more digital expertise in the accessibility space . . . and we know that from the development, the designers and the developers that we work with, most of them have never really been exposed in any large way during their education into disability awareness or digital accessibility."

– CEO Tāngata Whaikaha company

Furthermore, there are challenges in accessing supports, being visible and being included. These challenges can stem from limited understanding of disabilities by employers and educators. People may judge disabilities based on what they can see, overlooking the diverse needs of those with neurodivergences, for example. Those we spoke with argued disabilities should be assets if properly supported. The current industry focus seems to be on the preconceived ideas of difficulty of managing disabilities, rather than exploring how they might actually enhance the workplace and add value.

New Zealand's legislation is also outdated relative to the needs of tāngata whaikaha, and many digital technology products created inhibit rather than enhance inclusion.

“

. . . [T]he only thing that there is available is the Human Rights Act. And in the Human Rights Act, you are not allowed to discriminate against a person on the basis of their disability. However, there is no other legislation around inclusion or anything else. There is the Housing Act that states how wide your door’s supposed to be but there is nothing else. So with regards to technology, currently, you can create, you can sell, you can mandate inaccessible technology with no repercussions.

”

—Tāngata Whaikaha hui attendee

Photo by Mikhail Nilov from Pexels

Fortunately, there are positive developments. There are vocal champions of tāngata whaikaha within the industry who collectively highlight the issues tāngata whaikaha face. These efforts include promoting greater visibility, advocating for their strengths, improving access to resources and ensuring a deeper understanding of disabilities.

Toi Mai has undertaken separate research on barriers to entering the tech sector and the upcoming report on tāngata whaikaha experiences in vocational education and the sector. Both shed light on issues and make proposals, some of which are included in this plan.

To create a more equitable environment, we need more data collection and more support for tāngata whaikaha. This data will help us understand the specific barriers to participation and access faced by tāngata whaikaha in the Toi Whānui sector, allowing us to develop solutions that meet tāngata whaikaha needs and unlock their full potential.

Me tīmata ngā ara i te kura tuatahi, ā, me pāhekoheko ki te hapori

Pathways need to start at primary school and be integrated into the community

To cultivate a strong domestic tech workforce, it is crucial to integrate digital technology throughout the school curriculum, from primary to secondary school. The growth of digital technologies will impact various white-collar professions and will continue to disrupt and innovate the future of work, especially for legacy industries, such as law, medicine and accountancy.

Currently, students face inconsistent access to resources, teaching provision and teacher capabilities in technology education. Early exposure is essential, and introducing technology concepts as early as primary school is vital, especially as digital literacy is needed in all aspects of society. Providing technology education early helps students choose relevant courses in high school and consider careers in tech.

Photo by Makea Pokere from Ormiston High School Girls in Tech programme

He mana tō te kiriwhakatauira i te aweawetia o tō te rangatahi whai painga ki te hangarau

Role models play a key role in inspiring rangatahi interest in technology

To grow Māori participation in the sector, it is essential to promote Māori role models who have already forged their way in the industry to rangatahi, supported by their whakapapa. Role models show what possibilities exist in a tech career.

"So, if I was a young rangatahi growing up, I wouldn't know where to start, and actually helping provide that visibility of where to start, what's available, what your job, what your career path may be like."

– Government Technologist

"We know that our rangatahi are likely to go into the careers of their parents or their parents' social network."

– Māori Technology Educator

For Pacific participation to grow there is a similar need to highlight successful Pacific professionals as role models. We also need to invest in infrastructure and programmes to provide Pacific communities with increased access to technology and the Internet.

". . . our people are quite impressionable with things like they have to see the role models and see the people . . . I should say so when we see those people in those positions we gravitate towards them and get more curious.

– Tech Talanoa Participant

Pacific-led initiatives need more support and responsive education and training programmes, designed using Pacific values, to address existing skills gaps.

"There's a few kind of interventions that are happening on a social media stage, but there's no one going into a church. There's hardly anyone going into those areas to actually try and break that down, or someone that you can go to to have one on one conversations with about a particular area."

– Pacific Executive Director

Community engagement is also key. Providing technology workshops and resources associated with marae, fale, community centres and churches can bridge the gap between schools and homes, with whānau supporting learners' decisions. STEM and STEAM academies are excellent ways of growing learner interest in technology careers.

Additionally, having role models active in these community spaces can inspire students, particularly Pacific and Māori communities, by showcasing success stories, the impact of technology on the world and the earning potential in the technology industry.

“

There’s some parents that are more open or just need someone to help bridge quite often that’s what happens . . . And what we try and do is when a young person says they really enjoy gaming or they really enjoy creative stuff and the parents, very used to, for example, medicine or health sector as a pathway, what we try and do is articulate, “did you know that VR technology has been used in the health sector now?” . . . and trying to bridge those examples so that they’re having the same understanding. That’s what we try and do. But I think again, it’s just going to depend on there’s only 4.4% of us are in the industry, that means 4.4% of us have an echo chamber of how much of a reach.

”

– Pacific Technology Leader

The current education system, heavily focused on NCEA and university pathways, needs to offer more diverse pathways to success. Work-based learning, digital apprenticeships and earn-as-you-learn models are crucial to create a broader pathway for students to access tech careers, even if they don’t follow traditional NCEA paths.

Kia pua i te hua
Actions and Recommendations

KIA PUA TE TAU

The recommendations build on those made in previous Toi Whānui research by Toi Mai, including *Barriers to diversity in the Aotearoa tech sector* and the *COVID-19 Recovery Baseline Engagement and Data (BED)* project and *Barriers for Women in Creative Technology Tertiary Training in Aotearoa*. Where possible, this plan adopts and refines those recommendations by using additional insights from qualitative engagement and quantitative data.

