CONCORE TŪHURA

The Funding of TVET

Literature Review

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May 2025

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1. Purpose and scope

The purpose of this literature review was to provide a research-based foundation for understanding the role of technical and vocational education and training (TVET) in workforce development.

This review examined the benefits, costs, funding structures of TVET systems, with a particular focus on how these elements interact to shape the responsiveness, effectiveness and performance of the training system, particularly in the construction and infrastructure sector.

The insights from this review – along with information and insights provided by our key informants –informed the discussion of how to optimise funding structures and improve incentive mechanisms to align educational outcomes with workforce needs.

This report is part of series of companion reports that comprise the technical background to a discussion paper on the funding of TVET for the construction and infrastructure sector.

References cited in this paper are presented in the standalone report, *Funding of Construction and Infrastructure TVET – Methodology and Bibliography*.

2. Key areas of focus

This literature review explores the fundamental concepts of vocational education and workforce development, including the distinctions between workplace-led vocational education and provider-based work-integrated learning.

It examines the economic rationale behind vocational education, identifying both public and private benefits. It also investigates the benefits of vocational training for individuals, employers, and society at large, considering factors such as earnings premiums, job stability, workforce productivity, and broader economic contributions.

The review also explores the financial implications of vocational education, evaluating the costs for employers, trainees, and the government. This includes direct training costs, opportunity costs for learners, and regulatory expenses.

The study analyses funding models and incentive structures, comparing the New Zealand approach with other countries' models. It explores the adaptability of these international models to New Zealand's construction and infrastructure sector, identifying lessons that could inform policy reforms. It also addresses gaps in performance measurement, discussing methods for tracking workforce retention, employer satisfaction, and graduate employability.

We consider how funding mechanisms influence long-term workforce development and how equity in access

and outcomes can be evaluated, particularly for the participation and achievement of 'underrepresented'[1] groups in training and their employment outcomes.

Finally, this review highlights existing misalignments in New Zealand's funding model and identifies key barriers to equitable access and participation in vocational education.

It explores strategies to enhance industry-government co-investment and examines policy considerations to ensure funding mechanisms align with Te Tiriti o Waitangi obligations.

We placed our findings in the context of the history of TVET funding in New Zealand.

Note: Most of the findings presented in this review of the research literature relate to all forms of TVET, workplace-based TVET, as well as WIL; to TVET at trades level, as well as professionally-focused TVET. However, many of the studies reviewed, however, looked at workplace-based TVET (see Sections 7 and 8 for instance). Some sections, however, look specifically at WIL – for instance Sections 5.7, 6.6

3. Relevance to the broader programme

This literature review serves as a critical input into the broader ConCoVE programme of work, which aims to develop recommendations for strengthening funding and incentive structures in vocational education.

The findings of the review, together with the insights of our key informants have directly informed the discussion paper and recommendations, ensuring that our policy proposals are grounded in research evidence, empirical evidence and international best practice.

By synthesising key research insights, this review lays the groundwork for reimagining how New Zealand funds and supports TVET (including WIL), with the ultimate goal of building a more skilled, adaptable, and resilient workforce in the construction and infrastructure sector.

4. Conceptual foundations

Most definitions of TVET tend to emphasise the relationship of education, training and skills development to specific occupations or, in some cases, to the labour market in general (Cedefop 2025, UNESCO-UNEVOC 2025, OECD, 2024).

TVET emerged as a distinct educational form in the late eighteenth and nineteenth century, albeit one that built on a long tradition of personalised and small-scale trades and crafts apprenticeships.

[1] This term is an unsatisfactory shorthand for the complex social, historical, and systemic factors that lead to the exclusion or limited participation of certain groups, such as women, Māori, Pacific peoples and tangata whaikaha/disabled people, in various sectors of society, and fail to acknowledge the diversity of achievement within such groups.

It reflected the need to maximise the economic benefits of the shift from pre-industrial economies with a limited amount of small-scale, highly personalised trades and crafts training to accommodate the demand for large number of skilled technical workers to support larger scale industries with new production methods and technologies (Anderson 2009).

These changes pervaded other forms of education leading to a greater emphasis on economic purposes in general education, the incorporation by traditional universities of more practical and applied elements into their offerings and the creation of new types of higher education institutions that blurred technical and theoretical learning (Stratton and Mannix 2005, Geschwind and Boström 2020)

These identities of a more personalised TVET system, universities that straddle two complementary worlds and new kinds of institutions are all present in the New Zealand tertiary education system (see below *Box 1: History of TVET funding in New Zealand*).

Our approach has been to take an expansive view of the education and training relevant to this report. Accordingly, we consider apprenticeships and other kinds of post-secondary trades training along with nominally more advanced programmes of teaching and learning that are vocational in nature (such as degrees in vocational fields like engineering, law, school teaching or the health professions).

This approach takes account of the high levels of occupational-specific training offered at New Zealand universities, not only professional degrees but also a significant amount of work-integrated learning and the multiple roles that the former (and future) institutes of technology and polytechnics play.

While, as we will see, the differences between types of provision and types of institutions are hardwired into policy, funding and regulatory settings in New Zealand, these distinctions are somewhat arbitrary given the range of models and typologies of work-integrated learning that can readily coexist (Cedefop 2015).

5. The economic rationale – the benefits of TVET

Analysis of any system of resourcing needs to be underpinned by an understanding of the costs and benefits of the system – who stands to gain, how much and in what way, where will the costs fall, who should meet those costs and how should they be met, where are the risks of people or organisations capturing an unfair share of the benefits, how we can ensure that the system creates incentives on all the players to work towards achieving the outcomes that the system was set up to deliver.

All tertiary education is a mixed good; it creates private, appropriable benefits for individuals, as well as public benefits (Hűfner 2003).

Economists define a public good as one that people can consume without reducing what others can access – the classic example of a public good is a lighthouse which creates safety for each and every passing ship. Traffic management systems and the judicial system are other examples.

Public goods don't get "used up" by being accessed – while the traffic management system and the judicial

system can get clogged and crowded, they still create benefits for everyone, even if there are queues at the traffic lights (Hűfner 2003).

But those who undertake TVET gain more highly paid jobs and have a reduced risk of unemployment, so TVET creates private gains for individuals.

There are also important external, social benefits – increasing the availability of skills to the employers (and therefore, reducing the price of those skills), increasing firm productivity, wider social benefits – including higher tax revenue, reduced benefit expenditure as well as a range of non-market benefits to the society at large (Kau 1998)

That provides a case for seeing TVET as creating benefits that are partly captured by the individual and partly a public good (Hűfner 2003, Ball 2005, Wößmann 2006).

5.1 Classifying benefits

In reviewing the costs and benefits of TVET, we have followed the standard approach in the economics of education literature of categorising benefits as market and non-market benefits that accrue to the public and to private individuals – a four-way categorisation (see for instance, Russo et al 2013, McMahon 2004, Oreopoulos and Petronijevic 2013).

