



Hanga-Aro-Rau

Post COVID-19 workforce
development needs in
New Zealand's manufacturing
and engineering sectors

20 September 2022



HANGA-ARO-RAU
**Manufacturing, Engineering
and Logistics**
Workforce Development Council

He tīmatanga kōrero nā te Poari o Hanga-Aro-Rau | Foreword from the Hanga-Aro-Rau Council

Mā te rongō, ka mōhio
Mā te mōhio, ka mārāma,
Mā te mārāma, ka mātau,
Mā te mātau, ka ora

Through awareness comes realisation
Through realisation comes understanding
Through understanding comes knowing
Through knowing comes wellbeing

We are delighted to have commissioned this research with several key insights on the current and future workforce development needs of New Zealand's manufacturing and engineering sectors, with a deep dive into how COVID-19 has impacted these industries.

This Deloitte report sets solid foundations to build on and inform further mahi to ensure the manufacturing and engineering sectors, that we represent, have a greater leadership role and influence across the vocational education system and its transformation.

We now invite you to carefully consider the key findings and opportunities and how we can all apply them – both in unison and independently – to address the unique needs of our manufacturing and engineering industries, communities and the partners we serve while honouring Te Tiriti o Waitangi.

Ngā manaakitanga

Dr Troy Coyle

Co-chair

Renata Hakiwai

Co-chair



He kupu arataki nā Ngā Tumu Whakarae o Hanga-Aro-Rau | Welcome from the Executive Leaders of Hanga-Aro-Rau

Mānuka takoto, kawea ake

E te iwi ihupuku e whakahohe ake
nei, tēnā rā koutou

The outcomes of this in-depth research project will help us to drive and influence change across the system to create strong, unified and sustainable vocational education fit for the future.

Our gratitude goes to the Tertiary Education Commission (TEC) for funding this important project from its COVID-19 Response Projects Fund and to Deloitte for walking alongside us to do the research and produce this comprehensive report on its findings.

We enthusiastically accept the challenge of bringing this research to life in very tangible ways, using it to guide how we work alongside the manufacturing and engineering industries. Its key insights will inform all our mahi including our Statement of Strategic Direction which is currently in development and our workforce development strategies. You are warmly invited to join us on this hīkoi of transformation.

Noho ora mai i roto i ā māua mihi

Phil Alexander-Crawford

Chief Executive

Samantha McNaughton

Deputy Chief Executive



Me mahi tahi tātou mō te oranga o te katoa

We must all work together for our collective wellbeing

Ngā mihi | Acknowledgements

This research is funded by the Tertiary Education Commission and conducted by Hanga-Aro-Rau in collaboration with Deloitte. Deloitte and Hanga-Aro-Rau acknowledge the significant contribution by experts and individuals who shared their views over the course of this research, including the following:

Name	Role and Organisation	Key Contribution
Philip Alexander-Crawford	Chief Executive Hanga-Aro-Rau	Research Direction
Samantha McNaughton	Deputy Chief Executive Industry Transformation Hanga-Aro-Rau	Research Direction and Project Leadership
Laura Mansfield	Insights Manager Hanga-Aro-Rau	Research and Data Subject Matter Expert
Mathew Vandy	Industry Relationship Manager Hanga-Aro-Rau	Industry Relationships
Heather Geddes	Project Manager Hanga-Aro-Rau	Research Project Manager
Darrell Lambert	Poumatua General Manager Māori Workforce Hanga-Aro-Rau	Subject Matter Expert and Stakeholder Engagement
Jahn Vannisselroy	Industry Relationship Lead Hanga-Aro-Rau	Industry Relationships
Maree Thomas	Industry Relationship Lead Hanga-Aro-Rau	Industry Relationships
Kieran Ormandy	Industry Manager Hanga-Aro-Rau	Industry Relationships
Alisha Tsai	Executive Assistant to Philip Alexander-Crawford & Samantha McNaughton	Project Coordination
John Tan	Partner Deloitte Access Economics Deloitte	Project Leadership
Tamarapa Lloyd	Partner Hourua Pae Rau Deloitte Māori Services Deloitte	Project Leadership and Stakeholder Engagement Lead
Richard Bailey	Partner Financial Advisory Services Deloitte	Project Leadership and Education Subject Matter Expert
Lisa Tai	Partner Pās Peau Deloitte Pasifika Services Deloitte	Pacific Peoples Subject Matter Expert
Liza van der Merwe	Director Deloitte Access Economics Deloitte	Workforce Analysis Lead
Sylvia Yan	Associate Director Artificial Intelligence and Data Deloitte	Project Leadership and Data Analysis Lead
Daniel Kawana	Associate Director Hourua Pae Rau Deloitte Māori Services Deloitte	Stakeholder Engagement
Dieter Adam	Chief Executive New Zealand Manufacturers and Exporters Association	Research Direction and Industry Subject Matter Expert
John Hamilton	Business Advisor Canterbury Employers' Chamber of Commerce	Industry Subject Matter Expert
Rachel Barker	Chief Executive Officer Plastics New Zealand	Industry Subject Matter Expert

Kuputaka | Glossary

Terminology	Interpretation
ākonga	Student
aiga	A family (in Samoan culture)
Aotearoa	New Zealand
hapori	A section of a kinship group, family, society, community
hapū	A kinship group, clan, tribe, subtribe - section of a large kinship group and the primary political unit in traditional Māori society
iwi	An extended kinship group, tribe, nation, people, nationality, race – often refers to a large group of people descended from a common ancestor and associated with a distinct territory
kaupapa Māori	A philosophical doctrine, incorporating the knowledge, skills, attitudes and values of Māori society
kōrero (noun)	A speech, narrative, story, news, account, discussion, conversation, discourse, statement, information
Mahi (noun)	Work, job, employment, trade (work), practice, occupation, activity, exercise, operation, function
Māori	Māori, indigenous New Zealander, indigenous person of Aotearoa / New Zealand
matawhānui	Broad vision
ngā pou (noun)	Pillar, goalpost (used to guide the Hanga-Aro Rau Statement of Strategic Direction)
rangatahi	Young people, the younger generation
te ao Māori	The Māori world view which acknowledges the interconnectedness and interrelationship of all living and non-living things
te reo me ōna tikanga Māori	Reflects the intrinsic link between the Māori language and culture
Te Tiriti o Waitangi (Te Tiriti)	The Treaty of Waitangi
tikanga Māori	Māori traditional rules, protocol and culture
tuakana-teina	A concept from te ao Māori and refers to the relationship between an older (tuakana) person and a younger (teina) person. This can take a variety of forms such as peer to peer, younger to older, older to younger, or able/expert to less able/expert.
wānanga	A seminar, conference, forum, educational seminar
whakawhanaungatanga	The process of establishing relationships, relating well to others
whānau	An extended family, family group, a familiar term of address to a number of people – the primary economic unit of traditional Māori society

Ihirangi | Contents

5	Ngā mihi Acknowledgements	53	He arotake pūkenga mō āpōpō Future skills survey
6	Kuputaka Glossary	68	He tātaritanga kaimahi Workforce analysis
8	He kupu whakataki Executive summary	104	He aronga pae tawhiti Strategic alignment
17	Te horopaki me te huarahi Context and approach	109	Arawātea matua Key opportunities
22	He rangahau Desktop research	115	Tohutoro References
32	Kiripānga Stakeholder engagement	116	Tāpiritanga Appendices



He kupu whakataki | Executive summary

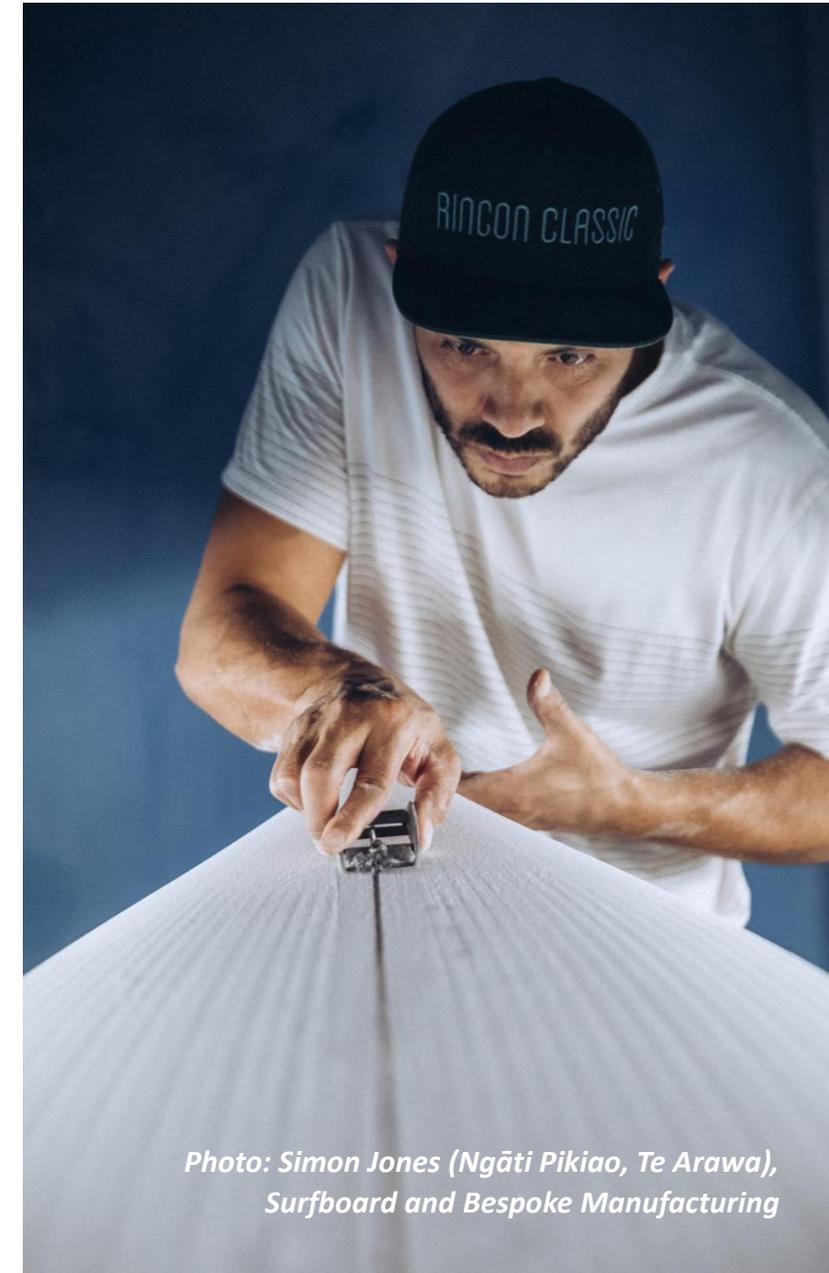
BACKGROUND AND CONTEXT

The Reform of Vocational Education (RoVE) aims to create a unified and cohesive vocational education and training system for industry, employers, employees/learners and providers. The Reform has coincided with the duration of the COVID-19 pandemic, which has had a significant impact on the manufacturing and engineering workforce. In particular it has:

- Had a sustained impact on the relationship and wellbeing of employees, managers and learners as each group has had to balance employment, learning and home pressures in an unfamiliar disrupted environment. This impact has been uneven, with Māori and Pacific Peoples being disproportionately impacted;
- Closed borders and intensified disruption of industry access to migrants, which has historically been the key source for meeting workforce gaps in New Zealand. In recent times, the trend has reversed with negative migration from New Zealand exacerbating a workforce shortage across all industries, but particularly impacting the manufacturing and engineering industries, which have traditionally relied on migrants and returning New Zealanders to meet key skills gaps; and
- Created extraordinary pressure on supply chains and the labour market, which is currently manifesting in a surge of cost pressure, including wage pressure, and significant economic uncertainty relative to pre-COVID-19 economic conditions. During engagement with industry, these pressures have acted to constrain output for some businesses.

To help the manufacturing and engineering industries to recover from this COVID-19 induced disruption, and to prepare industry and the workforce to be more resilient and sustainable in the future, the Tertiary Education Commission provided funding to Hanga-Aro-Rau, which has commissioned Deloitte to undertake this industry research on the *Post COVID-19 Workforce Development Needs in New Zealand's Manufacturing and Engineering Sectors*.

The key purpose of this research has been to examine how vocational education and training can assist the manufacturing and engineering industries to maintain and upskill current workforces. This would help to ensure they operate in a more resilient, sustainable and equitable manner in a post-COVID-19 environment. This research, its findings, and the lessons learned are designed to be developed by Hanga-Aro-Rau to inform its Statement of Strategic Direction. This research identifies opportunities that can be developed further by Hanga-Aro-Rau into specific strategic initiatives or areas for further investigation. The research is supported by datasets and tools to support the monitoring and calibration of strategic initiatives in future.



*Photo: Simon Jones (Ngāti Pīkiao, Te Arawa),
Surfboard and Bespoke Manufacturing*

He kupu whakataki | Executive summary (Continued)

RESEARCH APPROACH

This research adopts the following key steps:

1. A desktop literature review of existing research compiled by Hanga-Aro-Rau to date, from which the research hypotheses were developed.
2. Engaging with key stakeholders from across the industry, including kōrero, employee wānanga and survey to test the research hypotheses, and to capture primary data and insights.
3. Gathering relevant data from Statistics New Zealand and other proprietary data sources to develop an outlook for current and future skills demand and current and future skills requirements.
4. Completing workforce analysis based on the datasets and insights captured from the desktop literature review, stakeholder engagement and the future skills survey using Deloitte Access Economics' in-house demographic and macroeconomic models to develop insights based on:
 - data analysis, Deloitte's base case economic outlook, scenario modelling and primary research
 - the potential 'workforce capacity gaps' in the manufacturing and engineering industries
5. Identifying potential opportunities based on the data, research and analysis for Hanga-Aro-Rau to advance further research or to develop into specific strategic initiatives to support the development of its Statement of Strategic Direction.
6. The research is supported by datasets and tools to support the monitoring and calibration of strategic initiatives in future, including:
 - a 'data catalogue' that sets out relevant datasets that informed the research; and
 - prototype data dashboards and an analytical framework that can potentially be developed further to track and monitor specific workforce development initiatives or future research themes.

RESEARCH HYPOTHESES AND THEMES FOR ENGAGEMENT

Following the completion of the desktop research, key themes emerged, which were distilled into three research hypotheses:

Hypothesis 1: Relationships and engagement

If the relationship across learners, employers, providers, regional and industry stakeholders are better integrated despite challenges with COVID-19, there will be higher participation, retention and engagement rates.

Hypothesis 2: Digital capability and future roles

COVID-19 is accelerating the need for digital capability. This has an impact on skills mix, tool sets, operations, infrastructure requirements for supply chains, Client Relationship Management (CRM), data and information, and ways of learning and upskilling.

Hypothesis 3: Business continuity and resilience

COVID-19 has caused significant business disruption, and particularly impacted staff availability. This has forced businesses to change their operating model and constrained their operating capacity.

Businesses can build resilience to manage future disruption by sustainably building workforce skills and capabilities.

These hypotheses were used to shape the themes of the engagement with stakeholders.

Research Scope

While the scope of this research has a focus on the Auckland, Waikato and the Canterbury regions, the research has gathered many insights that are equally applicable for other regions. Although the logistics sector is within the remit of Hanga-Aro-Rau, it is outside of the scope of this research.

He kupu whakataki | Executive summary (Continued)

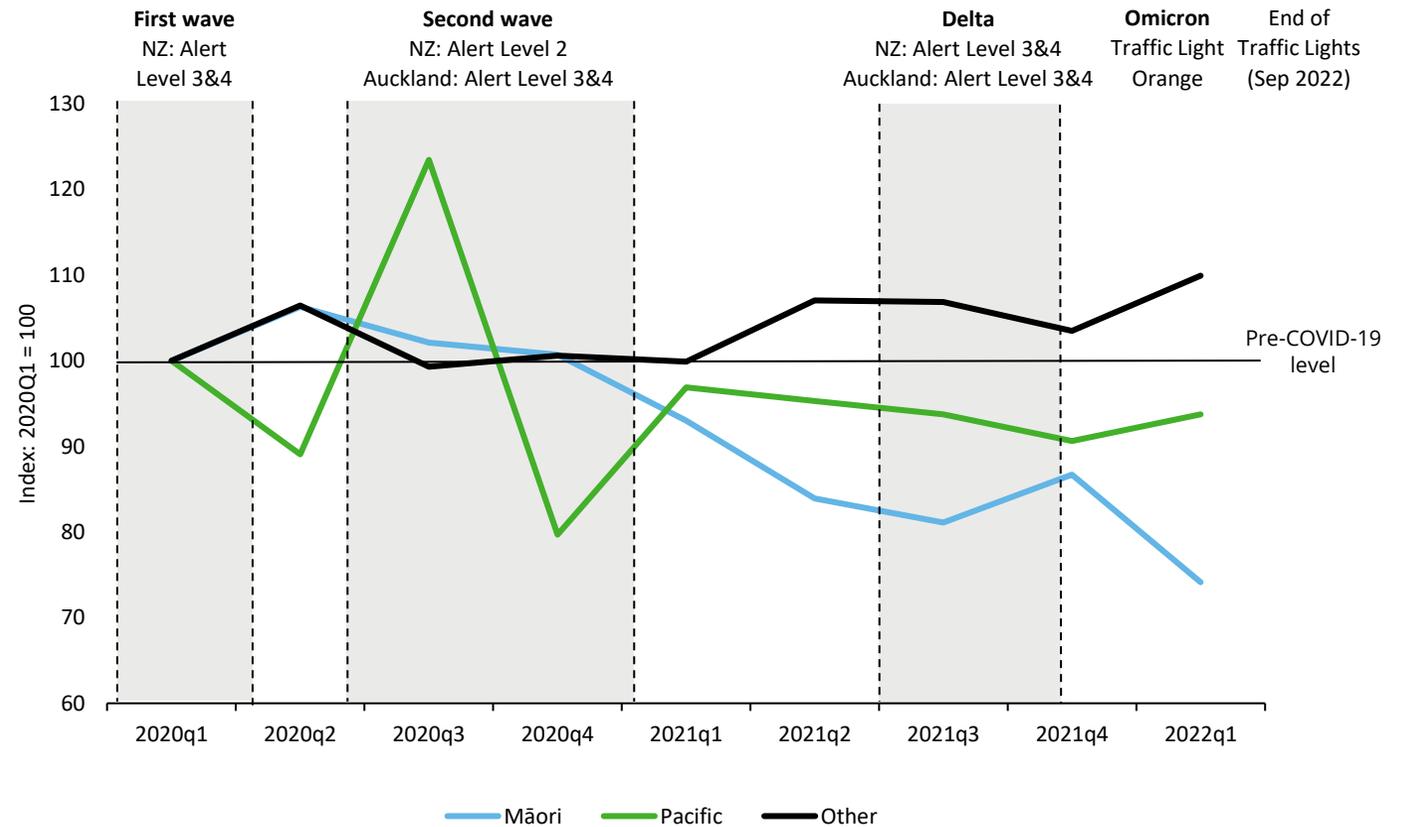
People



The chart shows engineering sector employment outcomes during the COVID-19 period, with the impact on Māori and Pacific Peoples analysed separately. Key COVID-19 'waves' are shaded in grey.

- While overall engineering sector employment in March 2022 now exceeds pre-COVID levels, employment of Māori and Pacific Peoples has not rebounded to pre-COVID 19 levels. Employment in engineering among Māori is still 25% below pre-COVID levels and 7% below for Pacific Peoples.
- A similar chart for manufacturing employment outcomes is included in section 5 which indicates that employment in manufacturing among Māori is 10% below pre-COVID levels and 5% below for Pacific Peoples'.
- COVID-19 has impacted mental wellbeing. Education institutions and employers have observed increased learner stress and the need for additional pastoral support.
- Flexible or remote working and learning has allowed more time for personal and whānau commitments – and are likely to remain a feature post COVID-19. However, the stress of managing home, family and learning life 'from home' has been challenging for many.
- COVID-19 has exacerbated labour shortages which puts extra pressure on staff and business owners, leaving less resources for on-the-job or tuakana-teina training.

Impact of COVID-19 on engineering employment by ethnicity (quarterly, 2020 to 2022)



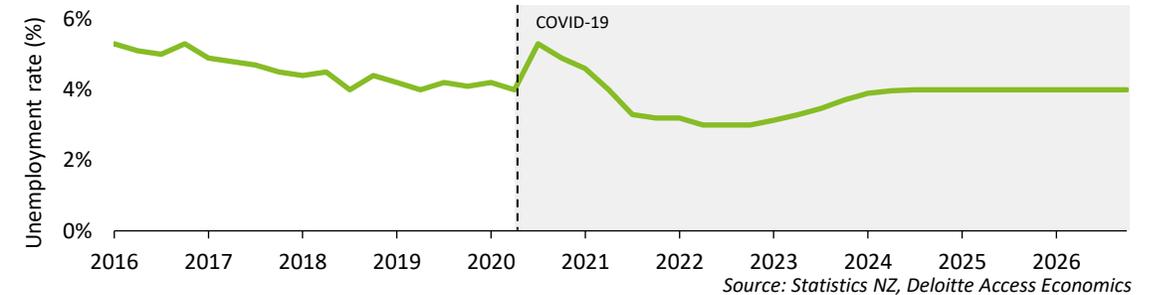
Source: Statistics NZ, Deloitte Access Economics

He Kupu Whakataki | Executive summary (Continued)

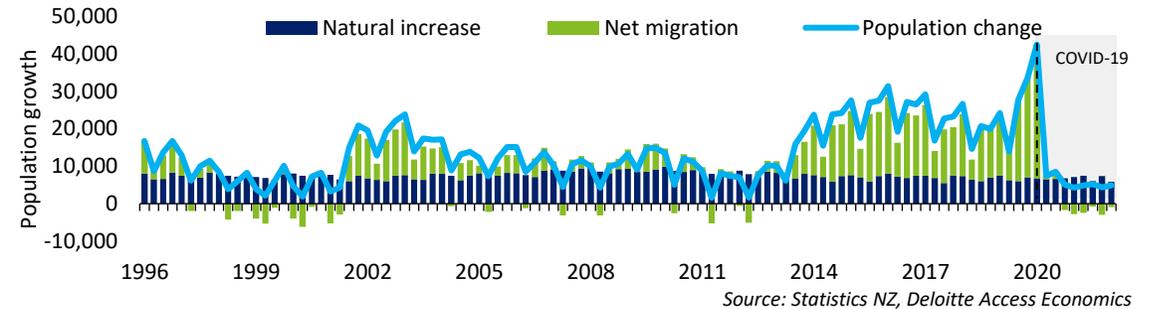
Sustainability

- Since COVID-19, there has been a reversal of the trend of positive net migration, highlighting New Zealand’s traditional reliance on skilled workers from overseas. A pivot to more domestically trained employees will be more sustainable – but this change will take time and cannot scale to meet the immediate industry needs.
- The shortages in skilled and unskilled labour, evidenced through low unemployment rates, are a global trend across all sectors. This is particularly acute for manufacturing and engineering, which has traditionally relied on overseas skills, where there is also strong international competition. The shortages are unlikely to reverse in the short-term, post pandemic.
- Employers and training providers feel that many students and potential employees are not attracted to the manufacturing and engineering industries. More work is needed to communicate the opportunities and career pathways in these industries.
- The size of the 65+ age cohort has almost doubled in the manufacturing sector over the last decade. There is an opportunity for experienced older workers to continue to make a meaningful contribution to stay on in a part time capacity and through tuakana-teina approach in passing on knowledge.
- Employers, industry and learners felt that some existing learning programmes are not fit for purpose for the current and future needs of industry. There is a critical role for Hanga-Aro-Rau to facilitate and strengthen the relationship between providers and industry to develop fit for purpose training that meets industry needs.

Unemployment rate



New Zealand migration and population growth



Permanent and long term arrivals

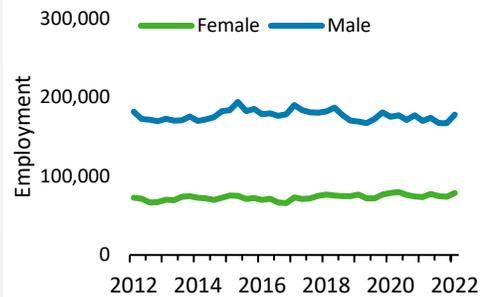


He kupu whakataki | Executive summary (Continued)

Equity

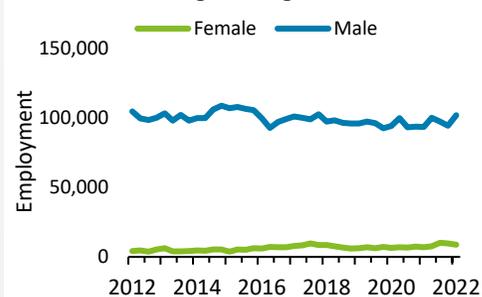
- Māori and Pacific Peoples' employment has not recovered to pre-COVID-19 levels in both manufacturing and engineering. Employment for other ethnic groups now exceeds pre-COVID-19 levels.
- COVID-19 disproportionately affected the Māori and Pacific workforce, which are populations that are more likely to: face underlying health conditions, to be classed as 'essential workers', have lower vaccination rates, live in larger extended family groups, and face an economic imperative to keep working to support whānau. While there was a lift in vocational education and training enrolments during COVID-19, this was most noticeable in non-Māori/Pacific groups.
- Māori and Pacific Peoples have a lower average skills mix than other ethnic groups. Achieving Level 1 parity with other ethnic groups by 2028, would require an additional ~9,000 Māori and ~6,800 Pacific manufacturing employees to be trained. This would require a 11% p.a. growth rate for Māori and a 23% p.a. growth rate for Pacific Peoples. In engineering, ~2,600 more level 1 Māori employees would need to be trained to achieve parity with other ethnic groups by 2028.

Gender mix in manufacturing



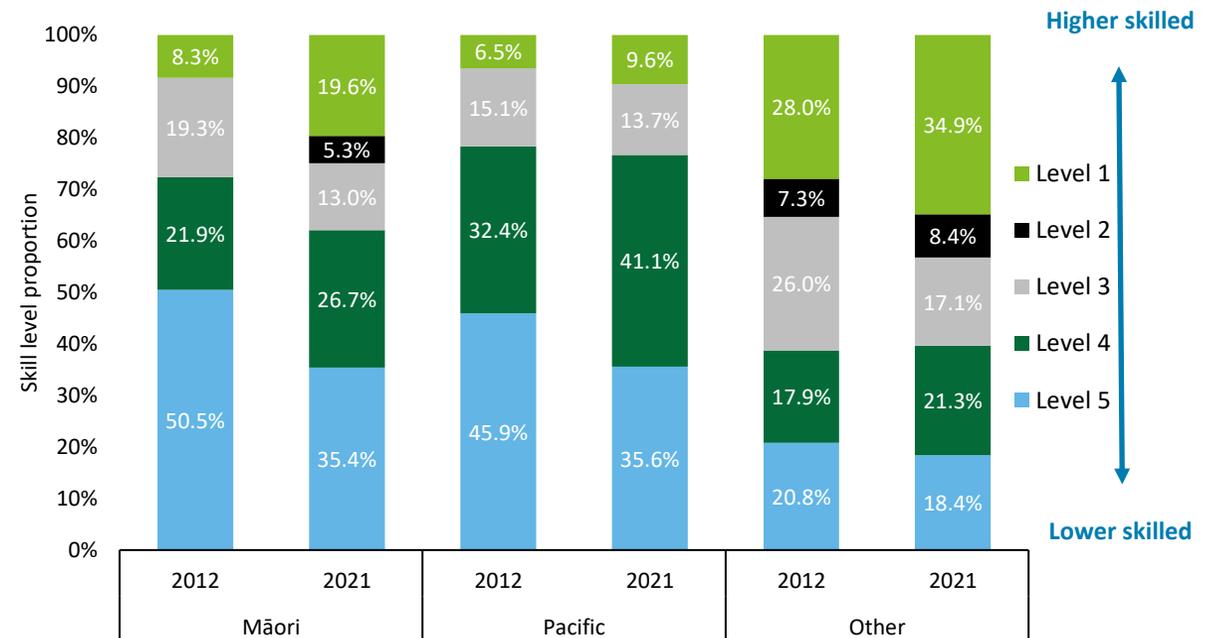
Source: Statistics NZ, Deloitte Access Economics

Gender mix in engineering



Source: Statistics NZ, Deloitte Access Economics

Manufacturing skills mix trend by ethnicity (2012Q2 vs. 2021Q2)



Source: Statistics NZ, Deloitte Access Economics

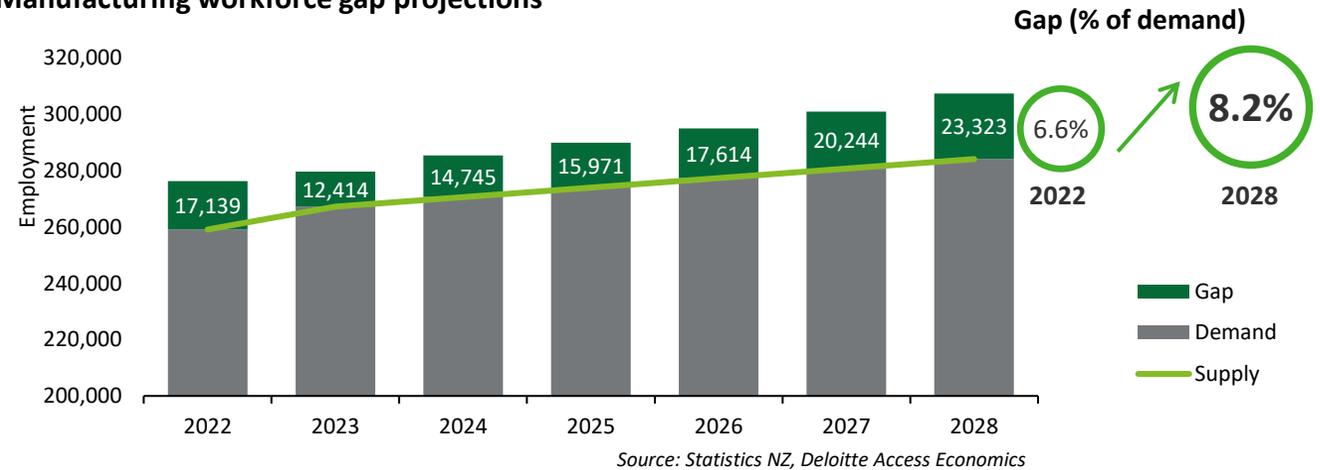
- Women make up only about 30% of the manufacturing workforce and only 7% of the engineering workforce. In 2022, women only make up 12% of learners studying manufacturing and engineering. Increasing participation rates among women has the potential to make the biggest impact on addressing the workforce gap.

He kupu whakataki | Executive summary (Continued)

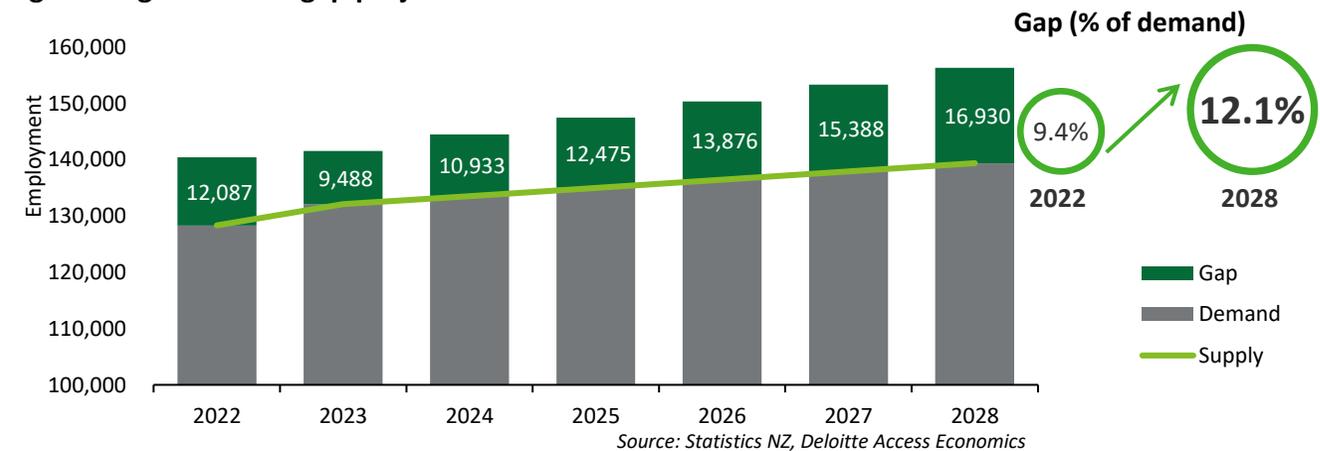
Industry Voice

- Supply chain disruption, access to labour, and changes in how businesses were forced to operate during COVID-19 were key pain points for the manufacturing and engineering industries.
- Immigration settings are of critical concern in the manufacturing and engineering industries as these industries relied heavily on skilled migrants to address key skills gaps. Immigration policy settings and COVID-19 has resulted in skilled migrant shortages and significantly disrupted workforce availability with border closures and restrictions. The transition to a more domestically trained workforce is needed to create a more sustainable workforce but cannot occur immediately.
- Deloitte estimates that there is a significant workforce capability and capacity gap of up to 17,000 manufacturing roles and 12,000 engineering roles, and the size of this gap is likely to increase if current trends and policy settings persist.
- This lack of capacity and capability is putting upwards pressure on the cost of labour or risks constraining output.
- Migration restrictions and the loss of younger employees overseas under a possible brain drain scenario are key concerns for industry, right now.
- Small and medium-sized businesses lack the capacity or capability to keep up with the skills transformation, with training budgets constrained by cost pressure – but they need the most support.

Manufacturing workforce gap projections



Engineering workforce gap projections

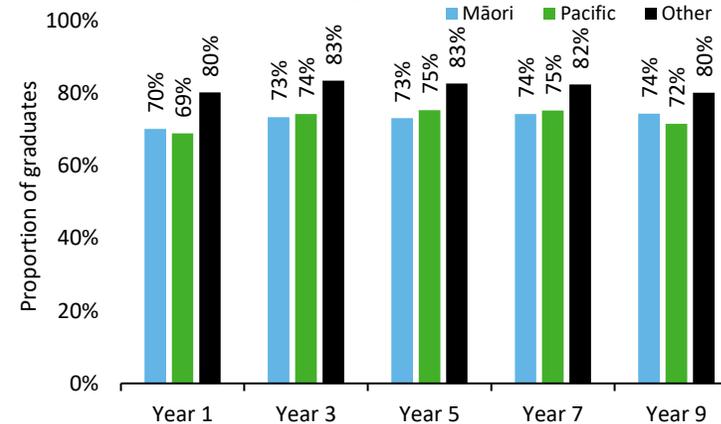


He kupu whakataki | Executive summary (Continued)

Te Tiriti

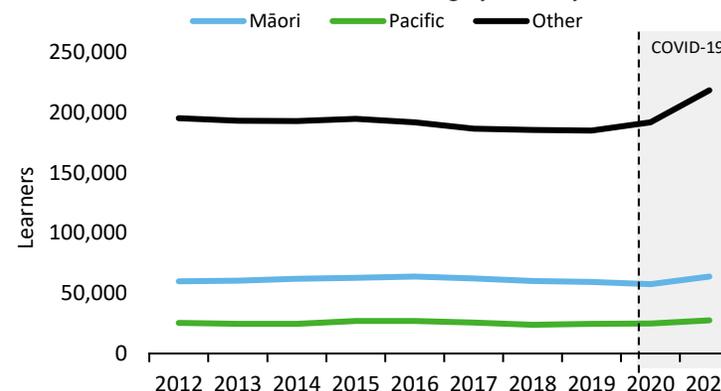
- Māori make up 15.3% of the manufacturing and 7.6% of the engineering workforce – improving equitable for Māori and Pacific People are expected and necessary to meet the workforce capacity and capability gap given future demographic trends.
- While there has been an upward trend in learners participating in vocational education during COVID-19, this trend is weaker for Māori and Pacific People.
- Māori, Pacific Peoples and peoples with disabilities favour mixed modes of learning and teaching – more learner centric modes of learning will be needed in the future.
- Alignment with Te Tiriti is expected and mandated from RoVE - however industry is grappling on how to embed Te Tiriti.
- There is a current tendency for courses and trainings to be designed and delivered using a “one size fits all” approach, not giving sufficient focus on cultural obligations under Te Tiriti. This approach needs to change as employment outcomes, one year after graduating, are worse for Māori and Pacific People.
- Māori people with disability achieve higher workforce participation rates than Pacific Peoples, Asian and other ethnic groups with disability – further research would be useful to understand the drivers for this.

Proportion of manufacturing and engineering graduates that are employed each year after graduating



Source: Ministry of Education, Participation in Vocational and Educational Training programmes

Learners in vocational education and training by ethnicity



Source: Nga Kete, Post Study Outcomes

Te ao Māori System Input

We would very much like to have a training and learning system that is more te ao Māori centric. Māori values must be featured in the design, decision making and delivery of the training, otherwise it won't work for us all.

Authentic Change

Change needs to be authentic and we welcome the opportunities to partner with the industry and providers to design the actions and see those actions take shape.



Voice of Māori Employers

Whānau Centric Learning

Our learning and working needs to be flexible for us to be able to take care of our family responsibilities on top of working, especially when working from home.

Equal Opportunities for Work

Being able to use the skills from my training and learning so that I can earn a better income to support my whānau.



Voice of Māori Employees

He kupu whakataki | Executive summary (Continued)

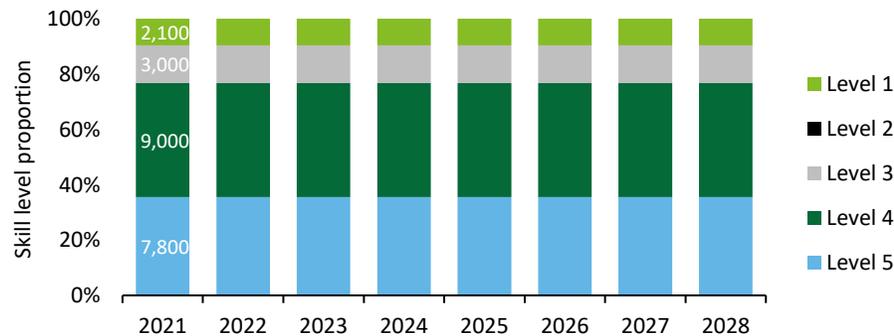
Transformation

- COVID-19 has transformed the industry’s future skills set requirements and digital mindset – businesses will need to continue to adapt to be competitive and employees will need to learn new skills to be relevant.
- Teamwork and problem solving were rated as the most important skills in the Skills Survey conducted as part of this research. Cultural competency and language skills were rated the lowest.
- Industry 4.0 will demand more digital as well as non-technical skills such as critical thinking, problem-solving, creativity and communication – education providers will need to evolve their programmes to meet these needs.
- There is evidence that suggests Industry 4.0 could introduce greater digital and automation needs. However, the survey results did not reflect this. This could indicate that the industry is not prepared for or anticipates continued disruption from modernisation and automation.
- Employers focussed on business survival during COVID-19, which meant that formal training was deprioritised. Businesses and employees were forced to adapt and innovate rapidly, and fundamentally change long standing ways of operating – the response to COVID-19 proves that step change is possible.
- The workforce analysis includes a framework to model scenarios such as different transition pathways to uplift the skills mix of Pacific Peoples to achieve more equitable outcomes.

Pacific Peoples’ current skills mix



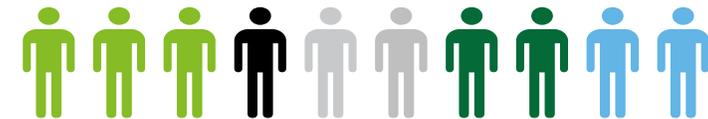
Base case: Pacific Peoples' skills mix forecast



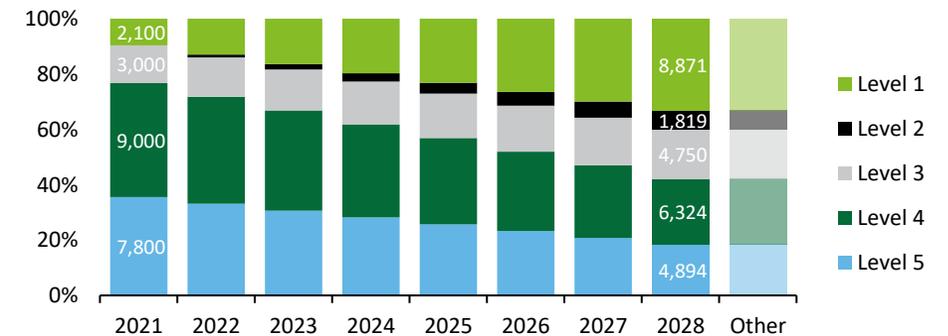
Source: Statistics NZ, Deloitte Access Economics

© 2022. Deloitte Limited (as trustee for the Deloitte Trading Trust).

Equitable transition pathway scenario



Scenario: Uplift Pacific Peoples' to other ethnic skills mix



Source: Statistics NZ, Deloitte Access Economics

Arawātea matua | Key opportunities

This research has highlighted the following opportunities with a prominent focus on strengthening the relationship across key stakeholders in the vocational education eco-system and promoting equitable outcomes for the under-served population groups. Hanga-Aro-Rau has a stewardship role to play across these opportunities and the success of achieving these will rely on the industry, providers, iwi/Māori partners, employers and the relevant public sector agencies to own and work with the learners to progress these opportunities going forward.

Opportunity 1: Increase Māori and Pacific Peoples' presence in the higher skilled roles in manufacturing and engineering through enhanced connection across the vocational education and training eco-system. In particular there will need to be partnership with Te Tiriti partners and iwi groups, Pacific groups, employers and industry associations to monitor progress for equity and education outcomes.

Opportunity 2: Explore how to attract and support disabled people to increase uptake in training and working in manufacturing and engineering through a better understanding of learning and employment support needs across the vocational education and training eco-system. Specific focus is required to engage with education and training providers, disability advocacy, support groups and employers to promote career opportunities.

Opportunity 3: Increase the number of women in the manufacturing and engineering workforce informed by the opportunities identified through the Industry Equity Project conducted by Hanga-Aro-Rau in collaboration with Waihanga-Ara-Rau. It can begin by researching barriers that women face, if any, and what can be done to retain and attract them.

Opportunity 4: Improve retention rates and increase new hires into the manufacturing and engineering industry through collective learning of best practices and targeted promotional initiatives to help ease skills shortages. This can begin with a good understanding of workforce turnover incentives, barriers for training and employment success across different regions and demographic groups.

Opportunity 5: Improve skills alignment for the manufacturing and engineering workforce through working with the vocational education and training sector and employers to inform requirements. This is an all-of-sector initiative in which Hanga-Aro-Rau has key responsibility to ensure cross-sector sharing of insights to enable providers to design curricula and approaches that promote industry knowledge and future skills development and exchange.

Opportunity 6: Providers have a role to play in working with industry, Māori, Pacific People and under-served groups to **identify programmes that are working well to achieve high levels of engagement** with these groups and to adapt and promote similar programmes more broadly across the sector.

Opportunity 7: A cross-system approach to reduce burden introduced by the costs of training in the workplace through facilitation of cross-industry knowledge exchange and identification of innovative, cost and outcome effective best practice. This will enhance sustainability of businesses especially small and medium-sized enterprises (SMEs) and enable them to achieve better value for money outcomes from their investments.

Opportunity 8: Embrace the knowledge and experience of the older generation in the manufacturing and engineering workforce and support tuakana-teina approach to upskill tēina/rangatahi. This can begin with Hanga-Aro-Rau working with providers and businesses to establish an understanding of the roles and skills where age imbalance is particularly problematic and how best to embed this approach in the upskilling of younger workforce.

Opportunity 9: Establish a set of key system performance and outcomes indicators to help the manufacturing and engineering sectors to monitor workforce supply and demand changes. The eco-system would benefit from a framework, leveraging other Tertiary Education Commission funded programmes, to support prioritisation for the sectors in training and education.