Actions

Toi Mai will review existing qualifications and develop new products to promote opportunities for work-based learning, foundation skills and flexibility in provision.

- Toi Mai to review all vocational IT qualifications strengthening transferable skills and incorporating industry-specific knowledge.
- Toi Mai to develop micro-credentials and skill standards to enable more flexible delivery including work-based learning opportunities.
- Toi Mai to work with providers and community groups to strengthen digital skills pathways through the development of micro-credentials and skill standards at levels 1–3.

Toi Mai will set progressive workforce targets and improve quality of data sources to enable workforce mapping.

- Toi Mai to set real targets for Pacific, Māori and women in post-secondary study to achieve population parity by 2040.
- Toi Mai to gather data about workforce composition, and work with industry and Stats NZ to have more up-to-date data. Census data is too infrequent and slow to understand true industry needs.
- Toi Mai to advocate for ANZSCO to be updated and to include new IT occupations.
- Toi Mai to work with industry to develop medium- and long-term capability pipelines.

Recommendations

Facilitate growth of a diverse workforce through work-based learning and new delivery options.

- TEC to prioritise development of work-based learning programmes by providers.
- TEC to prioritise new delivery in regional areas and South and West Auckland.
- TEC and NZQA to create a definition of, and funding provision for, digital apprenticeships specific to the IT industry, that includes IT qualifications and levels 5, 6 and 7.
- TEC to reinstate $22 million in funding for sector.
- TEC to widen its criteria for provider funding to include pilot funding for non-NZQCF (New Zealand Qualifications and Credentials Framework) listed, industry-defined and delivered short-form courses and stackable micro-credentials that are flexible, nimble and meet immediate industry needs.
- Toi Mai to work with Māori Tech and Pacific Tech organisations, MBIE, Summer of Tech and other work-based learning organisations, and providers, to develop digital apprenticeship models.

Improve coordination of training and industry initiatives to achieve better outcomes.

- Toi Mai to work with the Digital Government Leadership Group to better coordinate and align the sector, including training so that models developed are fit-for-purpose and there is no duplication of pilots and initiatives between government departments and ministries.
- Toi Mai to work with industry and government as an employer, in conjunction with providers and placement organisations, to create more opportunities for work-based learning across the entire technology sector.

Haere ake nei
Next steps

HAERE AKE NEI

Kia rangona ai tō reo
Have your say

We encourage Toi Whānui members and education providers to give feedback on this report's recommendations.

Your feedback will inform the final recommendations and advice to the Tertiary Education Commission for investing in vocational education and training for Toi Whānui careers. It will also influence the future work of Toi Mai in supporting the sector.

For details on the consultation process visit toimai.nz

Consultation is open until 10 June 2024

For more information contact:

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TOI MAI
Workforce
Development
Council

MAHI TAHI

Ngā whakamānawatanga
Acknowledgements

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Kuputaka
Glossary of terms

f

Fale
Samoan word - house/building.

Feau
Samoan word - which means chores or allocated tasks.

h

Hangarau
Technology; technological.

Hauora
Wellbeing.

Hui
Gathering, meeting, assembly, seminar, conference.

k

Kai
food, meal.

Kākano
seed, kernel, pip, berry, grain.

Kauri
Kauri - largest forest tree but found only in the northern North Island, it has a large trunk and small, oblong, leathery leaves, kauri resin, soot from burnt kauri gum used for tattooing.

Korero
Speech, narrative, story, news, account, discussion, conversation, discourse, statement, information.

Korimako
Bellbird - an olive-green songbird with a short curved bill and dark bluish-black wings known for its loud, clear, liquid songs. Female has a lighter colour and a white stripe below the eye.

Kōwhai
Small-leaved native trees common along riverbanks and forest margins and noted for their hanging clusters of large yellow flowers in early spring.

m

Mahi tahi
Work together, collaborate, cooperate, work as a team.

Manu
Bird - any winged creature including bats, cicadas, butterflies.

Mānuka
A common native scrub bush with aromatic, prickly leaves and many small, white, pink or red flowers.

Marae
Meeting house.

Mātauranga Māori
Māori knowledge – the body of knowledge originating from Māori ancestors, including the Māori world view and perspectives, Māori creativity and cultural practices.

Motu/Ngā motu
Island, country, land, nation, clump of trees, ship – anything separated or isolated.

p

Pihinga
Shoot, young plant, seedling.

Pīwakawaka
Fantail - a small, friendly, insect-eating bird of the bush and domestic gardens which has a distinctive tail resembling a spread fan.

Puāwaitanga
To bloom, come to fruition, open out (of a flower).

r

Rangatahi
(a) younger generation, youth (b) to be young.

s

STEAM
Science, Technology, Engineeering, Arts & Mathematics.

STEM
Science, Technology, Engineeering & Mathematics.

t

Talanoa
A meeting to discuss community issues.

Tangata whaikaha
A person with a disability.

Te Ao Māori
The Māori world.

Tipuranga
the growth / mature tree.

Tōtara
Large forest trees with prickly, olive-green leaves not in two rows.

Tūi
Tūī, parson bird - a songbird that imitates other birds' calls and has glossy-black plumage and two white tufts at the throat.

w

Whakapapa
Geneology.

Whakaaro
Thought, opinion, plan, understanding, idea, intention, gift, conscience.

Whānau
Extended family, family group, a familiar term of address to a number of people.

About the statistics used in this plan

Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the author, not Stats NZ or individual data suppliers.

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) and Longitudinal Business Database (LBD) which are carefully managed by Stats NZ. For more information about the IDI and LBD please visit https://www.stats.govt.nz/integrated-data/

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

Te Wao Toi Whānui