Market and non-market benefits

Benefits are of two types – market and non-market. Market benefits are those that can be valued by looking at how what is produced is traded in a price-based market. For instance, gaining a qualification may lead to higher earnings in the labour market – a market benefit. But there are also non-market (or non-pecuniary) benefits from gaining a qualification; for instance, having a qualification may lead to more challenging and satisfying tasks at work or better health outcomes.

Public and private benefits

Education creates private benefits for individuals; those who gain TVET qualifications are more likely to earn more, have a reduced risk of unemployment and are more likely to have more satisfying work lives. Firms also gain private benefits from the TVET system – they gain access to skilled people whom they can employ and who can help them fulfil their business objectives.

There are also public benefits from TVET, social benefits – for example, increasing the availability of skills (and therefore, containing the price of those skills to members of the public[2]), higher tax revenue for the government, while a more highly educated population is associated with non-market benefits to the society, such as greater social cohesion (Russo et al 2013, McMahon 2004, Satherley 2018 and 2021).

5.2 Benefits for learners – earnings and employment

Using a range of European survey data[3], Cedefop analysis finds positive financial returns for TVET in Europe (of around 7% per year for initial training) and higher still for subsequent or continuing VET[4] (Cedefop 2011a, Russo et al 2013). A positive financial return for TVET is also found in other countries – the US (Cedefop 2011a),

[2] For instance, if there is a shortage of qualified plumbers or accountants in the labour market, there will be queuing and waiting for the services of those people and there will be opportunities for those with those skills to increase the price of their labour.

[3] The EU's Survey of Income and Living Conditions, the European Community Household Panel, the International Social Survey Programme

[4] Cedefop (2011a), citing research by Heckman, notes that the Continuing VET (CVET) result may be affected by a selection bias in that employers may select more capable workers for CVET.

Australia (Griffin 2016, Ball 2005), England (Wolf 2011, McIntosh 2004) and New Zealand (Hurren et al 2017, Crichton 2009, Scott 2020).

Drawing data from Statistics NZ's integrated data infrastructure (IDI), Pacheco et al (2023) investigated the labour market outcomes of a cohort of 110,000 individuals who completed qualifications in 2012 in vocational fields – those covered by the six current Workforce Development Councils (WDCs).

The study looked at their income and employment status (and much else besides) over the following ten years, comparing the graduates with a matched control sample of people in the same industries with no post-school qualification. The analysis showed that higher-level qualifications were associated with higher incomes. Compared with people with VET qualifications, those with no post-school qualifications saw their incomes grow at a slower rate –showing that the earnings premium for experience alone is relatively low, whereas the premium for experience plus a qualification is much higher.

Those with level 4 qualifications – the level of completion of an apprenticeship – in fields like construction, infrastructure, engineering, manufacturing etc all had steady growth in incomes. But there were some fields, particularly art and design and enabling technologies (which are covered by the Toi Mai WDC[5]), where the earnings qualification link was not apparent.

Other financial benefits

In the New Zealand context, the financial benefit of TVET isn't solely a question of earnings; compared with non-VET education; those undertaking workplace-based TVET face lower opportunity costs in studying, in that they have higher earnings while studying. One consequence of that is that VET learners have a greater opportunity to accumulate assets (Hurren et al 2017, Scott 2020).

Employment benefits

Higher earnings is not the only way that completion of TVET is rewarded in the labour market; in addition to its effect on earnings, completion of TVET reduces the probability of unemployment. TVET is more successful than general education in helping young people gain employment in the short to medium term; those with TVET qualifications find work faster and they are more likely than general education graduates to find stable employment following completion of study (Ertelt et al 2021, Cedefop 2012a, Wolf 2011).

Wolf (2011) argues that a "…workplace teaches both general and specific work-skills more effectively than any education-based simulation can, however hard it tries; and … [that] employers use employment records as signals that individuals have acquired important character traits and ways of behaving …" so that work-based training creates the base for a sustainable career.

Looking at those who took out a vocational qualification in New Zealand in 2012, Pacheco et al 2023, unemployment is relatively low over the ten years following completion, but with wide variation by area of study and area of employment. Infrastructure, for instance, had negligible unemployment and Construction had unemployment of 6.8% for those with qualifications at Levels 2-4, while manufacturing and art/design unemployment is higher (11.8% and 16.5% respectively in 2022 for those qualification levels).

In summary, the evidence suggests that completion of TVET is associated with increased human capital.

[5] Which covers sectors like performing arts, Māori creative arts, the exercise industry, hairdressing, screen production, …

However, there is some international evidence that the earnings benefit of VET tends to flatten out in a worker's later years (Hanushek et al 2017, Wößmann 2019). Drawing on data from the OECD's PIAAC survey[6], Wößmann (2019) notes that those who took vocational education had an earnings advantage over those who with a general (ie, non-VET) education until around their late 40s but that by age of around 50, that advantage had disappeared.

Hanushek et al (2017) found the same pattern in employment rates, with the employment rate of those who took VET overtaken by the general education group around the age of 50. These papers speculate that those trends may result from the way that people adapt to economic change over the course of their careers, with those who have taken a general education perhaps being more adaptable.

5.3 Benefits for learners – non-market benefits

Reviewing the research literature, Cedefop (2011b) identifies a range of non-market benefits from VET for learners. These include, in a number of countries, better health outcomes (such as better self-rated health status, fewer chronic ailments), greater job satisfaction and greater participation in voluntary organisations.

Vaughan (2017) finds that, in New Zealand, those who undertake apprenticeships develop socio-emotional skills, inter-personal skills (such as communication skills) and enhanced dispositions[7], findings echoed in Europe by Cedefop (2011c) which notes that VET is associated with higher self-esteem, greater self-confidence, higher civic engagement and greater job satisfaction. Those findings suggest that, in many contexts, completion of VET is associated with greater social, cultural and identity capital[8], as well as human capital (Russo et al 2013, Ertelt et al 2021).

However, consistent with the findings of Hanushek et al (2017) and Wößmann (2019), the non-market benefits of VET were most pronounced between the ages of 26 and 45 years (Cedefop 2011b).

Looking at non-market benefits for individuals from VET in Australia, Griffin (2016) noted that individuals build social capital through VET by developing new networks, and, thus, that they gain confidence and self-esteem. However, she notes that the gain in social capital may occur incidentally to the training, rather than as a deliberate act of training.

Those who completed vocational qualifications in New Zealand in 2012 in most areas (Construction, Infrastructure, Engineering, Agriculture and Manufacturing for instance), had fewer mental health engagements than a matched control group with no post-school qualifications (Pacheco at al 2024). That was the case also with most of the Toi Mai WDC fields, but less so in the Toitū te Waiora WDC (which covers Community, Social Services, Education, Health etc).

Investigating the relationship between VET and well-being in Australia, Stanwick et al (2006) reported that educators said that their trainees gained confidence, self-esteem and feelings of control; the educators told

6 That means that it covered most OECD countries, including New Zealand, Australia and all the EU countries. Hanushek et al (2017) used the IALS survey which had a narrower range of countries (although, including New Zealand).