Opportunity 10: Test the findings of this research on their relevance to the logistics industry and identify gaps for further research and analysis to enable better synchronisation of workforce needs for the manufacturing, engineering and the logistics sectors to operate as a sustainable eco-system.

A worker in a high-visibility vest and headphones is operating a large industrial machine in a wood mill. The machine has a control panel with many buttons and a monitor displaying data. The worker is looking at the machine. The background shows a large industrial facility with various structures and equipment.

Section 1: Te horopaki me te huarahi | Context and approach

Photo: Josh Gray, Solid Wood Manufacturing

The role of Hanga-Aro-Rau in the vocational education and training (VET) sector

Hanga-Aro-Rau (HAR) Manufacturing, Engineering and Logistics Workforce Development Council (WDC) has responsibility for ensuring the vocational education system in New Zealand is meeting the needs of the manufacturing, engineering, and logistics industries. This research is funded by the Tertiary Education Commission (TEC) and commissioned by Hanga-Aro-Rau with Deloitte as the research provider.

Hanga-Aro-Rau is one of six Workforce Development Councils or Ohu Mahi established in 2021 as part of the Reform of Vocational Education (RoVE) programme which is reimagining vocational education in Aotearoa.

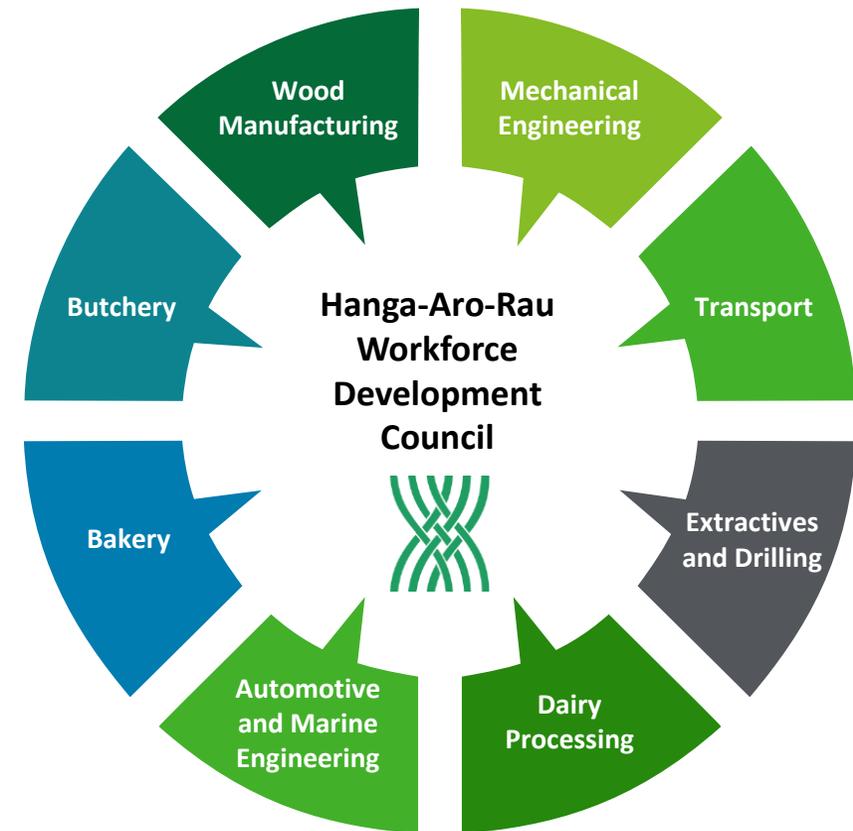
The role of Hanga-Aro-Rau is to ensure the vocational education system meets industry needs and gives a stronger voice to Māori business and iwi development, Pacific and under-served groups, with the aim to give industries and employers greater leadership and influence across vocational education.

As a Te Tiriti o Waitangi-based organisation, Hanga-Aro-Rau is committed to reimagining vocational education through leading and building a vocational education system that honours Te Tiriti o Waitangi and supports Māori Crown relations to meet the needs of Māori, iwi and hapū industry, businesses, learners and their whānau to fill present and future talent needs. Talent that will underpin their sustainability, viability, and relevance to the future of both the Māori and wider Aotearoa economies.

Hanga-Aro-Rau represents the manufacturing, engineering and logistics industries including wood manufacturing, bakery, butchery, mechanical, automotive and marine engineering, dairy processing, extractives and drilling, and transport.

Hanga-Aro-Rau plays a fundamental role in a unified vocational education system that brings together industry and educators to ensure New Zealand's workforce is fit for today's needs and tomorrow's expectations.

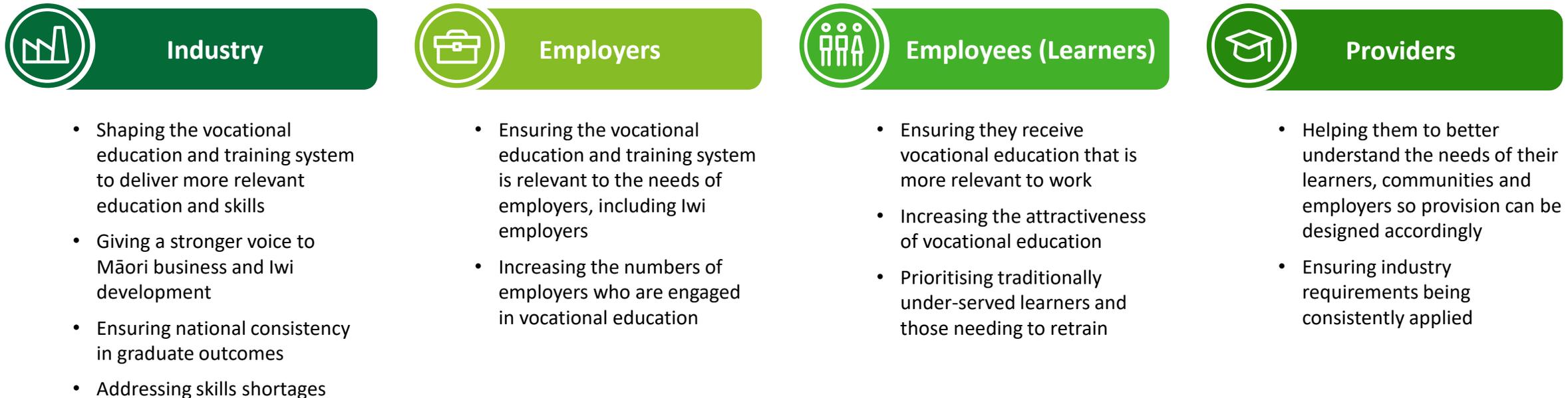
Examples of industries in the remit of Hanga-Aro-Rau



A full list of industries can be found in Appendix 1.

The relevance of the Reform of Vocational Education for this research

The Education (Vocational Education and Training Reform) Amendment Act came into effect on 1 April 2020. It amends the Education Act 1989 and repeals the Industry Training and Apprenticeships Act 1992 to create a unified and cohesive vocational education and training system. The Reform of Vocational Education (RoVE) aims to create a strong, unified, sustainable system for all vocational education delivering the skills that learners, employers and communities need to thrive. The key objectives of this reform and the outcomes desired have guided the research report. In particular, this research focuses on the four key stakeholder segments for the system to be successful. Objectives of RoVE for each segment are outlined below:



Aligning with these objectives and in the context of COVID-19, this research explores the relationship across the system with a particular focus around addressing skills shortages, the needs of the employers, understanding Māori, Pacific and under-served employees/learners, and giving insights to education providers on training requirements to meet the industry's future skills needs.

The purpose and scope of the research

The key purpose of this research is to establish a view of workforce challenges caused by COVID-19. It seeks data and insights to help the sector to understand the trend of workforce supply and demand and skills mix changes. This will allow vocational education and training to enable the manufacturing and engineering industries to maintain, retrain and upskill the workforce to ensure they are fit for the future. The research includes gathering key data and information from the manufacturing and the engineering industries relevant to the Auckland, Waikato and the Canterbury regions. While the logistics sector is within the remit of Hanga-Aro-Rau, it is outside of the scope of this research, noting that it can potentially be considered in future research. Below is a summary of outputs that are part of this research:

The scope of the research

Quantitative and Qualitative Data

Gather data and using the data to analyse:

- Current and future skills demand and supply in a COVID-19 environment
- Gaps in the current skills levels and future skills mix requirements
- Key trends on training, education and employment

Stakeholder Engagement

Engage with key stakeholders including:

- Education Providers
- Employees
- Employers and Chambers of Commerce
- Hanga-Aro-Rau Iwi and Māori Businesses

Opportunities

Present opportunities on potential further research, engagement and workforce development actions that are relevant to the role of Hanga-Aro-Rau. These will serve to assist the manufacturing and the engineering industries to be more resilient during the time of change, and to uplift education/training outcomes for employees across the two industries.

Research Report

This research report, which informs Hanga-Aro-Rau Statement of Strategic Direction and workforce development strategy. This can be used by employers, providers, industry bodies and government with the aim to support workforce development, programme development, and setting of policies and guidelines.

Tools to support workforce plans

Develop tools and potential frameworks for Hanga-Aro-Rau to support development and monitoring of strategic initiatives for the manufacturing and engineering industries. An example is a proof-of-concept dashboard for Hanga-Aro-Rau to build on.

Out of Scope

- Logistics industry
- Analysis outside of the Auckland, Waikato and the Canterbury regions

There is a need to broaden the research to include these areas and test the findings.

The research approach

The research is based on three sources of data and information collected through various methods. These are: desktop research, engagement and survey, and data and modelling. This has helped to develop integrated and specific insights of the manufacturing and engineering workforce skills to maintain, retrain and upskill the workforce to ensure they are future proofed for a changing COVID-19 environment. The three sources are outlined below:

Desktop Research

Desktop Research

46 documents were studied from the large body of research collated by Hanga-Aro-Rau that has a strong alignment with this research. See the bibliography and references for a complete list of these documents.

Research Themes

Based on the desktop research, four primary research themes were established that cover:

- Strategic and system alignment
- Workforce supply and demand
- Workforce enablement and investment
- Workforce quality and competencies

These themes were used to guide stakeholder engagement, future skills survey, data dashboarding and workforce modelling work for this research.

Hypotheses

Insights from the desktop research enabled the initial development of hypotheses. Three key hypotheses were selected to guide the stakeholder kōrero and employee wānanga.

Engagement and Survey

Whakawhanaungatanga Workshop

A full day workshop was conducted between Hanga-Aro-Rau and the research team at Deloitte to refine and prioritise the set of hypotheses and identify the approach and key stakeholders for kōrero, wānanga and the future skills survey.

Kōrero Sessions

Stakeholder kōrero sessions (individual and small group interviews) were conducted with 26 organisations and over 40 participants. These were smaller conversation settings to capture and develop insights on the current challenges and future state opportunities across the manufacturing and engineering industries.

Wānanga

Two employee wānanga were held with 50 employees from Buckley Systems and Red Stag Timber with representation from Māori and Pacific Peoples.

Skills Survey

This research developed a future skills survey which was sent to employers to capture experience on the importance of a set of skills and the difficulties in finding these skills, both pre- and post-COVID-19. The effectiveness of suggested actions to resolve skills shortages has also been asked in the survey. There were 69 survey responses received across a broad cross section of sub-industries.

Data and Modelling

Data Catalogue

A list of 160 datasets was established based on research themes and hypotheses for this research. The fields included in this data catalogue is in Appendix 2.

Data Collection

A list of datasets essential for the data dashboard and for workforce analysis was either obtained from public sources or via a customised data requested from Statistics New Zealand.

Workforce Analysis

Deloitte Access Economics provided a historical and forward analysis of the manufacturing and engineering industries to understand the current and future state of skills availability in addition to the requirements. This included supply, demand and a 'gap analysis' with a base case outlook and three thematic scenarios. This provides a framework for Hanga-Aro-Rau to potentially develop further in future. Appendix 3 provides details of the methodology.

Dashboard

A prototype dashboard was developed, aligned to the four primary research themes. This dashboard is a draft tool for Hanga-Aro-Rau to continue to develop further.



**Section 2:
He rangahau |
Desktop research**

Photo: Pharmaceutical Manufacturing

Desktop research

Prior to Deloitte being engaged to conduct this research, Hanga-Aro-Rau had reviewed a significant body of research in the vocational education and training sector transformation space. However, insufficient written research had been completed around the impact of COVID-19 on the industry and the enduring impact on future skills needs. This research has included a review of 46 documents from sources including the Ministry of Education, Tertiary Education Commission, Ngāi Tahu, Te Pūkenga, Tai Tokerau and Tertiary Education Union Te Hautū Kahurangi o Aotearoa.

Approach



Document Review

All documents were reviewed and collated to synthesise the key information and insights. Information used and referenced was limited to the scope of this research. A list of documents used can be found in the bibliography.



Research Themes

From the collated information a set of four key research themes were developed. Each key theme had a set of sub-themes that further break down the research areas.



Key Insights

The key insights from the document review were mapped against the four key research themes. These were then used to support the research work and this report.

The next page outlines the four key research themes used in this research.

Document Breadth



Learner and Community Insights



Workforce and Regional Plans



HAR Plans and Proceedings



Industry and Education Reports



Māori Focused Policies and Think Pieces



Responses

A list of documents for desktop research is included in Appendix 4.

Key research themes

Four key research themes with associated sub-themes have been developed following the desktop research and the Whakawhanaungatanga workshop attended by Hanga-Aro-Rau and the Deloitte research team. These themes were useful to help categorise data and insights during the research process into areas of relevance for stakeholder engagement, future skills survey, data collection and dashboarding and workforce supply and demand analysis. The following diagram provides an outline of the four themes and sub-themes.



1. Strategic and System Alignment

- COVID-19
- Business continuity
- Relationship and engagement
- Digital capability and modernisation
- Te Tiriti o Waitangi and te ao Māori
- Equity
- Co-design
- Supply chain changes
- Market conditions



2. Workforce Supply and Demand

- Labour supply
- Labour demand
- Workforce retention and attrition
- Skills shortage
- Skills levels
- Current and future roles
- Economic outlook (including COVID-19 recovery pathways and scenarios)



3. Workforce Enablement and Investment

- Learning and working tool sets
- Learning and working environments e.g., physical, digital, flexible
- Technology investment



4. Workforce Quality and Competencies

- Quality assurance and competencies
- Development pathways
- Competency development, e.g., technical skills, knowledge, experience, cultural competencies
- Workforce wellbeing
- Social welfare and financial support

This section sets out granular insights from the perspective of a range of stakeholders summarised from the desktop research. We have tested these perspectives through our research hypotheses, stakeholder engagement and data analysis to inform our own research insights. Note that each key research theme has been tagged at the top right corner of the page to indicate groupings of the insights.



Impact of COVID-19 affects the industries

The manufacturing and engineering industries have been impacted by COVID-19 disruption to supply chains, labour markets and access to components. Post COVID-19 and with a shift to Industry 4.0, businesses are finding it challenging to keep up with the demand for new skills and modes of delivery. Better strategic and system alignment is needed.

COVID-19 has disrupted global, regional and local supply chains

COVID-19 caused major disruptions to global supply chains and the labour force, especially given that the industry has a reliance on international traded raw materials and critical components. Supply chain issues include delays in, or lack of, or increasing rates for shipping capacity, transport, and the flow-on impact to goods with limited shelf lives. Workforce has been restricted by lockdowns and border closures and the impact of timeliness in operations is often overlooked [2].

COVID-19 had a differential impact on regions and Auckland

Communities within Auckland's low socio-economic areas and those in rurally isolated communities have had a larger impact due to COVID-19. They have historically been under-served in accessing training, due to economic pressures, transport issues, geographical isolation, population spread, and socio-economic needs. Māori and Pacific peoples make up a large proportion of these groups. Therefore, meeting the distinct needs of these groups while retaining the features of quality vocational education is paramount [4].

COVID-19 has intensified the need for digital technologies

Industry 4.0 and automation have been key trends and a recent focus for the manufacturing and engineering industries. In some cases, COVID-19 has brought forward digital investments [3]. For instance, there is a need for faster upgrade cycles of communications systems [2]. In other cases, COVID-19 related uncertainty has delayed some planned investment.

RoVE takes a key role in ensuring a positive cultural and socio-economic impact

In relation to skills needs, a large part of the success of RoVE will be measured by the improvement in the system's ability to identify and respond to employers' skills requirements. This includes robust measures on whether RoVE has had a positive impact on regions. Skills needs may also stretch current thinking outside the box into previously unknown non-traditional territory e.g. cultural, socio-economic measures of need [11] and the ability for the workforce to adapt to change imposed by COVID-19.

Culture of the sector needs to evolve to lift vocational education outcomes

The Tertiary Education Union (TEU) considers the vocational education sector to be in a state of financial and management crisis, with change urgently required to meet learner needs [4]. In addition, there is recognition that practice, mindsets, and organisational culture in the sector need to evolve to lift vocational education outcomes [5,6] and for the industries to cope in the COVID-19 imposed changing environment.

Mixed modes of teaching and learning are preferred

Overwhelmingly, Māori, Pacific people and peoples with disabilities favour mixed modes of learning and teaching such as tuakana-teina (intergenerational learning), online, peer-to-peer mentoring, and work-based learning. A future post-COVID-19 recovery system, should consider the adoption of mixed methods of teaching and learning [9,10]. Adopting mixed models can support growth and development amongst all participants, including trainers and mentors.



Impact of COVID-19 affects the Māori community

Te Tiriti partnership and te ao Māori are pivotal in the post-COVID-19 recovery world and into the future for learners to be successful in the vocational education and training system. Their success will positively impact on the manufacturing and the engineering industries' success and New Zealand's reputation and presence in the world. Māori are prepared to deliver their own programmes that are most relevant to their needs.

COVID-19 impacted relationships between industry stakeholders and Te Tiriti partners

The disruption caused by the COVID-19 lockdowns had a direct impact on the ability of some industry stakeholders to work with their Te Tiriti partners to progress on planned actions to the intended degree [7]. In order to meet Te Tiriti obligations, pre-existing relationships of mana whenua with regional institutions should be recognised [5] and there is a need for more effective representation and conversations [8].

System-wide programmes need to be driven by Māori in the COVID-19 recovery world

In COVID-19 recovery, many iwi and hapū are investing heavily in business, industry and service provision, and require highly skilled staff that are also competent working in a Māori context [4]. System-wide programmes need to be driven by Māori voices and meet local needs, i.e., hapori Māori and the wider region in order to eliminate barriers that impede equitable access or Māori participation [7]. Māori want to participate in the future of their own workforce development and influence the broader sector.

Ao Māori, reo Māori and tikanga Māori as cornerstones to transformation

Hanga-Aro-Rau and the other WDCs have adopted a strong position on kaupapa Māori and its integration into the transformation of the system. There has been a decline in specific programmes or courses for te reo me ōna tikanga Māori as the sector became more focused on delivering economic outputs [4] especially during COVID-19. Māori want to participate in the transformation to “claim their space” in it [8].

Te Tiriti o Waitangi is fundamental to the success of RoVE

The industry must have a position and voice on Te Tiriti o Waitangi as fundamental to the success of the RoVE transformation. Māori learner or business needs should not be conflated with treaty obligations which sit separate and distinct. Māori needs are a product of well documented systemic failure across industry and the education sector which the transformation seeks to rectify [8].



Workforce supply and demand changes due to COVID-19

The loss of access to skilled migrants, loss of workforce capacity due to lockdowns and isolation requirements has significantly impacted workforce availability. COVID-19 has had a disproportionate impact on Māori, Pacific Peoples and under-served learners. Reform of the sector has also diverted the attention of education providers at this critical time, when there is greater need for vocational education to focus on a collection of non-technical skills.

Widespread sector reform risks diverting attention of education providers from delivery

In addition to COVID-19, funding pressures and reform of the sector have contributed to education providers' recent high turnover of staff. Remaining staff are struggling with heavy workloads. A significant amount of resource and management attention has been diverted into delivering the reforms from delivering education and training [3,4].

COVID-19 has been particularly challenging for Māori and Pacific Peoples

COVID-19 has posed challenges for Māori and Pacific Peoples, especially in testing, self-isolation, vaccination and taking time off work. Māori and Pacific Peoples also make up a large proportion of the essential workforce. This increases the risk of exposure and exacerbates the impact of exposure for individual workers' families, and also reduces overall workforce availability [14].

A focus on 'non-technical skills' will be increasingly important to support Industry 4.0

In a post-COVID-19 environment there will be growing demands for specific skills in manufacturing, such as data analytics, digital design and software programming. Industry 4.0 will also demand more in terms of non-technical skills such as critical thinking, problem-solving, creativity and communication. It is not clear how well these types of skills have been actively taught in existing training programmes [3,11].

Adequate wrap around style support and infrastructure are required for learners

Many learners, particularly those who may have historically been under-served (including Māori, Pacific and disabled people), require wrap around support to enable successful lifelong learning and learning in a COVID-19 restricted environment. A good support network needs strong links between the participants in the vocational education system. The quality of linkages between learning settings and workplaces is important to ensure successful skills development pathways [12, 13].

Border restrictions have impacted the strategic direction of the industry's plan for skills shortage

Immigration settings are of critical concern in the manufacturing and engineering industries. Prior to COVID-19, these industries relied heavily on skilled migrants to address certain key skills gaps. There is a perception amongst the industry stakeholders that COVID-19 has significantly disrupted workforce availability with border closures and restrictions, even when there have been ongoing challenges of skilled migrant shortages due to immigration settings pre-COVID-19. The transition to a more domestically trained workforce has become even more prominent but it cannot occur immediately. This lack of capacity and capability is putting upwards pressure on the cost of labour or risks restricting sector capacity [4].



Investment requirements to support workforce learning

Investment in staff will lead to success for businesses. However, smaller firms may struggle to resource and deliver training – especially in an uncertain COVID-19 recovery environment with capacity constraints, workforce shortages and cost pressure. Learners would benefit from having education staff with cultural competencies to better understand their learning needs and to provide a sense of connection.

Targeted investment that equips people to learn

Significant investment is required to bridge industry skills gaps, including the development of tools and delivery mechanisms for workplace learning during COVID-19, cultural expertise and field staff. The value of working directly with businesses to effectively and efficiently deliver the learning should be considered and resourced. It is “less about generating employees and more about equipping people to learn” [8].

SMEs should leverage investments from larger organisations for their workplace learning

There is an inherent “scale challenge” which prevents many small and medium-sized enterprises (SMEs) delivering effective workplace learning mechanisms. It is important that the industry leverages the resources, expertise and experience of larger companies to deliver and support workplace-based learning, particularly for those organisations that do not currently have the scale, capability or resources to maintain their own effective programmes and systems [15].

Employers must be willing to invest in staff development

The success of work-based industry training depends on the willingness of employers to support their staff by allowing them sufficient time to learn, practice, and study while at work [9] or at home. This time should be recognised as an investment, rather than a cost.

Develop cultural competencies in staff to reinforce learning and promote success

To uplift education outcomes, it is important to invest in the development of culturally competent staff. Thinking outside the box on who constitutes ‘staff’ or ‘teachers’ or ‘trainers’. For example we know that having Pacific or Māori staff can help reinforce Pacific and Māori learners’ sense of connection [10]. A general lack of disability awareness or provision by employers, industry and education providers can impact disabled learners receiving appropriate learning support [12].



Learning opportunities during COVID-19

The quality of the workforce and their competency levels is highly impacted by the support they receive during their learning journey. It was particularly challenging for Māori, Pacific and disabled learners during COVID-19 – who often have competing priorities to balance their own training needs with their responsibilities to look after their aiga and whānau. Learning opportunities need to consider individual needs and clear pathways to the labour market and how improvement in employment outcomes are reached.

Learning opportunities need to be co-created with Māori and Pacific learners

Providing for aiga or whānau is a strong value shared among many Pacific and Māori learners, and trainers need to be mindful of learners' competing priorities. This is particularly important during COVID-19. While, Pacific and Māori learners are culturally diverse, some commonalities exist. Learning opportunities need to be co-created alongside learners in order to relate to their specific needs, wants and expectations [10].

Financial hardship is a barrier to Māori, Pacific and disabled people from engaging in training

Financial hardship is a barrier for people engaging in learning, training and development especially during COVID-19. Groups with low income, low educational attainment and economic stress are more likely to be disadvantaged in taking advantage of learning opportunities. Māori, Pacific and disabled people are more likely to feature in these categories of need [9].

A learner's ability to learn should be considered and to shape the learning

Second-chance learners and those who didn't do well at formalised schooling need the right opportunities to learn. There is a limited understanding of capability issues relating to taking on new and advanced skills, especially for Māori, Pacific and disabled learners. Provisions to date have not significantly improved opportunities for these groups, and a paring back of expectations and listening to the learner will be needed [10].

Access to quality vocational education is important to support employment pathways

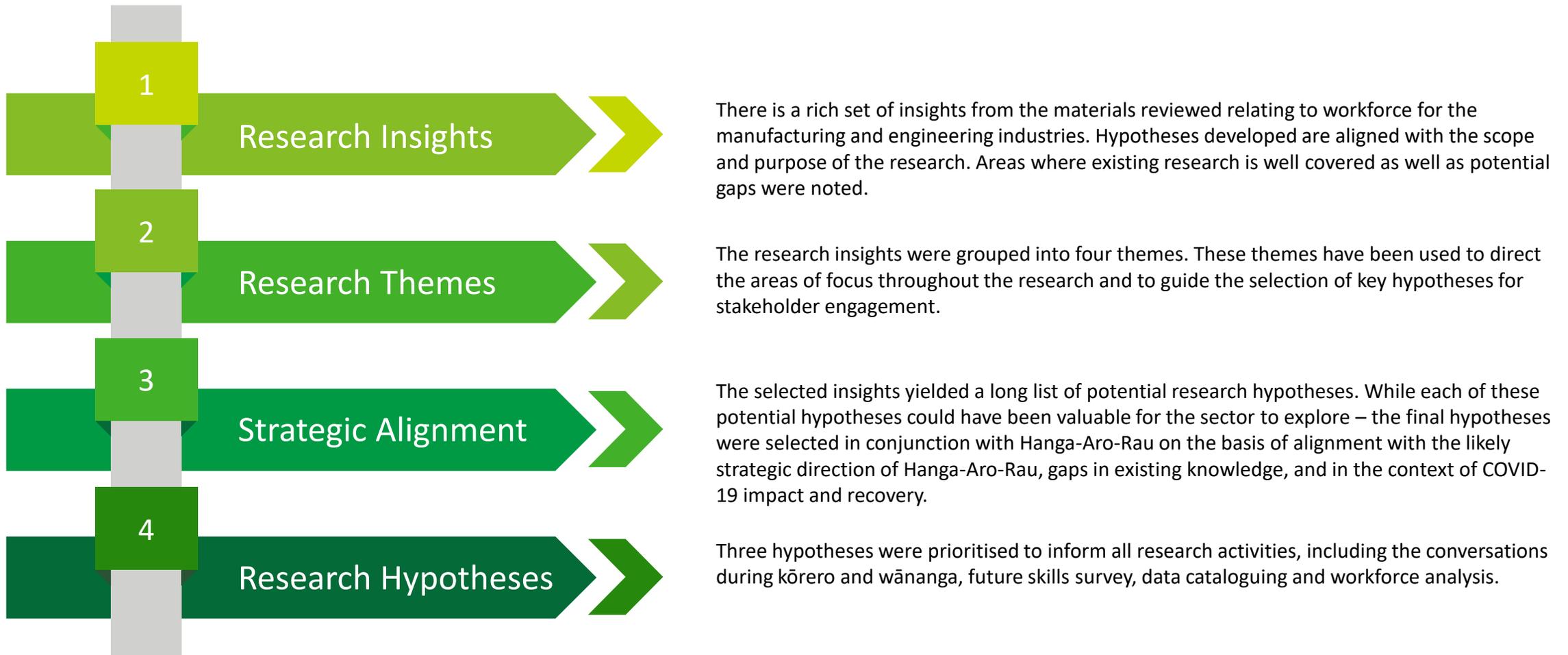
It is important that all learners have improved access to relevant quality vocational education, so that successful pathways to the labour market and expectations for reaching improved employment outcomes can be clear [11]. There is a general lack of well-defined employment pathways for learners, especially for disabled learners [12]. Consideration for pathways that have not been traditionally on offer e.g. culturally considerate and needs based training must be progressed to see transformation.

The unique needs of individual learners affect their learning outcomes

The unique circumstances of learners cannot and should not be separated. These circumstances improve or diminish wellbeing and the chances of overall success in learning. More broadly, whānau are also a key consideration for the Māori and Pacific learners in their learning journey [5]. COVID-19 exacerbated existing 'life' issues that places more pressure on the learners including competing demands around working vs learning, whānau, financial pressure, social isolation, need for extra pastoral care and cultural considerations [9].

Prioritisation of hypotheses

A range of potential hypotheses were considered based on the desktop research insights, which were grouped under the four key research themes. The three selected research hypotheses were developed between Deloitte and Hanga-Aro-Rau based on the process described below.



The next page outlines the three key hypotheses and a summary of research evidence linking to these hypotheses.

Key hypotheses for engagement

While there is good coverage in research undertaken overall, especially for learners and Māori, we found gaps in the assessment of the relationship across the VET eco-system or the changes in these relationships through the COVID-19 period. More evidence is required on whether COVID-19 has exacerbated the challenges in the relationship, digital capabilities and business continuity space, the three hypotheses below have helped explore these further:

Evidence from Desktop Research



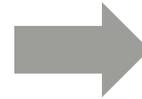
Business Continuity

COVID-19 has not only brought disruption to the global supply chains of good and services, it has also had a large impact on workforce availability which has a flow on effects to business continuity and continuous upskilling of staff challenges.



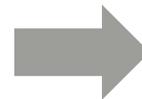
Relationship and Engagement

There is clear evidence that pre-existing relationships down to the regional level should be recognised and that a more integrated system is required to engage effectively with learners for better outcomes to cope with the continuous effects of COVID-19



Digital Capability, Modernisation and Future Roles

Industry 4.0 and automation have been a key focus for manufacturing and engineering. There is evidence that COVID-19 has had an impact on both the how and the turnaround time of investments in digital technologies. This includes tools and training channels to enable people to learn and work from home.



Key Hypotheses and Themes for Engagement

Hypothesis 1

COVID-19 has caused significant business disruption, and particularly impacted staff availability. This has forced businesses to change their operating model and constrained their operating capacity. Businesses can build resilience to manage future disruption by sustainably building workforce skills and capabilities.



Hypothesis 2

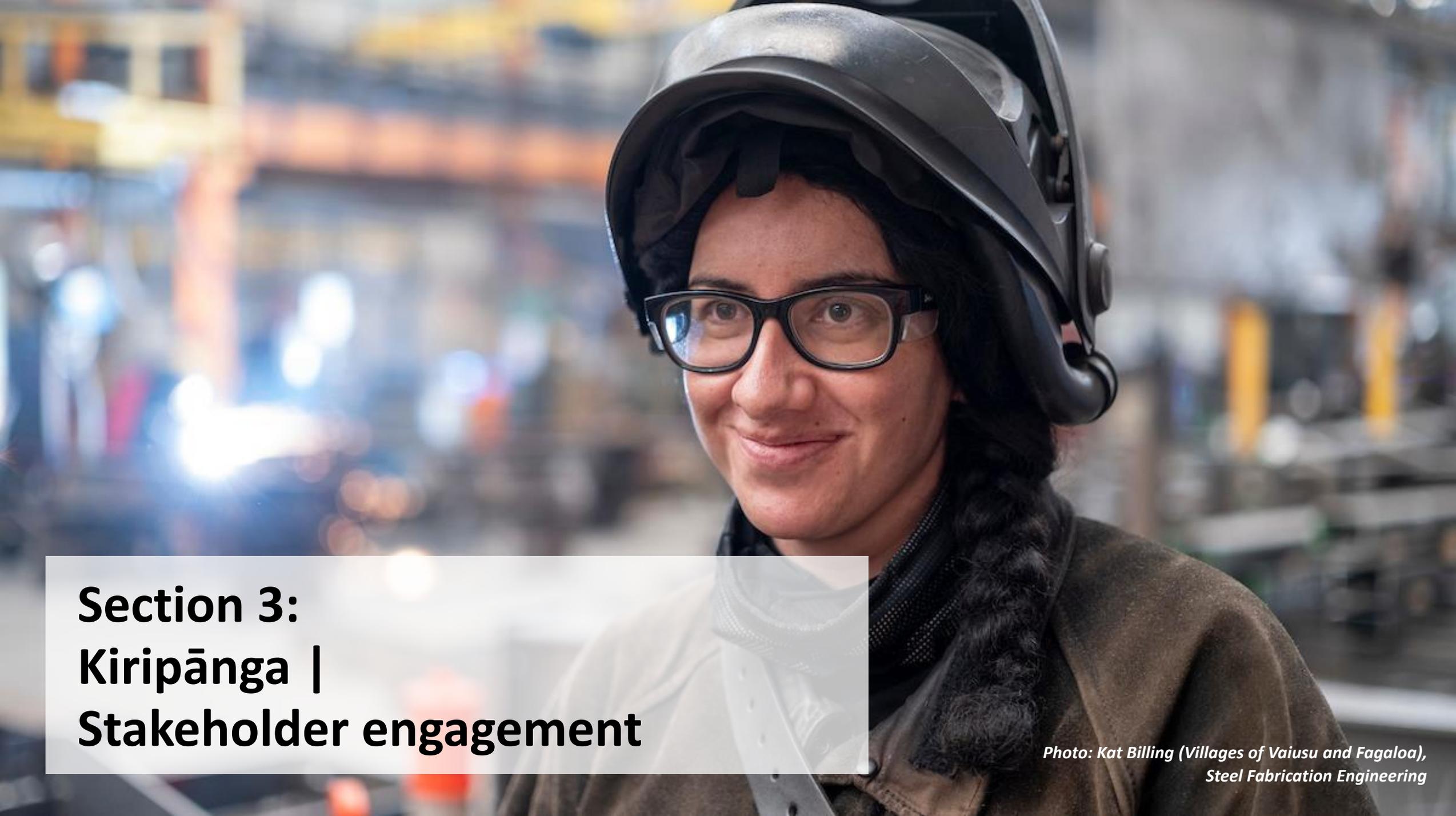
If the relationships across learners, employers, providers, regional and industry stakeholders are better integrated despite challenges with COVID-19, there will be higher participation, retention and engagement rates.



Hypothesis 3

COVID-19 is accelerating the need for digital capability. This has an impact on skills mix, tool sets, operations, infrastructure requirements for supply chains, customer relationship management (CRM), data and information, and ways of learning and upskilling.



A woman with dark hair, wearing a grey safety helmet and black-rimmed glasses, is smiling slightly. She is wearing a brown jacket over a white shirt. The background is a blurred industrial setting, likely a steel fabrication shop, with various pieces of machinery and structural elements visible.

Section 3: Kiripānga | Stakeholder engagement

*Photo: Kat Billing (Villages of Vaiusu and Fagaloa),
Steel Fabrication Engineering*

Stakeholder engagement

This research has covered engagement with 32 organisations comprising unions, associations, representative groups and employees across various businesses, training providers and sub-sectors of the industry to capture and develop key insights. A full list of those organisations engaged in this research can be found in Appendix 5, and the key lines of enquiry for the engagement can be found in Appendix 6. The diagrams below outline the approach of the engagement and the stakeholder groups for the engagement.

Approach



Kōrero

Small and large format interview sessions, i.e. stakeholder kōrero and employee wānanga, were conducted using a consistent format to build out ideas against the key lines of enquiry.



Personas

Using the outputs of the kōrero, a set of five key personas were developed to communicate the collective perspectives captured during the kōrero. These personas do not represent real individuals.



Insights

The kōrero outputs and personas were each used to formulate a set of key insights against the 4 key research themes.

Stakeholders



Iwi, Hapū, Māori
Businesses



Associations



Chambers



Industry



Education
Providers



Employers,
Workplaces



Trade Unions



Employees

This chapter sets out granular insights from the perspective of stakeholders summarised from the engagement. We have tested these perspectives through our research hypotheses and data analysis to inform our own research insights. Note that each key research theme has been tagged at the top right corner of the page to indicate groupings of the insights.

Stakeholder engagement | Summary

It is evident from the stakeholders that COVID-19 has posed additional challenges to the VET sector and for the manufacturing and engineering industries. Challenges can be experienced throughout the VET eco-system. It is important that these research insights can be turned into opportunities for further actions. As such, instead of grouping them under the three hypotheses used to facilitate the kōrero and wānanga, some of the findings have been highlighted in the observations with opportunities below and summarised under the draft Hanga-Aro-Rau themes for their Statement of Strategic Direction.

	Te Tiriti	Equity	Sustainability
Observations	<ul style="list-style-type: none"> • Alignment with Te Tiriti is expected and mandated from RoVE however the industries are grappling with how to embed Te Tiriti in their operations. • There is a tendency for courses and training to be designed and delivered using a “one size fits all” approach, not giving sufficient focus on cultural obligations under Te Tiriti or te ao Māori. • More partnership with the iwi and Te Tiriti partners is also needed to be effective in identifying gaps, opportunities, and to improve outcomes and equity. 	<ul style="list-style-type: none"> • Unions and employers observed that Māori and Pacific employees were greater impacted by COVID-19 due to more of them being back at work. • The strains on the system caused by COVID-19 and the overall skills imbalance meant that the divide in learning and career achievement for Māori, Pacific and disabled employees has not narrowed. • There is evidence of age, gender, ethnicity and pay inequity in the current workforce. 	<ul style="list-style-type: none"> • The manufacturing and engineering sector has been impacted by COVID-19 to varying degrees. • The key players in the system have no clear way to join up across the education eco-system sustainably for everyone to be involved or partner to achieve education and employment outcomes. • New Zealand has historically relied on skilled migrants to fill the skills gaps and train our domestic workers. Businesses are struggling to operate with the workforce gaps.
Opportunities	<ul style="list-style-type: none"> • There are a number of sector levers and initiatives that can help enhance the sector’s understanding and operationalise Te Tiriti and iwi partnership; these include actions under Manu Kōkiri and Ka Hikitia-Ka Hāpaitia, and other relevant levers. • Hanga-Aro-Rau can also use their Rangatiratanga Strategy as a vehicle to set strategic directions for the sector to take practical steps to give effects to Te Tiriti. 	<ul style="list-style-type: none"> • There are opportunities for Hanga-Aro-Rau to work with the sector to share data and insights and identify where inequity may exist. • Hanga-Aro-Rau can influence and monitor actions towards promoting diversity and inclusion, identifying best practice to achieving equity. • Hanga-Aro-Rau can work with training providers to identify opportunities to redesign career and education pathways, delivering programmes that would cater for diverse groups. 	<ul style="list-style-type: none"> • It is essential that there is a whole of system view and strategy on workforce development to address skills gaps. • Using the insights and dashboard tool developed through this research will provide a good starting point to monitor workforce sustainability moving forward. Planned actions can be developed connecting the key players to collectively work together towards targeted outcomes. • Environmental and social sustainability impacts due to COVID-19 can be explored further.

Stakeholder engagement | Summary (Continued)

Below is a continuation of the key findings highlighted in observations and opportunities that have alignment with the role of Hanga-Aro-Rau in the VET system. It is important to note that the stakeholder engagement activities only captured certain aspects of COVID-19 imposed changes. Other methods, i.e. the future skills survey, have been used to complement these insights, which are included in the next sections.

	Industry Voice	People	Transformation
Observations	<ul style="list-style-type: none"> Key players are calling for more deliberate collaboration and transparency on initiatives across in the sector so that they can leverage them to benefit their operations and their workforce. The vocational system is broadly disconnected, the industry is generally keen for a sector reshape. With the compounding effects of COVID-19, the industry is facing a major workforce shortage. Many are urging for immigration setting changes to take priority to address skills shortages. 	<ul style="list-style-type: none"> Staff and business owners are stretched thin from COVID-19 restrictions, leaving limited resources for on-the-job or tuakana-teina training. Vocational education in its current state is not tailored to suit all learners from diverse backgrounds, prompting some to fall off their learning pathways. As an effect of COVID-19, there is a large negative impact on staff wellbeing, especially for Māori, Pacific and disabled people, resulting in a higher need for culturally relevant pastoral care. 	<ul style="list-style-type: none"> Added to Industry 4.0, COVID-19 has fundamentally transformed the industry's future skill sets requirements and digital mindset. Businesses have realised the need to enhance their digital capabilities to cope with automation and the new ways of working. Many businesses do not have the capacity or capability to keep up or upskill their staff in this space, especially for the SMEs, Māori and Pacific businesses. The current reputation of the sector is at stake due to a historical view that it comprises of low wage and low skilled roles.
Opportunities	<ul style="list-style-type: none"> It is important to identify leaders in the different parts of industry to lead thinking and actions towards better training, education and employment outcomes. Hanga-Aro-Rau has a key role in orchestrating that in the areas of workforce development and attracting new talent. Industry networks and forums can be a good way to enable stakeholders to share experience and to promote collective influence and strategic solutions in response to industry challenges. 	<ul style="list-style-type: none"> Hanga-Aro-Rau, in its role to support the vocational education and training system and employers to meet their needs, can provide leadership in the shaping of the workforce development options to enable cross-sector knowledge and skills sharing. Hanga-Aro-Rau can work with the industries and employers to first understand training needs and then partner with key stakeholders and iwi groups to design and provide trainings and the right care for people to be successful. 	<ul style="list-style-type: none"> There are opportunities for New Zealand to learn from overseas experience in the adoption of automation and robotics to give effects to Industry 4.0, noting that intensive adoption overseas has typically occurred in large scale manufacturing. The reputation of the sector can be improved by more active promotion of opportunities in roles with career pathways for Māori, Pacific, disabled, young learners and females. Strong links with the Industry Transformation Plan.

Personas

The following section takes existing personas developed as part of the RoVE review and merges these with insights from the stakeholder engagement sessions. These personas include employers, Māori employers, industry groups, education providers, Māori employees and Pacific employees. The purpose of these personas is intended to provide insight into some of the key challenges and opportunities captured by the research. The example illustrated below helps navigate the information included in these personas.

Persona biography

A short background about the persona representing the segment group



Employers – “Gary”

Gary was born in Invercargill and moved to Christchurch as a youngster. He has been in the industry since leaving school and is a qualified mechanic. He runs a small manufacturing workshop, with a dedicated group of staff. He is very keen to teach young people about manufacturing skills and how fulfilling the career can be.

Needs

Commentary based on what the segment indicated their needs are based on conversations from the kōrero, wānanga or existing research

Needs

Grow Our Employees

We want to give our employees the opportunity to learn and develop even in areas that aren't directly applicable to their current role.

Time for Training

It is important for us to have enough staff to keep on top of incoming work and be able to spend time and effort on training and development.

Values

Commentary about what the group values the most at present time

Values

Continuing Operation in Lockdowns

During lockdowns we would like to be empowered to write our own rules for staying in operation to reduce the impact on our business and how our staff learn.

Learner-Employee Partnership

To us the ideal system would be a true partnership between staff, learners and employers, where each is able to guide and influence the other.

How can Hanga-Aro-Rau help me in the future

Observation generated by the research team on how Hanga-Aro-Rau can help this group based on the conversation from the kōrero or wānanga

HOW CAN HANGA-ARO-RAU HELP ME IN THE FUTURE

- Promote careers in the manufacturing and engineering industries to help young Kiwis realise how exciting a career it can be.
- Work with the government to refine immigration settings to allow skilled migrant workers to come in and train Kiwi learners.

Challenges

Commentary about challenges the group faces based on conversation from the kōrero or wānanga

Challenges

NZQA Qualification Admin

We use a lot of NZQA assessments, and we really support qualifications for our employees. The problem is that the paperwork needed for these is way too much, which inhibits progress.

Finding Qualified People to Train

We struggle to find qualified people in New Zealand to train our staff, especially for more technical and niche skills. Usually, we would employ these people from overseas but with current immigration settings we can't.

Opportunities

Opportunities the group sees based on conversations from the kōrero or wānanga

Opportunities

Holistic Funding for Apprenticeships

There are many hidden costs to offering great training and upskilling to staff, which should be factored into programmes and funding opportunities.

Digital Capability Upskilling

Some of our fellow business owners are well equipped with digital capabilities for the future, but others are well behind and need focused help to stay tech enabled.



Employers – “Gary”

Gary was born in Invercargill and moved to Christchurch as a youngster. He has been in the industry since leaving school and is a qualified mechanic. He runs a small manufacturing workshop, with a dedicated group of staff. He is very keen to teach young people about manufacturing skills and how fulfilling the career can be.

HOW CAN HANGA-ARO-RAU HELP ME IN THE FUTURE

- Promote careers in the manufacturing and engineering industries to help young Kiwis realise how exciting a career it can be.
- Work with the government to refine immigration settings to allow skilled migrant workers to come in and train Kiwi learners.

Needs

Grow Our Employees

We want to give our employees the opportunity to learn and develop even in areas that aren't directly applicable to their current role.

Time for Training

It is important for us to have enough staff to keep on top of incoming work and be able to spend time and effort on training and development.

Challenges

NZQA Qualification Admin

We use a lot of NZQA assessments, and we really support qualifications for our employees. The problem is that the paperwork needed for these is way too much, which inhibits progress.

Finding Qualified People to Train

We struggle to find qualified people in New Zealand to train our staff, especially for more technical and niche skills. Usually, we would employ these people from overseas but with current immigration settings we can't.

Values

Continuing Operation in Lockdowns

During lockdowns we would like to be empowered to write our own rules for staying in operation to reduce the impact on our business and how our staff learn.

Learner-Employee Partnership

To us the ideal system would be a true partnership between staff, learners and employers, where each is able to guide and influence the other.

Opportunities

Holistic Funding for Apprenticeships

There are many hidden costs to offering great training and upskilling to staff, which should be factored into programmes and funding opportunities.

Digital Capability Upskilling

Some of our fellow business owners are well equipped with digital capabilities for the future, but others are well behind and need focused help to stay tech enabled.



Māori Employers – “Arama”

Arama has owned her engineering business after taking over from her mother, the founder. She runs a small team of 20 staff, and prides herself on the whānau-centric culture of her business. Her staff have strong loyalty to her and the business, which has been built up over years of commitment and development.

HOW CAN HANGA-ARO-RAU HELP ME IN THE FUTURE

- Work with the industry and providers to develop an understanding of career pathways and prospects for Māori and Pacific Peoples and the training needed to support these aspirations.
- Identify programmes that are effective for Māori ākonga and promote these programmes more broadly.

Needs

Courses to Cater for the Right Needs

We would love to recruit more of our folks from iwi and hapū, and the Pacific communities, but they can't even get into the courses as they will need some basic skills sorted first.

Te ao Māori System Input

We would very much like to have a training and learning system that is more te ao Māori centric. Māori values must be featured in the design, decision making and delivery of the training, otherwise it won't work for us all.

Challenges

Providers are Sometimes Reluctant to Use a Non-standard Way of Operating

Some of the education providers aren't always open to an alternate, non-standard way of doing delivering courses, especially for Māori or Pacific Peoples.

Some Learners May Need Extra Pastoral Care to Succeed

Māori learners may face challenges including stress and lack of confidence from their previous learning journey and may need additional support from providers to succeed.

Values

Authentic Change

Change needs to be authentic and we welcome the opportunities to partner with the industry and providers to design the actions and see those actions take shape.

Hauora in Employees

Every employer wants and needs their staff to be happy and healthy. We will support them as much as we can, but the whole system needs to work together to achieve this fully, especially in time of difficulties like COVID-19.

Opportunities

Involvement in the Design of Training

We should have more Māori business owners involved in the design of training programmes, so that we can tailor the training for the skills needed for our next generation of Māori and Pacific employees.

Tailor for the Different Learning Styles

Sometimes night sessions can work well as a more relaxed learning style may be better for Māori and Pacific ākonga. It also improves accessibility for learners that have other commitments during the daytime.



Industry – “Kathleen”

Kathleen grew up in a family of tradesmen and manufacturers. She sits on the board for several trade associations and union groups and is very passionate about how New Zealand can maintain and improve the industry and sector.

HOW CAN HANGA-ARO-RAU HELP ME IN THE FUTURE

- Facilitate and strengthen the relationship between different stakeholder groups to develop fit for purpose training that meets industry needs.
- Industry consistently raised the impact that immigration policy is having on business operations and there is a need to identify the priority areas.

Needs

Strong Connection Between Groups

In our industry groups we need strong and healthy connections between the employers, providers, learners and ourselves in order to understand what they need and help them get it.

Not Enough People With the Right Skills

Not all employers are investing heavily in Industry 4.0 technologies, thus creating a big skills gap, only to find out that they don't have - and can't find - the people to operate the equipment and processes they have invested in.

Challenges

Burnt Out Business Leads

Some businesses are forced to turn work away, including from long-standing customers, as a result of crippling labour shortages for both skilled and semi-skilled workers.

Supply Chain Disruption

Many of our member businesses have had close calls with supply chain issues. They have come close to not being able to fulfil orders and need to be careful about overcommitting when supplies are not guaranteed.

Values

Well Supported Businesses

It is really important that our member businesses are well supported both by us and the government. This ensures they have what they need to keep their businesses going.

Enticing Career Prospects

We feel that it is vital we make a career in the industry as enticing as possible for prospective employees both within New Zealand and overseas.

Opportunities

Calibrate Immigration Settings

We need a better path to residency for skilled technicians, they've been on skill shortage lists for decades. Most are on too low of a salary to meet the residency pathway visa, and this doesn't work for them or for us.

Increase Inclusion

We focus a lot on diversity but need to do more on the inclusion component. We need to ensure a balanced mix of people across all skill levels and roles.



Providers – “Jackson”

Jackson leads an apprenticeship programme for a major education provider. He has spent years in the education sector and is passionate about making sure learners have all the tools they need to succeed.

HOW CAN HANGA-ARO-RAU HELP ME IN THE FUTURE

- Invest in industry outreach and engagement with learners, including secondary students, on the attractiveness of sector career pathways.
- Supporting providers to work with industry to better understand the future skills needed by industry.

Needs

Understanding Industry Needs

Everyone accuses providers that they do not provide programmes that are fit for purpose for industry. Tell us what skills you need learners of the future to develop.

Attractive Learning Pathways

We need to make sure that the learning pathway is as attractive and easy as possible for both the learners and employers so that we keep more people coming in and staying in.

Challenges

Disconnection Between Key Players

There is a lack of connectedness and communication between some groups in the system, which makes it difficult for us to contact people when we have questions or problems.

Too Much Bureaucracy

A particular pain point is the NZQA process. It has a really burdensome administration component which slows down the system and means we can't be as agile as we would like to be.

Values

Holistic Pastoral Care

The pastoral care of learners is really important to us, and it needs to encompass all aspects of their education. This is really important for keeping learners feeling supported.

Keeping Learners Connected

For us, our biggest concern is keeping learners engaged with their learning pathway, especially in times of COVID-19 lockdowns. We must keep them on the path to certification and learning.

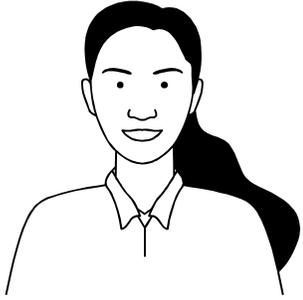
Opportunities

Implement Microcredentials

We would love for microcredentials to take a place in the education system, in particular for enabling learners to train for niche roles and for employees to pivot between roles in the same business or industry.

Outreach to Potential Learners

There is a huge opportunity for the industry to engage students at secondary schools and show them how exciting a career in the industry can be. The pipeline needs to start at the bottom.



Māori Employee – “Kayli”

Kayli is from Kawerau and currently living in Auckland. She is 19 with no qualification or NCEA certificates, and currently dabbling at temp jobs. She is happy to have any work and is a very strong starter but needs shadowing and support to get the most from her training. Keen to learn though prefers practical demonstrations to traditional learning but is capable and keen on e-learning.

HOW CAN HANGA-ARO-RAU HELP ME IN THE FUTURE

- Promoting a more whānau centric learning eco-system to connect better with Māori employees and nurture a more diverse workforce.
- Facilitate access to the most relevant training and to remove barriers to entry.

Needs

Whānau Centric Learning

Our learning and working needs to be flexible for us to be able to take care of our whānau responsibilities on top of working, especially when working from home.

Equal Opportunities for Work

Being able to use the skills from my training and learning so that I can earn a better income to support my whānau.

Challenges

Restrictive Timing of Courses

With the credit cap of 75 per year, people can be slowed down if they do fewer in one year and want to make up for it in another year.

Lack of Direct Applicability for Theoretical Learning

Sometimes the theory learning we do doesn't directly apply to what we are doing practically, which makes it harder to motivate for learning.

Values

Involvement with Changes to Learning and Working

We appreciate when we are included in proposed changes to the training or working we undertake. Being able to provide input and feedback is important in making the system work.

Feeling Appreciated and Valued by Employers

When the employers and broader system make us feel appreciated and valued, it builds trust and loyalty to keep us engaged with the learning and work.

Opportunities

Recognition for Undergoing Additional Training

Recognising the achievement of learners by supporting us to utilise our new skills and progress to higher level positions by filling existing workforce gaps.

More Relevant Course Material

There is an opportunity to update and develop new course material to be better aligned with innovation in the sector and focus on transferrable skill sets that are most relevant in future.



Pacific Employee – “Tusitala”

Tusitala was born in the Islands and moved to New Zealand as a child. He achieved 3rd form schooling and has been working in industry for over 30 years. He has an expert level of practical skills and knowledge, but no formal qualifications. He is a solo parent and keen to keep working to support his aiga.

HOW CAN HANGA-ARO-RAU HELP ME IN THE FUTURE

- To pilot a change programme in partnership with a Pacific employer to identify opportunities to leverage their expertise in the industry.
- Foster an inclusive culture and help to promote Pacific Peoples’ values.

Needs

Valuable Training and Development

In the training and development programmes we get offered, it's important that we can see how they will benefit us and not only our employers.

Culturally Relevant Pastoral Care

The support offered during our training is helpful, but it needs to be aligned with our cultural values for maximum benefit.

Challenges

Lack of Confidence in Digital Tools

The switch to online assessments and training has been useful, but some of our older folks struggle with using these tools they have had little experience with.

Delayed Paperwork Processes

When we submit the paperwork assessments for NZQA there can be up to a 6 week marking time, which can stop us from progressing with the next set of assessments quickly.

Values

Clear Progression Paths for New Positions

When new positions become available at work, it is valuable to us to see how we could move towards filling that new role from our current position.

Diversity of Values

Pacific values weave a diverse perspective to ways of working and learning in the industry.

Opportunities

Recognise Demographic Advantages

Given the favourable demographic profile of the Pacific communities, small changes that promote better engagement with these communities have the potential to make a real difference in filling workforce gaps.

Recognise Expertise

Pacific Peoples’ have a long history and contribute a significant proportion of employment in some sub-sectors, which make them the experts to lead transformational change.

Impact of COVID-19 on the manufacturing and engineering workforce

While COVID-19 demonstrated the independence and resilience of employers and employees and the importance of health and family to effective learning, the impacts of COVID-19 on training and learning varied and the Māori and Pacific workforces were disproportionately affected. While formal training was deprioritised during COVID-19, forced adaptation of new digital skills shows that rapid change is possible and important to achieve resilience.



COVID-19 demonstrated interdependence and resilience of employers and employees



Employers and employees demonstrated considerable, and in some cases extreme, levels of resilience for a sustained period of time throughout COVID-19, showcasing a high degree of interdependence. In some cases, staff had to rapidly learn new skills to cope. The interdependency of individual health status, education and employment must be considered together in the design and transformation of the vocational education system.

Impact of COVID-19 on training and education varied



COVID-19 had a major, and varied, impact on people's ability to provide training and education and on employees to undertake and complete training/learning. Where conditions were suboptimal i.e. For high-risk population groups, or workers in essential services - training was deprioritised with business continuity taking precedence. Conversely, the isolation helped some employees focus and get quality time with field staff and complete assignments e.g. motor mechanics doubled completions.

COVID-19 demonstrated the importance of health and family to employment and learning



COVID-19 demonstrated the importance of having healthy staff, and the interconnectedness of home life and work life to support effective employment and training outcomes. A post COVID-19 learning environment should recognise these competing pressures but also recognise the opportunity that effective training programmes contribute to business continuity, sustainability and resilience.

COVID-19 disproportionately affected the Māori and Pacific workforce



An industry stakeholder observed that businesses with high proportions of Māori and Pacific employees were disproportionately at work during the lockdowns as 'essential workers' and noted that this exacerbated health risks as their families were disproportionately vulnerable to COVID-19. In one wānanga a 60+ year old Samoan, female participant noted "we were scared to come in but knew we had to feed the whānau" and 60+ year old Samoan Male shared "I was told by my wife and kids to stay home but I went in anyway 'cause they needed me".

While formal training was deprioritised during COVID-19, forced adaptation shows that change is possible



There was widespread recognition across all stakeholder groups of the need to enhance and increase the digital capability of the workforce. This required businesses to develop new ways of operating to survive and staff to adapt by learning new skills. Even though digital capabilities improved, there was a strong primacy on getting work done (even from home). It has been all hands on deck, including senior management, and formal training was often deprioritised. The involvement of more experienced staff in operations, and the inability to access experienced skilled migrant staff also limited capacity to train staff exacerbating training pressures.

While the primacy of survival while operating during a sustained period of crisis management meant that formal learning and development was deprioritised, and it has also been a struggle for some to "get back into the flow of learning" – the forced adaptation of businesses and employees to pick up new digital skills demonstrate that change is possible and that these skills are important.

Developing resilience to COVID-19 business disruption (Hypothesis 1)

The following insights support the understanding of Hypothesis 1: “COVID-19 has caused significant business disruption, and particularly impacted staff availability. This has forced businesses to change their operating model and constrained their operating capacity. Businesses can build resilience to manage future disruption by sustainably building workforce skills and capabilities”



Industry and employers have learned how to operate safely during a pandemic – with a greater reliance on digital resources



During COVID-19, some businesses had to rapidly re-engineer their operating models, including protocols for operating safely during lockdown and isolation events. Some businesses suggested that there should be flexibility for organisations to define such measures. Business recognised the importance of having access to digital resources, including connectivity, to help them to minimise business interruption.

Supply chain disruption was a key pain point for the manufacturing and engineering industries



Supply chain issues have been reported as a key pain point due to COVID-19 which particularly affected the manufacturing and engineering industries due to reliance on global supply chains for raw materials, key components, machinery and specialist labour. Businesses reacted by narrowing product lines, sourcing alternatives and adopting a renewed focus on communications with their customers to mitigate downstream impact.

COVID-19 not only affected business operations in New Zealand but also globally



Many New Zealand businesses have global market presence and international contractual commitments. COVID-19 related supply chain constraints have also affected New Zealand businesses’ ability to ship production to global customers.

The border closures during COVID-19 have exacerbated the staffing shortage



Closed borders during COVID-19 accelerated existing issues around recruitment and retention. A mix of non-technical skills and high-end technical operators were and still are hard to source or find. A tight labour market and the inability to reliably access skilled migrants is contributing to uncertainty about businesses’ operations and future investment decisions.

COVID-19 has promoted a greater focus on staff wellbeing



To stay in operation, many businesses are providing greater support to their staff wellbeing, especially in the context of a tight labour market in part caused by COVID-19 related disruption to the labour market. For some businesses, the economic uncertainty of COVID-19 and wellbeing risk to their staff have caused them to shut down their operations, especially amongst high-risk populations.

A focus on wellbeing, organisation culture and values, including tikanga Māori and te Ao Māori values, have helped some businesses be resilient during the COVID-19 period.

Strengthening the relationship across the VET eco-system (Hypothesis 2)

The following insights support the understanding of Hypothesis 2: “If the relationship across learners, employers, providers, regional and industry stakeholders are better integrated despite challenges with COVID-19, there will be higher participation, retention and engagement rates.”



Relationships are patchy across industry and the vocational education sector



Stakeholder groups had varying perceptions on the maturity of relationships between industry and the VET sector. Several industry participants felt disconnected from others in the sector. Some participants felt that industry bodies look after the needs of employer members well, but without a lot of focus on those entering the workforce. COVID-19 and staff turnover has further disrupted the ability to strengthen and develop these relationships.

Relationships have been lost during the reform coinciding with restrictions on the ability to meet during COVID-19



There has been a lot change in the vocational training sector, with a major period of reform coinciding with the COVID-19 period and the movement of key relationship holders. Industry bodies and some associations expressed confusion on how to connect with key players such as the Unions, Te Pūkenga, Competenz and Hanga-Aro-Rau, especially during COVID-19. There was a perception that education institutions focused on funding outcomes rather than meeting industry needs.

A more integrated system is required to engage with Māori, Pacific and the disabled



While the workforce analysis chapter will demonstrate the important contribution that Māori and Pacific People make to the manufacturing and engineering workforce – there is broad recognition that the system does not currently engage with these groups effectively to support learning pathways and a more integrated approach will be required. From a Māori perspective, tailored wānanga can bring people together.

Online communication is helpful, but in-person relationships are also important



COVID-19 has changed how people interact and demonstrated that online communication in a 'work from home' context is possible, efficient and effective. However, in person relationships are also important – given the extent of change in the sector – and there was recognition that a mixed communications model of partly online and partly in person engagement will be needed in the future as we pivot from an almost entirely online format for communications during the COVID-19 period.

A more focused, local approach is needed to improve connectedness



Some participants expressed a view that training providers focus on the needs of largest businesses and that it was more challenging for smaller local businesses to upskill to navigate the system, especially during COVID-19. The variance of needs at a local level exacerbates the challenge – but given the spread of small and medium-sized businesses in the sector – effective localised engagement will be necessary

There is a role for Hanga-Aro-Rau to play in connecting the sector



Stakeholders have expressed that the engineering sector operates in silos, especially during COVID-19. Participants expressed that Hanga-Aro-Rau could assist in facilitating connectivity between key players in the sector. This will help improve the relationships between learners, providers, employers and stakeholders.

Impact of COVID-19 on digital capability and modernisation (Hypothesis 3)

The following insights support the understanding of Hypothesis 3: “COVID-19 is accelerating the need for digital capability. This has an impact on skills mix, tool sets, operations, infrastructure requirements for supply chains, customer relationship management (CRM), data and information, and ways of learning and upskilling”



Rapid digital transformation has varying uptake between different age groups



Industries, especially engineering, found that uptake of digital skills and tools tended to be age-based, i.e. younger people adopt new technology more quickly and easily. There are many long serving workers who were trained in older technologies who are struggling to adapt to newer technologies during COVID-19.

Digital capability varies in maturity across the industries



Industry associations observed that many of their members are digitally immature and require uplifting, especially in light of COVID-19. The current manufacturing and engineering industries are in the midst of a change toward Industry 4.0. Industry groups feel that while some businesses are planning for this well, there are many that are not able to keep up. With the trajectory towards automation and cloud-based business, those that are not able to adapt are at risk of not staying competitive.

There is a key focus on establishing fit-for-purpose online training platforms



Industry training has traditionally been conducted in-person. There is a need since COVID-19 to focus on opportunities for different methods of teaching and learning e.g. online training. Some industries, e.g. automotive, have been slow to embrace the transition, but changes are anticipated. Many businesses are working hard on increasing digital capabilities within their businesses.

Fit-for-purpose technology is required to meet local and global customer needs



Other than considerations for using higher level and modern technology for business operations, there is a need to meet the customers’ needs. This is particularly challenging during COVID-19. Cloud-based businesses, especially those involved in engineering tend to possess more advanced technology capabilities.

Productivity has been impacted while companies are uplifting their digital capabilities



Some companies have used focussed programmes, e.g. Digital Boost or Digital Awareness Programme, and facilitators to work with employees to successfully uplift digital capability. However, the commitment to improving digital capability did adversely impact on productivity for some businesses, especially during COVID-19. There is a view that RoVE has slowed down the skill shift programme which includes digital skills development.

Impact of COVID-19 relating to equity, Te Tiriti and te ao Māori

Evolution in learning and teaching is needed to bring equity to the forefront, especially to equip all workers equally well for the coming skills shift. Currently courses tend to be “one size fits all”. A more “learner-centric” design is needed to improve outcomes for diverse groups of learners. Some insights relating to this are listed below.



The model of delivering teaching and learning needs to be updated to be more ‘learner centric’



Participants expressed a need for a change in the education system so that it places the learner in the centre. Participants felt that many courses and lessons are out-of-date regarding teaching style and contents and that some learners are at risk of stalling, which will only increase in the coming years as students that were impacted by COVID-19 disruption in primary and secondary schooling transition into the workforce.

There is a gender imbalance in the workforce providing an opportunity for the industries



There are currently few females in the manufacturing sector and even fewer in the engineering sector. Women, Māori and Pacific Peoples are under-represented in management roles. One business reported that only 19% of their employees are female (including office staff). Given the capacity and capability constraints in the workforce – attracting and engaging more females to the industries could have a material impact.

There is a greater need for diversity and equity in the workforce



There is recognition across key stakeholders that initiatives to uplift the education levels for diverse groups of people and on how to support these groups are needed, especially to cope with added challenges with COVID-19. There are specific programmes, e.g. MITO scholarship programme, that focus on expanding and developing diversity.

Alignment with Te Tiriti o Waitangi is expected



One key mandate from RoVE was Te Tiriti alignment, and the expectation that key stakeholders take the necessary steps to enable this. Stakeholders such as training providers have noted that much can be done in a COVID-19 recovery environment, e.g. Hanga-Aro-Rau promotes the requirements to put focus on diversity groups and influence education programmes to demonstrate this. Participants in the sector are grappling with how to embed this in their programmes.

Issues should be addressed using te ao Māori lens and make a shift to being “learner-centric”



There is a current tendency for courses to be designed and delivered using a “one size fits all” approach. Course delivery needs to be community or segment specific and delivered in a learner-centric and whānau-centric manner. Experience through COVID-19 has identified capability gaps for some population groups i.e. Māori, Pacific and disabled. Initiatives, such as study groups, tuakana-teina training and mentoring for Māori and Pacific Peoples are seen as positive changes.

Impact of COVID-19 relating to labour supply and demand

The supply and demand of labour is affected by a larger network of issues and impacts many aspects of vocational education. As a result, employers are unable to rely on a sustainable pool of new entrants into the industries, leaving many businesses with skills shortages across the sector. Some evidence of this is presented as follows.



Workforce retention is a problem – requiring a renewed focus on upskilling



Some industries are experiencing challenges with retaining staff, e.g. the repair area in the Motor Trade industry. This was impacted by immigration, border closures during COVID-19 and the lack of commitment and resources put into apprenticeship programmes. Specific initiatives, such as the apprenticeship Boost Programme, have helped.

Success and opportunities exist with outreach programmes for potential workers



High-school outreach programmes and academy training e.g. Pūhoro STEM, have been successful. There are significant opportunities to expand the scope of existing programmes. Employer funded learning, e.g. wood and metal work classes and open days, help students to develop an understanding of the industry. Speed meets and bus tours can also be effective in getting the connections between employers and potential employees and building awareness of career prospects in these industries.

The reputation of careers in manufacturing and engineering needs to be enhanced



Employers and training providers feel that many New Zealand students and potential employees do not regard manufacturing and engineering as industries that will provide a fulfilling career. More work is required to uplift this perception and communicate the opportunities that come with these roles. There is a desire to show Kiwis of all ages, genders and backgrounds that a career in these industries is one with a bright future.

There are challenges in gaining skilled staff from overseas



Many businesses have expressed that they would like manufacturing and engineering roles to be given a higher priority on the Skills Shortage Lists, especially to recover from COVID-19. In some industries, such as plastics, training is mostly delivered ‘on the job’ requiring specialised personnel who are often not available locally. These shortages were compounded while New Zealand borders were closed. Restrictions on experienced staff to ‘train the trainers’, further impacts on workforce capacity and capability.

Domestic competition has added challenges to skills shortages for the industries



Some businesses feel that many of the current workforce issues existed prior to RoVE and COVID-19. Recruiting young people into trades-based employment has become increasingly difficult as they are more attracted to other industries. Education providers advised that there was a low number of manufacturing and engineering graduates last year during COVID-19 which has further exacerbated the long-standing issues with skill shortages.

Labour shortages have resulted in additional needs for training in a challenging environment



It has been broadly recognised that there are insufficient manufacturing and engineering workers available in the current market, both nationally and globally. Immigration settings play a key role in controlling the number of foreign nationals willing and able to join the New Zealand workforce. Participants highlighted an additional need for centralised facilitation of global skills transfers and learning during times of crisis.

Impact of COVID-19 relating to skills levels

To balance the supply and demand, more work is needed to ensure vocational education is as attractive as possible for all players involved, including workers, employers and providers. Transferable skills and non-technical skills are essential to enabling workers to be more resilient, especially in time of challenge such as COVID-19. Some insights are as follows.



Enable flexible upskilling through micro-credentials



There is a need to enable learners with flexibility in their future learning and employment, and facilitate mobility between roles and even industries, especially in the COVID-19 recovery environment. Learners wish to learn through micro-credentials that are relevant to their current or future employment pathways. Targeted programs exist, i.e. digital skill shift pilot, but some organisations do not have awareness of these to promote them.

Automation will create a need for micro-skill development



Technology will continue to evolve with the enduring impact of COVID-19. This will change the mix of skills required in many industries. It will require workers to develop new 'micro-skills' to operate the new tools, systems and processes effectively. For example, publishing has both a proportion of highly skilled workers and a sizeable group of low or unskilled workers. Participants identified micro-skills to address technology changes like digital printing as being of merit for low skilled workers.

Make learning attractive for the staff so that remuneration is not the only incentive



There is a perception the main benefit to training for workers has been to gain qualifications which will result in an increase in remuneration. Some industries, like food businesses, believe in the benefit of making learning attractive, fun and engaging for staff and give the learners tangible transferable skills that are useful in all aspects of life. This will enable them to be resilient in a COVID-19 recovery environment as well.

There are many hidden costs to offering great training and upskilling to staff



COVID-19 has illustrated that more digitally capable employers, like those in the precision electromagnets industry, which tend to have more mature staff found that there can be many costs involved in upskilling staff properly. Industry training organisations need to work directly with business to understand workforce training needs. Reducing the cost burden, such as support for apprenticeships and implementing incentive schemes to motivate staff, were seen as beneficial.

Non-technical skills are as important as technical skills



While many manufacturing workers will be relying on hands-on skills for their roles, training providers have advised that there is a gap when it comes to non-technical skills, for example managing employment issues, developing talent or to cope with change due to COVID-19.

Impact of COVID-19 relating to workforce enablement and investment

With the industries that are facing skills shortage, businesses are looking to invest more in empowering the current and next generation of workforce with digital technologies for professional development and to increase productivity of the industries. Some of the stakeholders' experiences obtained through the kōrero are summarised below.



It is cost effective to use digital technology to engage with diverse groups



Through COVID-19, industries found that upfront investment in digital capabilities is required. However, once they are in place, it is cost effective to use them to reach different groups including the disabled cohorts with various impairments. For example 'Will and Able', a manufacturer that extensively employs New Zealanders with disabilities, has made use of digital technologies to engage with its workforce.

Mass shift to automation and robotics has changed the technology needed for training



Training providers estimate only a third of the businesses are well advanced on an automation pathway. There is a significant shift towards automation and robotics throughout the sector, which in turn changes the technology and skills that employees need training in. Larger companies generally experienced a smoother transition to new technology, while smaller companies may not have the infrastructure to support this.

Many businesses are digitally immature and do not have the resources for digital capabilities



Some companies in the advanced manufacturing space are better equipped to support staff during COVID-19 where they need to access digital learning opportunities with many workers being Zoom, Teams and digitally capable. However, other companies are still digitally immature. Smaller businesses do not have the resources to invest sufficiently to enable digital capability uplift.

Digitally enabled working is the way forward



Participants noted that digitally enabled working is 'the way forward'; investing in both technology and increasing digital capabilities within their business. Businesses also reported building new relationships as COVID-19 lockdowns forced them to move online. Online forums are more accessible with greater opportunity for stakeholders to be in the "virtual" room with a range of people from the sector. Some businesses are making a significant capital investment in simulated learning, utilising cross-reality technologies.

The implementation of new digital technologies has empowered learners to engage differently



The implementation of advanced digital learning resources and new technologies such as virtual reality can empower learners and lift student engagement. New technologies will be critical in leveraging learning opportunities in the workplace, the classroom and online, particularly when operating in a COVID-19 restricted environment.

The ageing workforce amplifies the importance of tuakana-teina approach in passing on knowledge



With an ageing workforce senior staff are coming "off the tools" to train apprentices. The success of tuakana-teina approach has been demonstrated in programmes such as the Waikato Wisdom Project. Some industries are contemplating bringing retired workers back part-time to pass on their knowledge. This is particularly important to address staff shortages and knowledge gaps post-COVID-19.

Impact of COVID-19 relating to employee competencies

Developing the training and streamlining paperwork associated with training is essential for keeping workers connected to their learning pathways. This will also assist in ensuring employers and workers are up to date on opportunities to train or learn the skills necessary. Some relevant insights from key stakeholders are listed below.



Part of the workforce lacks literacy skills which impedes learning digital skills



A range of industry stakeholders observed that many workers lacked key literacy skills. With COVID-19 impacting attendance and achievement at many schools, there are concerns that the next cohort of young workers will be further disadvantaged. Employers find that workers who lack basic literacy require significantly more time and attention to train effectively.

Employees and learners cannot afford to be digital enabled



There is COVID-19 evidence that many learners were or are affected by 'technology poverty', and do not have access to a device or data which adversely impacts their ability to engage in learning opportunities. During COVID-19, the Ministry of Education made devices and connectivity equipment available to support school education. Some institutions have been able to lend devices to learners to make sure they can stay connected and enabled but this is not consistent across the VET providers.

Training programmes can be largely theoretical with limited practical aspects



Industry stakeholders have noted that learners coming out of the education system have insufficient opportunity to apply their learnings "on the ground". A charitable trust that support rangatahi transitioning from education to employment commented that the majority of industry training organisations delivered programmes that are highly theoretical, especially during the COVID-19 period.

Bureaucracy and administrative burden for qualifications is a barrier



Completion rates of some of the apprenticeship programmes in 2021 have risen e.g. Apprenticeship Boost's completion rates rose by 75%. This came from a real emphasis for industry training organisation e.g. MITO, working with people in COVID-19 lockdown to get their paperwork done. Employers, e.g. food companies, rely on New Zealand Qualifications Authority (NZQA) assessments and support qualifications. However, the administration process is burdensome and the system is unable to respond quickly. Many participants noted that streamlining NZQA processes would be beneficial.

Training methods and standards vary greatly across businesses



A participant noted that workers in different sites were not trained against national standards or in a structured way and that this inconsistency was exacerbated during the COVID-19 period. Training on new technology can vary widely amongst and within businesses and industries, ranging from supplier-facilitated training, to inhouse sessions through to self-directed training.

People are coming off their learning pathways and the true reasons and impacts for career development need to be explored



Learners are dropping off their learning pathway before the completion date, especially for Māori and Pacific Peoples. It is believed that there is a conflict of choice for young people between training or immediate employment, especially during COVID-19 which exacerbated financial pressures for many families. More work is required to both understand and address the reasons for the withdrawals and whether it has an impact on career development and progression so that these groups can complete their learning journey.

Impact of COVID-19 relating to employee skill level and wellbeing

By implementing quality of life changes in working and learning, stakeholders found that workers feel more supported in their learning and wellbeing. Recognising the cultural and financial support required for employers and employees to learn can assist in equipping them to be successful. The following insights illustrate these points.



Proactive engagement and targeted funding encourage people to train



The Targeted Training and Apprenticeship Fund has been successful in getting people to engage in training and providing opportunities to transition current graduates to the current workforce. However, the fees free component attached to courses offered by some of the education institutions during COVID-19 has resulted in the sector attracting young learners who were otherwise not ready to study.

Learning is regarded as a “tick box” exercise in some education institutions



One of the advanced manufacturing sector employers commented that not all education providers teach content relevant to the modern workplace. Advanced manufacturing industry operators require more advanced skills than what providers teach e.g. computer numerical control and robotics. Learning in education institutions seem to become more of a “tick box” exercise rather than learning directly applicable skills.

COVID-19 has impacted mental wellbeing



Anxiety has been expressed as the key phenomenon for COVID-19 in addition to the financial impact. Education institutions have observed increased learner stress and the need for additional pastoral support. Employers observed that staff had a lot to deal with in balancing home, work and learning commitments. This has led to an increased need for pastoral care.

Education institutions vary in their ability to meet emerging skills requirements



Capabilities amongst education institutions vary in supporting training, and this remains unchanged in a COVID-19 recovery environment. Having designated training managers could be useful to understand requirements better. While some companies experience good relationships with industry training organisations, the offerings do not always meet expectations. Some stakeholders believe certain providers lack capability to teach effectively in the current environment.

Training budgets are under pressure – especially for small and medium-sized employers



Better access to funding and financial support for employers was identified as a key enabler to engage in workforce training and development. This constraint was especially relevant for the small and medium-size businesses that may have experienced the most hardship during COVID-19 and the additional cost pressures on raw material pricing and wage inflation, which impacts on budgets available for training and development of staff.

Remote working has been a welcome change for some workers – but challenging for others



Some stakeholders commented that they found remote working a positive of COVID-19 with the quality of work being as good as when people were working in the office. Flexible or remote working can also be beneficial for some employees’ lifestyles, often allowing more time for personal and whānau commitments. This has been noted by the Māori and Pacific employees as important. However, the stress of managing home, family and school life ‘from home’ has been challenging for others.



**Section 4:
He arotake pūkenga mō āpōpō |
Future skills survey**

*Photo: Luke Zhang and Paul Gibson,
Collision Repair Engineering*

Future skills survey

There has been significant focus on skills shortages but relatively little understanding of what may be required to fill the gaps, particularly in the context of COVID-19. While the sample size of the survey is too small to present statistically robust conclusions, a broad cross section of responses were received and the value of the survey is to understand employers' views of current and future skills needs for their businesses. This survey has helped further our understanding of the skills mix impact of COVID-19 part of Hypothesis 3.

Approach



Survey Focus

The focus of the survey was to compare the challenges amongst employers in relation to skills shortages both pre- and post-COVID-19, and their experience finding the right skills in staff.



Survey Target

The survey was sent to the members of industry associations in the manufacturing and engineering industries in July 2022.



Survey Analysis

Analysis of the survey has been completed comparing the average scores of the companies against the survey focus areas noted in the diagram on the right.

Survey Focus Areas



Skills importance for employee success



Challenges in finding the important skills



Open positions due to a lack of relevant skills



Uncertainty results in an enduring future impact



Other skills and knowledge required to be successful in future



Effectiveness of actions in reducing impact of skills shortage

A total of 69 survey responses were received representing employers from the manufacturing and engineering industries. Key insights have been summarised in the following slides for the industries, with a deeper-dive into food and beverage sub-industry as it accounts for nearly 40% of the gross domestic product (GDP) in the manufacturing industry. The survey form with questions is included in Appendix 7A.

Future skills survey | Summary

The survey results show there is an opportunity to educate businesses on the importance of cultural competencies and the value of iwi and Māori partnership to gain better workforce outcomes. There is a further opportunity to explore how to enable disadvantaged communities to be trained in digital capabilities and promoting future skills awareness across employers.

	Te Tiriti	Equity	Sustainability
Observations	<ul style="list-style-type: none"> • Cultural competencies and language skills have not been identified as important or challenging to find for manufacturing compared with engineering. This result could indicate that there is a lack of understanding by some businesses in the industries of the importance of these skills. • It could also indicate that there is insufficient partnership with iwi and Māori partners to uplift these skills and upholding our collective commitment to the Te Tiriti o Waitangi. 	<ul style="list-style-type: none"> • There is an upward shift in importance of computer skills. However, given the nature of the work and lower level roles are generally taken up by Māori and Pacific Peoples, computer skills may not have been as important historically. • As such there could be fewer opportunities for Māori, Pacific and the disabled to learn and upskill in the more advanced areas. • This result does not tell us whether employers will make use of technology advancement to close equity gaps for Māori, Pacific and disabled staff. 	<ul style="list-style-type: none"> • There is evidence (outside of the survey) that suggests Industry 4.0 will introduce a higher degree of digital and automation needs. The survey results however did not reflect the importance of digital skills especially from the manufacturing employers. • This could indicate that some employers may not have the capacity to plan ahead for the future as they are too busy with more immediate concerns.
Opportunities	<ul style="list-style-type: none"> • There is an opportunity for the industry to partner with iwi and Māori leaders to educate the businesses on the importance and value of iwi and Māori partnership to gain better outcomes for staff, employers and the overall industries. • Hanga-Aro-Rau being one of the key system conduits has an influencing role to play to ensure key stakeholders have a strategic direction to follow in strengthening its Te Tiriti obligations and partnership. 	<ul style="list-style-type: none"> • Given the skills shortage, challenges in finding the right skills and the potential inequity embedded in the system, there is an opportunity to explore how to enable more Māori, Pacific and disabled people to be trained in digital capabilities. This will enable them to take up more value added roles and results in more capable local people being available to help ease the skills shortage challenges. • Hanga-Aro-Rau can work with iwi and Māori partners and education providers to target training to Māori, Pacific and disabled groups. 	<ul style="list-style-type: none"> • Given that there is a varying degree of future awareness in the industries, in particular manufacturing, there is an opportunity for key stakeholders such as Hanga-Aro-Rau to work with the businesses and education providers to promote future skills awareness. • Industry groups and Hānga-Aro-Rau can help link up SMEs who are less mature in this space with larger more experienced organisations to facilitate more future-proofed skills planning.

Future skills survey | Summary (Continued)

The survey results emphasise the importance of people related transferable skills and the gap in current skills to support future technological advancement. There is an opportunity to upskill the local workforce, alongside global expertise, and to create awareness of future skill needs for stakeholders to take action.

	Industry Voice	People	Transformation
Observations	<ul style="list-style-type: none"> Employers consistently rated the need to promote sector awareness and attractiveness as a priority. The sector is also calling for more collaborative actions to manage workforce and better alignment with future skills needs. There is evidence that suggests Industry 4.0 could introduce a higher need for digital and automation skills, however the survey results did not reflect the full importance of digital skills. This could indicate that industry is not prepared for continued disruption from digital and automation. 	<ul style="list-style-type: none"> Team work, leadership, management, decision making, problem solving and verbal communication are all people related transferable skills regardless of COVID-19. These transferable skills are amongst the most important and hard to find skills for the sector. In line with other research, the acceleration of digital channels would likely have removed some geographic barriers, allowing people to interact virtually and more regularly. 	<ul style="list-style-type: none"> The survey results have shown a slightly contradictory finding in the digital skills and cultural competencies compared with the research hypotheses, desktop research and stakeholder engagement. A greater awareness of these issues within the industry is required to enable true transformation. The local labour market is insufficient to meet all current and future skills needs and transformation of the industries will still need capacity and capability from global sources.
Opportunities	<ul style="list-style-type: none"> Given that there could be variety of skills capability and understanding of future needs, there is an opportunity for Hanga-Aro-Rau to play a key role in facilitating and influencing the right sector stakeholders to take actions to address the issues. There are a number of sector initiatives that the industries can leverage such as through RoVE, the Advanced Manufacturing Industry Transformation Plan, the Regional Skills Leadership Groups and other initiatives. 	<ul style="list-style-type: none"> There is an opportunity for businesses to make use of technologies to offer staff work life balance, to maintain or build new relationships. Online forums can be an effective way to enable partnership and promote inclusiveness. Hanga-Aro-Rau has a responsibility to work across businesses, industries and industries to coordinate efforts to identify workforce needs. Using effective people networks to support the vocational education and training system and employers to meet those needs. 	<ul style="list-style-type: none"> There is an opportunity for local resources to upskill alongside global expertise in the industry either through bringing in skilled people to train the local workforce or sending our people to learn offshore and bring back key skills. Hanga-Aro-Rau can help facilitate the networking that needs to happen to enable this. Uplifting the whole industry will attract a younger and more diverse group of people to seek and build a career in the manufacturing and engineering industries.

Future skills survey | Key insights

The survey results show team work, communication skills, computer skills and problem solving skills are the most important skills since COVID-19. Cultural competencies are seen as less important relative to other skills. Below are the key observations from the survey results and the next page presents the survey results in more detail. A score of 5 indicates that those skills are the most important and 1 being the least important.

High importance of transferable skills in manufacturing and engineering

- 91% in manufacturing, 83% in engineering, 100% in food and beverage responded with a score of 4 or 5 (highest) for teamwork being important skills since COVID-19.
- Verbal communication skills were also rated highly with an average score of 4 out of 5 for manufacturing, 4.3 for engineering and 4.3 for food and beverage.
- Problem solving and critical thinking skills are also very important since COVID-19 and in future.

The importance of written communication has increased since COVID-19

- Written communication skills were not viewed as highly important pre-COVID-19, with 40% of employers in manufacturing, 33% in engineering and 53% in food and beverage responding with a score of 4 or 5 for written communication.
- Responses of 4 or 5 increased to 47%, 67% and 56% for each respective industry responding to the importance of written communication skills since COVID-19 and in the future.

Computer skills have become more important since COVID-19

- Computer skills (including computer literacy, multi-media channels, computer programming and data analytics) were not as highly ranked as other skills pre-COVID-19, with an average score of 2.8 and 2 for manufacturing, 3 and 2.3 for engineering and 3.6 and 4 for food and beverage. However, the post-COVID-19 response saw an increase in importance of these skills for engineering and manufacturing to a lesser extent.

Other cognitive based technical skills are of average importance for some

- Numeric and quantitative (average scores of 3.3 in manufacturing and 3.2 in engineering), computer programming and big data analytics skills (average score of 2.3 in manufacturing and 2.8 in engineering), understanding of connected equipment and industrial control software (average score of 2.9 in manufacturing and 3.3 in engineering) have been considered by employers to have less importance.
- These skills are considered more important for the food and beverage industry when compared with others.

Working with manufacturing tools and techniques is important

- Working with manufacturing tools and techniques is regarded as an important skill, with 82% of manufacturing and 81% of food and beverage respondents scoring it 4 or 5.
- The results show a lesser degree of importance for engineering with 67% respondents scoring working with tools a 4 or 5. Note however the small sample size may not reflect the view of the whole sector.

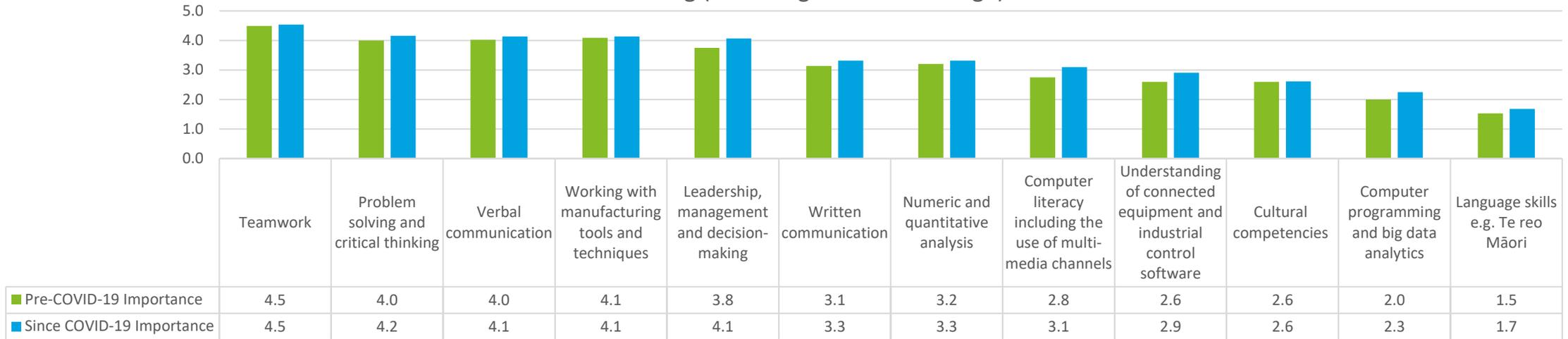
Cultural and language skills are seen as less important

- Cultural competencies and language skills have been considered by employers to have less importance for manufacturing employees, with average scores of 2.6 and 1.7 in manufacturing, 3.5 and 2.3 in engineering and 2.8 and 1.9 in food and beverage.
- The responses show that engineering employers put higher focus on cultural competencies than general manufacturing and the food and beverage industry.