7 Vaughan's research looked at carpentry, engineering and medical general practice.

8 Social capital refers to the network of relationships and connections with people in the society. Cultural capital is usually defined the assets a person has that increase that person's ability to function in society – such as knowledge, experiences, the ability to communicate etc. Identity capital is the set of experiences, education, goals etc that makes an individual himself/herself.

the researchers that trainees benefited from social interaction and solidarity[9].

However, in looking at the non-market benefits of training we need to be cautious and recognise the possible limitations of this sort of analysis – these are correlations, not necessarily causal relationships. It is clear, however, that these positive outcomes and the observed advantages are associated with more VET (Russo et al 2013).

5.4 Benefits from VET for employers

Research shows that differences between firms in human capital – the knowledge, skills and competencies of the people they employ – is a major determinant of differences in firm performance. Employing trained people, investing in the ongoing training of employees, building their firm-specific knowledge and skills leads to better firm productivity (Crook et al 2011, Cedefop 2011a).

Focusing specifically on VET (rather than on all forms of education), Cedefop (2011c) reports on its meta-analysis of studies of the effects of use of VET on company performance. The studies mainly focused on the effects of VET on firm productivity and on other measures of company performance[10]. The analysis found that the great majority of the studies (87%) recorded at least one positive, statistically significant, effect on the economic performance of the firm[11]. The meta-analysis found that the majority of positive, statistically significant effects were related to productivity, innovation and employment growth.

One of the important questions for employers working with TVET systems relates to how much of the on-job training given to apprentices and trainees is *generic to the industry* or trade and how much is *specific to the firm*. Kau (1998), looking at the German VET system, notes that the standards for certification in a trade are set nationally, but that firms may gear training more closely to their own processes. The same comment would likely apply to the New Zealand industry training system.

Employing trainees and apprentices carries a cost to employers (see the *Costs* section of this review below), but employers – especially larger employers – will see training as a key part of their recruitment approach – using apprenticeship as an extended induction for employees who become bonded to the workplace and their colleagues while training (Kau 1998).

5.5 Benefits from VET for off-job providers

Organisations that deliver the off-job component of a trainee's VET programme benefit in two main ways:

- They receive funding that covers (or should cover) their direct costs and that helps them get a return on their capital costs – their investment in the machinery and equipment related to the field of the training. That helps them build economies of scale, supporting their financial performance.
- Connecting with the trainees' mentors and employers helps the provider build networks and remain

[9] However, those findings have not been measured in any objective manner; they are the practitioners' observations.

[10] Other performance measures in the studies in the meta-analysis were productivity growth, profitability, innovation, employment, company costs and innovation.

[11] The Cedefop (2011c) meta-analysis looked at 62 studies that, collectively, reported on 259 analyses/observations. Of the 62 studies, 53 reported at least one positive significant observation. Of the 259 observations, 136 (53%) were both positive and significant while 18 (7%) were both negative and significant.

more current with industry trends.

5.6 Benefits from VET for society, communities and the government

For the individual trainee, skill formation is related to occupational identity and leads to career opportunities and the capacity to increase earnings. And, from a macroeconomic perspective, it builds the productive capacity of the workforce as a whole and thus, it lifts economic performance (Evesson et al 2009). This section looks in more detail at how training benefits the broader community – the public, the economy, the labour market, the government.

VET and the supply of skills

Skill constraints reduce firms' productivity, compromise innovation and increase costs for the economy and society. Faced with skill shortages, firms may leave positions unfilled for a time (reducing output) or else are forced to compromise on the skills of those they appoint, (risking output, quality and (likely) incurring additional training costs). It also has the consequence that the wage rate in the field where the shortage occurs may rise, raising the cost of production and hence, the price to consumers (Brunello and Wruuk 2021).

Broadly speaking, skill shortages are of two types – cyclical or structural.

- Structural skill shortages occur because of demographic change, technological change and changes in consumer preferences, so that demand falls for one type of product or service and increases for another, generating a skill oversupply for the former and a longer-term shortage of skills in the latter (Brunello and Wruuk 2021).

- Cyclical shortages occur when demand expands in the economy and disappear during recessions when aggregate demand falls (Brunello and Wruuk 2021). As an example, the construction industry in New Zealand is especially vulnerable to that form of cyclical expansion and contraction, with sharp peaks and troughs in demand of greater magnitude than changes in GDP[12] (Parke and Warren 2014, MBIE 2023). In part, that difference reflects the importance to construction of the availability of finance (Park et al 2012), perhaps also regulatory change in the industry.

In the New Zealand construction industry, there are endemic skill shortages (NZIOB 2021), leading to above average wage growth, despite below average productivity growth (MBIE 2023). In effect, the shortage of skills is driving cost increases in construction. NZIOB (2021) argues that the problem "is the result of under-investment, over decades, in trade apprenticeships and construction companies' in-house training programmes".

In that example, we see this one industry delivering diminishing value to the society, a result (in the view of NZIOB) of lower than needed investment in TVET[13] – a problem shared by a number of countries, especially the UK (Keep 2020 and 2002, Wolf 2011, DfE 2019).

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[12] See Parke and Warren (nd) Figure 4 and MBIE (2023) Figure 9. Note however that Park et al (2012) find that modelling that allows for factors like the finance availability will accurately predict the construction business cycle in the UK, Korea and the US.

[13] However, despite the findings of NZIOB, Te Pūkenga data shows that that Building and Construction part of Te Pūkenga's WBL division was much the largest arranger of work-based training in 2023.

A general increase in VET will increase the number of skilled individuals available to the labour market (and all else equal, will mitigate the risk of an escalation in the price of labour beyond any increase in productivity). That is it would help prevent the sort of wage rises reported by MBIE (2023).

The benefit of that cost containment is potentially available to all firms in the industry, *not simply to the firms that engage in training*; it is true that part of a firm's cost in training an apprentice is recouped as a saving in recruitment (as well as through firm-specific tailoring of training) (Kau 1998). All the same, there is a risk of some employers avoiding training and then "free-loading" on those that do train, benefitting from the constraints in earnings, paying slightly above the market to lure those trained at another's expense.

VET and national innovation performance

European research suggests that one factor influencing the take-up and implementation of innovation in an economy is learning-intensive forms of work organisation. That implies that opportunities for learning – in particular ongoing training – in a firm enable the organisation's workers to take on more complex tasks – an important factor in building innovation in firms.

The findings indicate that the take-up of continuing training in the workforce – including formal, non-formal and informal learning – might be as important a predictor of national innovation performance as participation in higher education (Cedefop 2012b, Russo et al 2013).

VET and national productivity growth

James Relly et al (2021) argue that the skills acquired through VET are important for productivity in the economy and for economic growth *provided that* the VET teaching is of high standard and is well-linked to industry (to reflect and keep abreast of the evolving nature of work and the workplace).

In a review of quantitative studies of the effects of VET on macro-economic indicators in Europe, Russo et al (2013) find that, in some countries, a rise in vocational skills is linked to productivity increases as well as to reductions in unemployment, benefitting the country's economy. In part, the effectiveness of vocational skills on productivity may be enhanced by "spillover effects" – skills passing between workmates. However, the magnitude of the effect varies a lot between countries.

Non-market benefits of VET for societies

Post-secondary education is associated with better social outcomes – social cohesion, well-being, social trust and health both in New Zealand (Satherley 2022, 2021, and 2018, Scott 2021 and 2018) and internationally (OECD 2024). However, evidence of direct non-market benefits of *TVET* for society as a whole is less clear (Russo et al 2013). Russo et al (2013) report on research that finds that initial VET has an association with lower crime and that a lack of VET opportunities in the UK is seen as a risk factor for delinquency. Their review notes that several European countries "report VET's positive effects on integrating groups at risk of social exclusion," a factor that may have an impact on other social factors.

However, one important social benefit of VET is that VET leads to certification of *trained expert practitioners in important, valuable occupations*. Members of the public can engage an electrician, plumber, builder etc with confidence that the practitioner in question is trained to meet a base level of competence – reducing anxieties about safety, quality of service etc. And, if training volumes are well-aligned to demand, the price to customers will be reasonable.

5.7 The benefits and value of work-integrated learning (WIL)

Work-integrated learning (WIL) means approaches to learning that integrate academic, theoretical learning with the practice of work (Patrick et al 2008, Orell 2004, UA 2019). Work-integrated learning (WIL) bridges academic study with practical experience, offering students opportunities to apply classroom learning in real-world settings (Patrick et al. 2008, Orell 2004, UA 2019).

Models vary from Canada's co-operative education, where students undertake full-time, paid work as part of their qualification (McRae & Johnston 2016), to the UK's "sandwich" courses, which incorporate extended workplace placements (Coll et al. 2009).

Research highlights significant benefits, including improved employability, confidence, and higher post-graduation earnings (Jackson 2014, Finnie & Miyairi 2017). Participation has surged globally, with three in eight Australian university students engaging in WIL by 2017 (UA 2019). However, effective WIL requires strong partnerships and substantial investment, as successful placements demand structured mentoring, assessment, and coordination between institutions and employers (Jackson 2013, Patrick et al. 2009).

In New Zealand, while WIL is expanding—seen in initiatives like the University of Waikato embedding WIL in all bachelor's degrees (Quigley 2020)—funding constraints remain a barrier. The current funding model does not reflect WIL's resource intensity, as funding rates are based on outdated cost structures from the 1980s (Smyth 2024).

Classroom-based teaching and learning that is *integrated with* opportunities to enrich that learning by applying it in a practical setting in a workplace relevant to their program of study and career aims (Jackson et al 2017, Coll et al 2009).

Jackson (2014) reports that participation in WIL helps higher education students develop employability skills; it lifts their confidence in their capability, builds their understanding of the world of work and makes them job ready.

It improves students' socio-emotional (soft) skills – their skills in team-working, problem-solving, communication skills, critical thinking ability, even their time management – all skills valued by employers (Jackson 2014, Coll et al 2009, Ferns et al 2014). In an analysis of research on WIL, Coll and Kalnins (2009) report that effective partnerships between institution and workplace, student, instructor and mentor can help the transfer of the academic learning to the workplace and can lead to talent growth.

Research covering 14 Canadian institutions shows that in most fields, participation in work-integrated learning leads to higher earnings over the eight years following graduation, even controlling for the students' GPA[14]. That implies there is value for graduates and employers in work-integrated learning. It suggests that the experience in the workplace has deepened the transfer of knowledge[15] (Finnie and Miyairi 2017).

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[14] There is, however, a possible selection bias in that it is possible that there are unobserved variables that predispose certain types of individuals top apply to take co-operative education and that also have a positive influence on their employment outcomes.

15 See also Statistics Canada (2015)

Students who took WIL as part of a university programme in Australia, the UK and the US were more likely to have a positive view of their university experience and more likely to have gained employment in their chosen field[16] (Orell 2004).

6. Financial implications – the costs of TVET

In this section, we look at what the literature tells us about the sources and types of costs in VET programmes but without looking at who meets those costs, or at how those costs might be allocated in an ideal world. Broadly, the costs of VET can be seen as of four kinds:

- Employer costs
- Off-job provider costs
- Trainee costs
- System or regulatory costs (McIntosh 2004).

6.1 Employer costs

In a VET system in which 50% or more of the training is done on-job, employers bear much of the cost of training.

But the total cost borne by the employer is rarely made explicit because:

- training costs are not recognised in the company's accounts (Kao 1998)
- much training occurs informally in unstructured settings or in the course of tasks that are not classed as training time – so the cost is less visible and unquantifiable (Richardson 2005)
- the firm's equipment, used by trainees as they learn, is also used in the firm's productive work – meaning that all of the depreciation on those assets is likely to be treated as a cost of production, so that the training component is invisible (Kao 1998, Jones 2023)
- there are unquantified transaction costs when the employer and experienced workers find themselves in the role of teacher/trainer, especially if that involves liaison with the off-job provider or (in the NZ context) a training advisor (Messam 2024, James Relly and Laczik 2022, Chan 2011, Squires et al 2015, Vaughan 2017).

Training lowers the firm's productivity because tasks take longer (and productivity is inversely proportional to time taken), and because experienced (faster) workers are diverted into mentoring and supervision while (slower) trainees perform tasks (Jones 2023). Jones (2023) notes that there are three phases in a trainee's career – the first in which there are high costs for the employer and low trainee productivity, a second phase

[16] The result came from a cross-country graduate survey. Note that here too, there is a risk of selection bias.

in which the trainee's output and productivity grows, leading to a modest benefit for the employer and the third in which the trainee achieves productivity and training costs diminish.

One of the most important aspects of workplace-based VET is that employers become the primary trainers and teachers of apprentices and trainees, and they are responsible for ensuring that trainees are well-inducted (Alkema 2016, Allen and Clarke 2024, Chan 2011, Squires et al 2015, Vaughan 2017). The employer's capability as a teacher is critical to the transmission of skills and knowledge to the trainees and hence to the firm's prospect of realising productivity gains[17] (James Relly et al 2021). That additional role adds transaction costs.

Employers are entitled to pay apprentices at the training wage, a lower rate than the adult minimum wage[18]. But they also continue paying that wage while the apprentice is off-site attending off-job training. And some employers pay the off-job course tuition fees as well (sometimes in exchange for an undertaking by the apprentice to remain with that employer after qualifying thereby ensuring a pipeline of skills) (Eichhorst et al 2021).

6.2 Off-job provider costs

Off-job providers bear the costs of tutor time and overheads – in particular, depreciation on equipment and tools – when they run off-job courses. Those costs are met partly by funding from industry training organisations (which purchase off-job courses) and partly by fees charged to participating trainees.