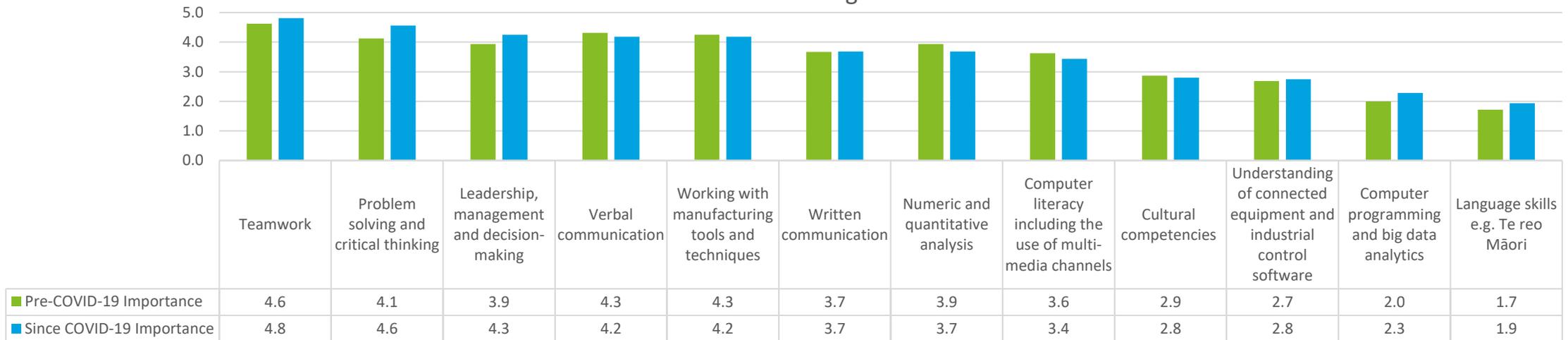
Survey results for the importance of key skills for manufacturing

The following graphs present the average scores in order of skills importance since COVID-19 for the manufacturing sector pre- and since-COVID-19, and in five years time. A score of 5 indicates that those skills are the most important and 1 being the least important.

Manufacturing (Excluding Food & Beverage)

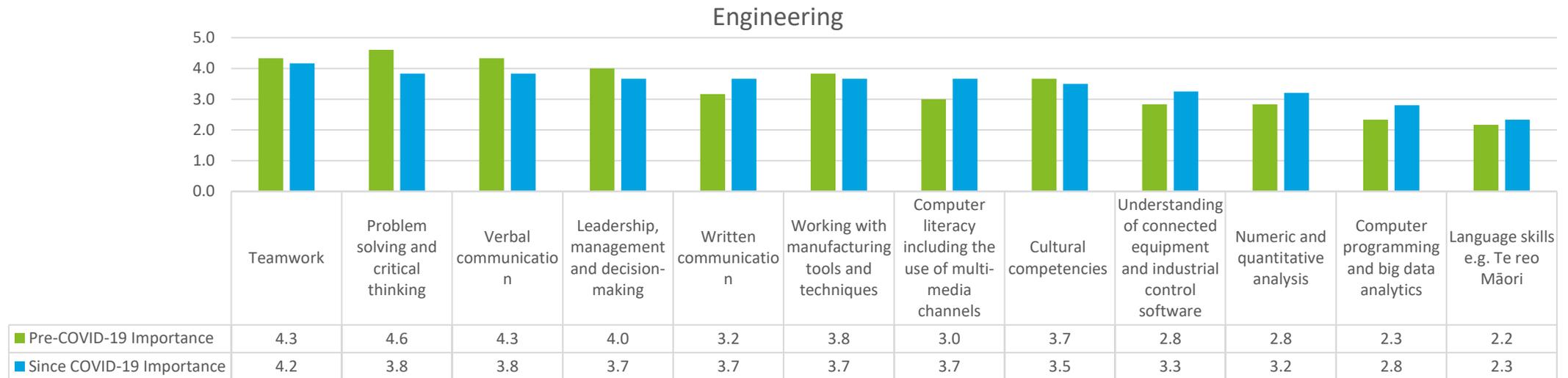


Food & Beverage



Survey results for the importance of key skills for engineering

The following graph presents the average scores in the order skills importance since COVID-19 for the engineering sector pre- and since-COVID-19, and in five years time. A score of 5 indicates that those skills are the most important and 1 being the least important.



Note that there is no universal definition of transferable skills or non-technical skills. For this research, transferable skills include: teamwork, problem solving and critical thinking, leadership, management and decision-making skills. While other skills such as verbal communication, written communication, cultural competencies and language skills are all transferable, these skills have been analysed separately.

Where non-technical skills have been mentioned in the desktop research section, this research follows the definition from the source reference materials.

There is likely variation from business to business across the sector. Note that due to the relatively small sample size of 69 (25 general manufacturing, 6 engineering and 16 Food and Beverage), the results presented are not presented as statistically robust and may not represent the whole industry's experience or opinion in terms of which skills are more important than others.

Hard to find skills in manufacturing and engineering

Since COVID-19, open positions increased by 20%. Transferable skills and technical skills were the most difficult to find skills. There is an increased difficulty in finding workers with both verbal and written communication skills and those with computer skills.

Transferable skills are considered the hardest to find

- Problem solving and critical thinking as well as leadership, management and decision-making skills are the hard to find skills for both manufacturing and engineering both prior to and since-COVID-19.
- While it was not regarded as difficult to find people with teamwork skills pre-COVID-19, it has since become one of the most challenging skillsets to find since-COVID-19.

Communication skills remain challenging to find

Although verbal communication is considered more challenging to find than written communication, employers in the engineering sector in particular found it far more difficult to find both sets of skills since-COVID-19.

Technical skills are challenging to find

- Technical skills, such as those required to work with manufacturing tools and techniques, are generally hard to come by and COVID-19 has posed more challenges for the manufacturing and the food and beverage sectors.
- For engineering and the food and beverage sectors, it has also become more challenging to find skills to understand connected equipment and industrial control software.

Increased difficulties in finding people with computer skills

Computer literacy, programming and big data analytics were noted by some of the general manufacturing and engineering employers as more difficult to source since-COVID-19.

Quantitative and big data analysis skills are relatively hard to find for the food and beverage sector

- Numeric, quantitative, computer programming and big data analytics skills are amongst the most difficult to find skills for the food and beverage sector. These skills were challenging to find pre-COVID-19 and have remained so.

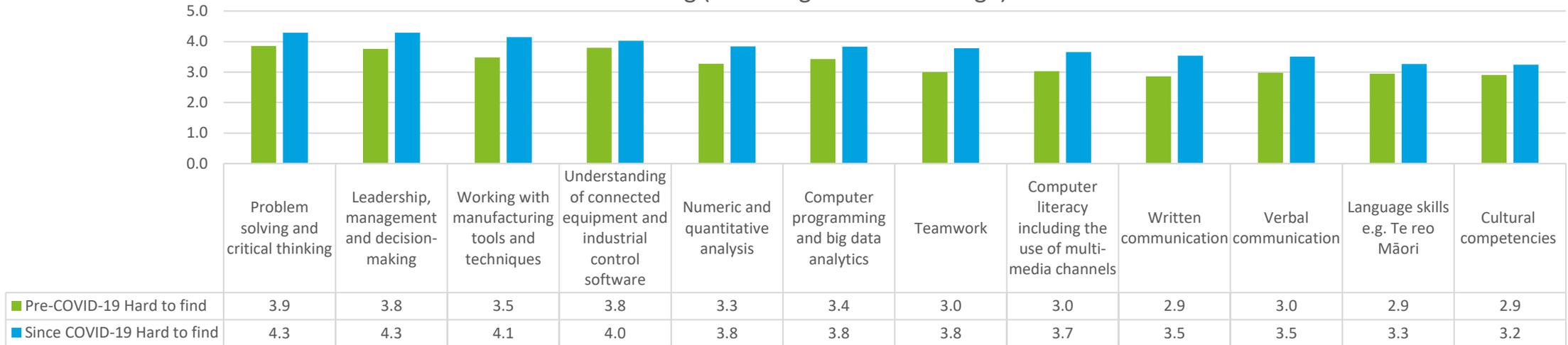
Food and beverage sector experienced more challenges finding cultural and language skills

While cultural and language skills are considered to be the most important skills in the food and beverage sector, and are also important in manufacturing and engineering industries, COVID-19 has increased the challenges in finding these skills. This was particularly noted in the food and beverage sector.

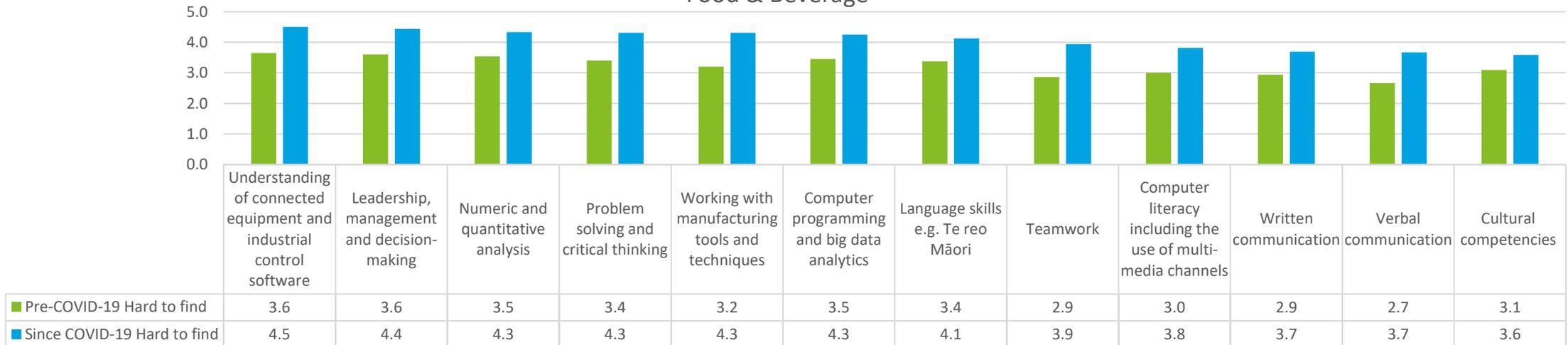
Survey results for the hard to find skills in manufacturing

The following graphs present the average scores in the order hard to find since COVID-19 for the manufacturing sector pre-COVID-19 and since COVID-19 and in five years time. A score of 5 indicates the hardest to find skills and 1 being the least challenging to find skills.

Manufacturing (Excluding Food & Beverage)

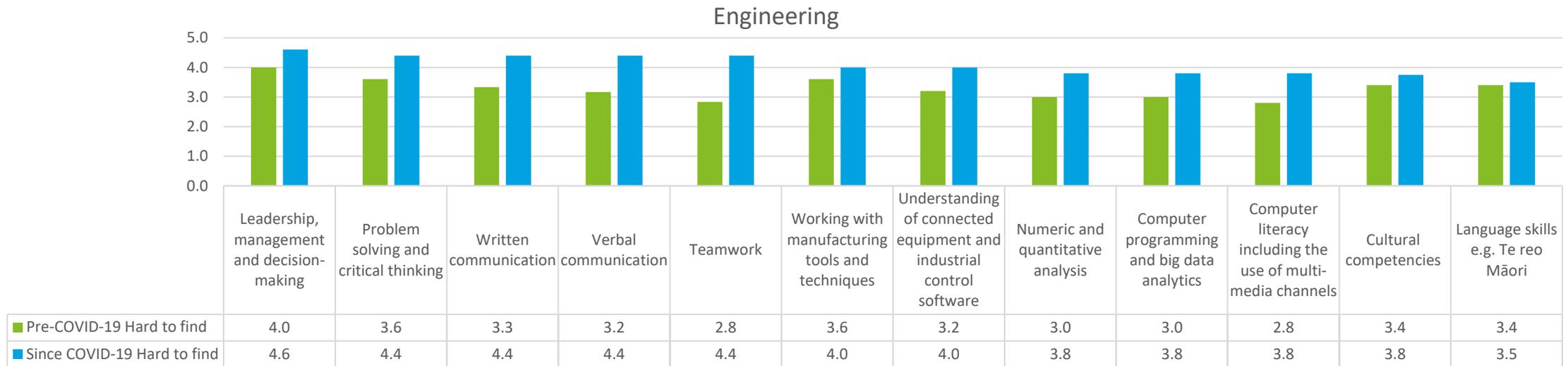


Food & Beverage



Survey results for hard to find skills in engineering

The following graph presents the average scores in the order skills importance since COVID-19 for the engineering sector pre-COVID-19 and since COVID-19 and in five years time. A score of 5 indicates the hardest to find skills and 1 being the least challenging to find skills.



There is likely variation from business to business across the sector. Note that due to the relatively small sample size, the results presented should be used as a guide to direct conversation. It may not represent the whole industry’s experience or opinion in terms of which skills are more important than others.

Open positions, uncertainty factors and other skills required in manufacturing and engineering

The survey results confirmed the challenge to fill positions with the relevant skills since-COVID-19, with most employers stating the impact of COVID-19 is enduring.

Open positions due to a lack of relevant skills

Lower percentage of employers advised that unfilled positions are not skills shortage related

- Prior to COVID-19, 28% of employers surveyed estimated that the open positions were not related to skills shortage, compared with 10% since-COVID-19, with none for food and beverage.
- A total of 35% of employers estimated that 41% to 100% of open positions are skills related which is 25% higher number of employers than pre-COVID-19.

There is a higher percentage of skills related unfilled positions observed since COVID-19

- A total of 76% of employers surveyed in the manufacturing and engineering industries reported that prior to COVID-19, less than 20% of positions were not filled due to a lack of applicants with relevant skills. No employers surveyed reported more than 80%.
- A total of 20% of employers surveyed have reported that since COVID-19, more than 60% of positions that remained unfilled were skills related, compared with 4% pre-COVID-19.

Uncertainty factors result in an enduring future impact

Majority of employers believed that COVID-19 has a more enduring future impact than automation and climate change

- A total of 52% of employers surveyed believed that COVID-19 has a greater enduring future impact (score of 4 and 5) on their businesses than automation (42%) and climate change (20%).

There is more uncertainty regarding the impacts of climate change and automation than COVID-19

- Only 4% of employers responded that COVID-19 represents unknown impacts to their businesses, while automation and climate change represent greater uncertainty for respondents, at 10% and 20% respectively.

There are other skills and knowledge required to be successful in the future

Resilience and self management are important skills for employees

- Comments have been made by engineering, manufacturing and food and beverage respondents that self management, time management, adaptive and resilience for change are important attributes, particularly as they relate to the ability to work remotely and/or unsupervised.
- Reliability was highlighted as an important future skill in the manufacturing sector.

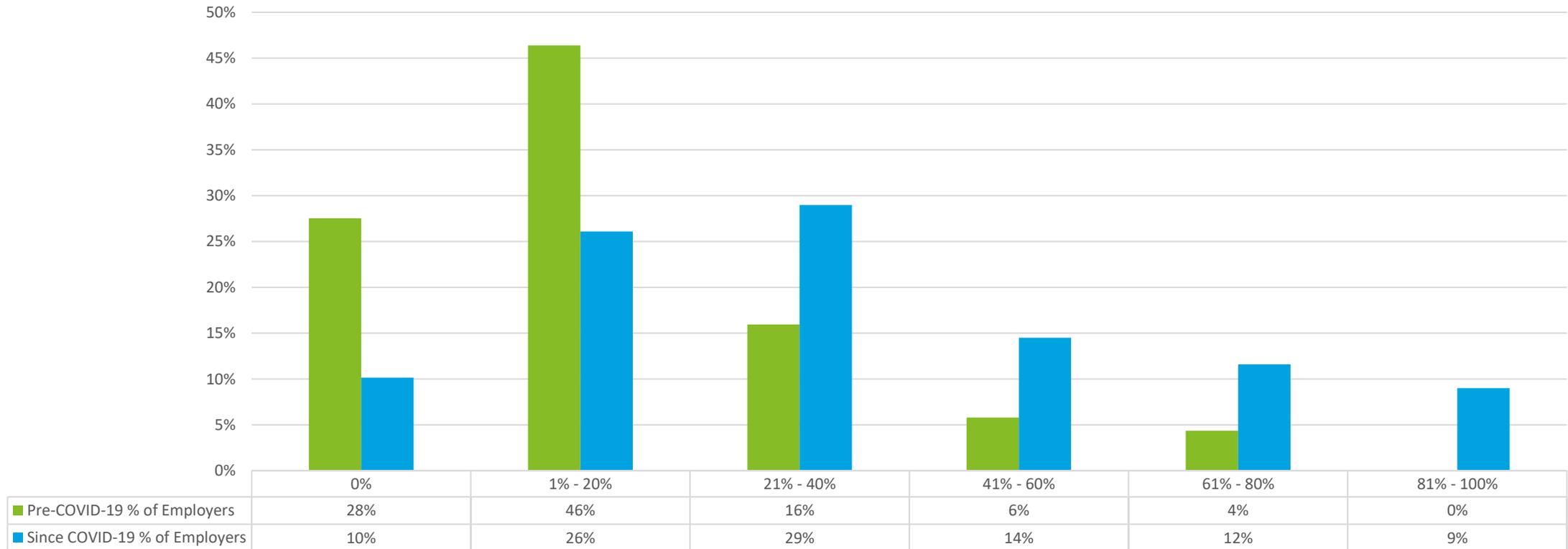
There are some key specific skills and knowledge required for different industries

- Deep knowledge of the industry, its standards, regulations and compliance, and its markets is important and for succession planning in the manufacturing industry.
- Science based skills e.g. physics, plus engineering and maintenance skills are becoming more important as industry processes are increasingly automated and rely less on physical labour.

Survey results for open positions

The chart below presents the percentage of open positions due to a lack of relevant skills for the combined manufacturing and engineering industries pre-COVID-19 and since COVID-19. e.g. 29% of employers responded that they have 21%-40% of open positions which cannot be filled due to a lack of relevant skills in the workforce market compared with 16% pre-COVID-19. The survey results indicated that COVID-19 has a large impact on workforce supply, which has impacted the sustainability of some businesses.

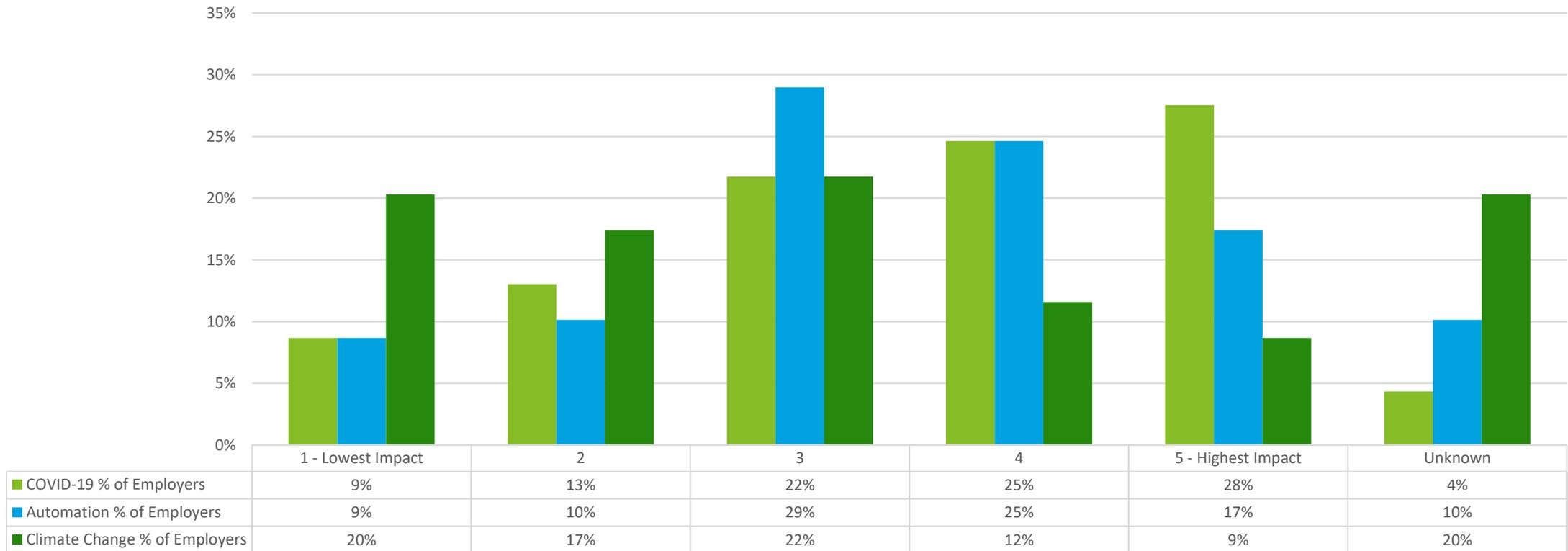
% of Open Positions Due to a Lack of Relevant Skills



Survey results for uncertainty factors

The chart below shows that respondents' thought that COVID-19 disruption would have the greatest impact on their business, followed by automation, and then climate change. More investigation is needed to understand how climate change impacts on businesses and the industries as this was the area which respondents were most uncertain.

Uncertainty Factors Result in an Enduring Impact



Effectiveness of actions in reducing the impact of skills shortage

The survey results provided some insights on employers' perceptions of the effectiveness of actions in reducing the impact of skills shortages, including promoting sector awareness to attract future talent, more collaboration across industry, more structured materials for in-house training and peer-to-peer management. The survey results are presented on the following pages for manufacturing, engineering and food manufacturing.

Promoting sector awareness to attract future talent is considered the most effective solution to the shortage of skills

- There is broad agreement across the manufacturing, engineering, and food and beverage sectors that the most effective way of reducing future impact on skills shortages is to promote sector awareness to attract future talent.

Aligning training with future skills needs for the manufacturing and food and beverage sectors

- The manufacturing and food and beverage sectors see that it is important to align training programmes with future skills requirements.

More collaboration across the industry for workforce management is required

- The food and beverage industry is keen to see more collaboration across the sector to manage workforce related considerations.
- This view is shared by the engineering employers in the survey and to a lesser extent by manufacturing employers.

Engineering employers would prefer more structured materials to be available for in-house training

- Engineering employers, and to a slightly lesser extent those in manufacturing and food and beverage sectors, prefer in-house training with more structured materials.

Leveraging digital training technologies is considered the least effective way to resolve skills shortage

- Many manufacturing, engineering and food and beverage employers indicated leveraging digital training technologies as less likely to be effective.

Peer-to-peer mentorship and training is more effective than individualised or group trainings

- Peer-to-peer mentorship and training is considered to be relatively more effective than individualised and group training in both the manufacturing and engineering industries.
- While these approaches are also regarded as effective in the food and beverage sector, individualised training is the preferred approach.

Survey results for the effectiveness of actions in reducing the impact of skills shortage

The following graph presents the average scores of effectiveness of actions for the manufacturing, food and beverage and the engineering industries pre-COVID-19 and since COVID-19. 5 being the most effective and 1 being the least effective.

Effectiveness of Actions



A further break down of the scores is included in Appendix 7B for manufacturing, Appendix 7C for Food and Beverage, and Appendix 7D for Engineering.



**Section 5:
He Tātaritanga Kaimahi |
Workforce analysis**

Photo: Austin Melville, Print Manufacturing

Workforce analysis

To further the sector's understanding of the manufacturing and engineering workforce before and after the onset of the COVID-19 pandemic, Deloitte provided a historical and forward analysis of both industries using its own in-house economics models and Statistics New Zealand employment data. Scenario modelling for each industry was also provided to capture the uncertain outlook for each industry in the face of the new COVID-19 environment. A data catalogue illustrating additional publicly available manufacturing and engineering data was also provided to further support Hanga-Aro-Rau analysis.

Approach



Data

To identify trends in the manufacturing and engineering industries, cross-tabulated employment data, obtained from Statistics New Zealand, by industry, region, year, ethnicity, age, gender, disability status and occupational skill level was analysed for the period 2012 to 2022.



Historical analysis

The analysis highlighted trends both pre-COVID-19 and over the COVID-19 period in the manufacturing and engineering industries. It also highlighted changes in demographics, age, gender, ethnicity and skill levels over time.



Workforce gap analysis

This workforce analysis develops a view on the potential future gap between workforce supply and demand and skill levels.



Scenario analysis

An outlook for industry specific labour supply and demand was provided to 2028 under a range of economic scenarios. This research presents three possible future scenarios which modelled the impact of a prolonged 'brain drain', a severe economic downside, and continued increases in workforce productivity. It also illustrated the pathway required to achieve more equitable skills mix for Māori and Pacific Peoples.

A full description of the methodology is included in Appendix 3.

Main Data Sources



Custom employment dataset for March 2012 to March 2022 from Statistics NZ

Education Counts data from Ministry of Education



New Zealand population data from Statistics NZ

Post study outcomes and Tertiary provision from Nga Kete



Manufacturing and engineering gross value-added data from Deloitte

Industry data from Infometrics



A list of data fields in the data catalogue is included in Appendix 2.

Workforce analysis | Summary

This report has highlighted that across many outcomes, Māori, Pacific Peoples, and females fare worse than other population groups. But it has also provided Hanga-Aro-Rau with a roadmap and framework to assess future initiatives aimed at improving equity, sustainability and to uphold Te Tiriti.

	Te Tiriti	Equity	Sustainability
Observations	<ul style="list-style-type: none"> Across both manufacturing and engineering, Māori employment has not rebounded to pre-COVID-19 levels. Māori have a lower skills mix compared to other ethnic groups, but the upskilling trend is positive. Māori make up 15.3% of the manufacturing and 7.6% of the engineering workforce. Relative to other ethnic groups, Māori transition into employment at ~10% lower rates. 	<ul style="list-style-type: none"> Across both manufacturing and engineering, Pacific Peoples’ employment has not rebounded to pre-COVID-19 levels. Pacific Peoples also have a lower skills mix relative to Māori and other ethnic groups. Women make up 30% of the manufacturing workforce and 7% of the engineering workforce and there has been no recent change in this trend. Disabled people have lower labour force participation and higher unemployment. 	<ul style="list-style-type: none"> The number of 65+ year olds working in manufacturing has doubled in the last 10 years. Pre-COVID-19, the workforce has relied upon net migration from overseas to fill skills shortages. This may not be possible under current policy settings.
Opportunities	<ul style="list-style-type: none"> Implementing strategic Hanga-Aro-Rau initiatives to uplift Māori participation in manufacturing and engineering. Since Māori make up a high proportion of the manufacturing and engineering workforce, achieving a step change in skills mix, participation, or entry into training and employment will make a material impact on reducing the skills gap and labour capacity constraints. 	<ul style="list-style-type: none"> Making a material impact on the skills gap and labour capacity by encouraging recruitment, upskilling, and reskilling of women, Māori and Pacific Peoples. Promoting awareness and attractiveness of career pathways – targeted at Māori and Pacific Peoples. Hanga-Aro-Rau promote more accessible and suitable working environments for disabled people and collaborate with the Ministry for Disabled People. 	<ul style="list-style-type: none"> Presenting the attractiveness of career options in manufacturing and engineering. A shift in focus to developing the domestic workforce is a more sustainable approach, although will likely take time to have an impact. Recognise the important role that the older workforce can have in training and developing the workforce and providing additional capacity to help to meet the current gap.

Workforce analysis | Summary (Continued)

This report has also demonstrated that over the last decade there has been a marked shift in the skills required to work in both the manufacturing and engineering industries, and that in the face of COVID-19, there are opportunities to improve industry voice, develop people and transform the industry for the future.

	Industry Voice	People	Transformation
Observations	<ul style="list-style-type: none"> Migration restrictions and the loss of younger age cohorts under a possible brain drain scenario are key concerns for the sector right now. Deloitte estimates that there is a significant workforce capability and capacity gap of up to 17,000 manufacturing roles and 12,000 engineering roles, and that the size of this gap is likely to increase if current trends and policy settings persist. 	<ul style="list-style-type: none"> Since COVID-19, there has been a clear reversal of the trend in net migration to meet skills gaps, highlighting New Zealand’s reliance on skilled migrant workers. The shortages in skilled and unskilled labour across all industries is a global trend, however, it is a particular issue for manufacturing and engineering where migrants make up 25% of their workforce. An expected slowdown in economic conditions may dampen demand for labour. 	<ul style="list-style-type: none"> The current trend of gradual upskilling, low female participation rates, and low use of technology will not improve industry competitiveness, nor will it meet workforce capability and capacity gaps. The industry will need targeted initiatives that make better use of technology supported by a more highly skilled workforce to raise productivity and to help to fill the workforce gaps.
Opportunities	<ul style="list-style-type: none"> For Hanga-Aro-Rau to develop strategic initiatives to boost the industry voice in manufacturing and engineering to maintain a sustainable workforce. Hanga-Aro-Rau to adopt the frameworks in this research to track and monitor different initiatives over time. 	<ul style="list-style-type: none"> To attract returning New Zealanders, with international experience to grow capability and capacity. For Hanga-Aro-Rau to take the lead on initiatives that attract more workers through training or from other industries or from overseas, upskill the current workforce, or increase productivity (e.g. through technology). 	<ul style="list-style-type: none"> Hanga-Aro-Rau could consider implementing initiatives that could help boost the regional skills base, regional employment, and business growth in the areas of interest. Hanga-Aro-Rau should get access to the Integrated Data Infrastructure (IDI) to track workforce developments over time.

Workforce analysis | Current state summary

COVID-19 has exacerbated inequities in both the manufacturing and engineering industries. While employment among other ethnic groups has rebounded to pre-COVID-19 levels, Māori and Pacific Peoples' employment has not recovered. Similarly, while there has been an uplift in skills mix over time, Māori and Pacific Peoples remain significantly behind other ethnic groups.

COVID-19 has tightened global labour markets and cut off the supply of skilled migrant labour

Historically low unemployment rates and high levels of job advertisements since the start of COVID-19 show that it is extremely difficult to find both skilled and unskilled labour.

The skills gap that would normally be partially filled through net migration is unable to be due to COVID-19 border restrictions and subsequent changes to immigration policy. Even if immigration policy is adjusted, these skills shortages are global, meaning local workforce development is critical.

Māori and Pacific Peoples are overrepresented in lower skilled jobs in both manufacturing and engineering

While there has been a shift in skills across all ethnic groups in the last decade, Māori and Pacific Peoples still predominantly make up the highest proportion of the workforce with the lowest skills mix.

At current trends, Māori and Pacific Peoples won't reach parity with other ethnic groups without new initiatives.

Māori and Pacific Peoples' employment has not recovered to pre-COVID-19 levels in both manufacturing and engineering

COVID-19 has had a distinct impact on each ethnic group in the manufacturing and engineering industries. By March 2022, overall employment exceeded pre-COVID-19 levels, while Māori and Pacific Peoples' employment had not rebounded to pre-COVID-19 levels.

Manufacturing and engineering have notable demographic differences including by gender, age and disability

While both industries employ notably more males than females, engineering is significantly more male dominated, where 93% of the workforce is male and 7% is female, compared to 70% male and 30% female in manufacturing.

In engineering, the 65+ age cohort has doubled in size over the last decade, however, remains a small percentage of the total workforce.

In manufacturing, Māori have slightly higher participation among their disabled population compared to other ethnic groups.

There has been an upward shift in the proportion of highly skilled workers in both industries

Both industries have experienced an upward shift in the number and proportion of highly-skilled workers in the last decade – a trend that is expected to continue.

While this has occurred in each ethnic group, the trend has been strongest among Māori, and weakest among Pacific Peoples, in manufacturing. Comparatively, in engineering the trend was strongest among Pacific Peoples.

Vocational education and training play a significant role in preparing and upskilling the manufacturing and engineering workforce

There has been a noticeable increase in the number of all vocational education and training learners since COVID-19, although this trend is not as pronounced for Māori and Pacific Peoples.

However, since 2012, Māori and Pacific Peoples' participation in manufacturing and engineering tertiary education has increased at a much faster rate than other ethnic groups.

Workforce analysis | Future state summary

This research report provides Hanga-Aro-Rau with a range of economic outlooks on the manufacturing and engineering industries. It demonstrates the current workforce gap and how this might grow if policy settings and industry initiatives do not change. It also provides a framework to test or measure the impact of different strategic initiatives, levels of investment, and areas of focus.

There is a current labour force shortage of 17,000 in the manufacturing industry. At current trends, this gap is expected to worsen

Deloitte's base case outlook suggests that the labour force 'gap' may fall to 12,000 by 2023, in line with New Zealand's COVID-19 economic recovery pathway.

However, in the absence of any policy change, significant change in the current workforce skills mix, or productivity, the gap may rise to 23,000 by 2028.

This is unsustainable, and without action, could act as a constraint to output in the sector.

New COVID-19 variants, future border settings and brain drain pose a significant threat to New Zealand's recovery pathway

New Zealand is beginning to see negative net migration, which exacerbates the workforce shortage. If this nascent 'brain drain' trend continues for another three years, the manufacturing and engineering labour supply could fall by an additional 5,000 and 3,000 people, respectively.

If New Zealand experiences a significant recession (e.g. as a result of new COVID-19 variants), the economic slowdown could reduce manufacturing and engineering labour demand by 33,000 and 20,000 people, by 2028, respectively.

There is a current labour force shortage of 12,000 in the engineering industry. Without action, this gap could grow to 12% by 2028

The labour force gap is currently 12,000 and could grow to 17,000 employees (12% on a national level). It is estimated that Auckland comprises 44%, Canterbury 16% and Waikato 12% of the national workforce gap.

The main driver of this gap is that, in the absence of net migration returning to pre-COVID-19 levels, population growth cannot meet current and future levels of demand. Pivoting to a domestically trained workforce will take time.

Investment in technology is expected to improve labour productivity and increase the demand for higher-skilled workers

Investment in technology and improved labour productivity could reduce workforce requirements and shift the future skills mix - increasing the demand for more highly-skilled workers at the expense of lower-skilled workers.

If labour productivity increases by 2% per annum over the next 6 years, the manufacturing and engineering industries could achieve the same level of output with 20,000 and 12,000 fewer workers, respectively.

At current trends, the skills mix for Māori and Pacific Peoples is unlikely to reach parity with other ethnic groups by 2028

To achieve an equitable skills mix for Māori and Pacific Peoples in manufacturing, there would need to be an additional 9,000 level 1 Māori employees and 7,000 level 1 Pacific employees by 2028. This would require a 11% per annum growth rate for Māori and a 23% per annum growth rate for Pacific Peoples.

In engineering, 2,600 more level 1 Māori employees would be needed to reach parity with other ethnic groups by 2028.

Hanga-Aro-Rau Initiatives

This research highlights areas of need in the manufacturing and engineering industries, particularly for Māori and Pacific Peoples. It also provides a framework to test the potential impact of different strategic initiatives, different focus areas, and illustrate the potential impact of different levels of investment / priority / ambition. Commenting on the reasons for the deficit is outside of the scope of this research.

Finally, it provides a prototype to develop tools to track progress against planned outcomes of strategic initiatives.

Workforce analysis

The research analysis is based on Deloitte's in-house models, using employment data from Statistics New Zealand to provide historical analysis and projections for the manufacturing and engineering workforce. The results were broken down at a national, regional and industry-level, and covered the period from March 2012 to March 2022 with forecasts up to 2028.



Overview

COVID-19 has exacerbated issues for workforce development (including groups who have been traditionally under-served by the education system) in New Zealand's manufacturing and engineering industries. Reduced access to migrant labour under immigration policy settings and in the current COVID-19 environment has meant that employers have had to look internally and locally to upskill, cross skill and attract staff - rather than importing skills and expertise.

Traditionally, both industries have had ready access to skilled migrant labour. In the future, industries may need to rely more on developing and attracting the domestic workforce to deliver these skills. This provides a new opportunity for the vocational education and training (VET) sector to work with employers to upskill, cross-skill, or reskill staff to ensure they have sustainable and stable career prospects, and enhanced skillsets to support the growth of industry. Wherever possible, this should result in employees gaining further formally recognised credentials.

The increasing evolution of technology, together with the existing skills shortages, COVID-19 lockdowns, border closures and subsequent supply-chain challenges is having a detrimental effect on sustainable workforce development, and the limited availability of suitably skilled employees is a key constraint on production expansion for these industries.



Objective

The purpose of this section is to provide Hanga-Aro-Rau a historical and forward analysis of the manufacturing and engineering workforce. It examines the current demand and supply for skills, and estimates the workforce gap in each industry in a COVID-19 environment. It also identifies trends in tertiary and vocational education and training that may impose barriers to meeting current and future workforce requirements.

To provide a forward view on each industry, Deloitte's in-house models were used to forecast labour demand, labour supply, and the workforce gap from 2023 to 2028. Several economic scenarios and transition pathways are presented which consider significant future uncertainty as a result of the COVID-19 pandemic.

Finally, to support further analysis on the manufacturing and engineering industries, a data catalogue on available data in the public domain is produced.



Structure

- Macroeconomic environment as it relates to the labour market
- Historical overview of manufacturing and engineering
- Education and training analysis
- Future state and gap analysis of workforce and skills
- Scenario analysis

New Zealand macroeconomic environment: The labour market

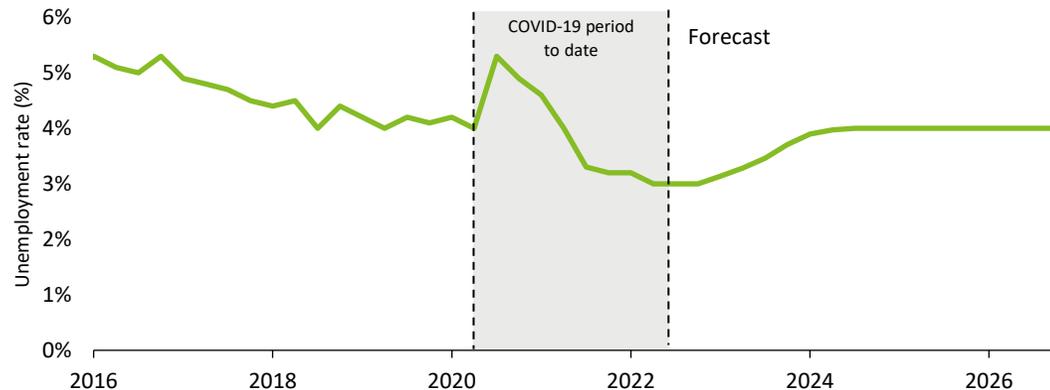
The immediate effect of COVID-19 was a spike in unemployment and a sharp fall in job advertisements as a result of economic uncertainty, lockdowns and border restrictions. COVID-19 policy responses and a reset in employees' expectations during COVID-19 have resulted in historically low levels of unemployment globally and difficulties in finding labour across almost all industries.

Record low unemployment and high levels of job advertisement

Since the onset of COVID-19, there has been a noticeable step change in New Zealand's labour market. Border restrictions, record low unemployment, and high levels of job advertising reflect the disruption of COVID-19 on the economy.

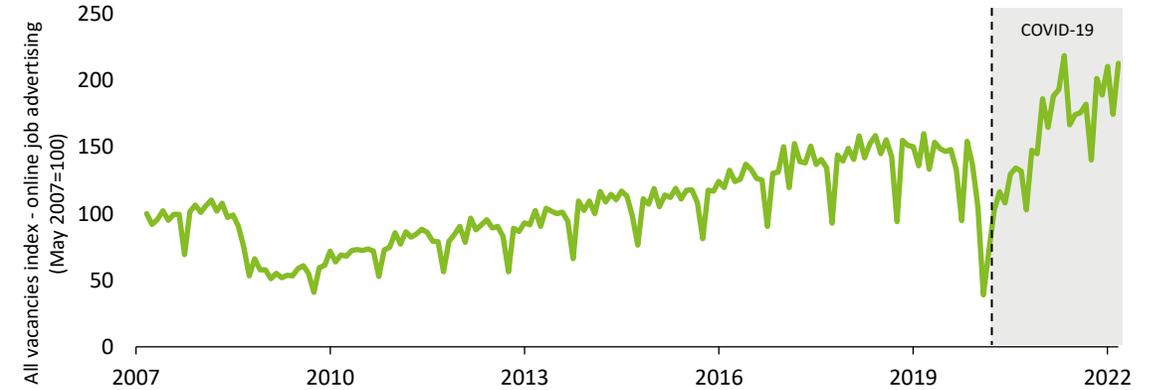
Across New Zealand, businesses have found it incredibly difficult to find both skilled and unskilled labour. The shortage of skilled and unskilled labour is starting to constrain economic activity.

Unemployment rate



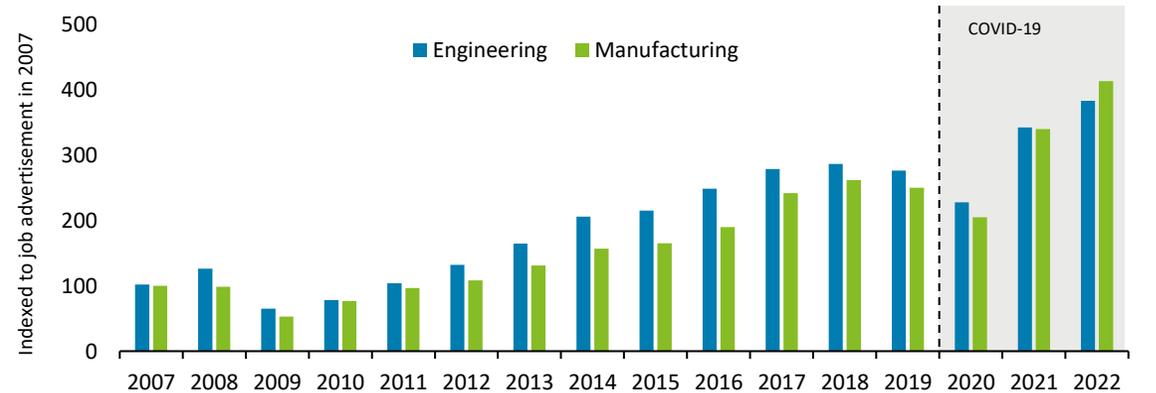
Source: Statistics NZ, Deloitte Access Economics
© 2022. Deloitte Limited (as trustee for the Deloitte Trading Trust).

Online job advertising (all industries)



Source: Statistics NZ, Deloitte Access Economics

Online job advertising by Industry



Source: Statistics NZ, Monthly online job advertisements index

New Zealand macroeconomic environment: Net migration

New Zealand has historically relied on net migration to fill workforce shortages. COVID-19 policy settings have prevented worker and student arrivals and net migration has been negative in recent quarters. Even if immigration policy settings are relaxed, labour shortages in New Zealand reflect a global COVID-19 trend. There is a greater need to develop the domestic workforce to improve the sustainability and resilience of the industries.

Skills shortages and net migration

New Zealand's COVID-19 border settings have been a key driver of skilled labour shortages which have historically been met by skilled migrants.

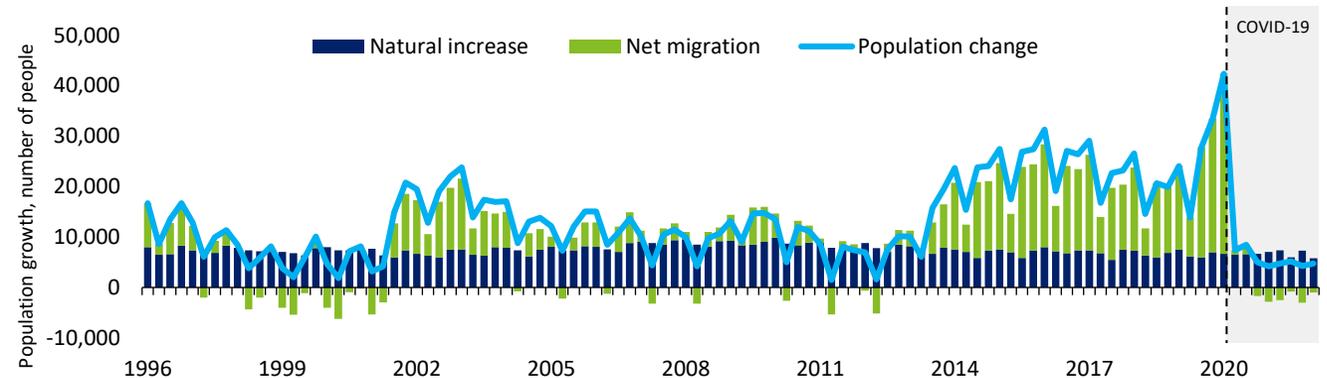
Since the beginning of COVID-19, **net migration has plummeted**, with provisional estimates from Statistics New Zealand suggesting a net loss of 7,300 persons in the year to March 2022 and a net loss of 1,700 in the year to March 2021 [16]. This is a **significant drop compared to pre-COVID-19 levels**, where New Zealand had a net gain of 91,700 persons in the year to March 2020.

Even as New Zealand reopens its borders, **net migration has not returned to pre-COVID-19 levels** with a **noticeable decline in work and student visas** continuing into 2022.

Industries such as manufacturing and engineering have historically hired over 25% of their workforce from overseas and as such both industries are expected to struggle to fill workforce gaps in the advent of a global skilled shortage [17].

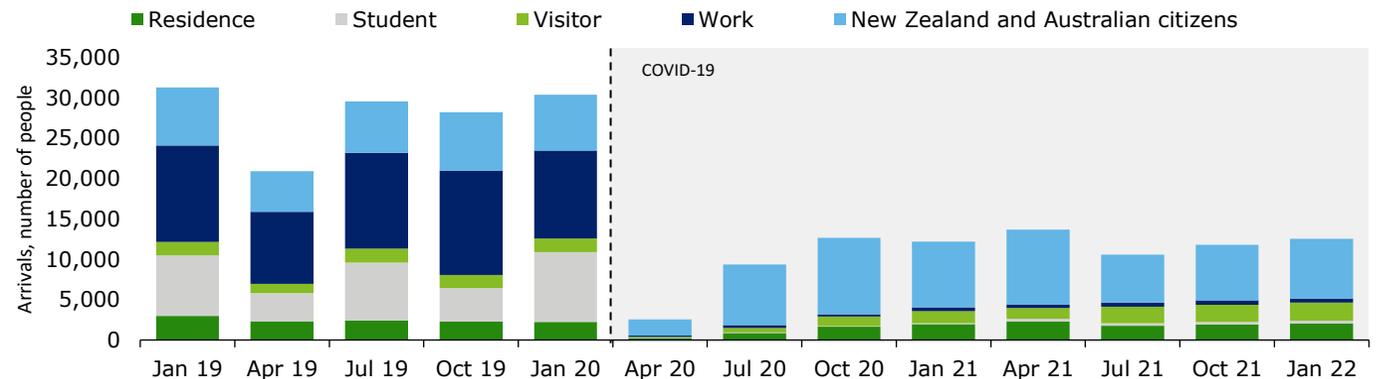
A focus on developing the **domestic workforce is essential** in view of these trends to develop a more sustainable and resilient workforce.

New Zealand migration and population growth



Source: Statistics NZ, Deloitte Access Economics

Permanent and long term arrivals



Source: Statistics NZ, Deloitte Access Economics

Manufacturing and engineering: National shift in skills since 2012

Both the manufacturing and engineering industries have experienced an upward shift in the number and proportion of highly-skilled workers – a trend that is expected to continue.



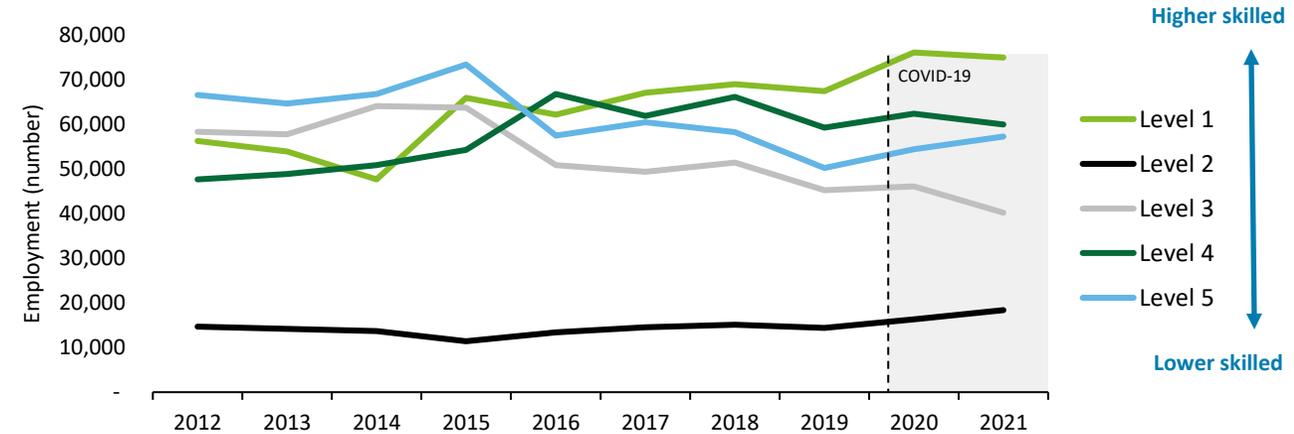
Defining skill levels

Deloitte’s workforce analysis used employment data from the Household Labour Force Survey (HLFS) which categorised domestic occupations into five categories, ranging from highly skilled (level 1) to lower skilled (level 5). The skill levels are assigned based on the level of formal education, training, and on-the-job training required for the occupation and are based on The Australian and New Zealand Standard Classification of Occupations (ANZSCO). Note that our engineering analysis was restricted to level 1, 2 and 3 occupations as a result of limitations in Statistics New Zealand employment data.

Level 1: Highly skilled	Level of skill commensurate with a bachelor degree or higher qualification. At least five years of relevant experience may substitute for the formal qualification.
Level 2	Level of skill commensurate with one of the following: <ul style="list-style-type: none"> NZ Registered Diploma or AQF Associate Degree, Advanced Diploma or Diploma. At least three years of relevant experience may substitute
Level 3: Skilled	Level of skill commensurate with one of the following: <ul style="list-style-type: none"> NZ Registered Level 4 qualification AQF Certificate IV or AQF Certificate III including at least two years of on-the-job training. At least three years of relevant experience may substitute.
Level 4	Level of skill commensurate with one of the following: <ul style="list-style-type: none"> NZ Registered Level 2 or 3 qualification or AQF Certificate II or III. At least one year of relevant experience may substitute.
Level 5: Lower skilled	Level of skill commensurate with one of the following: <ul style="list-style-type: none"> NZ Registered Level 1 qualification AQF Certificate I or Compulsory secondary education.

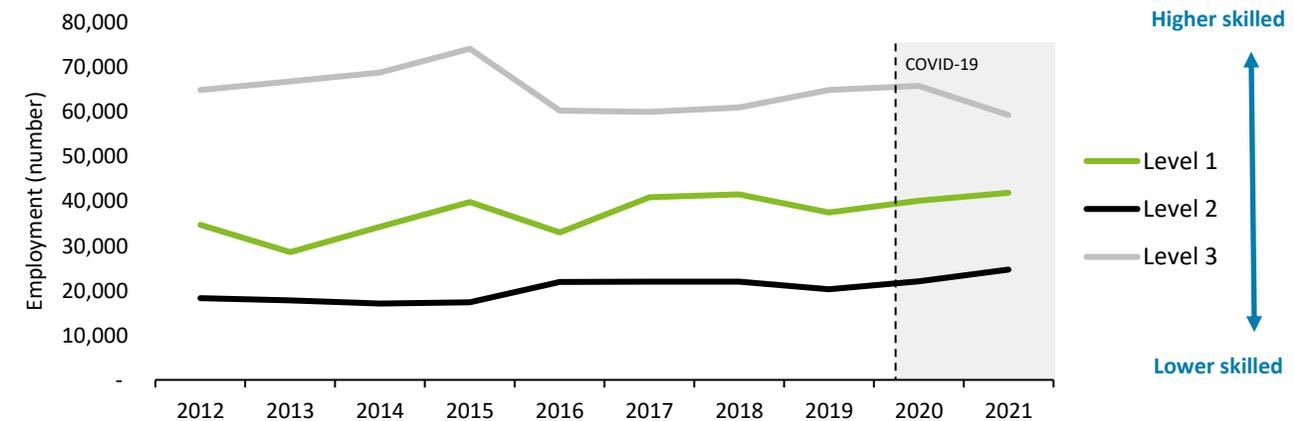
Source: Aria, Statistics NZ

Manufacturing: Annual skills trend (2012 – 2022)



Source: Statistics NZ, Deloitte Access Economics

Engineering: annual skills trend (2012 – 2022)



Source: Statistics NZ, Deloitte Access Economics

National manufacturing overview: COVID-19 analysis

COVID-19 has impacted all people employed in the manufacturing sector, especially Māori and Pacific Peoples, as their employment rates have not rebounded to pre-COVID-19 levels in the same way that other population groups have.

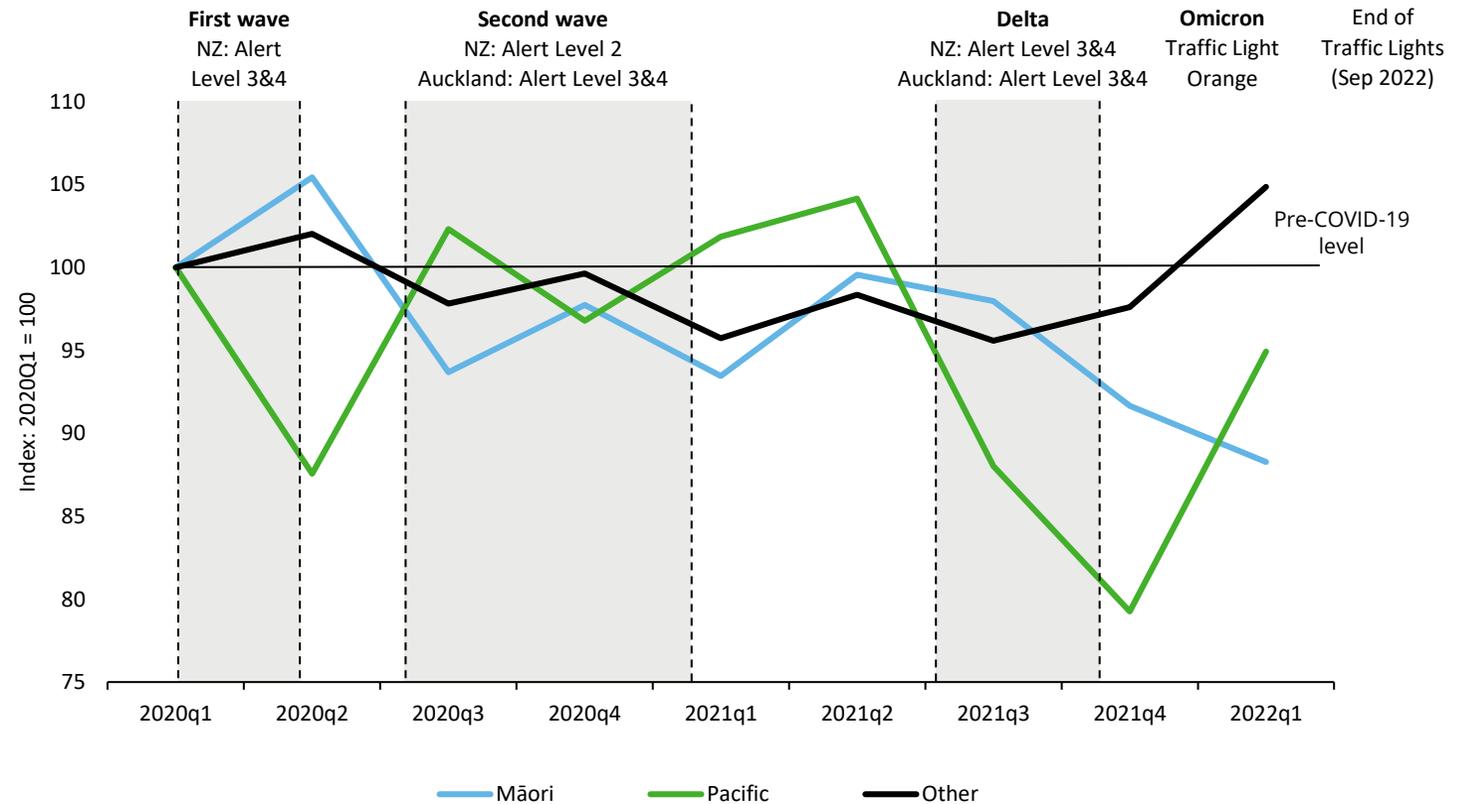
The impact of COVID-19 on manufacturing employment outcomes has varied by ethnicity

Total manufacturing employment rebounded from 253,300 in March 2020 (pre-COVID-19) to 256,100 by March 2022.

COVID-19 has had a distinct impact on each ethnicity in the manufacturing industry. By March 2022, although total manufacturing employment and employment of other population groups exceeded pre-COVID-19 level, Māori and Pacific Peoples' employment have not rebounded to pre-COVID-19 levels.

By March 2022, **Māori employment remains at 90% of COVID-19 levels while Pacific Peoples' employment remains at 95%.**

Impact of COVID-19 on manufacturing employment by ethnicity (quarterly, 2020 to 2022)



Source: Statistics NZ, Deloitte Access Economics

National manufacturing overview: Skills mix analysis

There is a higher proportion of lower skilled workers (levels 4 and 5) in the Māori and the Pacific Peoples groups compared with other ethnicities. While there has been an uplift in skill levels over the past decade, this has varied significantly by ethnicity and a clear equity gap remains. There is an opportunity for the sector to uplift the skills levels for Māori and Pacific Peoples, especially in the hard-to-find skill areas reported by employers through the skills survey.

Shift in manufacturing skills mix

The change in manufacturing skills mix has varied by ethnicity over the past decade. There is currently more skilled labour operating in the sector.

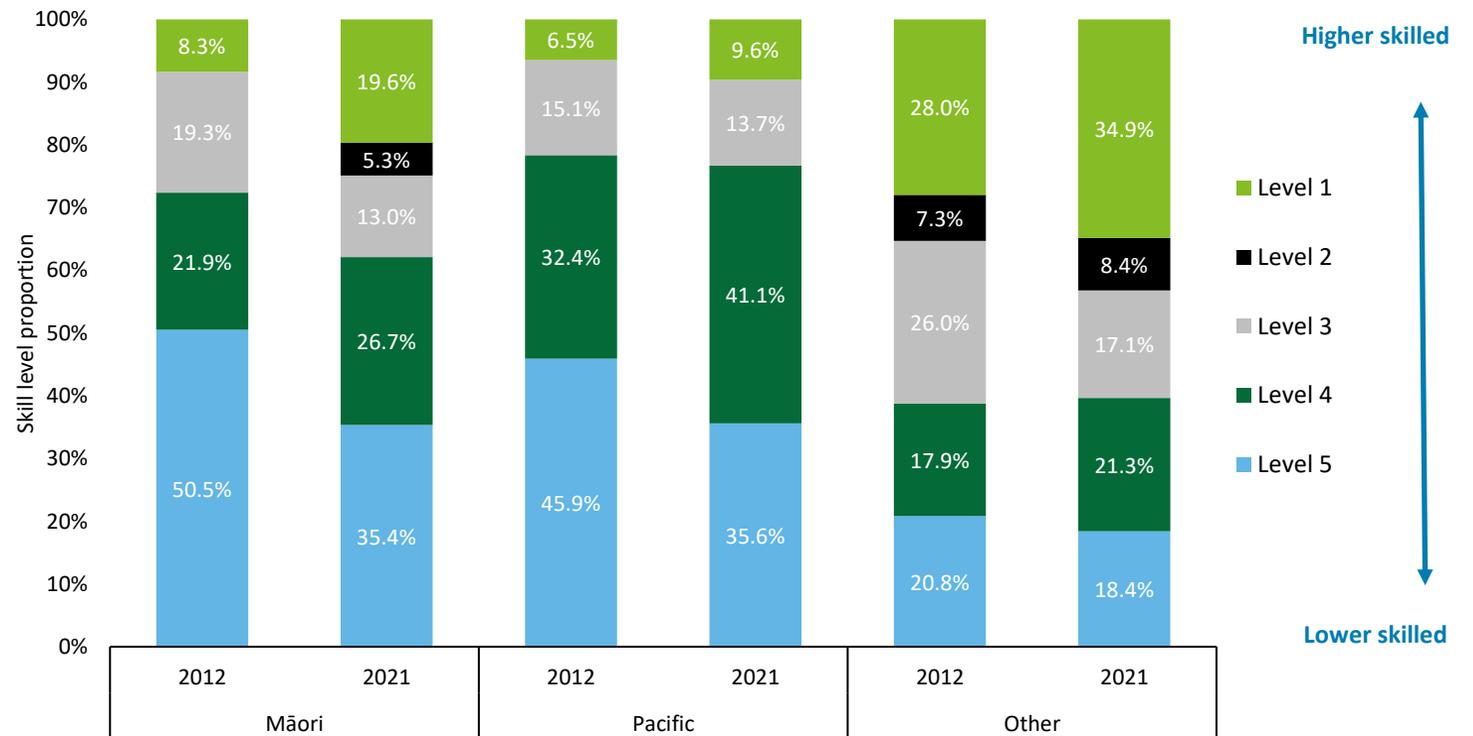
While all population groups have experienced an uplift in skill levels between 2012 and 2021, the data shows that **Māori and Pacific Peoples are generally in lower skill level roles** (level 4 and 5).

The rate of improvement in the highest level 1 skills category was largest for Māori (+11.3%), followed by Other (+6.9%), and lowest for Pacific Peoples (+3.1%). There remains a significant skill level gap between each group.

This data implies that **more advanced skills may be required to operate in manufacturing** which could be an effect of Industry 4.0, automation or other industry tools advancement.

Nevertheless, this data shows that there is an **opportunity for future interventions to achieve a more equitable skills mix for Māori** and especially **for Pacific Peoples** to address this gap.

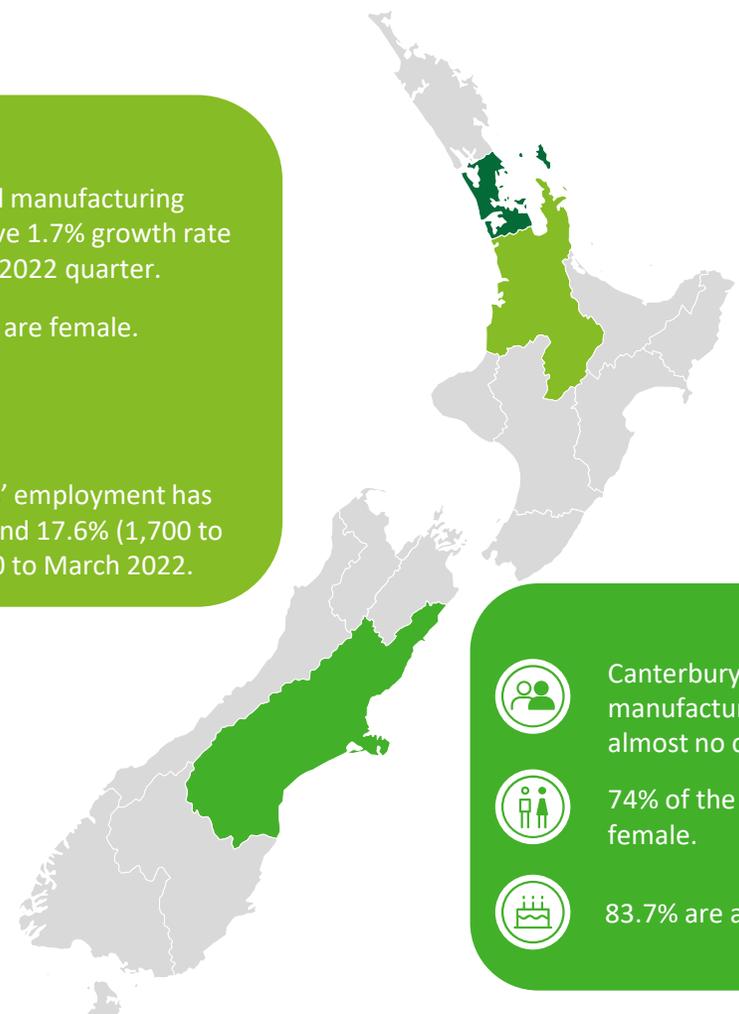
Manufacturing skills mix trend by ethnicity (2012Q2 vs. 2021Q2)



Source: Statistics NZ, Deloitte Access Economics

Manufacturing overview for Auckland, Waikato and Canterbury

Manufacturing activity is concentrated in the Auckland, Canterbury and Waikato regions. COVID-19 has had a large impact on Māori and Pacific Peoples with up to a 31.9% decline in employment for Māori and 17.6% for Pacific Peoples in the Waikato region. The data implies that Canterbury demonstrated the most resilience in manufacturing employment during COVID-19.



Waikato

-  Waikato makes up 11.4% of the total manufacturing workforce and experienced a negative 1.7% growth rate as a result of COVID-19 up to March 2022 quarter.
-  67% of the workforce are male, 33% are female.
-  82.2% are aged between 25 and 64.
-  COVID-19: Māori and Pacific Peoples' employment has declined by 31.9% (9,100 to 6,200) and 17.6% (1,700 to 1,400) respectively from March 2020 to March 2022.

Auckland

-  Auckland makes up 32.8% of the total manufacturing workforce, and experienced 1.2% growth rate as a result of COVID-19 up to March 2022. Relative to other regions, Auckland is the largest employer of Māori and Pacific Peoples in manufacturing.
-  65% of the workforce are male, 35% are female.
-  81.8% are aged between 25 and 64.
-  COVID-19: Māori and Pacific Peoples' employment decreased by 4.3% (7,000 to 6,700) and 0.8% (13,200 to 13,100) respectively from March 2020 to March 2022.

Canterbury

-  Canterbury makes up 14.3% of the total manufacturing workforce and experienced almost no change up to March 2022.
-  74% of the workforce are male, 26% are female.
-  83.7% are aged between 25 and 64.
-  COVID-19: Māori employment has declined 9.7% (3,100 to 2,800) from March 2020 to March 2022.
-  COVID-19: Pacific Peoples' employment has rebounded from COVID-19 and increased 18.2% (2,200 to 2,600) between March 2020 to March 2022.

National engineering overview: COVID-19 analysis

Despite an increase in the number of job advertisements, Māori employment has continued to fall since COVID-19 and is 25% below pre-COVID-19 levels as of March 2022. Pacific Peoples' employment also remains 7% below pre-COVID-19 levels, while other ethnicities rebounded back to pre-COVID-19 levels by early 2021.

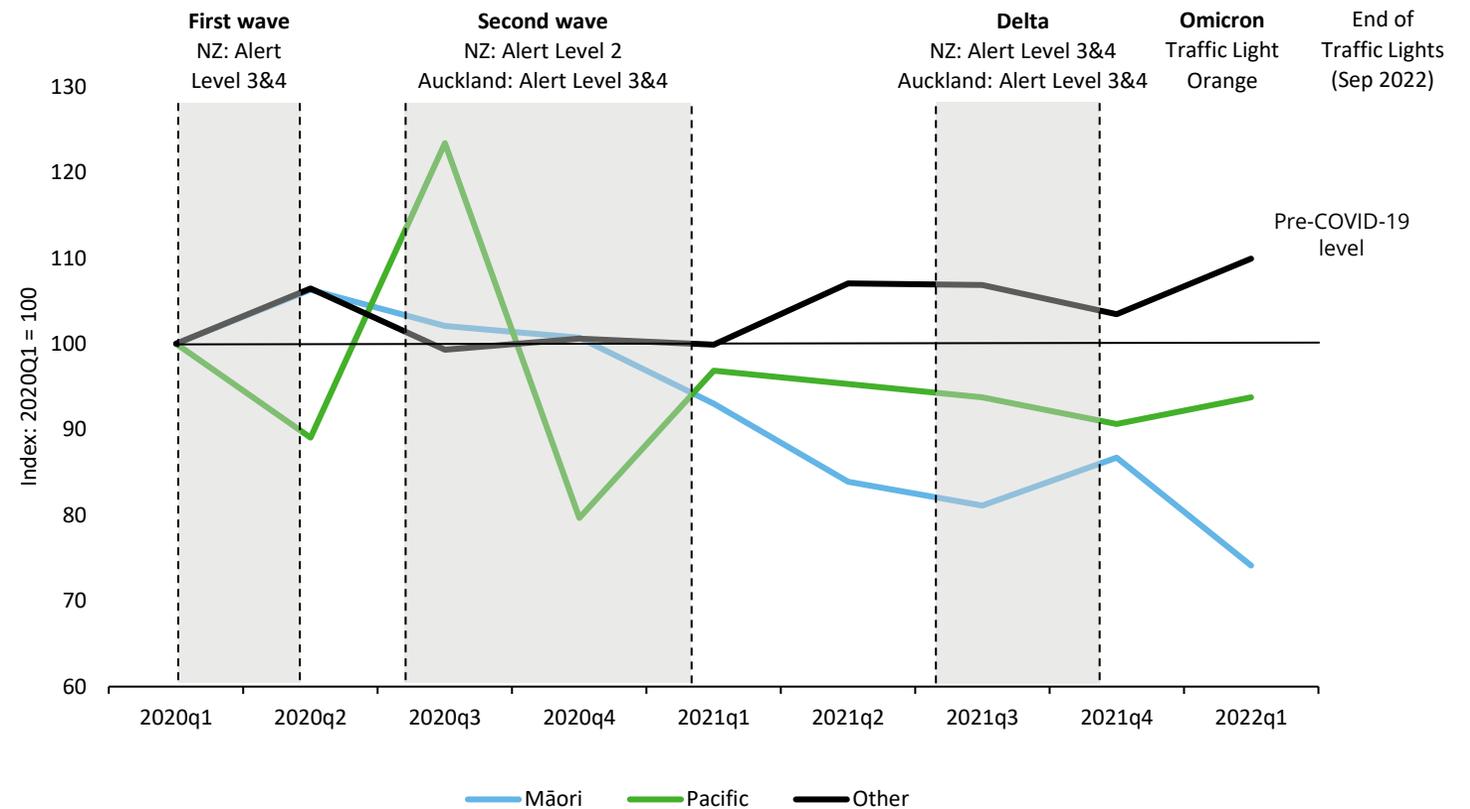
The impact of COVID-19 on engineering employment outcomes has varied by ethnicity

Total engineering employment has rebounded, rising from 121,400 in March 2020 to 127,300 by March 2022 and now exceeds pre-COVID-19 employment levels.

COVID-19 has had a distinct impact on each ethnic group with Māori and Pacific Peoples faring worse than other ethnicities over the COVID-19 period.

By March 2022, **Māori employment in engineering remains 25% below pre-COVID-19 levels**, while **Pacific People remains 7% below pre-COVID-19 levels**.

Impact of COVID-19 on engineering employment by ethnicity (quarterly, 2020 to 2022)



Source: Statistics NZ, Deloitte Access Economics

National engineering overview: Skills mix analysis

Differences in the proportion of skills levels between Māori, Pacific Peoples and other ethnic groups have narrowed for engineering roles in recent years. This is due to a significant positive shift towards a higher proportion of highly-skilled workers among Māori and Pacific Peoples over the last decade. Nevertheless, there is an opportunity for the industry to better align skills mix in line with skills identified based on the future skills survey.

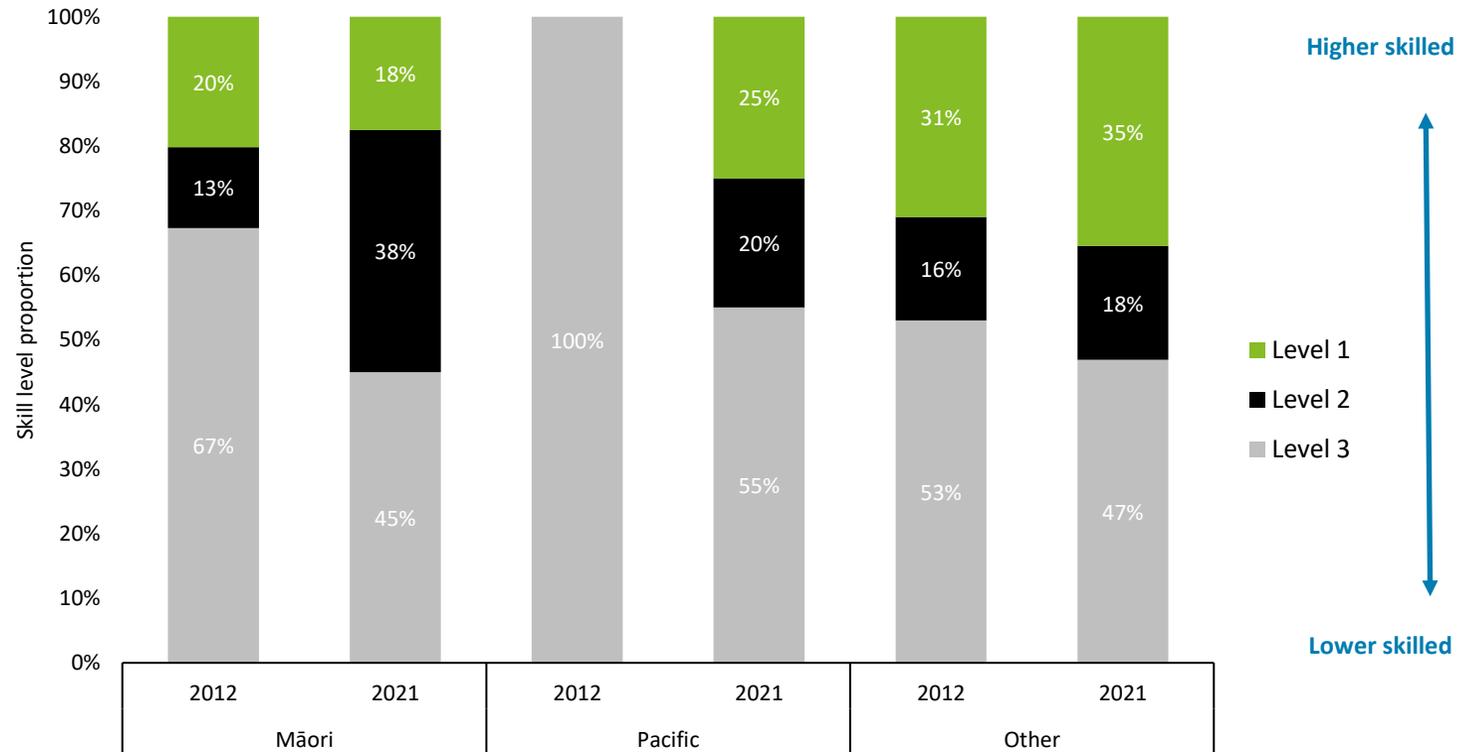
Shift in engineering skills mix

The availability of engineering employment data is limited to occupations with skill levels 1, 2 and 3 as a result of how Statistics New Zealand identifies employees in engineering. Notably, **participation among Pacific Peoples is significantly lower** (<1000 per quarter) in engineering and as a result Pacific Peoples appear absent in much of the employment data.

Between 2012 and 2021, the **proportion of highly-skilled Māori workers has fallen slightly** from 20% to 18% but this is offset by a **large increase for level 2 skills** from 13% to 38%. **Pacific and other ethnic groups have experienced an increase in highly-skilled level 1 workers.**

Similar to manufacturing, the data implies that **more advanced skills may be required for engineering roles** in recent years and since COVID-19. Despite this, given the outlook of the industry driving more automation and advanced technologies, there is **opportunity for future interventions to better align employee skills mix** in the engineering sector.

Engineering skills mix trend by ethnicity (2012Q2 vs. 2021Q2)



Source: Statistics NZ, Deloitte Access Economics

Engineering overview for Auckland, Waikato and Canterbury

COVID-19 has had a large impact on the engineering workforce, with positive growth in employment in the Auckland and the Canterbury regions. However, there is an ethnicity and age-based difference in the level of impact with a 38% decline in employment for Māori in the Waikato region and a 57% increase in the 65+ age cohort in the Auckland region during COVID-19. The workforce is overwhelmingly male in all regions.

Waikato



Waikato makes up 10.2% of the total engineering workforce. The region experienced a negative 5.8% growth rate from March 2020 to March 2022.



85.1% of the workforce are male, 14.9% are female.



83.8% are aged between 25 and 64.



COVID-19: Māori employment declined by 37.5% (2,400 to 1,500) from March 2020 to December 2021.



Pacific Peoples' employment is significantly low, with observations frequently less than 1,000 in the 10-year period.

Auckland



Auckland makes up 33.5% of the total engineering workforce. The region experienced an 17.3% growth rate from March 2020 to March 2022. Relative to other regions, Auckland is the largest employer of Pacific Peoples in engineering.



COVID-19: Pacific Peoples' employment has declined 4.5% (4,400 to 4,200) from March 2020 to March 2022.



90.3% of the workforce are male, 9.7% are female.



COVID-19: Māori employment increased by 21.4% (2,800 to 3,400) from March 2020 to March 2022.



81.7% of the workforce are aged between 25 and 64 years old.

Canterbury



Canterbury makes up 14.4% of the total engineering workforce. The region experienced 19.6% growth from March 2020 to March 2022.



Māori employment is relatively low, with observations falling below 1,000 in over half of the 10-year period.



94.1% of the workforce are male, 5.3% are female.



Pacific Peoples' employment is even lower, with observations less than 1,000 for the entire 10-year period.



86.7% are aged between 25 and 64

New Zealand macroeconomic environment: Expected population growth

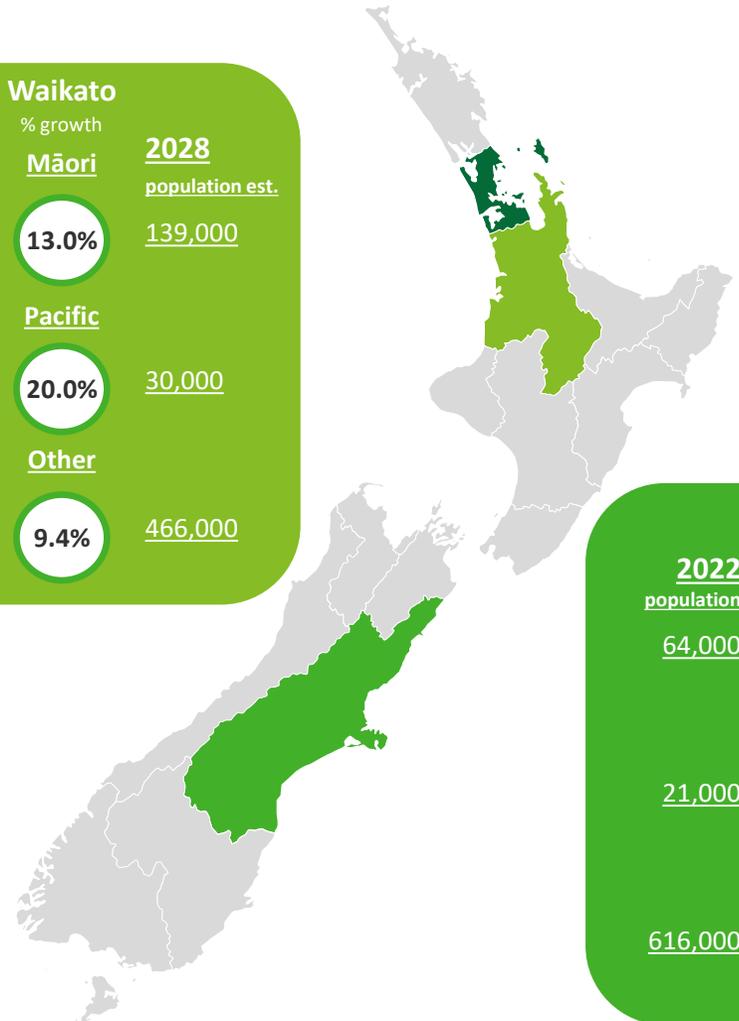
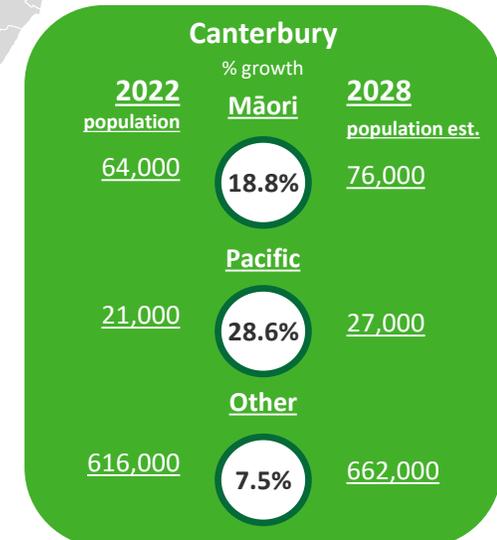
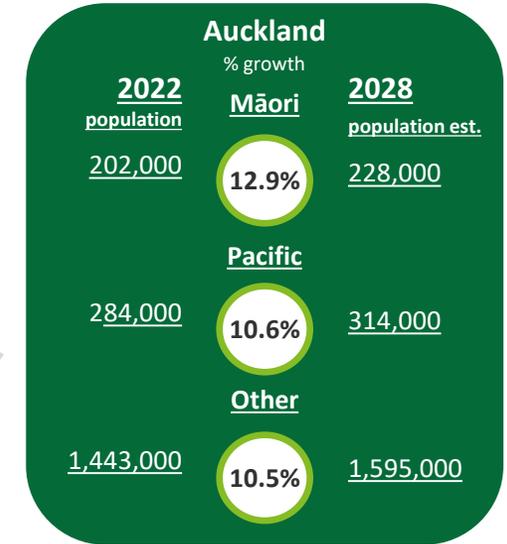
Māori and Pacific populations are expected to grow the most in the next six years, both at a national and regional level. Strong Pacific population growth is expected in the Waikato and Canterbury regions.

Expected population growth

Compared to other ethnicities, Māori and Pacific populations are expected to experience the highest growth in the next six years, both at a national and regional level.

In absolute terms, other ethnic groups in Auckland are expected to grow by ~150,000 people, representing 42% of the national change in other ethnicities' population, and 29% of the total change in overall population.

Comparatively, Auckland's Pacific population growth is expected to make up 53% of total national Pacific growth over the next six years.



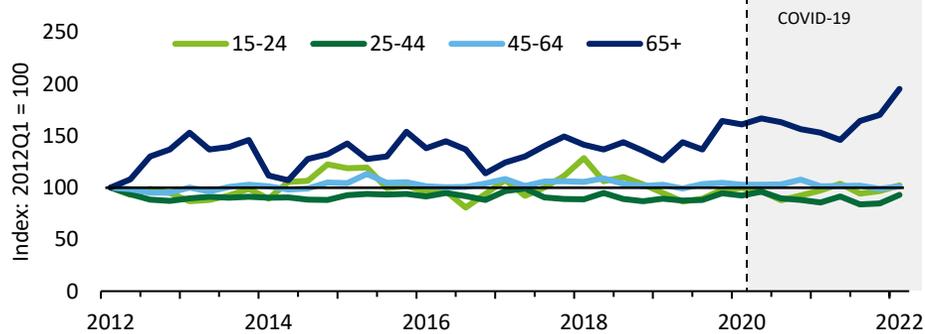
Manufacturing and engineering: Age profile changes over time

Over the last decade, the 65+ age cohort has been a growing resource for the manufacturing industry, doubling in size from 8,700 (3.4%) to 17,000 (6.6%). Comparatively, there has been no significant change across all other age groups in the manufacturing and engineering industries. In vocational education and training, there has been a large uptick in 25-39 year old learners over the COVID-19 period, a likely outcome as a result of regional lockdowns.

Ageing workforce is a barrier and opportunity in a tight labour market

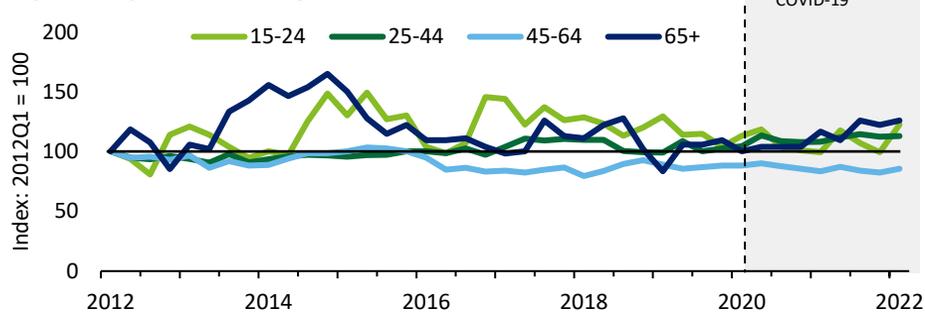
The 65+ age cohort has doubled from 8,700 (3.4%) to 17,000 (6.6%) between 2012 and 2022. The impact of COVID-19 illustrates that older workers continue to make up an important part of the manufacturing workforce. Comparatively, engineering has had no significant age shift in the last 10-years.

Manufacturing workforce: Age index



Source: Statistics NZ, Deloitte Access Economics

Engineering workforce: Age index



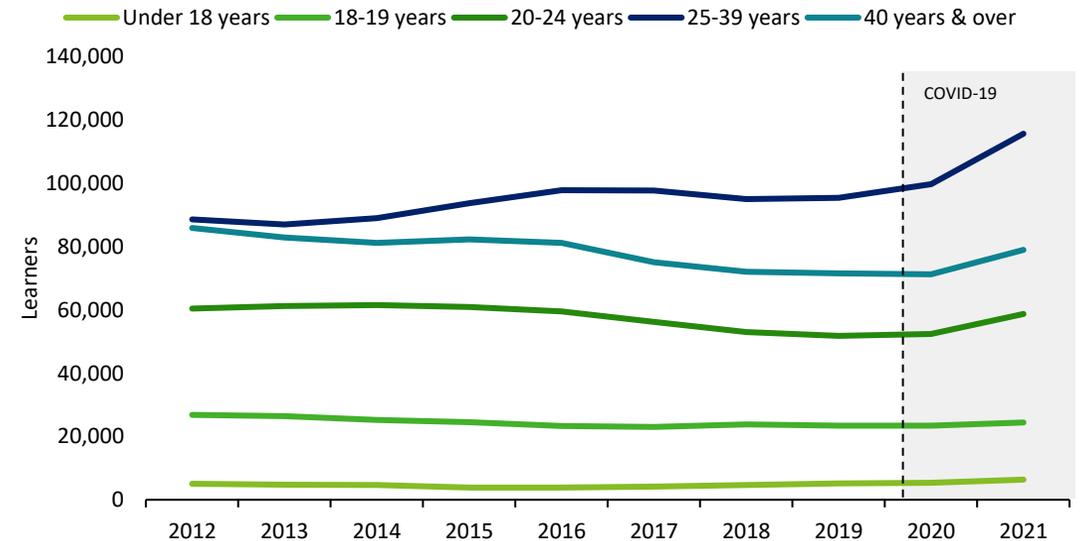
Source: Statistics NZ, Deloitte Access Economics

Increased number of VET learners aged 25-39 during COVID-19

Since 2012, the 25 to 39 age cohort has made up the largest share of total vocational education and training learners with their share increasing over time. The age 40+ cohort makes up the second largest share, followed by the age 20 to 24, and the age 19 and under cohorts.

Since-COVID-19, there has been a general increase in learners in training especially during the lockdown period. This could also reflect the effect of fee-free education provided by training providers.