To be effective in delivering to trainees, off-job provider tutors need to be in contact with both training advisors and the employers of the students attending their programmes (Squires et al 2015, Chan 2011). Isolated from the dynamic industrial environment, off-job provider tutors may not be aware of changes in practice by firms in the industry; that places an obligation on those providers to ensure they remain in close contact with firms, so their off-job courses can provide information and skills in the most relevant way (Eichhorst et al 2021, OECD 2014). Time for those interactions represent a cost to the off-job provider.

6.3 Trainee costs

The share of the cost of training met by the trainee or apprentice will vary by employer and by industry, with some employers paying a greater share as a means of encouraging people to join the firm or in exchange for an agreement by the apprentice to be bonded to that employer for a period following qualification.

Trainees can be paid the training wage, which is lower than the adult minimum wage (although some employers and some industries pay a margin above the training wage, especially as a trainee progresses through training and hence, becomes more productive) (Eichhorst et al 2021, Richardson 2005). In effect, the trainee bears a cost that is (at the very least), the difference between the adult minimum wage and the training wage but may be much greater for those who could expect to earn well above the minimum wage had they not been in training; this is an investment in future earnings (James Relly and Laczik 2022, Eichhorst et al 2021).

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[17] It was noted above that part of the German "meister" qualification is devoted to training in teaching, training and pedagogy. Few Anglosphere countries devote that focus to this important part of the employer's work.

18 See this information.

In addition, most apprentices have to provide a range of their own tools.

And trainees may be expected to meet fees for off-job courses (and, possibly, travel and accommodation costs) – though, as noted above, some employers may help meet these costs and, in some cases, trainees can borrow fees for off-job courses through the (subsidised) student loan scheme. In addition, some employers may not pay wages to trainees while they are attending off-job courses.

6.4 System and regulatory costs

In all the countries surveyed for this analysis, the government contributes some of the funding for VET.

In the post-1992 New Zealand industry training system, the government funded industry training organisations (ITOs) to arrange training for apprentices and trainees in its areas of coverage, to deploy a network of training advisors to oversee the training and to purchase off-job programmes for trainees, mostly from polytechnics, PTEs and wānanga.

From time to time, that funding has been supplemented by additional special purpose funds (like the NZ Apprentices tool grant, the Targeted Training and Apprenticeship Fund (TTAF), the Apprenticeship Boost Initiative and the Māori and Pasifika Trades Training (MPTT) initiative

ITOs (and now WDCs) have also been standard-setting bodies[19], using intelligence gathered from environmental scanning, from employers and from industry leaders to propose changes and updates to standards and qualifications.

Government also bears the costs of maintaining the system – in particular, the regulatory system, quality assurance and the qualifications system (NZQA) and the funding and monitoring systems (TEC).

6.5 The cost of WIL

The key characteristic of all work-integrated learning lies in the word "integrated"; WIL provides an opportunity to enhance classroom learning by applying what is learned in relevant tasks in a work setting relevant to the programme being taken (Coll et al 2009). In other words, done well, WIL is not simply an add-on to an academic programme. The work placement should be linked clearly to the learning outcomes expected from the class. It means that the on-site mentor and the TEO-based instructor must have a shared understanding of the expectations on the learner and they should both contribute to the assessment of the learning acquired during the placement.

This means that effective WIL is difficult and costly to manage (Jackson 2013) while under-resourced WIL placements can be highly problematic (Jackson et al 2017). If WIL is to be effective, students need not just the *experience* of work and not just a reflective essay or a presentation on the internship. There should be deliberate, specific educational input from the education provider as well as the workplace mentor, meaning that economies of scale evaporate (Smyth 2024, Patrick et al 2009). The Australian government has acknowledged this issue (Jackson et al 2017).

Assessment of WIL students' performance is a particular challenge. Ideally, the institutional supervisor will

[19] And the soon to be created Industry Skills Boards (ISBs)

set clear learning objectives for the placement in consultation with the learner and the workplace mentor and the institutional supervisor's assessment will take account of the workplace mentor's observations and the learner's self-assessment. Effective assessment of WIL takes time and time costs (McNamara 2014).

But the government funding doesn't recognise that …

The problem faced by institutions in developing and managing high quality WIL is that, except in a few areas, funding rates don't recognise this additional cost. Funding rates are differentiated by field of study, based on assessments made of the cost of delivery in 1989-1990.

Therefore, the current funding differentials reflect modes of delivery from 30+ years ago (Smyth 2024)[20]. If there is a more effective but more costly, mode of delivery (such as WIL), then it will be less likely to be implemented by cost-conscious management in institutions. WIL has always been used in New Zealand in degrees such as nursing and teaching and so the funding rates in those fields take account of the additional costs of WIL. But a move towards adoption of WIL in traditionally lower cost fields would have to be made by finding economies elsewhere in an institution's budget (Smyth 2024).

Resourcing, of course, is a partnership between students (through their fees) and government (through tuition funding and student loan subsidies). But, under the current policy settings, the government controls both its level of funding and domestic fee levels, leaving international student fees as the one source of revenue that is within providers' control[21].

[20] There have been adjustments to the differentials since then (especially in 2011/12 when some imbalances were corrected – see Connew et al (2015) but the methodology used to make adjustments wouldn't have allowed for a shift in delivery approach.

[21] Note that there are risks in excessive reliance on international student fees as a primary source of revenue – as was evident when the country's borders were closed during the pandemic.

Summary of costs and benefits

The costs and benefits identified in the literature and discussed above are summarised in the table below.

	Market Benefit	Non-market Benefit	Costs
Trainee	• Training wages • Enhanced future earnings potential • Enhanced employability prospects	• Greater job satisfaction • Other possible[22] benefits in social, cultural and identity capital – health, self-esteem, civic engagement	• Wage discount – trainees are paid below the rate they could otherwise command • Cost of buying tools • Fees and associated costs for off-job courses
Employer	• Increased firm productivity over time as trainees get more skills • Recruitment advantage – trainees are likely to stay with the training firm after completion • Short term wage discount – training wage is lower than minimum wage	• More satisfied workforce • Picking up on trends in the industry through engagement with off-job provider and training advisors	• Loss of productivity as trainees learn and as experienced staff mentor trainees • Transaction costs of training/mentoring, dealing with off-job providers and training advisors • Depreciation on use of capital for training purposes • Subsidising off-job courses for trainees
Off-job provider	• Revenue from fees/funding • Greater use of equipment – return on capital investment	• Improved links to industry • Up-to-date information on industry trends	• Tutor time • Overhead costs, including depreciation on equipment • Transaction costs – dealing with employers/training advisors
Public/society - by proxy, the government	• Availability of skills in labour market – increased aggregate productivity • Containment of price/costs of advanced skills • Increased innovation in the economy • Lower costs in justice, social welfare etc	• Social inclusion benefits • Public confidence in the quality, safety etc of providers technical services (such as electricians, motor mechanics, builders etc)	• Funding for the VET system and for trainees • System costs – regulation, monitoring, funding, policy
Firms in the industry that don't train	• Containment of price/costs of advanced skills • No loss in productivity loss from training		

Source: Authors' summary of the findings of the literature review

[22] Note that the causality of these benefits is unclear – however, there is clear correlation between those outcomes and TVET.