Learners in vocational education and training by age



Source: Ministry of Education, Participation in Vocational and Educational Training programmes

Manufacturing and engineering: Gender balance changes over time

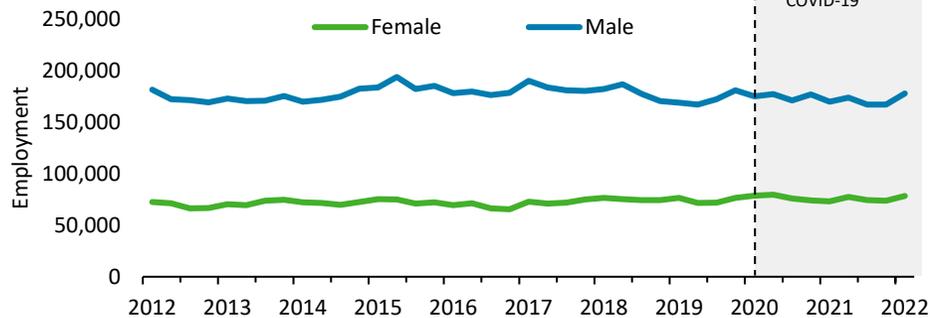
Both the manufacturing and engineering industries are heavily male dominated. Over the last decade, there has been no significant change in gender composition. The workforce pipeline coming from people studying manufacturing and engineering has not improved this imbalance as there are significantly more men than women currently studying in this field. More targeted initiatives are required to support and attract women entering the industries.



There are more men employed in the sector than women

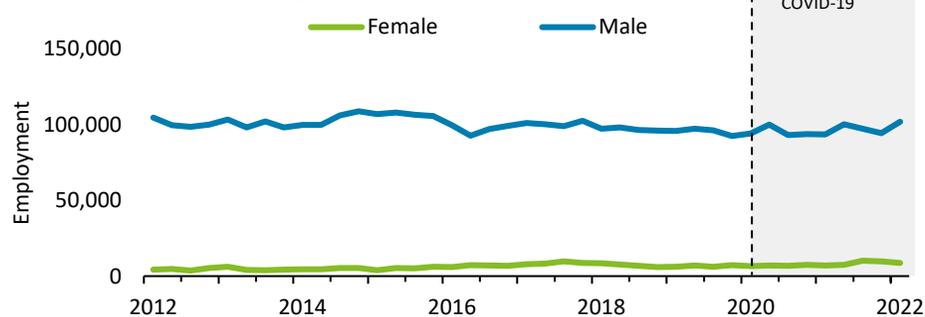
While both industries employ notably more men than women, engineering is significantly more male dominated, with 93% of the workforce identifying as male compared to 7% as female. Comparably, manufacturing has consistently had about a 70%:30% mix of male female employees.

Gender mix in manufacturing



Source: Statistics NZ, Deloitte Access Economics

Gender mix in engineering



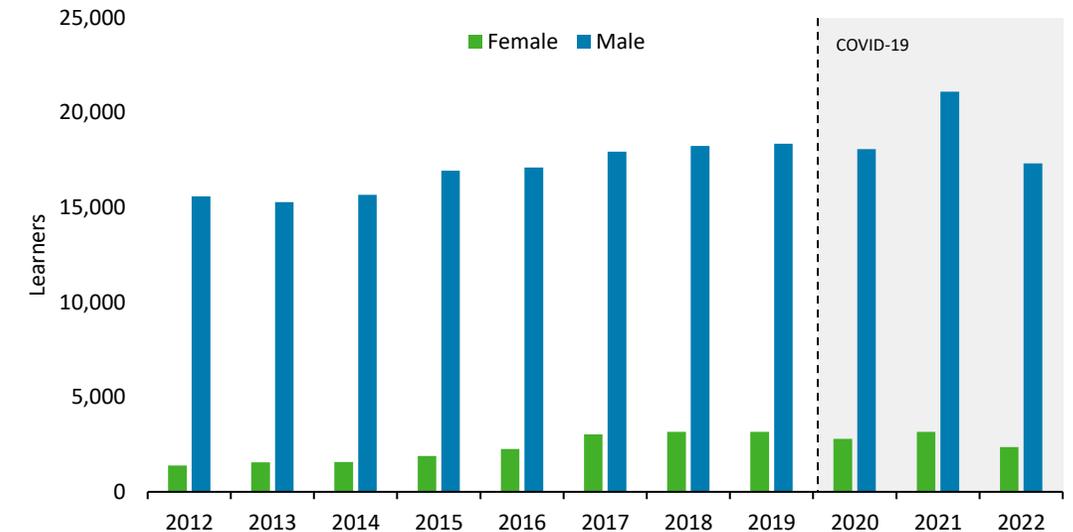
Source: Statistics NZ, Deloitte Access Economics



There is also a higher number of male learners

There is a significantly higher number of men to women studying manufacturing and engineering. This has not changed significantly over the last decade. As of 2022, men made up 88% of learners, compared to 12% of women. Notably, there has been an increase in the number of learners over time, with a slight uptick over the COVID-19 period. This imbalance signals an opportunity to increase workforce capacity if both industries are able to attract more female learners.

Manufacturing and engineering learners by gender



Source: Nga Kete, Tertiary Provision Manufacturing Engineering

Macroeconomic environment: Workforce by gender

Over the last decade, there has been no significant change in workforce gender equity. Female labour force participation rates continue to lag behind males, and the gender pay gap remains at 9.1%.

New Zealand's workforce differs substantially by gender

Despite changes to legislation and workplace policies, women tend to work fewer hours than men, and are more likely to take time out of the workforce, or not be in the workforce altogether. This affects the labour force participation patterns of men and women.

Men are concentrated in full-time employment, while women are more likely to work part-time, or not be employed. The working age population is split roughly 50:50 between men and women. However, for the June 2022 quarter:

- 75% of men were in the labour force, compared to 66% of women.
- 65% of men were employed full-time, compared to 44% of women.
- 8% of men were employed part-time, compared to 18% of women.

Analysis of this report suggests that women are more likely to work in manufacturing roles (30% of the manufacturing workforce) than engineering (7% of the engineering workforce). One outlier is in Apparel manufacturing where 78% of the workforce are female [23].

Addressing the gender pay gap is one important action to support greater workforce participation by women. Figures from Statistics New Zealand show the gender pay gap in New Zealand is currently 9.1%, a significant reduction from 16.2% in 1998.

Another important action is normalising flexible work to incentivise greater workforce participation by women and minimising any perceptions of those who use flexible work as being less interested or committed to their careers.

Perhaps the simplest, yet hardest change required is challenging stereotypes around what men and women 'should' do. Gender norms are socially constructed ideals around the appropriate roles and behaviours of men and women. They are so pervasive, they often alter our preferences without our conscious awareness, or influence our decisions in ways we may not fully agree with [24].

Workforce structure by gender

New Zealand's female labour force participation rate continues to lag behind males.



	Male	Female
In the labour force	75%	66%
Not in the labour force	25%	34%
Employed	73%	62%
Unemployed	3.0%	3.5%
Full-time	65%	44%
Part-time	8%	18%

Source: Statistics New Zealand, June 2022

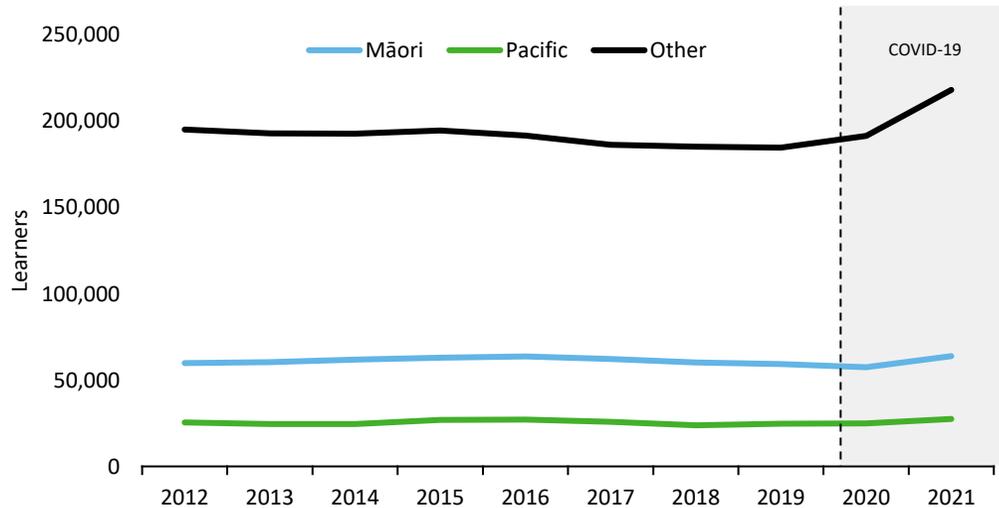
Manufacturing and engineering: Education and training by ethnicity

There have been noticeable increases in the number of learners participating in the VET system over the past decade, with an uptick during the COVID-19 period. While there has been an increase in Māori and Pacific Peoples' participation in manufacturing and engineering over the past decade, relative to population and relative to other ethnicities, this is insufficient to address the equity gap.

Increased VET enrolments in COVID-19, except Māori and Pacific Peoples

While there has been a higher uptick in learners in VET across all industries during the COVID-19 period, this trend is less distinct in Māori and Pacific enrolments. This data observation aligns with insights from the stakeholder engagement that some employees are making the most of the lockdown period to complete their training.

Learners in vocational education and training by ethnicity



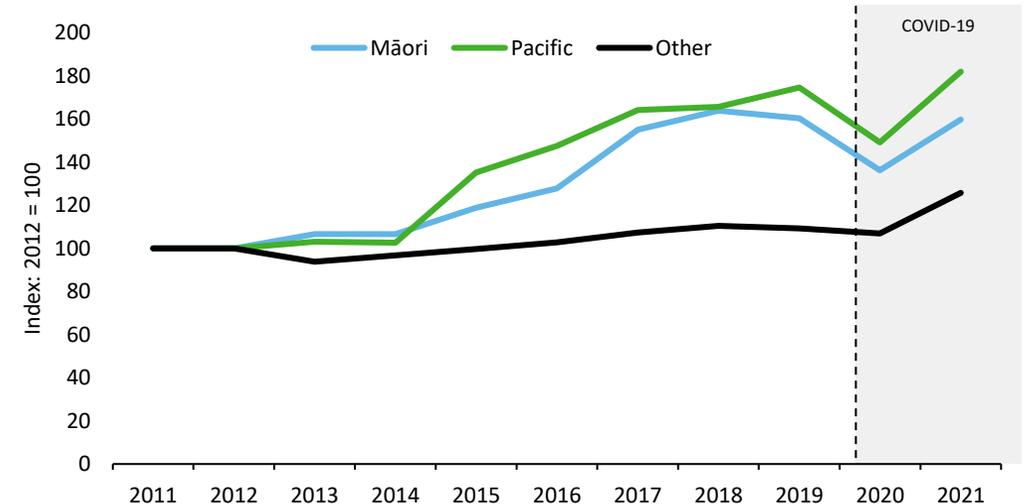
Source: Ministry of Education, Participation in Vocational and Educational Training programmes

Pacific and Māori learners show high growth rates in tertiary education

Similar to the overall trend for VET enrolments across all industries, there is a noticeable increase in manufacturing and engineering tertiary enrolments. Māori and Pacific Peoples' participation in manufacturing and engineering learning has grown at a faster rate than other ethnicities.

While there has been an increase in Māori and Pacific Peoples' participation in manufacturing and engineering over the past decade, relative to population and relative to other ethnicities, this increase is insufficient to address the equity gap.

Manufacturing and engineering learners by ethnicity



Source: Nga Kete, Tertiary Provision Manufacturing Engineering

Manufacturing and engineering: Transition from training to employment

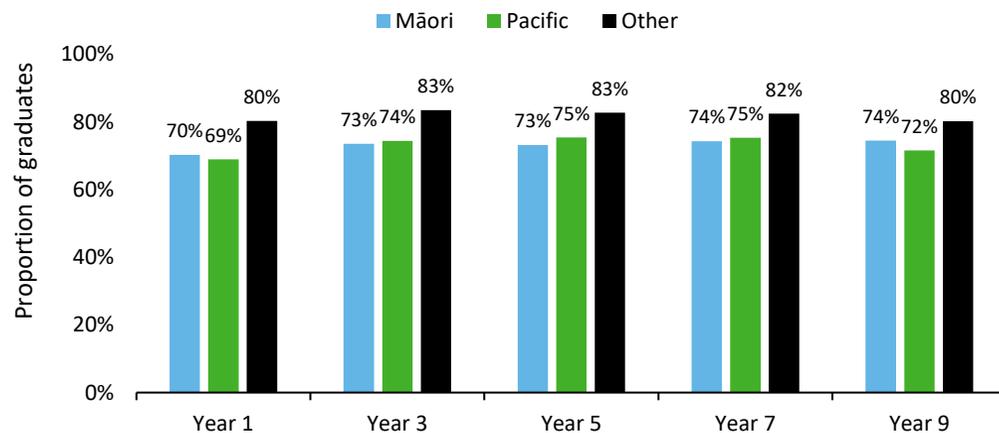
Among manufacturing and engineering graduates, other ethnicities transition into employment at greater rates than Māori and Pacific Peoples. Moreover, Māori manufacturing and engineering graduates receive Jobseeker benefits at higher rates.



Lower % of Māori and Pacific learners transition successfully to the workforce

Among manufacturing and engineering graduates, other ethnic groups transition into employment at higher rates than Māori and Pacific Peoples. The proportion of learners who go into employment is roughly 10% less for Māori and Pacific graduates compared to other ethnic groups, regardless of the number of years post-graduation. This highlights challenges Māori and Pacific learners face in entering the industry. Further validation with the employers is required to understand the reasons for this difference and how to better prepare graduates better to fill the labour shortage facing the sectors.

Proportion of manufacturing and engineering graduates that are employed each year after graduating



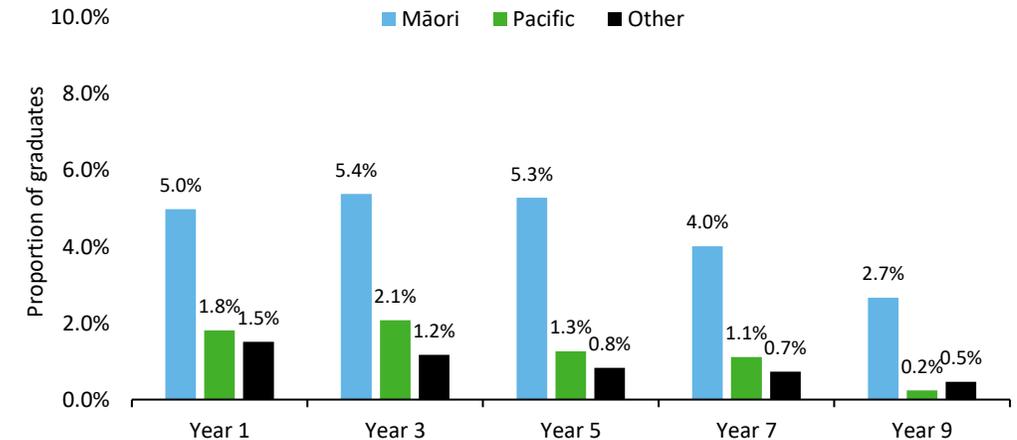
Source: Nga Kete, Post Study Outcomes



The relationship between ethnicity and Jobseeker benefit

Māori are disproportionately represented in manufacturing and engineering graduates who go on to receive the Jobseeker benefit. Five years after graduating, there are 4% more Māori graduates receiving the Jobseeker benefit than any other ethnic group. Pacific graduates in manufacturing and engineering receive Jobseeker benefits at similar rates to other ethnic groups. At the national level, outside of manufacturing and engineering, a similar trend can be observed - where Māori make up the highest proportion of Jobseeker benefit recipients. More can be done to understand how to help these groups to successfully transition into the workforce, especially in areas where skills shortages are more prominent.

Proportion of manufacturing and engineering graduates that receive the Jobseeker benefit



Source: Nga Kete, Post Study Outcomes

Manufacturing: Participation among disabled peoples

Nationally, disabled people have a lower employment rate and higher unemployment rate compared to non-disabled groups. Māori have greater workforce participation among their disabled population in manufacturing. More research is needed to understand the factors contributing to this trend.

Disabled persons participation in manufacturing

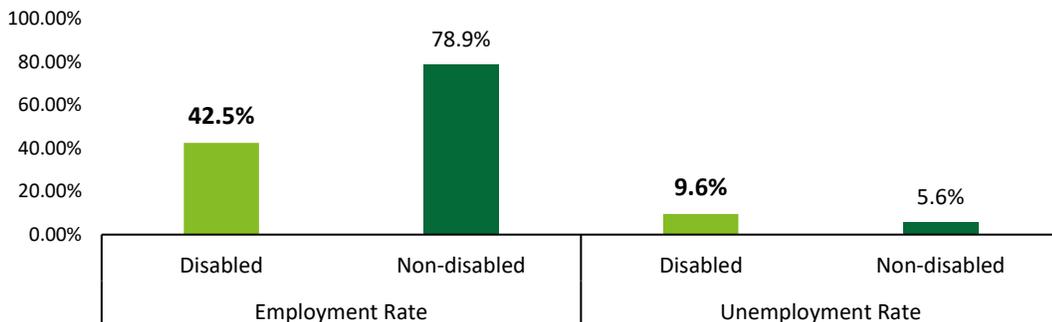
A person is defined as disabled in the Statistics New Zealand dataset if respondents self-identify as having, 'a lot of difficulty' in at least one of the following six categories: *Vision, Hearing, Mobility, Cognition, Self-care, and Communication.*

Relative to Pacific Peoples, Asian, and other ethnicities, Māori had greater participation among their disabled population between 2017 and 2021. Following Māori, 'Other' ethnic groups had the second highest rates of participation, followed by Pacific Peoples and Asian people.

Across occupations with different skill levels, there is a greater proportion of disabled people working in occupations with skill levels 3 and 5.

As outlined in the chart below, disabled people have worse labour market outcomes nationally compared to non-disabled people.

National trends for disabled people (June 2021 quarter)

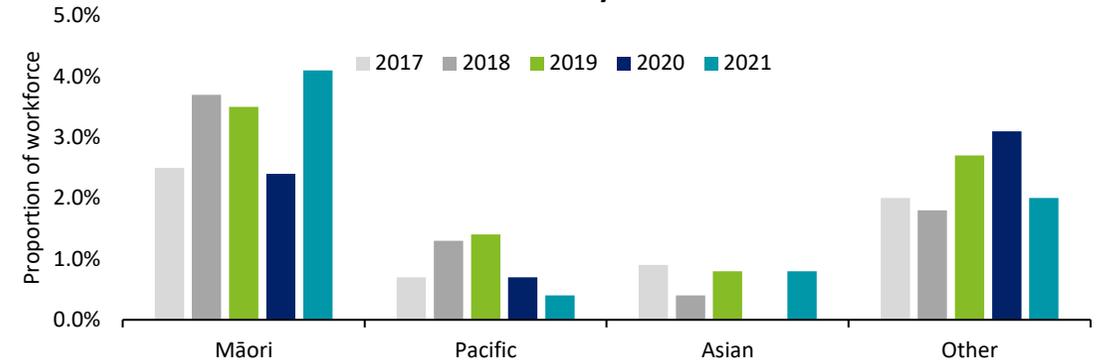


Source: Statistics NZ, Deloitte Access Economics

Note: Statistics New Zealand split the manufacturing disability data into 4 ethnicity categories compared to 3 categories in the historical employment data

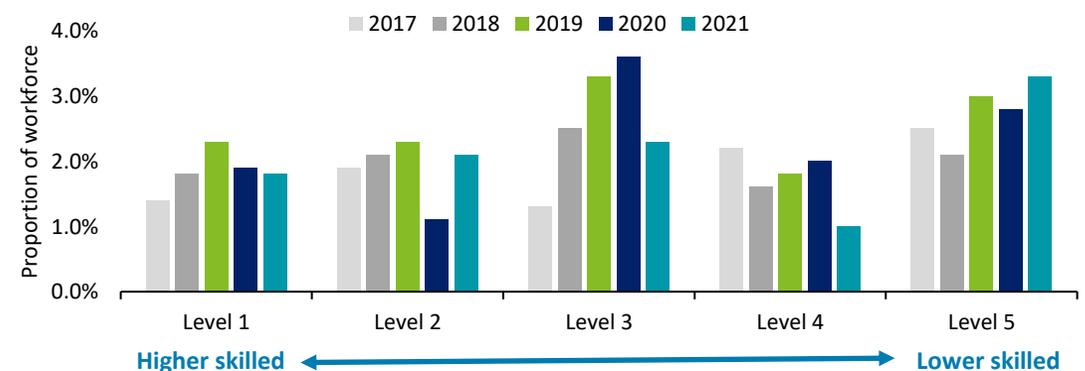
Note: National labour market statistics on disabled people by ethnicity for the June 2021 quarter was limited.

Manufacturing: Disabled people's employment participation by ethnicity



Source: Statistics NZ, Deloitte Access Economics

Manufacturing: Disabled people's employment participation by skill level



Source: Statistics NZ, Deloitte Access Economics

Note: Statistics New Zealand data has been used for the two graphs above with Statistics NZ advised that the disabled people data was estimated based on the 2013 Disability Survey

Future state outlook

Demand outstrips supply in all regions, with the workforce gap expected to increase over the next five years. This gap is caused by a shortage of skilled workers from overseas but represents an opportunity - to develop a more sustainable and resilient locally trained workforce over time.



Disabled persons participation in manufacturing

Independent projections for demand (i.e. the demand for workers from an employer's perspective) and supply (i.e. the supply of the local and international talent pool) from 2022 to 2028 were developed by Deloitte for this project.

The methodology is shown on the next page and Appendix 3, and a summary of the results follows both a national and regional perspective. Note all results are in June end years.

Forecasts for manufacturing show:

- **Labour supply** is expected to increase to **~284,000** by 2028 nationally, from **~260,000** in 2022.
- **Labour demand** is expected to increase to **~307,000** by 2028, from **~276,000** in 2022.
- A national **workforce gap** between demand and supply of **~23,000** manufacturing employees by 2028. The gap is expected to be largest in Auckland (**~5,600**) and similar in Canterbury (**~3,600**) and Waikato (**~3,200**).

Forecasts for engineering show:

- **Labour supply** is expected to increase to **~139,000** by 2028 nationally, up from **~128,000** in 2022.
- **Labour demand** is expected to increase to **~156,000** by 2028, up from **~140,000** in 2022.
- A national **workforce gap** between demand and supply of **~17,000** manufacturing employees by 2028. The gap is expected to be largest in Auckland (**~7,400**) and similar in Canterbury (**~2,600**) and Waikato (**~2,000**).

This gap arises from difficulties in recruiting employees from overseas, a change in employee behaviour and a globally tight labour market. It is not sustainable in the long run without potentially constraining future manufacturing output.

This gap provides support for the need to take on new initiatives to support local workforce development, reinforce the attractiveness of the sector and increase workforce participation training. Particularly within key demographics such as Māori, Pacific Peoples and females, this could help to bridge the capability and capacity gap.

Key assumptions underpinning the forecasts:



Baseline assumptions for demand

- Policies remain unchanged and the current COVID-19 recovery pathway persists (i.e. assume that there is no clear and present threat of new variants or lockdowns).
- Wage movements match the broader economy.
- There is no change in which services are delivered in the baseline; i.e. labour:capital ratio remains unchanged.



Baseline assumptions for supply

- Education policy remains unchanged and there are no new interventions.
- Impact of recent border closures is included in the baseline, but borders will be open by July 2022.
- Propensity to leave workforce is similar.



Demand for training and education

The gap between demand and supply presents an opportunity for domestic training. Overall, demand for VET training is driven by:

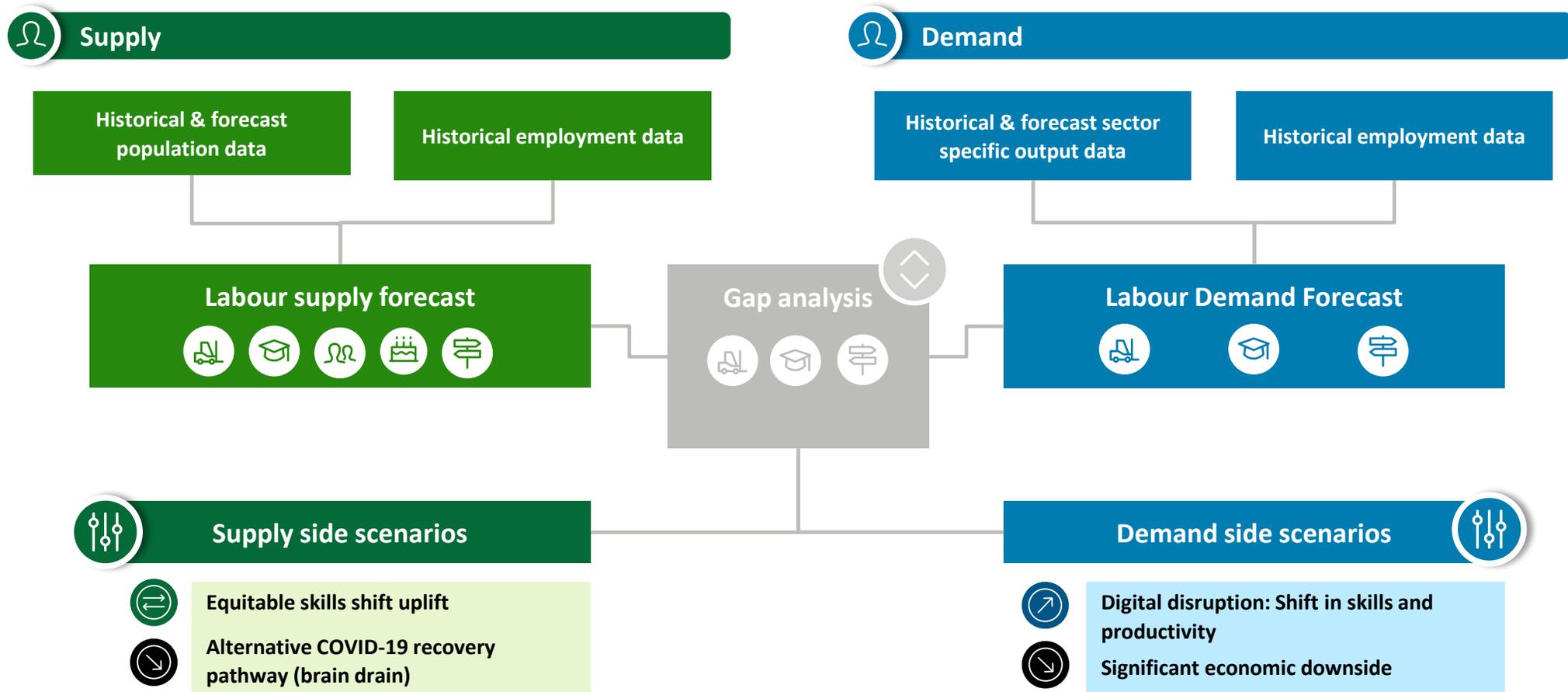
- The attractiveness of working in the industry
- Skills broadening and deepening by those already in the workforce
- The need to train the local workforce in place of migrants
- The need to replace experienced retiring workers.

Methodology: Projecting workforce supply and demand

The diagram illustrates the approach to develop the workforce outlook and the gap between supply and demand. See Appendix 3 for further detail.

Dataset demographics key:

- Industry
- Skill Level
- Ethnicity / Gender
- Age
- Region



Manufacturing: Future state outlook

There is a current labour force shortage of 17,000 in the manufacturing industry. In the absence of any policy change, this gap is likely to worsen over time, which poses a risk to economic activity if labour is persistently unavailable. To fill this gap, the industry will need to work collaboratively to find ways to attract more workers, learn from proven effective ways to upskill the current workforce and/or leverage technologies to increase productivity.

Manufacturing labour force gap could grow to 23,000 by 2028

This figure shows Deloitte’s base case outlook for manufacturing employment over the next six years. The dark green bars illustrate the gap between labour supply and labour demand based on current employment, future demographic changes, net domestic and net international migration. This difference represents the opportunity to train, upskill, reskill and develop the current workforce to meet these needs.

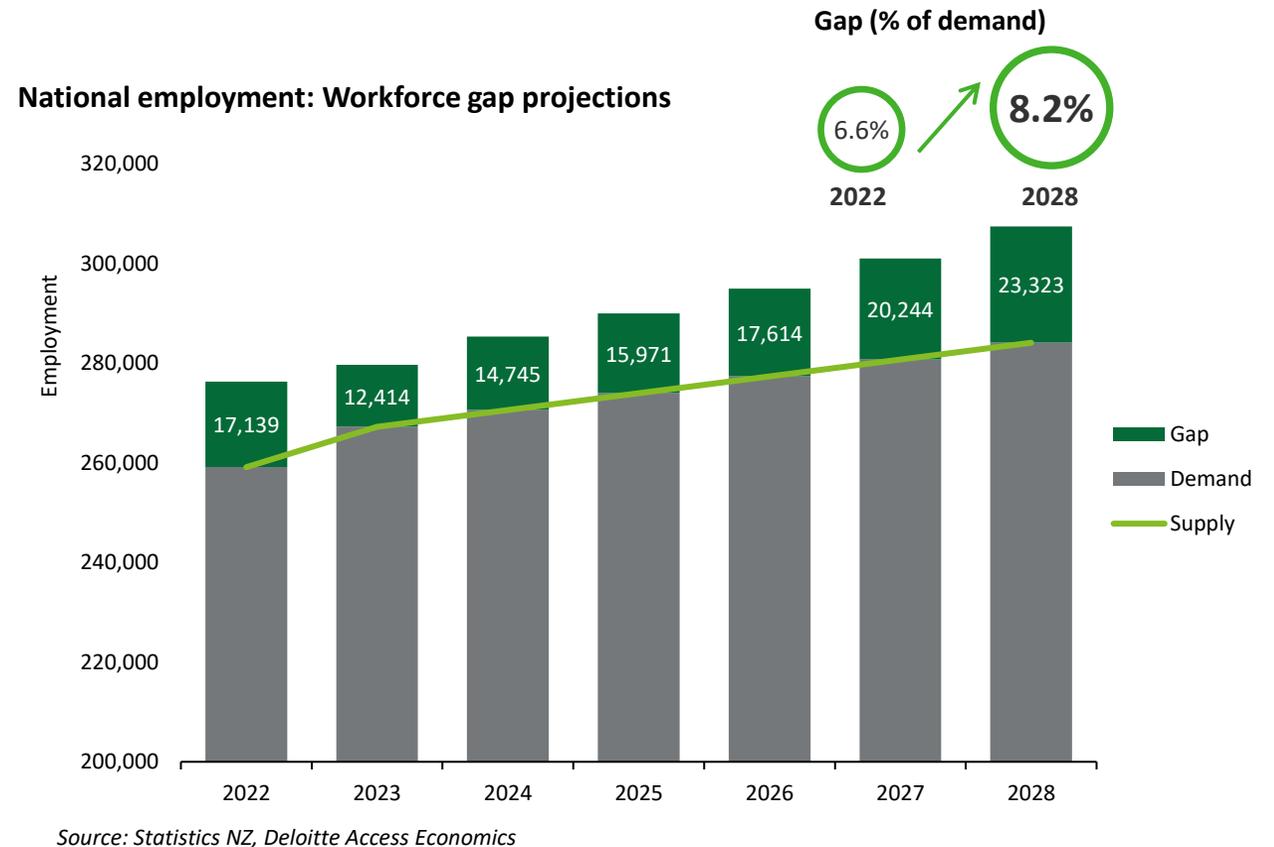
The labour force gap is expected to grow to ~23,000 employees (8.2% on a national level) by 2028. It is estimated that Auckland comprises 24%, Canterbury 16% and Waikato 14% of the national workforce gap.

The base case outlook suggests that the gap may reduce in 2023 from ~17,000 to ~12,000 as a result of slowing economic activity forecast for 2023. However, we expect the gap to grow in line with New Zealand’s COVID-19 economic recovery pathway, based on Deloitte’s base case projections.

The main driver of this gap is that in the absence of net migration returning to pre-COVID-19 levels, the domestic workforce cannot make up the difference in the short term. To meet current levels of demand, the manufacturing industry needs to adopt one or more of the following approaches to meet this gap:

- attract more workers through training or from other industries or from overseas,
- upskill the current workforce; or
- increase productivity (e.g. through technology).

If this gap is not filled through one of the approaches, this could act as a constraint on industry output.



Engineering: Future state outlook

Demand for labour in engineering will remain strong through to 2028 while labour supply will remain tight, with a gap of 12,000 or 9.4% of the total engineering workforce in 2022. Without making any changes, this gap could grow to 17,000 by 2028. The engineering industry will need to attract or upskill more workers and/or invest in technology that drives higher productivity.

 **Engineering labour force gap could grow to 17,000 by 2028**

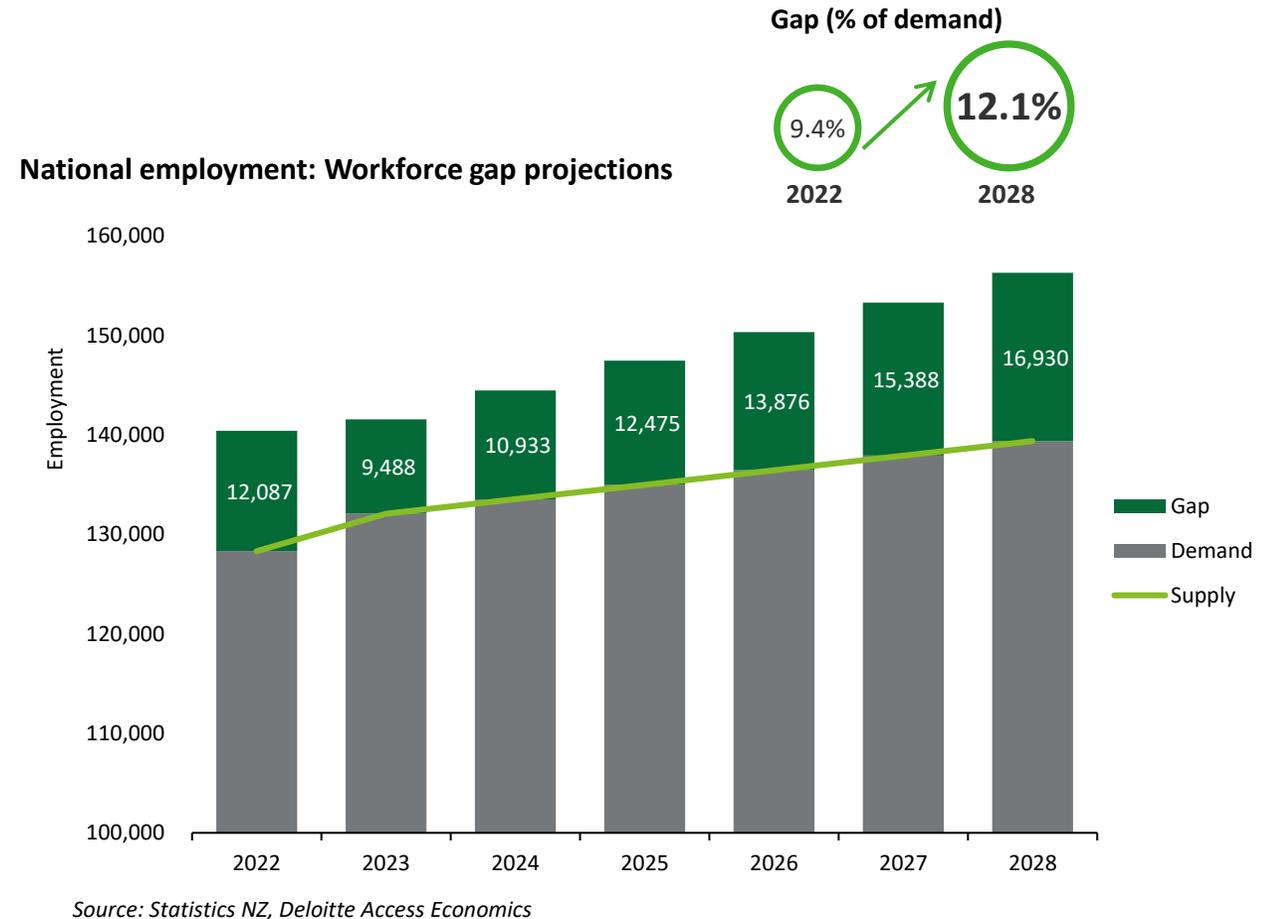
This figure shows Deloitte’s base case outlook for engineering employment over the next six years. The dark green bars illustrate the gap between labour supply and labour demand based on current employment, future demographic changes, net domestic and net international migration. This difference represents the opportunity to train, upskill, reskill and develop the current workforce to meet these needs.

The labour force gap is currently ~12,000 and could grow to ~17,000 employees (12% on a national level in 2028). It is estimated that Auckland comprises 44%, Canterbury 16% and Waikato 12% of the national workforce gap.

The workforce gap is expected to decline in 2023 as a result of an expected economic downturn in New Zealand. The workforce gap is expected to increase to ~17,000 in 2028 as the economy recovers and the demand for labour increases with rising forecasted output.

The main driver of this gap is that, in the absence of net migration returning to pre-COVID-19 levels, the domestic workforce cannot make up the difference in the short term. To meet current levels of demand, the manufacturing industry needs to attract more workers from other industries, upskill the current workforce and increase productivity.

This economic analysis suggests a current imbalance between labour demand and supply for both manufacturing and engineering workforces – and that these pressures are expected to get worse under current policy settings. In the absence of policy change, the workforce gap can be reduced through higher wages, constrained output, or technology induced productivity improvements needing less labour content per unit of output.





**Section 5a:
He tauira |
Scenario modelling**

Photo: Eric Lo. Automotive Engineering

Scenarios

This section presents three scenarios which illustrate potential transition pathways to achieve a more equitable skills mix for Māori and Pacific Peoples and a change in skills mix based on digital disruption. A further three scenarios illustrate different economic outcomes based on ‘brain drain’, ‘a significant economic downside’ and ‘productivity increase’.



Equitable skills shift scenarios

Equitable Māori skills shift

In the baseline, skills mix for Māori is relatively stable through to 2028 based on current trends. The proportion of Māori that are within the higher skill levels 1 and 2 is relatively smaller when compared to skill levels 3 to 5.

This illustrative ‘what if’ scenario contemplates an equitable shift in skills mix for Māori where the proportion of Māori across higher skill levels is uplifted to achieve parity with other ethnic groups by 2028.

Equitable Pacific Peoples skills shift

In the baseline, the skills mix for Pacific Peoples is stable through to 2028 – in fact, the average skills mix has changed little since 2012. The proportion of Pacific Peoples within the higher skill levels 1 is relatively smaller when compared to skill levels 3 to 5, with no data available for skill level 2.

This illustrative ‘what if’ scenario contemplates an equitable shift in skills mix for Pacific Peoples where the proportion of Pacific Peoples in higher skill levels is uplifted to achieve parity with other ethnic groups by 2028.



Alternative COVID-19 recovery pathway scenarios

Brain drain

New Zealand is currently experiencing net negative migration among 15 to 24 and 25 to 34 year-olds, each experiencing a net loss of 3% and 4% in 2022, respectively.

The “brain drain” scenario illustrates this current net negative migration trend (among 15 to 24 and 25 to 34 year-olds) continuing until 2025.

Significant economic downside

This scenario examines a significant economic downside scenario, including the emergence of a new severe COVID-19 variant which results in a severe economic recession.

In this scenario, GDP contracts significantly, while price growth is initially very high. Aggregate demand throughout the economy suffers, including those sectors that need manufacturing and engineering skills. The international border is temporarily closed again and, when re-opened, inwards migration remains subdued. Population growth slows in the near term and growth remains below the baseline scenario to 2028.



Digital disruption or productivity shift scenarios

Skill shift as a result of digital disruption

Currently, higher skill levels 1 and 2 comprise a lower overall proportion of total skill levels in manufacturing. The proportion of skill categories 1 and 2 for manufacturing currently sits at 37%.

Digital disruption can change the demand for skills in the future. The “skill shift” scenario illustrates an increase in the demand for higher skill levels 1 and 2, at the expense of lower skill levels 4 and 5.

Productivity increase

The “productivity increase” illustrates a scenario where productivity (measured as the gross value added (GVA) output divided by the number of employees) increases by 2% per annum.

The increase in productivity reflects increased technology uptake. Under this scenario, modelled productivity increases result in less labour required for a given level of manufacturing output.

Manufacturing: Equitable skill levels for Māori

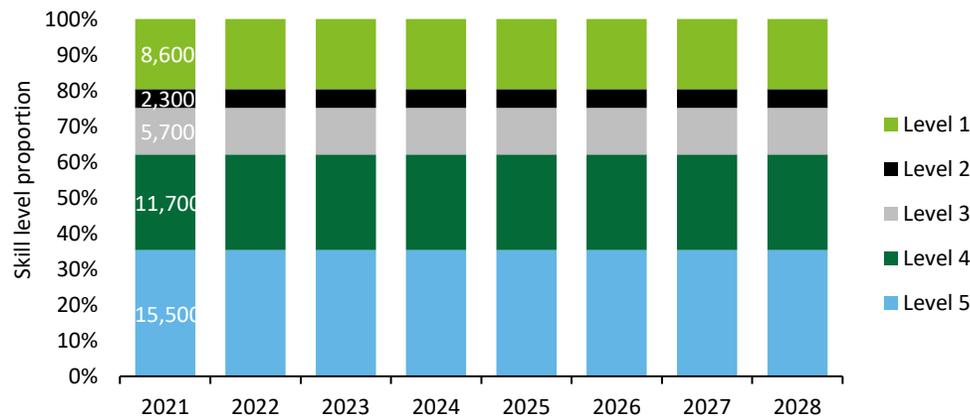
Based on current trends, the skills mix for Māori is unlikely to reach parity with other ethnic groups by 2028. This scenario demonstrates a potential pathway to achieve a more equitable skills mix for Māori over the next six years. This highlights the need for the Hanga-Aro-Rau and the manufacturing and engineering industries to strengthen their partnership with iwi, hapū and Te Tiriti partners to co-design a system that would encourage Māori communities to be trained in more future proofed set of skills, so that they can take on higher skilled occupations within the industries.

Manufacturing: Initiatives that result in a more equitable skills shift for Māori

To achieve an equitable skills mix for Māori in manufacturing, the number of Māori working in skill Level 1 occupations must increase by 11% per annum over the next six years. This is equivalent to ~9,000 more Māori employees in level 1 occupations by 2028. The charts below illustrate a 'what if' scenario of the effect of the impact of potential new strategic initiatives to promote equitable outcomes.