7. Funding models and incentive structures

7.1 Funding workplace-based TVET in New Zealand

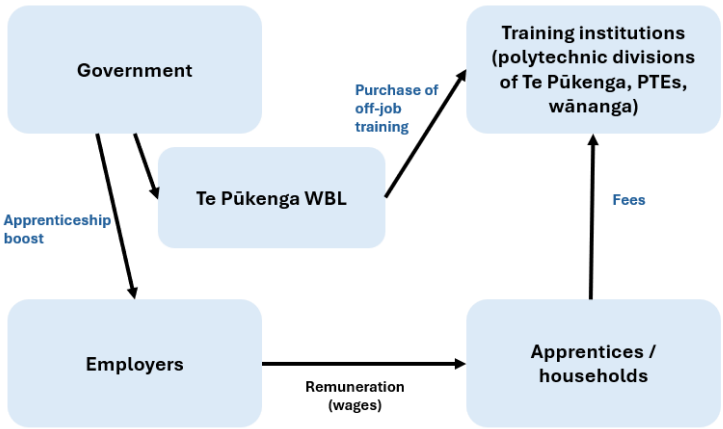
Public resourcing systems for education are primarily intended to reflect the benefits of education to society and also to mitigate the risk of market failure, the risk of under-investment by lowering the cost to individuals and families (Glomm et al 2011, Friedman 1982). Government's orchestration of the resourcing of the TVET system is intended to create a balance – ensuring that the cost of delivering learning and the cost of undertaking learning are at levels that see "enough" learners can participate – otherwise, there will be skill shortages in the economy. Resourcing needs to enable providers of learning to offer a good quality service and to be able to sustain that over time. The learner also contributes, reflecting the benefit that he/she receives. And, as noted above, in the case of workplace-based TVET, many employers also make a contribution

Any education resourcing system has three primary components:

- Resourcing for learning – covering the costs of delivering and supporting learning
- Resourcing for learners – supporting the costs that learners must meet in order to engage in learning
- Resourcing for system costs – meeting the costs of managing, monitoring and overseeing the system, including quality assurance.

The resourcing flows are represented schematically in Figure 1.

Figure 1: Work-based training resource flow schema in New Zealand, as of 2024



Source: Authors, based on government agency documents and practices. Note, this diagram excludes the cost of the fair value write-down on any lending under the Student Loan Scheme which is, in a structural sense, a payment in kind from the government to the apprentice.

In New Zealand, the approach to workplace-based training of apprentices is decentralised. The linkage between the employer, the learner and the government agencies involved is provided by the training brokers/advisors (pre-RoVE, the ITOs and during RoVE, the Work-Based Learning divisions of Te Pūkenga) who arrange training, advise and monitor the progress of learners and liaise with employers.

7.2 Examples of European TVET systems

European countries – those of Northern Europe especially – provide an interesting contrast to New Zealand in their approach to managing and resourcing TVET. Those countries tend to have systems that perform well on measures such as completion rates[23] (though their more highly regulated, centralised approaches would jar with much of the New Zealand public sector culture).

Most European governments subsidise their TVET systems more heavily than the recent past in New Zealand:

- in many cases, the government pays the full costs of off-job courses
- in some countries (Denmark, for instance), apprentices' living costs are subsidised through grants, allowances, loans etc
- in some cases (Germany, Netherlands, Ireland, Denmark), the government subsidises employers' training costs through grants, subsidies or tax breaks (Cedefop nd).

Figure 2 below shows the resource flows in three northern European countries.

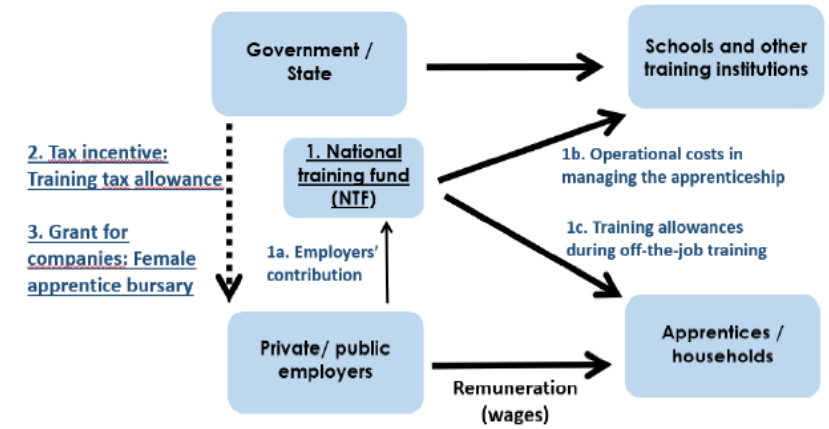
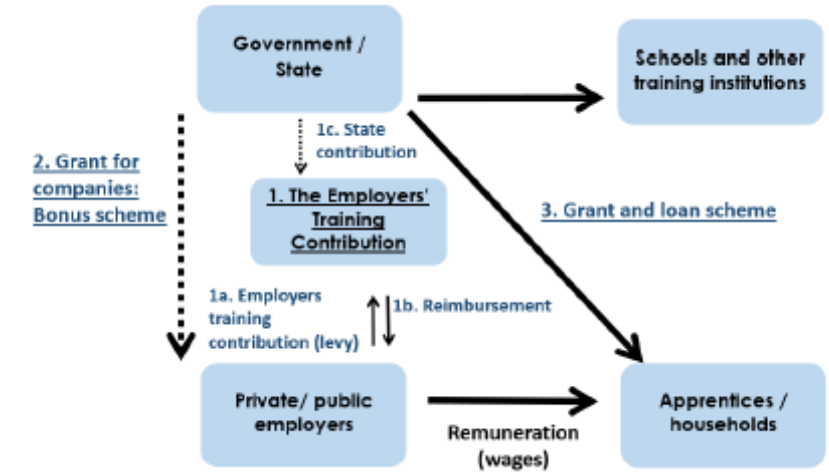
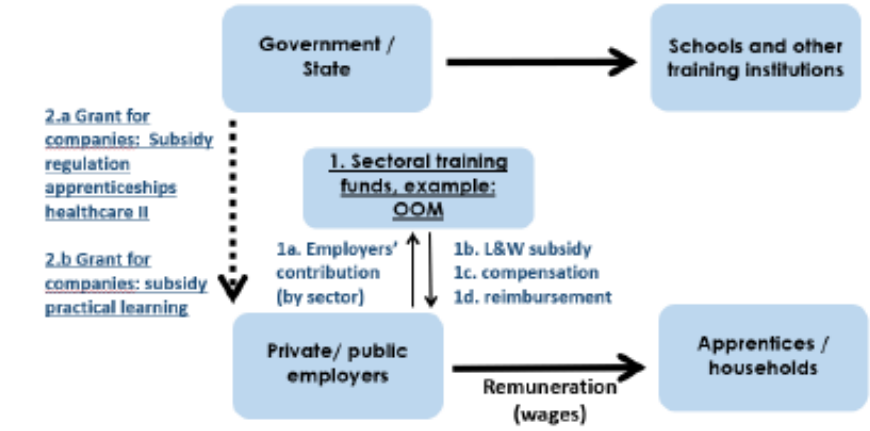
In some cases (Ireland, Denmark, Netherlands, France – and also the UK), employers pay a levy into a central fund which is then used to meet some of the costs of training. In the cases of Ireland, the UK and France, that fund pays for/subsidises off-job training, while in Denmark and the Netherlands, those employers who train can claim back from the fund to offset their training costs; in those two countries, the effective net levy rate is lower.

Most European countries specify the duration of training (in contrast to the New Zealand competency-based approach).

Apprentices in most countries in northern Europe (like those in New Zealand) spend more than 50 per cent of their training on the job, whereas in southern Europe (Italy, France, Portugal) off-job training constitutes between 20 per cent and 50 per cent of the time spent in training.

[23] CEDEFOP reports that completion rates of apprentices in Austria and Germany are around 75%. In NZ, the rate is 43% in building, 49% in electrical and 55% in civil engineering and is not much better in other Anglophone countries (such as Canada, Australia and England – though Scotland and Ireland have higher rates) – refer to MartinJenkins (forthcoming).

Figure 2: Work-based training resource flow schema, selected European countries

Details	Resourcing flows
Ireland	
Training duration: 4 years, 1,600 hrs/year On-job training: >50% Employers get a tax break for training Employers pay into a central fund that pays a stipend to trainees during off-job and subsidises off-job courses Government also funds off-job courses.	
Denmark	
Training duration: 2-4 years, 1,110 hrs/year On-job training: >50% Employers pay into a central fund and claim back to offset the costs of training. Government subsidises that fund. Government subsidises apprentice's wage. Government pays full cost of off-job courses.	
Netherlands	
Training duration: 1-4 years, 1,280 hrs/year on average. On-job training: >50% Government subsidises employers' training costs. Employers pay into central funds and claim back to offset the costs of training. Government pays full cost of off-job courses.	. 

Source: CEDEFOP – see this set of summaries of national TVET policies

Learning from international examples

It needs to be noted that, while it is possible to learn from the example of other countries, it is not possible to "transplant" the approaches taken in those systems. Each country's approach to its TVET system reflects its educational culture, its public sector and public financing approaches, its traditions, its demography, the nature of its labour market, its industrial traditions, its natural resources ….and a host of other factors (Li and Pilz 2023)

For instance, the German TVET system, which has shaped the TVET systems of the so-called DACH countries (Germany, Austria and Switzerland) and influenced the systems in Lichenstein, Denmark and Luxembourg, offers a model of the way the on-job and off-job parts of TVET can operate together (Cedefop 2024). And the German "meister" qualification, the highest level of the TVET system, provides a capstone to the training (and includes finance, management, law and the pedagogy of training) (Hippach-Schneider 2019, Cedefop 2024).

But the German system works as it does because of the way that firms are linked to well-established and powerful chambers of commerce, the way the vocational colleges are set up to offer complementary off-job training that is well-linked to on-job training. And the German system has grown in a country where the disparities of esteem between vocational and academic education – one of the features of most Anglosphere countries' educational culture – are much less, all but non-existent (Cedefop 2024, Deissinger et al 2011).

Other levy models

Looking abroad, many countries have experimented with funding models that explicitly support equity and universal design in education. A common approach in technical/vocational training is the use of training levies or national training funds, which require industries or employers to co-fund education. Globally, at least 75 countries operate training levy schemes to generate dedicated funding for vocational skills development (UNESCO, 2022).

Most levies internationally involve payroll levies from employers[24] although there are some notable exceptions including levies on foreign worker permits. These funds tend to be use for multiple purposes including financing 'in-firm' training, equity training for disadvantaged groups and pre-employment training. These funds can be structured to provide for 'criteria-based' subsidies for specific population groups, subsidise training programmes for disadvantaged groups or to finance broad improvements in training quality (including curriculum design and instructor training) (UNESCO, 2022).

There are four state and federal levy schemes in Australia used to provide training opportunities including additional funding to employers to support mature and aboriginal workers, subsidize training for veterans, train workplace trainers[25], and develop initiatives for young workers[26], although most funding contributes to universal 'free-free' education places[27].

Connection to other policies in New Zealand

Exploring changes to how construction and infrastructure tertiary and vocational education and training is

[24] Although the mechanisms vary widely among the 63 countries with such mechanisms. See (UNESCO, 2022)
[25] See Construction Industry Training Fund (South Australia)
[26] See Keystone Tasmania
[27] See Skilling Australians Fund levy

funded in New Zealand involves consideration of other related policies.

Some important areas where education and training interface with wider government policy include the Going for Growth agenda which included reference to infrastructure to support economic growth and the National Infrastructure Plan which is intended to build a more complete picture of the nation's infrastructure needs and priorities over the next 30 years.

One particular area that we focus on for this report is the City and Regional Deals policy because of the way this policy interacts between central government and regional New Zealand.

City and Regional Deals

These deals are formal partnerships between central and local governments designed to spur regional infrastructure investment and economic growth by shifting decision-making powers and funding to local leaders and businesses (HM Government, 2011) and are part of a broader set of place-based strategies to achieve specific economic and social development goals (Barca, 2012). They are intended to unite key stakeholders – local authorities, industry, iwi (tribal) groups, and educational institutions – around shared development goals.

Crucially, many Deals embed education and skills initiatives alongside infrastructure projects to ensure local workforces can capitalize on new opportunities. For example, the successful Greater Manchester City Deal (UK) combined major transport investments with the creation of new research institutes and skills programs to boost local employability (Cabinet Office, 2012).

Likewise, Australia's Townsville City Deal not only funded a range of infrastructure initiatives but also included plans to develop the region as an international education and training hub (Infrastructure Australia, 2016).

By integrating vocational and tertiary education into growth strategies, these Deals can foster collaboration between government, industry and communities to build human capital in tandem with physical capital.

United Kingdom: Manchester's Devolved Education Model

Over 30 City Deals have been negotiated in the United Kingdom that focused on infrastructure investment, research institutes, skills development and more effective local governance, with Greater Manchester offering a leading case. Greater Manchester's City Deal (signed 2012 between 10 local councils and the UK Government) explicitly prioritized skills development to improve employability, alongside infrastructure and innovation initiatives (Simpson Grierson, 2024).

It created a new combined authority governance that took on responsibilities for post-16 education and training. Manchester gained control over a unified skills budget and the ability to re-commission further education (FE) provision, allowing local leaders to reshape college programmes and apprenticeships to meet the city-region's economic needs (Cabinet Office, 2012).

An innovative City Apprenticeship and Skills Hub was launched to broker apprenticeships with SMEs and give employers a direct role in training delivery. This devolved approach has led to stronger employer engagement and more responsive tertiary education. Local businesses in Greater Manchester now help co-design curricula and influence funding priorities, resulting in training that is better aligned with the region's labour market

demands (GMCA, 2012).