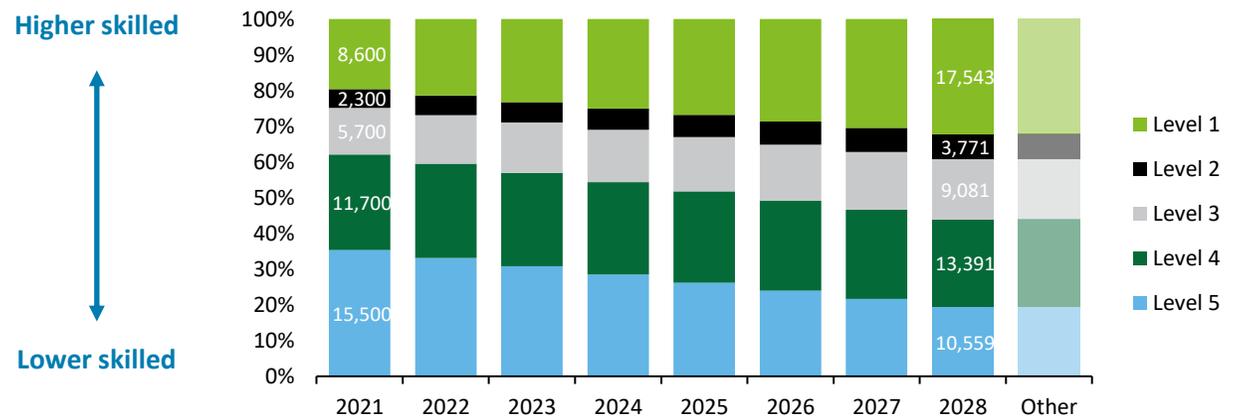


Base case: Māori skills mix forecast



Source: Statistics NZ, Deloitte Access Economics

Scenario: Uplift Māori to Other skills mix



Source: Statistics NZ, Deloitte Access Economics

Manufacturing: Equitable skill levels for Pacific Peoples

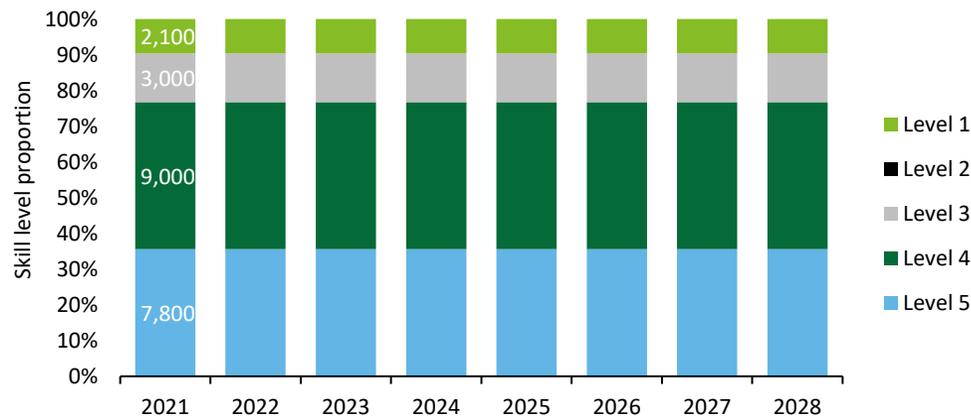
Based on current trends, the skills mix for Pacific Peoples is unlikely to reach parity with other ethnic groups by 2028. This scenario demonstrates a potential pathway to achieve a more equitable skills mix for Pacific Peoples. The uplift needed for Pacific Peoples is much greater relative to Māori – suggesting that more effort and resources would be required to achieve this outcome. This requires Hanga-Aro-Rau and the industries to work closely with Pacific-led organisations and communities to promote better skills needs and training to uplift their skills for the industries.

Manufacturing: Initiatives that result in a more equitable skills shift for Pacific Peoples

To achieve an equitable skills mix for Pacific Peoples in manufacturing, the number of Pacific Peoples working in skill level 1 occupations must increase by 23% per annum over the next six years. This is equivalent to ~6,800 more skill level 1 Pacific Peoples in manufacturing by 2028. This scenario also highlights the limited number of Pacific Peoples in manufacturing at skill level 2, which requires an average increase of ~300 employees per year until 2028 to achieve parity with other ethnic groups.

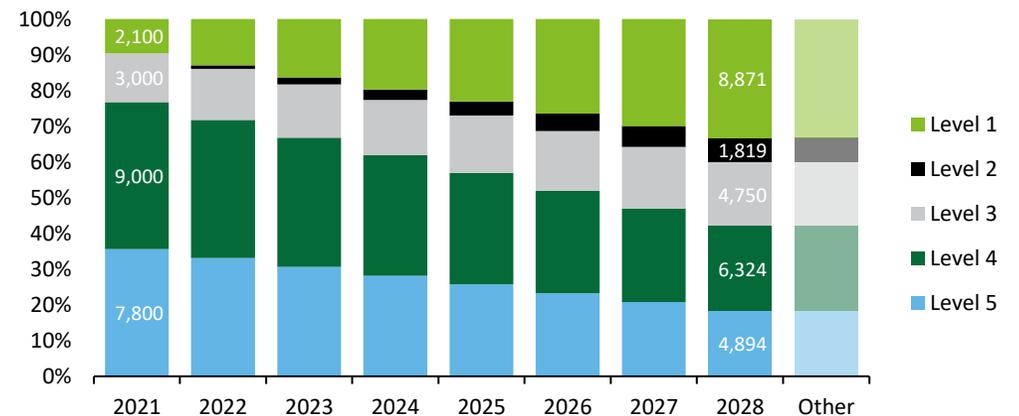


Base case: Pacific Peoples' skills mix forecast



Source: Statistics NZ, Deloitte Access Economics

Scenario: Uplift Pacific Peoples' to other ethnic skills mix



Source: Statistics NZ, Deloitte Access Economics

Engineering: Equitable skill levels for Māori

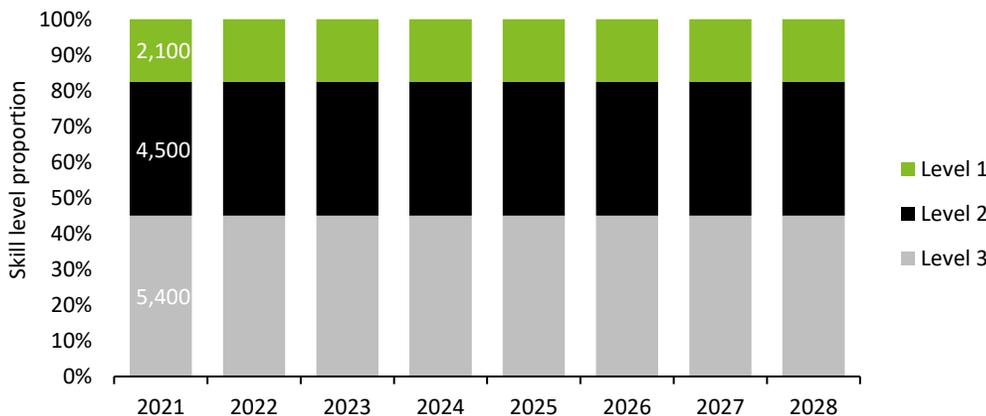
Based on current trends, the skills mix for Māori is unlikely to reach parity with other ethnic groups. This scenario demonstrates a potential pathway to achieve a *more* equitable skills mix for Māori over the next six years. There is insufficient data to present a similar scenario for Pacific Peoples for engineering.

Engineering: Initiatives that result in a more equitable skills shift for Māori

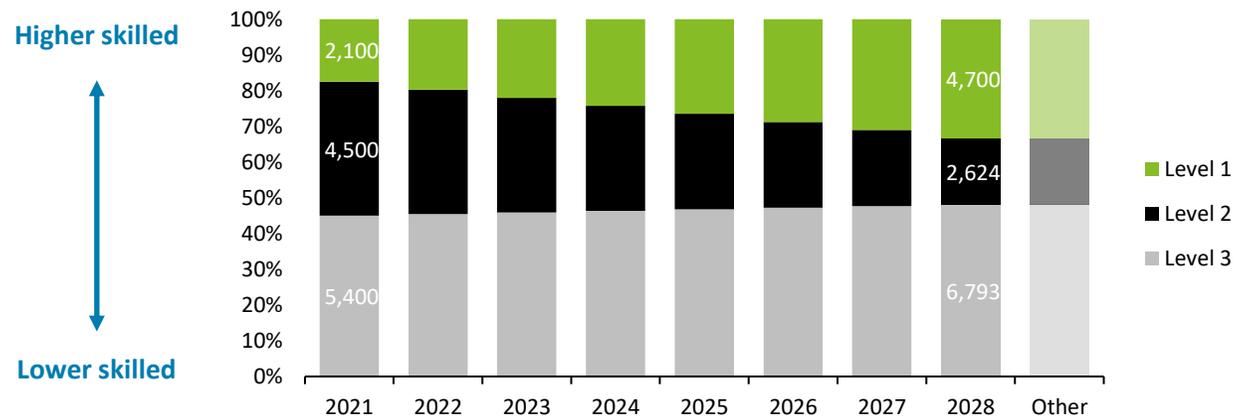
To achieve an equitable skills mix for Māori in engineering, the number of Māori working in skill level 1 must increase by 12% per annum over the next six years. This is equivalent to ~2,600 more skill level 1 Māori engineers by 2028. The framework that Deloitte has developed can be used to inform the workforce development strategy of Hanga-Aro-Rau, in particular which initiatives to prioritise to achieve more equitable outcomes for Māori.



Base case: Māori skills mix forecast



Scenario: Uplift Māori to other ethnic skills mix



Source: Statistics NZ, Deloitte Access Economics

Source: Statistics NZ, Deloitte Access Economics

Alternative COVID-19 recovery: Brain drain

This scenario illustrates the impact of continued brain drain into 2025 on manufacturing and engineering labour supply. Modelling suggests that labour supply could fall by an additional 5,000 in manufacturing and 3,000 in engineering compared to the base case. There is an opportunity for Hanga-Aro-Rau and the sector to work with government to calibrate settings for key skills shortages.

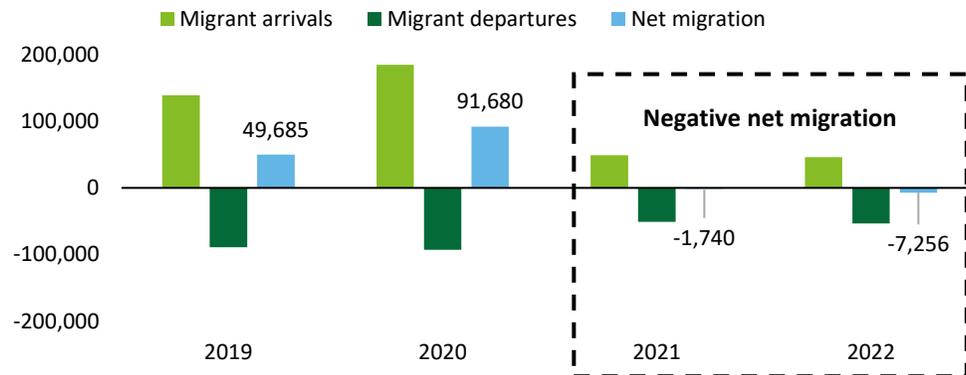
Impact of brain drain on labour supply

This economic scenario illustrates the impact of prolonged brain drain in the 15-24 and 25-34 age cohorts on both the manufacturing and engineering industries. In particular, it models a 3% per annum reduction in the 15-24 age cohort and a 4% per annum reduction in the 25-34 age cohort over the next two years.

Under this scenario, the manufacturing labour supply could decrease by an additional 5,000 employees each year from 2023 to 2025. Similarly, the engineering labour supply could decrease by an additional 3,000 employees each year over the same period. Note that the skills mix in the labour supply will be different across each industry.

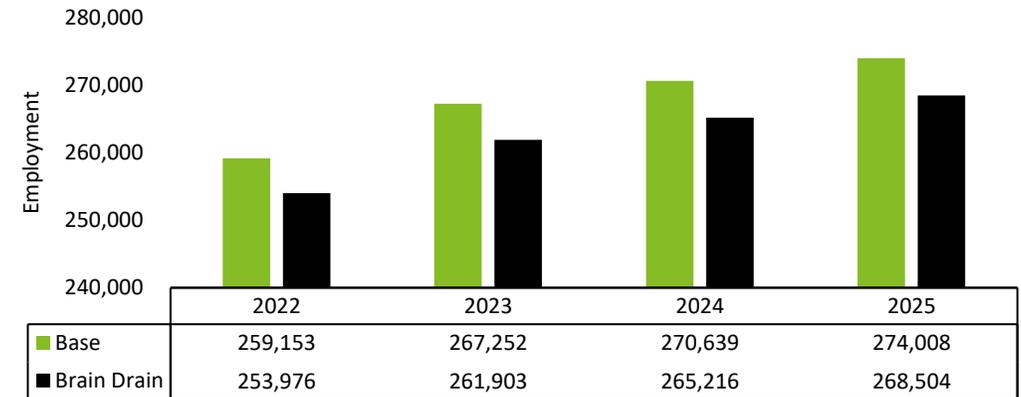
This demonstrates the need to train and upskill the local workforce and to make New Zealand more attractive to both domestic workers and potential migrants to reduce the risk of a sustained brain drain.

New Zealand migration



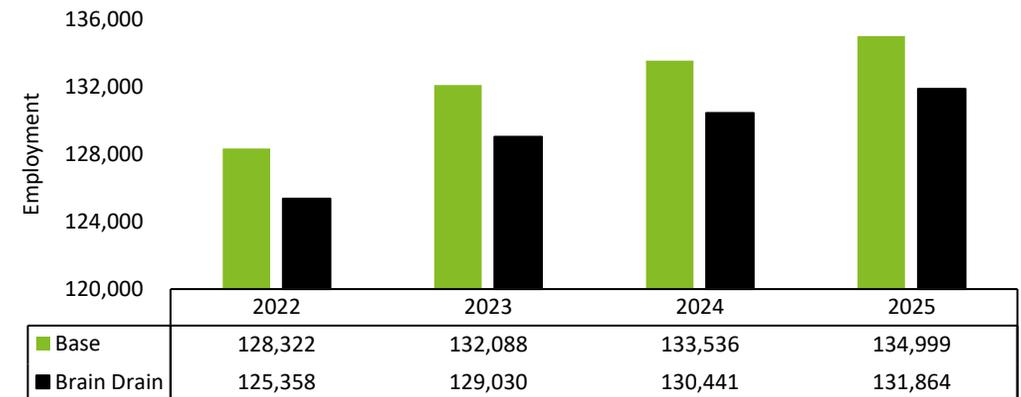
Source: Statistics NZ, Deloitte Access Economics

Manufacturing labour supply: Base case vs. brain drain



Source: Statistics NZ, Deloitte Access Economics

Engineering labour supply: Base case vs. brain drain



Source: Statistics NZ, Deloitte Access Economics

Alternative COVID-19 recovery: Significant economic downside

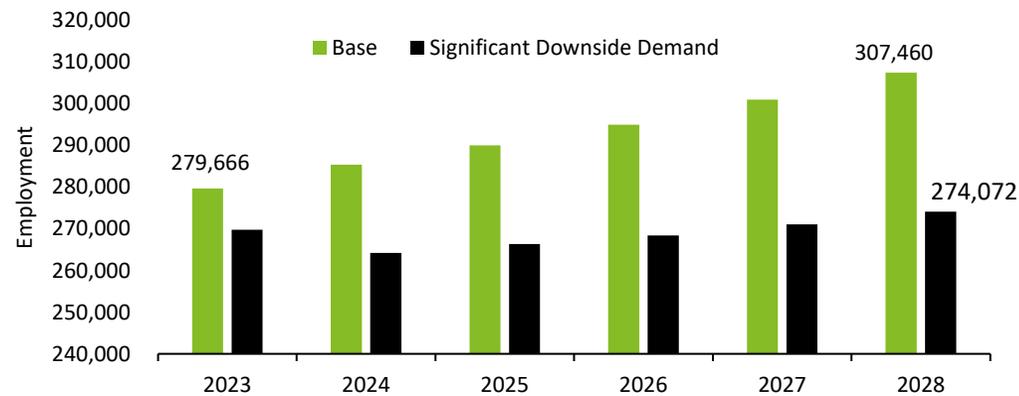
This scenario illustrates the impact of an alternative COVID-19 recovery pathway with new COVID-19 variants, the return of border closures, and a resulting contraction in manufacturing and engineering activity.

This is a scenario where New Zealand faces a significant recession brought about by risks such as the emergence of a new severe COVID-19 variant, border closures, and a significant contraction in economic activity. This type of scenario analysis provides Hanga-Aro-Rau with a framework to consider the potential impact of an alternative set of strategic initiatives in response to a different set of employment and economic conditions (i.e. an increase in unemployment, a smaller skills gap, and potentially a greater availability/willingness of the population to engage in re-skilling).

Manufacturing: Significant economic downside

Under the significant economic downside scenario, manufacturing labour demand could fall by ~33,000 employees by 2028 relative to the base case.

Manufacturing: Base case vs. significant downside demand

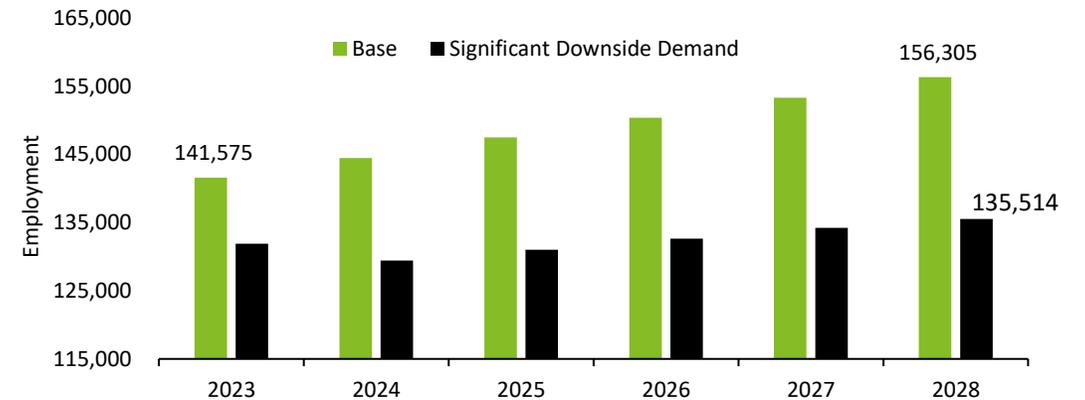


Source: Statistics NZ, Deloitte Access Economics

Engineering: Significant economic downside

Under the significant economic downside scenario, engineering labour demand could fall by ~20,000 employees by 2028 relative to the base case.

Engineering: Base case vs. significant downside demand



Source: Statistics NZ, Deloitte Access Economics

Manufacturing: Digital disruption: Skill shift

This scenario illustrates the impact of digital disruption that drives more demand for higher skilled employees. This example illustrates the transition pathway of an additional 25,000 level 1 and 19,000 level 2 workers by 2028. This highlights the need for the manufacturing and engineering industry to work with vocational education and training providers to better align course materials to be more relevant to future skills needs.



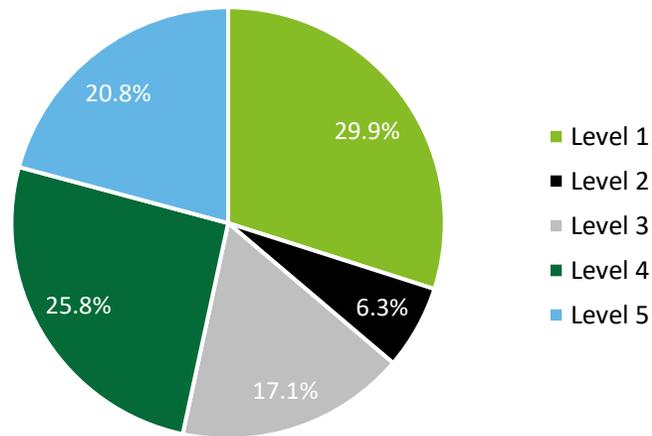
Engineering: Initiatives that result in a more equitable skills shift for Māori

As recognised in the advanced manufacturing industry transformation plan, the manufacturing industry is expected to keep going through a significant technological step change. This can improve business decisions and productivity but will require a higher-skilled workforce that can understand and fully utilise these technologies.

This scenario demonstrates the impact of rapidly increasing demand for a higher skilled workforce (level 1 and 2) at the expense of the lower skilled workforce (4 and 5).

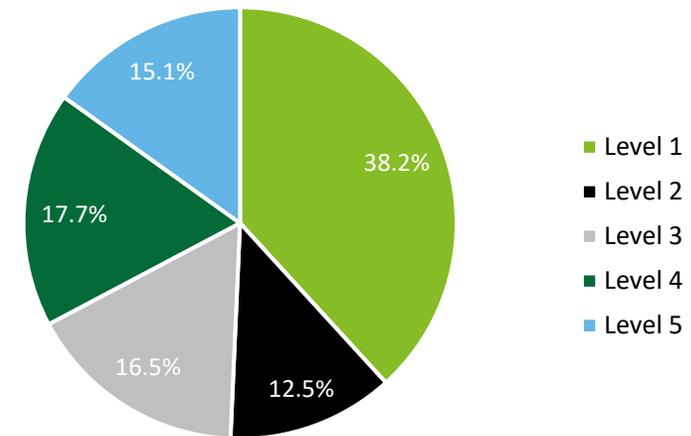
In this illustrative example, the skills mix of skill levels 1 and 2 could increase from 36% to 50% over the transition period. This equates to an additional ~25,000 level 1 and ~19,000 level 2 workers by 2028 to enable business to take advantage of technological advancements. The actual transition path will depend on the specific initiatives chosen, resources applied and level of ambition and prioritisation.

Base case: National manufacturing demand by skill level in 2028



Source: Statistics NZ, Deloitte Access Economics

Scenario: National manufacturing demand by skill level in 2028



Source: Statistics NZ, Deloitte Access Economics

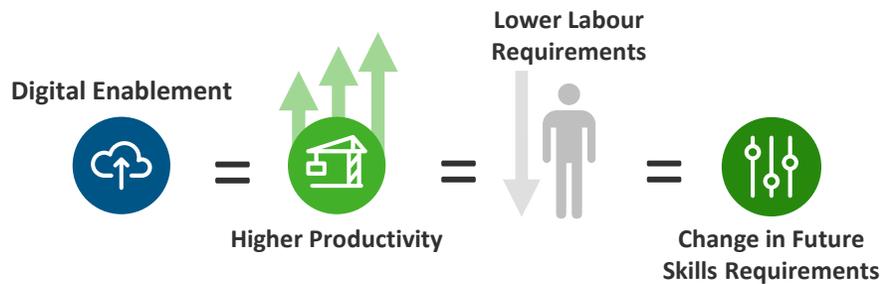
Digital disruption: Productivity shift

This scenario illustrates a future where productivity increases by 2% per annum, as a result of technology uptake, leading to 20,000 fewer workers required in manufacturing and 12,000 fewer workers in engineering to produce the same level of output. To achieve this scenario, the manufacturing and engineering workforce must be upskilled to enable them to fully utilise improvement in technology.

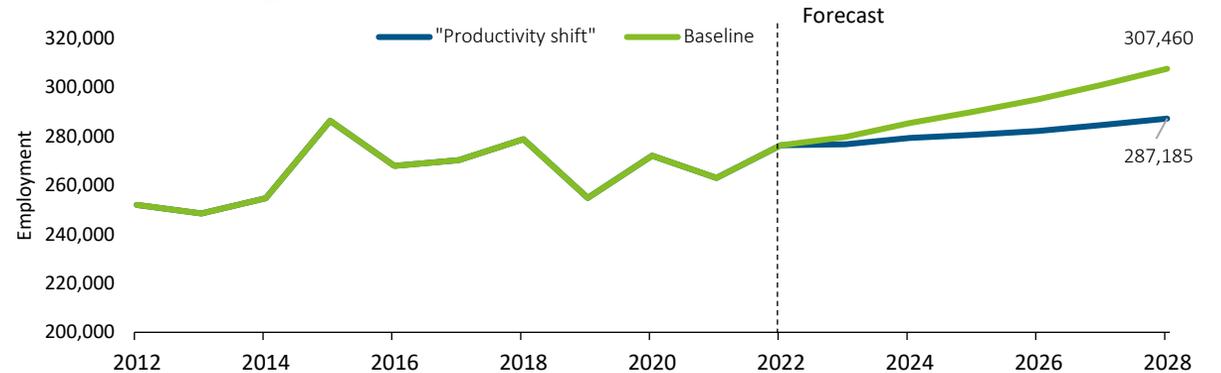
Productivity increase

This economic scenario illustrates the effect of increasing productivity by 2% per annum on the manufacturing and engineering industry. Under this scenario, a manufacturing workforce that is smaller (in relative terms) by 20,000, and an engineering workforce that is smaller (in relative terms) by 12,000, could deliver an equivalent level of output.

This demonstrates how each industry could close the workforce gap over time by improving labour productivity, either through workforce training or further technological advancement.

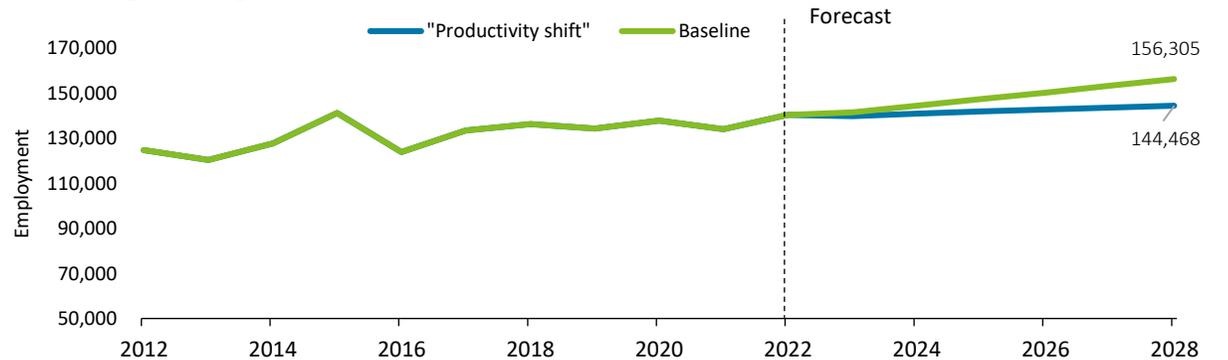


National manufacturing demand



Source: Statistics NZ, Deloitte Access Economics

National engineering demand



Source: Statistics NZ, Deloitte Access Economics



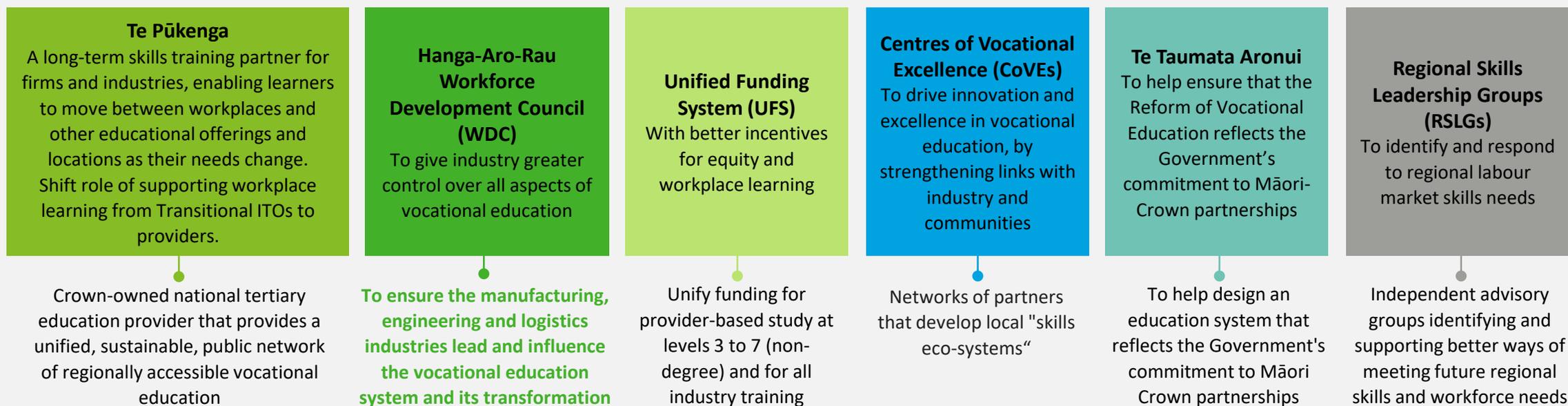
**Section 6:
He aronga pae tawhiti |
Strategic alignment**

Photo: Azaria Weston (Ngāruahine), Mechanical Engineering

Strategic Alignment – Where is the sector focussed?

This research provides further context for Hanga-Aro-Rau and the sector to understand both pre-COVID-19 and COVID-19 recovery challenges. Insights and lessons learned from this research are intended to be developed into a workforce development strategy with actions and tools to support it - that are useful to both industry and iwi - with the ultimate goal of making a difference across the sector. To be successful, and to achieve the best outcomes for Aotearoa, Hanga-Aro-Rau must work across the VET eco-system, leveraging established sector initiatives and relationships across the sectors to uplift its system performance. A unified and strong system will help businesses to cope with unexpected challenges such as COVID-19. The diagram below summarises at a higher level how Hanga-Aro-Rau fits in and works across the VET system.

A unified vocational education and training (VET) system



Adapted from: Cabinet Paper: Order in Council to Establish Six Workforce Development Councils, 29 March 2021, Minister of Education

There is a significant body of work already underway and planned across the wider sector under RoVE across the above key players. The following section summarises several of these initiatives, including for example The Tertiary Education Strategy and the Industry Equity Project, their alignment with the Statement of Strategic Direction of Hanga-Aro-Rau and its focus areas and strategic alignment that this research can contribute to.

Strategic Alignment – Relevant levers and initiatives

Key:  Little or no Alignment  Partial Alignment  Full Alignment

LEVER OR INITIATIVE	DESCRIPTION	STATEMENT OF STRATEGIC DIRECTION FOCUSED AREAS						STRATEGIC ALIGNMENT WITH THIS RESEARCH
		<i>Te Tiriti</i>	<i>Equity</i>	<i>Transformation</i>	<i>Industry Voice</i>	<i>People</i>	<i>Sustainability</i>	
The Tertiary Education Strategy [18]	The Tertiary Education Strategy (TES) sets out the long-term strategic direction for tertiary education. This strategy has been developed following consultation with the tertiary education sector and other stakeholders.							The underpinning strategy for tertiary education in New Zealand will provide the key signals to tertiary education providers, which can be built upon from the output of this work.
Ka Hikitia–Ka Hāpaitia [19]	Ka Hikitia, Ka Hāpaitia sets out how we will work with education services to achieve system shifts in education and support Māori learners and their whānau, hapū and iwi to achieve excellent and equitable outcomes. It provides an organising framework for the actions that kura will take.							Will provide a Māori perspective on the education reforms in New Zealand. This represents an opportunity to align the key areas for delivering equity to Māori Peoples.
The Action Plan for Pacific Education 2020–2030 [20]	The Action Plan for Pacific Education 2020–2030 outlines the actions the Government has committed to achieving for Pacific Peoples and signals how early learning services, schools and tertiary providers can achieve change for Pacific learners and their families.							Will provide a Pacific perspective on the education reforms in New Zealand. This represents an opportunity to align the key areas for delivering equity to Pacific Peoples.
Manu Kōkiri – A ‘Think Piece’ by Taumata Aronui [21]	Manu Kōkiri – Māori Success and Tertiary Education: Towards a Comprehensive Vision – looks at what we need to do to shape our tertiary education system into – in the words of the rōpū – the best indigenously inspired tertiary education system in the world.							Insights generated from this research help identify equity gaps and opportunities for system improvements. This will inform the sector on how to achieve the vision set out in Manu Kōkiri. A summary of ‘Aspirations’ is in Appendix 8.

Strategic Alignment – Relevant levers and initiatives (Continued)

Key:  Little or no Alignment  Partial Alignment  Full Alignment

LEVER OR INITIATIVE	DESCRIPTION	STATEMENT OF STRATEGIC DIRECTION FOCUSED AREAS						STRATEGIC ALIGNMENT WITH THIS RESEARCH
		<i>Te Tiriti</i>	<i>Equity</i>	<i>Transformation</i>	<i>Industry Voice</i>	<i>People</i>	<i>Sustainability</i>	
Hanga-Aro-Rau Statement of Strategic Direction [22]	This document guides the strategic direction of Hanga-Aro-Rau, its operation and future outcomes in the context of Te Tiriti principles, equity, transformation, industry voice, people and sustainability.							Research findings and recommendations are essential for the development of the Statement of Strategic Direction and provide testimonial and statistical evidence to inform a Workforce Development Strategy.
Hanga-Aro-Rau Rangatiratanga Strategy – Māori Workforce Development Plan [23]	The plan identifies pou (such as industry voice, partnership and engagement, cultural capability, and systemic change) upon which the foundation of our mahi will be built and will provide focus for our investment and efforts in 2022/23.							This work will provide foundational insights into the Rangatiratanga Strategy which is underpinned by Hanga-Aro-Rau Te Tiriti Framework (included in Appendix 9). It helps identify gaps for Māori in terms of skills, age, and pay equity issues in workforce.
Industry Equity Project – Hanga-Aro-Rau & Waihanga-Ara-Rau	This project extends the Women in Trades research, completed earlier, to industries under Hanga-Aro-Rau, as well as other groups that have traditionally not been attracted to these industries and/or roles. All industries are facing the challenges of skills shortages due to growth, transformation, innovation and the ageing workforce.							Insights found from this Research Project will contribute to the understanding of females in trades and in the manufacturing and engineering industries.
Advanced Manufacturing Industry Transformation Plan (ITP) – MBIE	Led by the Ministry of Business, Innovation & Employment (MBIE), the purpose of the ITP is to accelerate the growth and transformation of a thriving Aotearoa New Zealand advanced manufacturing sector.							This work provides insights to strengthen the implementation of the ITP, helping to understand areas of focus for workforce development.

Strategic Alignment – Relevant levers and initiatives (Continued)

Key:  Little or no Alignment  Partial Alignment  Full Alignment

LEVER OR INITIATIVE	DESCRIPTION	STATEMENT OF STRATEGIC DIRECTION FOCUSED AREAS						STRATEGIC ALIGNMENT WITH THIS RESEARCH
		<i>Te Tiriti</i>	<i>Equity</i>	<i>Transformation</i>	<i>Industry Voice</i>	<i>People</i>	<i>Sustainability</i>	
Strength in Work Apprenticeships Pilot	A Ministry of Social Development pilot programme to match employers with people who want to start a career in an industry and need extra support. Pays for training fees, wage subsidy during training, and provides pastoral care.							Research findings and recommendations are essential for the development of the Statement of Strategic Direction and provide testimonial and statistical evidence to inform a Workforce Development Strategy.
Employer Assisted Work-Visa Framework Changes	Changes have been made to the framework making it easier for employers to get workers visas for low talent pool jobs.							This work will provide foundational insights into the Rangatiratanga Strategy which is underpinned by Hanga-Aro-Rau Te Tiriti Framework (included in Appendix 9). It helps identify gaps for Māori in terms of skills, age, and pay equity issues in workforce.
Regional Apprenticeship Initiative	The initiative has introduced a wage subsidy to support businesses - with up to \$40,000 per apprentice available to small to medium enterprises in specific regions.							Insights found from this Research Project will contribute to the understanding of females in trades and in the manufacturing and engineering industries.
Apprenticeship Boost	A booster payment made to employers to help with taking on, and retaining, new apprentices. Up to \$500 per month paid to the employer.							This work provides insights to strengthen the implementation of the ITP, helping to understand areas of focus for workforce development.
Targeted Training and Apprenticeship Fund	Competenz apprenticeships are fees-free from July 2020 to December 2022 for all enrolled and new apprentices. This includes resources, block courses, and eLearning fees.							Research findings and recommendations are essential for the development of the Statement of Strategic Direction and provide testimonial and statistical evidence to inform a Workforce Development Strategy.

A man with dark hair, a blue shirt, and visible tattoos on his left arm is leaning over a tray of chocolates. He is smiling and looking towards the camera. The chocolates are arranged in a row on a reflective surface. The background is a plain, light-colored wall.

**Section 7:
Arawātea matua |
Key opportunities**

*Photo: Tom Hilton (Te Parawhau, Ngāpuhi,
Ngati Whatua (orakei, kaipara) & Te Whakatōhea),
Food and Beverage Manufacturing*

Summary of the research

From the desktop research, stakeholder engagement, and data analysis work completed, there is a clear set of key opportunities for Hanga-Aro-Rau to consider. Each opportunity area has within it a system view on what is required to be beneficial across the VET eco-system from a workforce development perspective. The strategic themes of Hanga-Aro-Rau and a suggested priority rating have been attributed against each opportunity.

Approach



Strategic

Opportunities that have a strategic aspect refer to elements required to achieve the vision, mission, goals, and objectives.



Tactical

Opportunities that have a tactical aspect refer to specific elements of what needs to happen or be produced to accomplish a strategic goal.



Operational

Opportunities that have an operational aspect refer to elements to effectively perform the basic activities in order to achieve strategic and tactical objectives.

Strategic Themes



Te Tiriti



Industry Voice



Equity



People



Sustainability



Transformation

There are eight opportunity areas outlined in the following pages which are intended to inform the development of the Statement of Strategic Direction for Hanga-Aro-Rau. Prioritisation of actions can be considered within the implementation plan of the Statement.

Key opportunities

Opportunity Statements

Opportunity Statements	Hanga-Aro-Rau Strategic Themes	Nature of the Opportunity
<p>Opportunity 1: Increase Māori and Pacific Peoples’ presence in the higher skilled roles in manufacturing and engineering through enhanced connection across the vocational education and training eco-system. In particular there will need to be partnership with Te Tiriti partners and iwi groups, Pacific groups, employers and industry associations to monitor progress for equity and education outcomes.</p>	<p>Te Tiriti Equity Sustainability Industry Voice People Transformation</p>	<p>Strategic: Sector-wide strategy and partnership Tactical: Industry practice guidelines</p>
<p>Opportunity 2: Explore how to attract and support disabled people to increase uptake in training and working in manufacturing and engineering through a better understanding of learning and employment support needs across the vocational education and training eco-system. Specific focus is required to engage with education and training providers, disability advocacy, support groups and employers to promote career opportunities.</p>	<p>Equity Sustainability Industry Voice People Transformation</p>	<p>Strategic: Informing sector-wide strategy</p>
<p>Opportunity 3: Increase the number of women in the manufacturing and engineering workforce informed by the opportunities identified through the Industry Equity Project conducted by Hanga-Aro-Rau in collaboration with Waihanga-Ara-Rau. It can begin by researching barriers that women face, if any, and what can be done to retain and attract them.</p>	<p>Equity Sustainability People</p>	<p>Strategic: Informing sector engagement and awareness</p>
<p>Opportunity 4: Improve retention rates and increase new hires into the manufacturing and engineering industry through collective learning of best practices and targeted promotional initiatives to help ease skills shortages. This can begin with a good understanding of workforce turnover incentives, barriers for training and employment success across different regions and demographic groups.</p>	<p>Sustainability People Transformation</p>	<p>Strategic: Sector-wide strategy Tactical: Informing promotional opportunities</p>

Key opportunities (Continued)

Opportunity Statements

Opportunity Statements	Hanga-Aro-Rau Strategic Themes	Nature of the Opportunity
<p>Opportunity 5: Improve skills alignment for the manufacturing and engineering workforce through working with the vocational education and training sector and employers to inform requirements. This is an all-of-sector initiative in which Hanga-Aro-Rau has key responsibility to ensure cross-sector sharing of insights to enable providers to design curricula and approaches that promote industry knowledge and future skills development and exchange.</p>	<p>Sustainability Industry Voice People Transformation</p>	<p>Strategic: Sector-wide enablement and co-design</p> <p>Tactical: Informing shared learning approaches</p> <p>Operational: Develop career pathway</p>
<p>Opportunity 6: Providers have a role to play in working with industry, Māori, Pacific People and under-served groups to identify programmes that are working well to achieve high levels of engagement with these groups and to adapt and promote similar programmes more broadly across the sector.</p>	<p>Industry Voice People</p>	<p>Strategic: Promoting better learning journey</p> <p>Operational: Monitoring</p>
<p>Opportunity 7: A cross-system approach to reduce burden introduced by the costs of training in the workplace through facilitation of cross-industry knowledge exchange and identification of innovative, cost and outcome effective best practice. This will enhance sustainability of businesses especially small and medium-sized enterprises (SMEs), and enable them to achieve better value for money outcomes from their investments.</p>	<p>Sustainability Industry Voice People</p>	<p>Tactical: Sector-wide knowledge sharing</p> <p>Operational: Facilitation</p>

Key opportunities (Continued)

Opportunity Statements

Hanga-Aro-Rau Strategic Themes

Nature of the Opportunity

Opportunity 8: Embrace the knowledge and experience of the older generation in the manufacturing and engineering workforce and support tuakana-teina approach to upskill tēina/rangatahi. This can begin with Hanga-Aro-Rau working with providers and businesses to establish an understanding of the roles and skills where age imbalance is particularly problematic and how best to embed this approach in the upskilling of younger workforce.

Equity
Sustainability
Industry Voice
People

Operational:
Informing approaches to effectively upskill workforce

Opportunity 9: Establish a set of key system performance and outcomes indicators to help the manufacturing and engineering sectors to monitor workforce supply and demand changes. The eco-system would benefit from a framework, leveraging other Tertiary Education Commission funded programmes, to support prioritisation for the sectors in training and education.

Sustainability
People
Transformation

Operational:
Informing monitoring framework

Opportunity 10: Test the findings of this research on their relevance to the logistics industry and identify gaps for further research and analysis to enable better synchronisation of workforce needs for the manufacturing, engineering and the logistics sectors to operate as a sustainable eco-system.

Sustainability
People
Transformation

Tactical: Promoting Sector alignment
Operational:
Promoting operational awareness

Ehara taku toa i te toa takitahi engari he toa takitini

Success is not the work of one but the work of many

Tohutoro | References

Reference	Source
1	Reform of Vocational Education. (2020). Education New Zealand. https://conversation.education.govt.nz/conversations/reform-of-vocational-education/
2	Kapoor, K., Bigdeli, A. Z., Dwivedi, Y. K., & Raman, R. (2021). How is COVID-19 altering the manufacturing landscape? A literature review of imminent challenges and management interventions. <i>Annals of Operations Research</i> . https://doi.org/10.1007/s10479-021-04397-2
3	Knuckey, S. (2020, February). Manufacturing matters. The Manufacturers Alliance. https://www.metals.org.nz/wp-content/uploads/2020/04/Manufacturing-Matters-Final-Report-March-2020.pdf
4	Gilchrist, M. (2019, April). Submission of the Tertiary Education Union Te Hautū Kahurangi o Aotearoa On the Government consultation document Reform of Vocational Education. Tertiary Education Union. https://assets-global.website-files.com/5c6dcbdefb133660ed1ad071/5ccf074d33f0ea5c1d0c78ba_TEU%20submission%20to%20RoVE%20April%202019.pdf
5	Ngāi Tahu. (2019, March). A Ngāi Tahu perspective on the reform of vocational education. https://ngaitahu.iwi.nz/
6	Office of the Minister of Education. (2019, January). Consulting on Proposals for Vocational Education System Reform. https://conversation.education.govt.nz/assets/Uploads/28-2019-01-28-Cabinet-Paper-Consulting-on-Proposals-for-Vocational-Education-System-Reform-plus-annexes-1-4.pdf
7	Te Pae Tawhiti. (2021, October). Te Pae Tawhiti Quarterly Report. Te Pūkenga. https://www.msd.govt.nz/about-msd-and-our-work/about-msd/strategies/te-pae-tawhiti/index.html
8	Reform of Vocational Education (RoVE). (2019, May). RoVE Technical Workshop [Slides]. PowerPoint. https://www.tec.govt.nz/rove/
9	Te Rito. (2021, June). Te Rito Insights from learners and staff. Te Pūkenga. https://xn--tepkenga-szb.ac.nz/assets/Our-Pathway/Learner-Journey/Te-Rito-Insights-from-learners-Part-One-Final-Digital.pdf
10	Te Rito. (2021, June). Te Rito Insights from Pacific learners. Te Pūkenga. https://xn--tepkenga-szb.ac.nz/assets/Our-Pathway/Learner-Journey/Te-Rito-Insights-from-Pacific-learners-Part-Two1.pdf
11	Ministry of Education. (2019, August). Reform of Vocational Education regulatory impact assessment. https://www.treasury.govt.nz/sites/default/files/2019-08/ria-minedu-rve-jun19.pdf
12	Te Rito. (2021, June). Te Rito Insights from disabled learners. Te Pūkenga. https://xn--tepkenga-szb.ac.nz/assets/Our-Pathway/Learner-Journey/Te-Rito-Insights-from-Disabled-learners-Part-Three1.pdf
13	Tertiary Education Commission. (2020). ITP Roadmap 2020. TEC. https://conversation.education.govt.nz/assets/RoVE/05e-B-18-00652-FINAL-report-What-we-heard-during-public-engagement-2.pdf
14	Ministry of Health. (2020). Impact of COVID-19 on Pacific peoples living in South Auckland. https://www.health.govt.nz/system/files/documents/pages/impact_of_covid-19_on_pacific_peoples_living_in_south_auckland.pdf
15	The Manufacturers' Network. (2019, November). Skills shift in manufacturing. https://www.themanufacturersnetwork.org.nz/
16	Annual net migration loss of 7,300 Stats NZ. (2022). Stats NZ. Retrieved August 2022, from https://www.stats.govt.nz/news/annual-net-migration-loss-of-7300/
17	Infometrics. (2021). Infometrics. https://www.infometrics.co.nz/reports
18	Ministry of Education. (2020). The Statement of National Education and Learning Priorities (NELP) & Tertiary Education Strategy (TES). https://assets.education.govt.nz/public/Documents/NELP-TES-documents/FULL-TES-2020.pdf
19	Ministry of Education. (2020a). Ka Hikitia – Ka Hāpaitia. https://www.education.govt.nz/assets/Uploads/Ka-Hikitia-Ka-Hapaitia-FINAL.pdf
20	Ministry of Education. (2020a). Action Plan for Pacific Education 2020–2030. https://conversation-space.s3-ap-southeast-2.amazonaws.com/Pacific+Education+Plan_WEB.PDF
21	Taumata Aronui. (2022). Manu Kōkiri. https://www.tec.govt.nz/assets/Publications-and-others/Manu-Kokiri-by-Taumata-Aronui-April-2022.pdf
22	Hanga Aro Rau. (2022). HAR Statement of Strategic Direction. https://www.hangaarorau.nz/
23	Hanga Aro Rau. (2022a). HAR Rangatiratanga Strategy – Māori workforce development plan. https://www.hangaarorau.nz/
24	Deloitte. (2021). Westpac Value of Sharing the Load Report

A woman with dark hair tied back, wearing a light pink blazer over a matching top, stands in a brightly lit garment factory. A yellow measuring tape is draped around her neck. She is smiling and looking towards the camera. The background shows industrial sewing equipment and workstations.

Section 8: Tāpiritanga | Appendices

Photo: Apparel Manufacturing

Appendix 1: List of manufacturing and engineering industries in the remit of Hanga-Aro-Rau

Manufacturing	
1. Alcohol Manufacturing (Excluding Wine)	22. Motor Vehicle Manufacturing (Coachbuilding)
2. Aluminium Joinery	23. Non-Metallic Mineral Manufacturing
3. Apparel	24. Offsite Manufacturing
4. Automotive Parts and Wholesaling	25. Petroleum and Coal Manufacturing
5. Baking	26. Pharmaceutical and Medicinal Product Manufacturing
6. Binding and Finishing	27. Plastics, Polymer and Rubber Product Manufacturing
7. Boat Building and Maintenance	28. Primary Processing Support
8. Chemical Manufacturing	29. Print
9. Dairy Processing	30. Protective Coatings
10. Direct Mail Production	31. Pulp and Paper Retail
11. Energy and Chemical Plant Operations	32. Meat/Butchery
12. Fibreboard and Paper Packaging	33. Signmaking
13. Food and Beverage Manufacturing	34. Solid Wood Manufacturing
14. Furniture Manufacturing	35. Textiles
15. General Manufacturing	36. Tissue Converting
16. Glass Processing	37. Wood Panel and Plywood Manufacturing
17. Industrial Textiles	
18. Kitchen Joinery	
19. Marine Technology	
20. Meat Processing	
21. Metal Manufacturing	

Engineering
1. Automotive Engineering
2. Automotive Reglazing
3. Collision Repair
4. Composites Technology
5. Dairy Systems Engineering
6. Engineering Design and Consulting Services
7. Engineering Fabrication
8. Extractives
9. Extractives - Blasting
10. Extractives - Drilling
11. Fire Protection
12. Irrigation
13. Laundry and Dry-Cleaning Services
14. Locksmithing
15. Maintenance Engineering
16. Mechanical Building Services
17. Mechanical Engineering
18. Motorcycle Engineering
19. Outdoor Power Equipment
20. Refrigeration and Airconditioning
21. Welding

Appendix 2: Fields included in the Data Catalogue

The full data catalogue can be obtained from Hanga-Aro-Rau. Listed below are the fields included in the Data Catalogue.

Unique ID

An identifier allocated to each dataset which combines the domain name and a number to create a unique ID

(e.g., EDU.10)

Geo Level

Which regions the dataset covers

(e.g., National, Regional, Territorial Authority)

Frequency of Release

How regularly the dataset is released

(e.g. Yearly)

Data Access Criteria

Describes additional steps that can be taken to access the dataset with a different format where applicable

(e.g., For Territorial Authority level data, please email info@stats.govt.nz)

Dataset

Name of the individual dataset

(e.g., Linked Employer-Employee Dataset)

Details (Data granularity)

Summary of the data included in the dataset

(e.g. Median annual earnings by industry, location and time)

Landing Site

A hyperlink to the website where the dataset can be found

Data Privacy, Confidentiality and Sensitivity Considerations

Provides a link to the data considerations for the dataset where applicable

(e.g., <https://creativecommons.org/licenses/by/4.0/>)

Source Data Agency

The organisation from which the dataset was sourced

(e.g., Ministry of Education)

Data Challenges (Limitations)

Aspects of the dataset that make it challenging to access/work with

(e.g., regional data not available)

Electronic Source (Data Files)

A hyperlink to the dataset source file

Data Quality and Standards

Describes the data quality of the dataset

(e.g., Very high)

Availability

Determines whether the dataset is publicly available or requires a subscription

(e.g., Public, On Request)

Time Range

When the data was captured

(e.g. 2000 – 2020)

File Format

The data type of the dataset

(e.g., pdf, csv, xlsx)

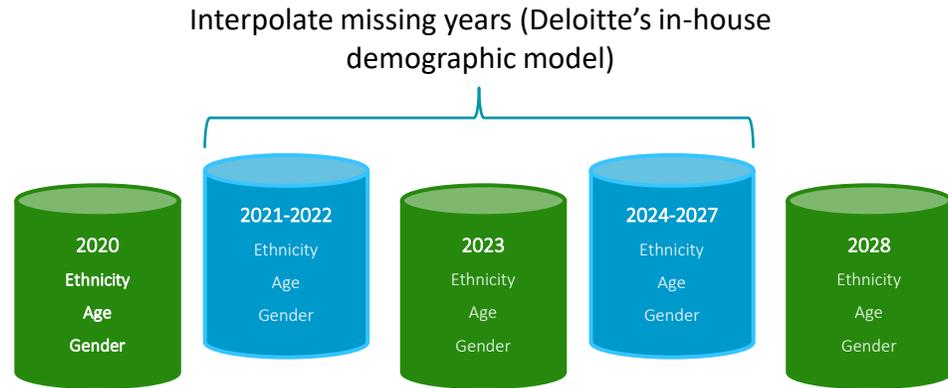
Notes

Contains any additional information on the dataset

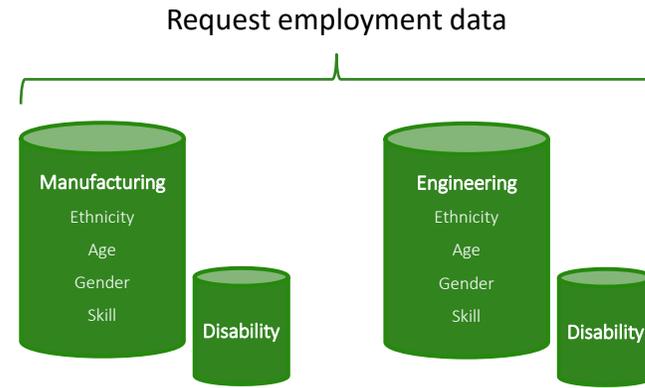
(e.g. Contact agency to obtain data)

Appendix 3A: Supply forecast methodology

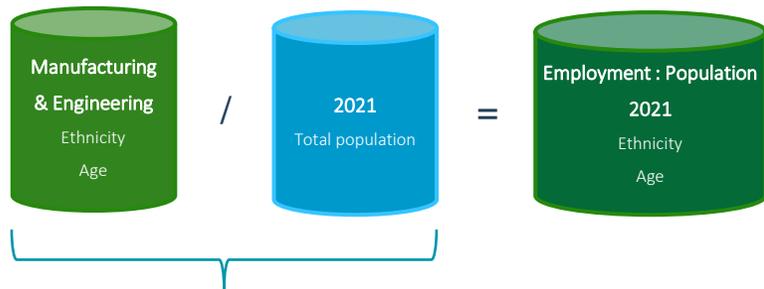
1 Interpolate Statistics New Zealand demographic population data using Deloitte's in-house demographic model



2 Request manufacturing and employment data from Statistics New Zealand

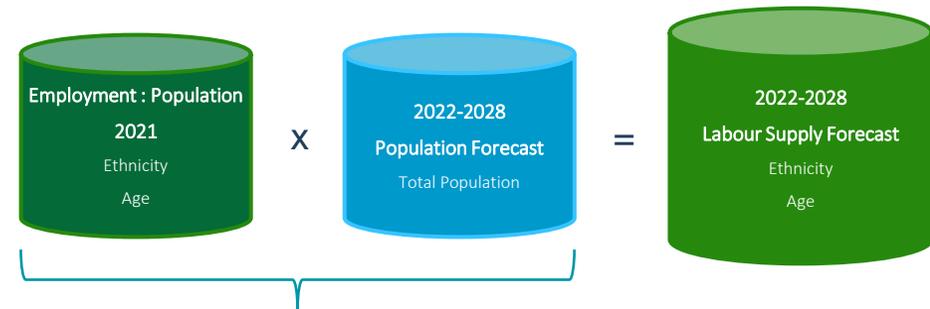


3 Calculate employment:population ratio (June 2021 quarter)



Calculate employment : population ratio

4 Forecast employment (manufacturing & engineering sector)

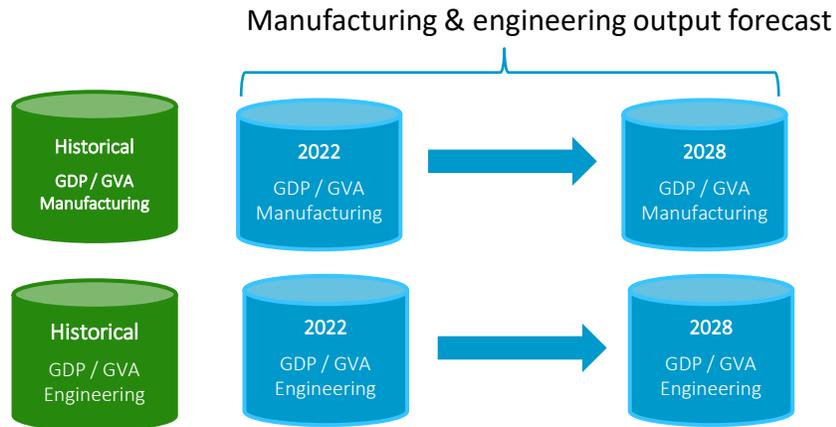


Cross-multiply E:P and population forecasts

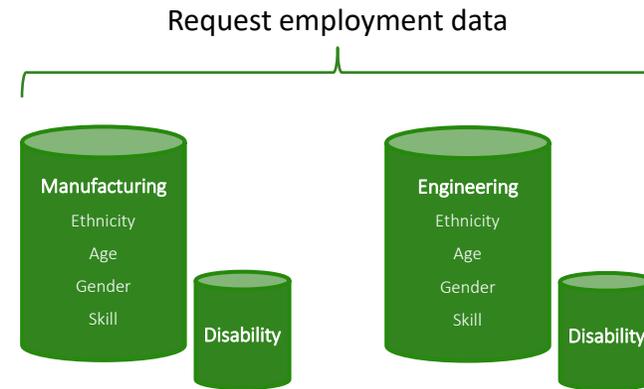
Note: Where definitions of variables are in debate, source data definitions are used. For example, gender is categorised based on the Data Standard for Gender, Sex, and Variations of Sex characteristics issued by Statistics NZ in 2021 with further verification using the HISO 10046:2022 Consumer Health Identity Standard issued by the Ministry of Health in May 2022.

Appendix 3B: Demand forecast methodology

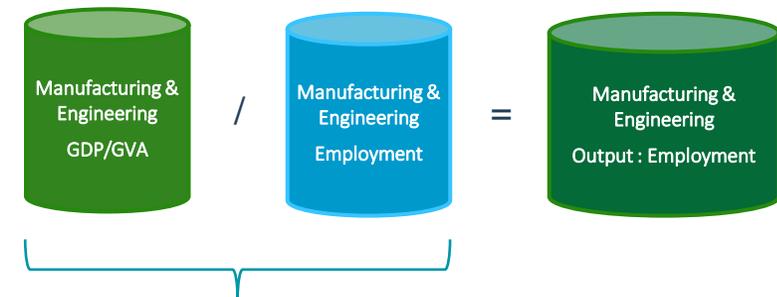
1 Source GDP/GVA historical and forecast series from Deloitte's in-house Macro Model



2 Request manufacturing and employment data from Statistics New Zealand

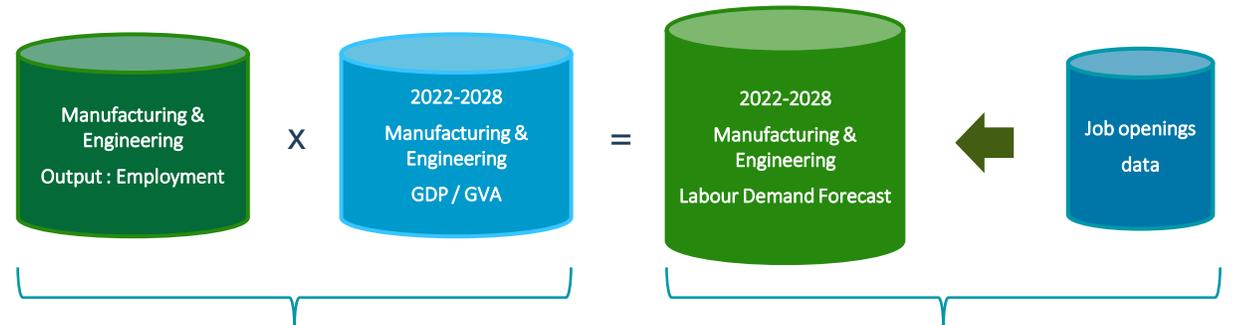


3 Calculate GDP/GVA : Employment ratio



Calculate output : employment ratio

4 Apply GDP/GVA: employment ratio to the GDP/GVA forecast (demand forecasts)



Cross-multiply O:E and output forecasts

Incorporate job openings data

Appendix 4: List of documents for desktop research

Below is a list of documents and files used for background desktop research

Learner and Community Insights	HAR Plans and Proceedings	Workforce Plans and Regional Documents	Responses
<ol style="list-style-type: none"> Pacific peoples data for Operational Plan Pasifika Overview March 2022 Te Rito - Insights from Disabled Learners (Part Three) Te Rito - Insights from Learners (Part One) Te Rito - Insights from Pacific Learners (Part Two) Te Rito Outcomes Framework diagram 	<ol style="list-style-type: none"> Hanga Aro Rau Skills and Workforce Dev Plan Hanga-Aro-Rau advice for 2023 investment to the Tertiary Education Commission submitted 29 April 2022 Hanga-Aro-Rau Establishment Phase Final Report 26 April 2022 Hanga-Aro-Rau Manufacturing Engineering and Logistics WDC Order in Council Hanga-Aro-Rau Operational Plan April 2022 Hanga-Aro-Rau Scope Manufacturing [Māori-Pacific] 	<ol style="list-style-type: none"> Canterbury Local Insights Report March 2022 Canterbury Regional Workforce Plan draft for Regional Skills Leadership Groups review Regional Skills Leadership Groups - Key Contacts (Chairs and Regional leads) - NOV 21 Regional Skills Leadership Groups Regional Workforce Plan Priority Summary Regional Workforce Plan timeline Tai Tokerau Regional Investment Plan Tai Tokerau Regional Investment Plan - Action Plan Waikato Local Insights Report November 2021 Waikato Regional Skills Leadership Groups Draft Regional Workforce Plan Aspirations and Actions March 2022 	<ol style="list-style-type: none"> Consulting on Proposal for Vocational Education System Reform Ngāi Tahu Perspective on Reform of Vocational Education (ROVE) (March 2019) Tertiary Education Union Submission to Reform of Vocational Education (RoVE) - 5 April 2019
Industry and Education Reports	Māori Focus Policies and Think Pieces	Skills and Development Plans	
<ol style="list-style-type: none"> Education New Zealand Cabinet Paper Pack Manufacturing Matters - Final Report March 2020 Regulatory Impact Assessment - Reform of Vocational Education Skills Shift in Manufacturing - Survey Findings Report Skills Shift in Manufacturing Gaps and opportunities in Tertiary Education Tamaki Makaurau Local Insights Report March 2022 Update Infometrics June 2022 	<ol style="list-style-type: none"> Draft Māori Data Sovereignty Policy Manu Kōkiri by Taumata Aronui April 2022 Māori Workforce Skills Development engagement questions Tatauranga Umanga Māori Statistics on Māori Businesses 2020 Te Pae Pata 2020-2025 - NZIST Te Tiriti o Waitangi Excellence Framework Te Pae Tawhiti 2020-2025 Excellence Framework Nov 2020 Te Pae Tawhiti Quarterly Report - March 2022 	<ol style="list-style-type: none"> Education Order 2021 (LI 2021/99) 9 Statement of strategic direction – New Zealand Legislation Institutes of technology and polytechnics (ITP) Roadmap 2020 Reform of Vocational Education (RoVE) Technical Workshop - 28 May 2019 	

Appendix 5: Key stakeholder list

List of stakeholders engaged during engagement sessions:

Iwi, Hapū / Māori Business

1. Amotai
2. Waikato-Tainui
3. Whāriki Limited

Education Organisations

1. Apprentice Training New Zealand
2. Bakels Training School Limited
3. Competenz
4. Fairview Educational Services
5. Horowhenua Learning Centre
6. Independent Tertiary Education New Zealand
7. Māori & Pasifika Trades Training
8. Motor Industry Training Organisation Incorporated
9. Muka Tangata
10. Pacific Coast Technical Institute
11. Te Matarau Education Trust
12. Te Pūkenga – New Zealand Institute of Skills and Technology
13. Waikato Institute of Technology Limited

Associations

1. Motor Trade Association
2. Pacific Business Trust
3. South Pacific Professional Engineering Excellence
4. Waikato Engineering Careers Association

Employers / Workplaces

1. Buckley Systems Limited
2. Kilmarnock Enterprises Limited
3. Longveld Limited
4. Red Stag Timber Limited

Chambers of Commerce

1. Canterbury Chamber of Commerce

Trade Unions

1. First Union

Industry

1. Dairy Companies Association of New Zealand
2. Plastics New Zealand Limited
3. Print New Zealand Limited

Employees

1. Buckley Systems Limited
2. Red Stag Timber Limited

Appendix 6: Stakeholder engagement key lines of enquiry

Stakeholder engagement sessions were conducted using a set of nine lines of enquiry, three for each of the themes identified in the desktop research. These questions were used as the starter questions to guide the conversation and the rest of the insights and inputs were guided by the participants.

Cohesion	Digital Capability	Business Continuity
In your view, how closely connected are the different groups in the vocational education system?	What impact has digital capabilities (or lack of) had on the skills mix requirement for the workforce?	What did you see across the sector during COVID-19 in terms of continuing business and learning?
Have you noticed a change in these connections since-COVID?	Have you changed the way you operate and utilise digital tools since-COVID?	What needs to be done to ensure sustainable operation of businesses since-COVID?
What critical actions need to take place to increase opportunities for connectedness across the system?	How is the sector responding to increased needs for digital capability?	What is being done or could be done to ensure the sector has an adequate workforce?

Appendix 7A: COVID-19 impact and Future Skills Survey questions

Hanga-Aro-Rau collaborated with the Industry Associations to distribution the survey to employers from the manufacturing and engineering industries. Displayed below are the questions within the survey.




Hanga-Aro-Rau COVID-19 Impact and Future Skills Survey

Thank you for taking part in this short 6-minute survey to help Hanga-Aro-Rau to understand the most relevant current and future state skill requirements for manufacturing and engineering industries since COVID-19. Please note that your answers will only be presented at a summary level.

* Required

Your Details

Please tell us about your organisation and industry.

1. Your name

2. Your organisation

3. Which industry do you predominantly work in? *

Manufacturing

Engineering

Other

In-Demand Skills

Please answer the following questions about the types of skill sets required by your organisation and industry both pre-COVID-19 and post-COVID-19.

4. Please rank the following skills by importance for employee success **pre-COVID-19**.

	Least important 1	2	3	4	Most important 5	Not relevant / Unknown
1. Problem solving and critical thinking	<input type="radio"/>					
2. Leadership, management and decision-making	<input type="radio"/>					
3. Teamwork	<input type="radio"/>					
4. Verbal communication	<input type="radio"/>					
5. Written communication	<input type="radio"/>					
6. Numeric and quantitative analysis	<input type="radio"/>					
7. Working with manufacturing tools and techniques	<input type="radio"/>					
8. Computer literacy including the use of multi-media channels	<input type="radio"/>					
9. Computer programming and big data analytics	<input type="radio"/>					
10. Understanding of connected equipment and industrial control software	<input type="radio"/>					
11. Cultural competencies	<input type="radio"/>					
12. Language skills e.g. Te reo Māori	<input type="radio"/>					

Appendix 7A: COVID-19 impact and Future Skills Survey questions (Continued)

5. Please rank the following skills by importance for employee success **since COVID-19 and in 5 years time**.

	Least important 1	2	3	4	Most important 5	Not relevant / Unknown
1. Problem solving and critical thinking	<input type="radio"/>					
2. Leadership, management and decision-making	<input type="radio"/>					
3. Teamwork	<input type="radio"/>					
4. Verbal communication	<input type="radio"/>					
5. Written communication	<input type="radio"/>					
6. Numeric and quantitative analysis	<input type="radio"/>					
7. Working with manufacturing tools and techniques	<input type="radio"/>					
8. Computer literacy including the use of multi-media channels	<input type="radio"/>					
9. Computer programming and big data analytics	<input type="radio"/>					
10. Understanding of connected equipment and industrial control software	<input type="radio"/>					
11. Cultural competencies	<input type="radio"/>					
12. Language skills e.g. Te reo Māori	<input type="radio"/>					

6. What other skills not listed above may be important **since COVID-19 and in 5 years time**?

Enter your answer

7. Please rank how hard the following skills were to find **pre-COVID-19**.

	Easy to find 1	2	3	4	Hard to find 5	Not relevant / Unknown
1. Problem solving and critical thinking	<input type="radio"/>					
2. Leadership, management and decision-making	<input type="radio"/>					
3. Teamwork	<input type="radio"/>					
4. Verbal communication	<input type="radio"/>					
5. Written communication	<input type="radio"/>					
6. Numeric and quantitative analysis	<input type="radio"/>					
7. Working with manufacturing tools and techniques	<input type="radio"/>					
8. Computer literacy including the use of multi-media channels	<input type="radio"/>					
9. Computer programming and big data analytics	<input type="radio"/>					
10. Understanding of connected equipment and industrial control software	<input type="radio"/>					
11. Cultural competencies	<input type="radio"/>					
12. Language skills e.g. Te reo Māori	<input type="radio"/>					

Appendix 7A: COVID-19 impact and Future Skills Survey questions (Continued)

8. Please rank how hard the following skills have been to find **since COVID-19 and in 5 years time**.

	Easy to find 1	2	3	4	Hard to find 5	Not relevant / Unknown
1. Problem solving and critical thinking	<input type="radio"/>					
2. Leadership, management and decision-making	<input type="radio"/>					
3. Teamwork	<input type="radio"/>					
4. Verbal communication	<input type="radio"/>					
5. Written communication	<input type="radio"/>					
6. Numeric and quantitative analysis	<input type="radio"/>					
7. Working with manufacturing tools and techniques	<input type="radio"/>					
8. Computer literacy including the use of multi-media channels	<input type="radio"/>					
9. Computer programming and big data analytics	<input type="radio"/>					
10. Understanding of connected equipment and industrial control software	<input type="radio"/>					
11. Cultural competencies	<input type="radio"/>					
12. Language skills e.g. Te reo Māori	<input type="radio"/>					

9. What was the percentage of open positions that were not filled due the lack of applicants with relevant skills **pre-COVID-19**?

	0%	1% - 20%	21% - 40%	41% - 60%	61% - 80%	81% - 100%
Estimation only	<input type="radio"/>					

10. What is the percentage of open positions that have not been filled due the lack of applicants with relevant skills **since COVID-19**?

	0%	1% - 20%	21% - 40%	41% - 60%	61% - 80%	81% - 100%
Estimation only	<input type="radio"/>					

11. How much will the following uncertainty factors result in an enduring future impact on the shortage of skills in your organisation, based on what you already know now?

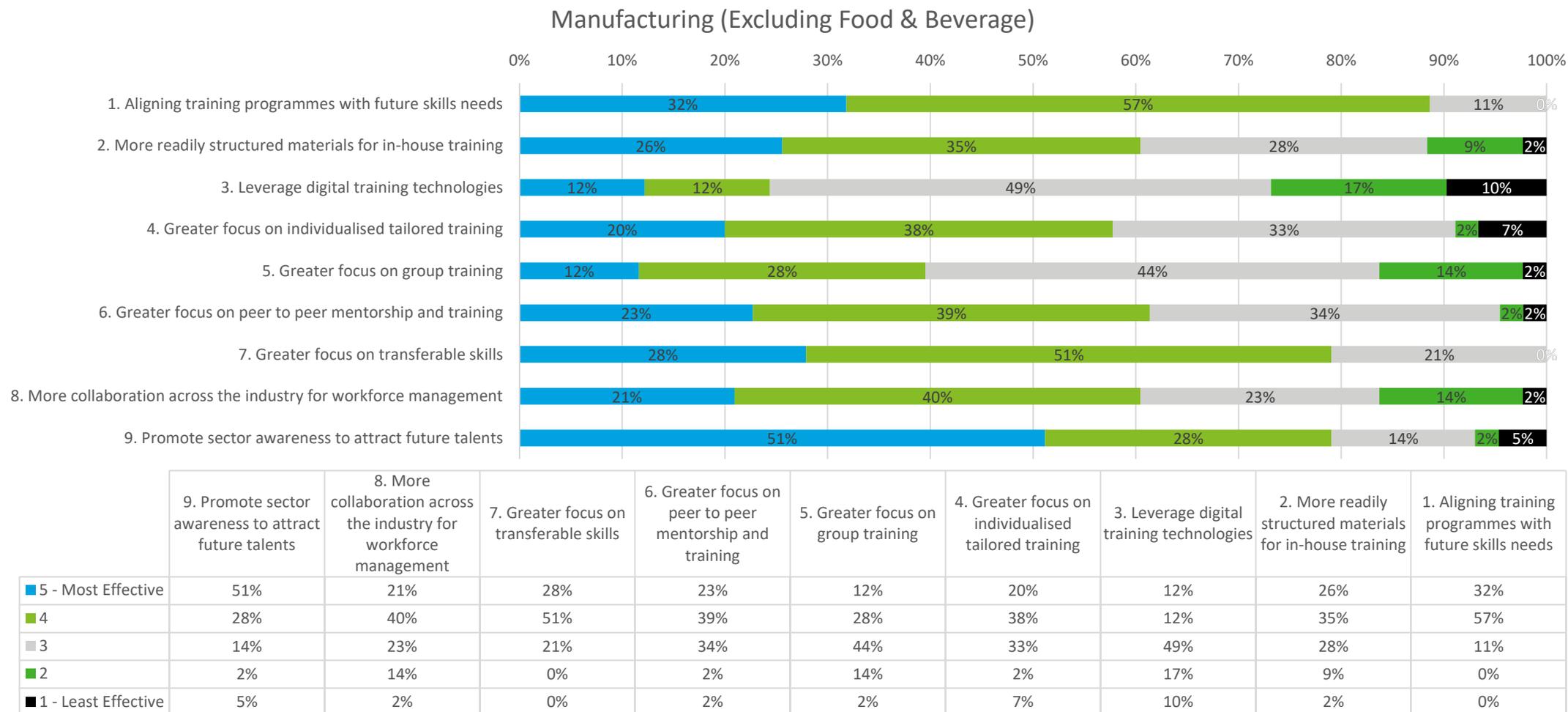
	Little impact 1	2	3	4	Large impact 5	Unknown
COVID-19	<input type="radio"/>					
Automation	<input type="radio"/>					
Climate change	<input type="radio"/>					

12. How effective would the following actions be in reducing the enduring future impact on the shortage of skills in your organisation?

	Not very effective 1	2	3	4	Very effective 5	Unknown
1. Aligning training programmes with future skills needs	<input type="radio"/>					
2. More readily structured materials for in-house training	<input type="radio"/>					
3. Leverage digital training technologies	<input type="radio"/>					
4. Greater focus on individualised tailored training	<input type="radio"/>					
5. Greater focus on group training	<input type="radio"/>					
6. Greater focus on peer to peer mentorship and training	<input type="radio"/>					
7. Greater focus on transferable skills	<input type="radio"/>					
8. More collaboration across the industry for workforce management	<input type="radio"/>					
9. Promote sector awareness to attract future talents	<input type="radio"/>					

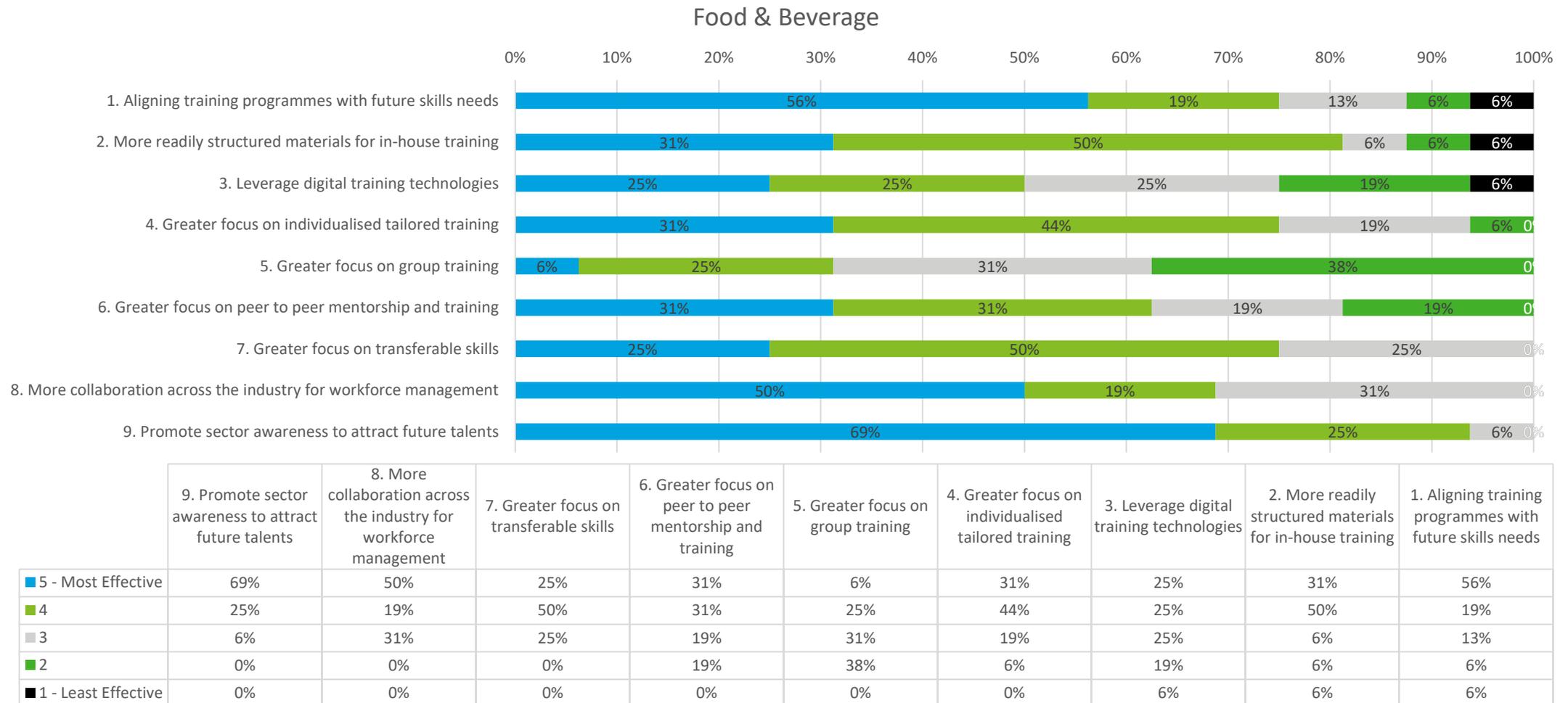
Appendix 7B: Survey results on the participants views on the effectiveness of actions in reducing the impact of skills shortage in manufacturing

The following graphs present the average scores in the order skills importance since COVID-19 for the manufacturing sector (excluding Food & Beverage) pre-COVID-19 and since COVID-19 and in five years time:



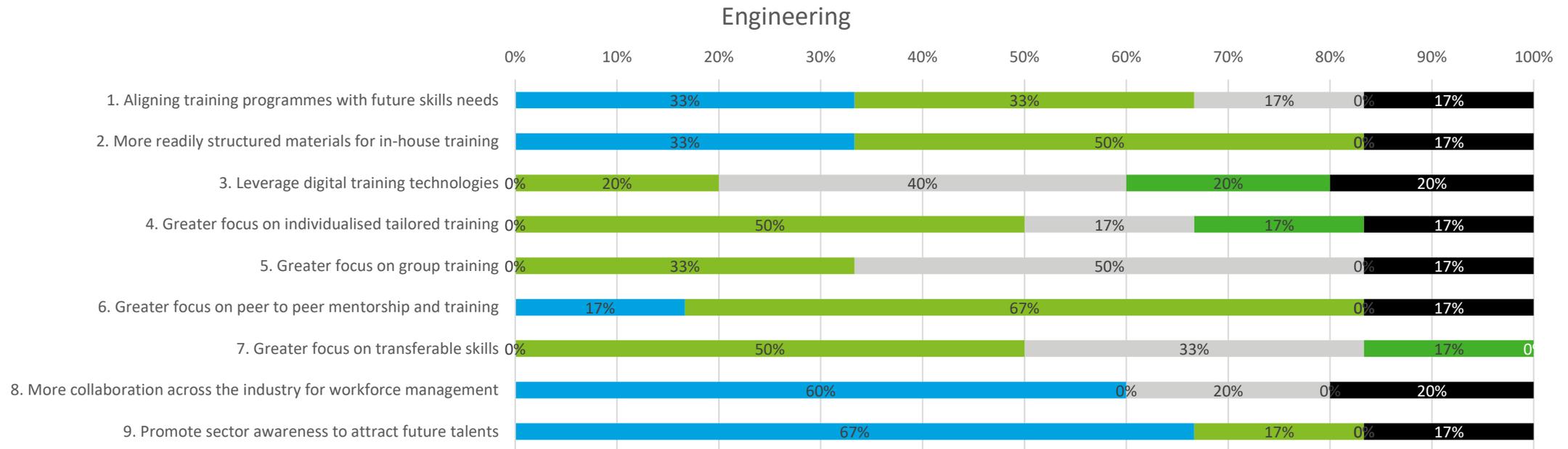
Appendix 7C: Survey results on the effectiveness of actions in reducing the impact of skills shortage in Food & Beverage

The following graphs present the average scores in the order skills importance since COVID-19 for the Food and Beverage sector pre-COVID-19 and since COVID-19 and in five years time:



Appendix 7D: Survey results on the effectiveness of actions in reducing the impact of skills shortage in engineering

The following graphs present the average scores in the order skills importance since COVID-19 for the engineering sector pre-COVID-19 and since COVID-19 and in five years time:



	9. Promote sector awareness to attract future talents	8. More collaboration across the industry for workforce management	7. Greater focus on transferable skills	6. Greater focus on peer to peer mentorship and training	5. Greater focus on group training	4. Greater focus on individualised tailored training	3. Leverage digital training technologies	2. More readily structured materials for in-house training	1. Aligning training programmes with future skills needs
■ 5 - Most Effective	67%	60%	0%	17%	0%	0%	0%	33%	33%
■ 4	17%	0%	50%	67%	33%	50%	20%	50%	33%
■ 3	0%	20%	33%	0%	50%	17%	40%	0%	17%
■ 2	0%	0%	17%	0%	0%	17%	20%	0%	0%
■ 1 - Least Effective	17%	20%	0%	17%	17%	17%	20%	17%	17%

Appendix 8: Manu Kōkiri – A ‘Think Piece’ by Taumata Aronui [21]

Aspirations: “... *the best indigenously inspired tertiary education system in the world* - one where incredible success is experienced by indigenous people (this is normalised and expected) and where indigenous knowledge and experience influences the sector positively and becomes the inspiration for the success of all. This is an internationally lauded, distinctive Aotearoa-New Zealand tertiary education system where all succeed.”

	Manu Kōkiri	Hanga-Aro-Rau theme	Research sub-themes
1	Māori people enjoy significant tertiary education success .	People, Equity	Equity
2	Māori people enjoy increasing levels of health and wellbeing, including cultural health and wellbeing , through tertiary education including through designing and delivering tertiary education study themselves .	People, Equity	Wellbeing, Co-design
3	Māori people enjoy increasing levels of economic prosperity including significant and meaningful employment success , entrepreneurial and business success through the growth of the ‘Māori economy’.	Industry Voice, People	Workforce retention and attrition, Business continuity
4	The Tertiary Education Sector is positively transformed through the application of the Treaty of Waitangi and a positive engagement with the Māori Treaty partner .	Te Tiriti, Transformation	Te Tiriti o Waitangi, Relationship & engagement
5	Aotearoa-New Zealand is transformed positively through a tertiary education sector which has embraced the Treaty of Waitangi and the Māori Treaty partner .	Te Tiriti, Transformation	Te Tiriti o Waitangi, Relationship & engagement

Appendix 9: Hanga-Aro-Rau Te Tiriti o Waitangi Framework

As a reference, Hanga-Aro-Rau has developed the Te Tiriti framework to be the foundation for its operation. It is important that the workforce development strategy to be developed is aligned with and underpinned by the framework.

	1 Kāwanatanga	2 Tino Rangatiratanga	3 Mana Ōrite
Ngā Pou - Pillars	Article 1 - Governance	Article 2 – Self-determination	Article 3 - Equity
Whakamāramatanga <i>Description</i>	Requirement for the Crown to govern and create structures for the benefit of all citizens of Aotearoa	The guarantee of tino rangatiratanga which provides for Māori self-determination/mana Motuhake in relation to activities that support the realisation of Māori aspirations	Requirement for the Crown to act, to the fullest extent practicable to achieve equitable outcomes for Māori. This includes ensuring that it, its agents, and its Treaty partners are well informed on the extent, and nature, of both Māori outcomes and efforts to achieve equity for Māori
Whakatīnanatanga <i>Application</i>	Ensure that robust policies, plans and support are in place to address racism, bias and low expectations that impact learners/workers, kaimahi and their whānau	Māori industry, hapū and iwi and meaningfully integrated in decision making to ensure Māori success as Māori	Ensure Māori voice leads investment and activities for Māori outcomes
Ngā Urupounamu <i>Reflective questions</i>	Do we commit to Te Tiriti in our plans and ask our Māori partners their views of us? Do we identify and analyse gaps/opportunities then plan to improve Māori outcomes? How do we consistently demonstrate quality in our processes and service delivery/approaches to support Māori outcomes?	Can we demonstrate collaborative partnerships with iwi/hapū and Māori communities? How well do we incorporate reporting and self-review of issues important to Māori into our wider organisational guidance – ensuring we are clear, genuine and timely?	Are our services highly valued by Māori, relevant and demonstrate positive impacts? Do we demonstrate our cognizance of Māori worldview throughout organisational business approaches?

Statement of responsibility

Restrictions and Limitations

- This Research Report is commissioned by and in accordance with the scope agreed with our addressee client Hanga-Aro-Rau.
- The reader acknowledges that this Research Report was prepared at the direction of Hanga-Aro-Rau and may not be appropriate for the purposes of the reader. This Research Report is based on the specific facts and circumstances relevant to our addressee client.
- This Research Report includes a compilation of evidence from desktop research, stakeholder engagement and data sources. Some of the evidence presented, particularly from the desktop research and stakeholder engagement are perspectives provided from third parties, which may not necessarily represent the view of Deloitte.
- Hanga-Aro-Rau consents to the use of its brand and images for publication in this Research Report, but not for any other purpose. The images of people used in this Research Report have been provide by Hanga-Aro-Rau, with the permission of the subjects.
- Deloitte, its partners, principals, employees, and agents make no statements or representations whatsoever concerning this Research Report, and the reader acknowledges that it may not rely on any such statements or representations made or information contained within this Research Report .
- The work contained within this Research Report is provided for the exclusive benefit of our client, Hanga-Aro-Rau, in accordance with our terms of engagement and Deloitte disclaims responsibility or liability for losses occasioned by any other party.

Reliance on Information

- In preparing this Research Report we have relied upon and assumed, without independent verification, the accuracy and completeness of all information that is available from public sources, from Statistics NZ and all information that was provided to us by Hanga-Aro-Rau.
- We reserve the right to review the analysis and conclusions included or referred to in this Research Report and, if we consider it necessary, to revise our work in the light of any information existing at the current date which becomes known to us after the date of this Research Report
- This Research Report has been prepared with care and diligence and the statements and conclusions in this Research Report are given in good faith and in the belief, on reasonable grounds, that such statements and conclusions are not false or misleading. However, in no way do we guarantee or otherwise warrant any statements, forecasts or scenarios. Forecasts are inherently uncertain. They are predictions of future events that cannot be assured. They are based upon assumptions, which may be beyond the control of Hanga-Aro-Rau and its management. Actual results will vary from the forecasts and these variations may be significantly more or less favourable.



Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited (“DTTL”), its global network of member firms, and their related entities (collectively, the “Deloitte organisation”). DTTL (also referred to as “Deloitte Global”) and each of its member firms and related entities are legally separate and independent entities, which cannot obligate or bind each other in respect of third parties. DTTL and each DTTL member firm and related entity is liable only for its own acts and omissions, and not those of each other. DTTL does not provide services to clients. Please see www.deloitte.com/about to learn more.

Deloitte Asia Pacific Limited is a company limited by guarantee and a member firm of DTTL. Members of Deloitte Asia Pacific Limited and their related entities, each of which are separate and independent legal entities, provide services from more than 100 cities across the region, including Auckland, Bangkok, Beijing, Hanoi, Hong Kong, Jakarta, Kuala Lumpur, Manila, Melbourne, Osaka, Seoul, Shanghai, Singapore, Sydney, Taipei and Tokyo.

Deloitte provides industry-leading audit and assurance, tax and legal, consulting, financial advisory, and risk advisory services to nearly 90% of the Fortune Global 500® and thousands of private companies. Our professionals deliver measurable and lasting results that help reinforce public trust in capital markets, enable clients to transform and thrive, and lead the way toward a stronger economy, a more equitable society and a sustainable world. Building on its 175-plus year history, Deloitte spans more than 150 countries and territories. Learn how Deloitte’s more than 345,000 people worldwide make an impact that matters at www.deloitte.com.

Deloitte New Zealand brings together more than 1600 specialist professionals providing audit, tax, technology and systems, strategy and performance improvement, risk management, corporate finance, business recovery, forensic and accounting services. Our people are based in Auckland, Hamilton, Rotorua, Wellington, Christchurch, Queenstown and Dunedin, serving clients that range from New Zealand’s largest companies and public sector organisations to smaller businesses with ambition to grow. For more information about Deloitte in New Zealand, look to our website www.deloitte.co.nz.

This communication contains general information only, and none of Deloitte Touche Tohmatsu Limited (“DTTL”), its global network of member firms or their related entities (collectively, the “Deloitte organisation”) is, by means of this communication, rendering professional advice or services. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser.

No representations, warranties or undertakings (express or implied) are given as to the accuracy or completeness of the information in this communication, and none of DTTL, its member firms, related entities, employees or agents shall be liable or responsible for any loss or damage whatsoever arising directly or indirectly in connection with any person relying on this communication. DTTL and each of its member firms, and their related entities, are legally separate and independent entities.