An evaluation found that the Deals process acted as a "catalyst" for closer collaboration between colleges, employers and councils, and gave employers a mandate to shape skills provision according to local needs. Manchester's experience shows how empowering regions to govern skills – through bodies like the Combined Authority and its Skills and Employment Partnership – can improve workforce outcomes and target education to support key industries (from advanced manufacturing to digital), fuelling broader economic growth (UKCES, 2015).

8. The performance of the New Zealand workplace-based TVET system

The measured educational performance of the TVET system is mixed. Nearly 400,000 people were employed in the construction and infrastructure sector in 2023, and this sector is expected to create between 4,000 and 5,000 new jobs each year in the short-to-medium term as it deals with New Zealand's housing shortage, the need to renew and refresh infrastructure, improve building and infrastructure performance and manage changing technologies.

The system produces around 9,800 graduates each year who play a vital role in sustaining and refreshing the construction and infrastructure workforce (Waihanga Ara Rau 2024).

But, despite the numbers in training, the industry continues to face shortages of skills and needs to bring in migrants to complement the domestic workforce. The BDO *Construction Sector Report 2023* found that skills shortages – skilled labour especially – is a constraint on construction, with 79 per cent of firms reporting access to labour as a problem. The 2024 BDO report noted an easing of the shortage of labour but 83 per cent of employers in civil and infrastructure firms were actively seeking staff (MBIE 2023, BDO 2024 and 2023).

That means that the performance of the TVET system is critical to the health of the sector and thus, to New Zealand's economic and social well-being.

This section draws from administrative data and from research and analysis to assess:

- The demand from learners for TVET
- Access to training
- The supply of training
- The quality of training
- The quality of the outcomes from the system.

Gaps in performance measurement

While it is possible to gain a reasonable sense of the *educational* performance of the New Zealand TVET system, there are gaps in performance measurement. Especially, the largest and most serious gaps relate to how the TVET system impacts the industries the system serves. For instance, if the system is designed to provide skills for industry it would be reasonable to ask how training impacts on firm productivity and workforce retention. It would be important to gain a sense of employer satisfaction. Those measures don't exist and should be developed.

There is a research literature on the relationship between on-job training and firm productivity – see for instance De Grip and Sauerman (2013), Colombo and Stanca (2008), Barba Aragón et al (2013) and the meta-analysis by Davar and Parti (2013) – which shows overall that firm productivity is positively affected by training. As noted in Section 5.4 above, a meta-analysis of studies of the effects of VET on company performance (Cedefop 2011c) found that most of the studies (87%) recorded at least one positive, statistically significant, effect on the economic performance of the firm – such as, for instance, gains in productivity, innovation and employment. There is also a literature that looks at the effects of enterprise training – uncredentialed training that firms initiate for existing employees – see for instance Maglen et al (2001) and Smith (2001).

However, the measurement is complex. Further, it's not clear that this literature can be assumed to apply equally in all contexts (De Grip and Sauernman 2013). Our interest in is the specific context of a set of firms in a small set of industries that access a particular form of training in a particular country. That research (and the monitoring approach that might be built from that research) do not currently exist in this country; it's a gap waiting to be filled. At that point, it may be possible to create measures that allow us to assess whether and how much the TVET system adds to firm performance.

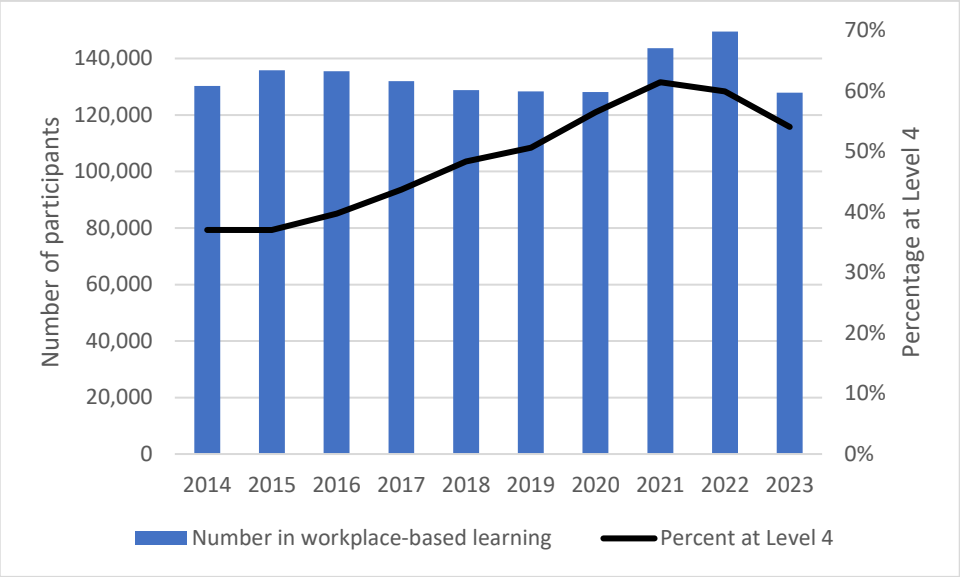
A more promising matter is to refine methods of tracking individuals' pathways through and beyond their TVET – looking at which individuals enter workplace-based training, how that affects their earnings, how long they stay with their initial employer, how long they stay in the industry, how long they stay in the country, what is the pathway to business ownership, with statistical controls for social and educational background. That would give a clearer sense of value add – of how the training system is building and enhancing human capital and how it is adding value to the individual, to the firm and to the industry. That sort of tracking is possible now through the IDI. Pacheco et al (2023 and 2024) have made a start. What is needed is a more directed pathways study that captures a sense of value add.

While we are unable to comment on how the system performs in relation to these larger questions, there are many areas where we can assess system performance – this is set out below in sections 8.1 to 8.6. While much of our focus is on construction and infrastructure, much of the analysis applies equally to how the workplace-based TVET system serves other sectors as well.

8.1 Learner demand for workplace-based TVET

The level of participation in workplace-based industry training has been relatively stable over the last decade, with the exception of a spike in 2021 and 2022 – in response to the government's Covid measures, in particular, the Apprenticeship Boost Initiative.

Figure 2: Trends in participation in workplace-based training



Source: Ministry of Education, VET statistics

With the exception of the Covid spike, the most significant change has been the shift from lower-level training to training at Level 4 and above. In 2014 and 2015, nearly two thirds of the training was at Levels 1-3; since 2019, more than half has been at Level 4 – the level of apprenticeship training.

But demand for workplace-based training continues to be affected by disparity of esteem – the widespread view that higher education is of higher prestige than trades-focused education (Murray 2005, James Relly 2021, Ackehurst et al 2022). Vocational education is sometimes seen as a good idea for "other people's children" (Murray 2005). An Ipsos survey for Waihanga Ara Rau in 2024 found widespread misconceptions about careers (and, consequently training for careers) in sectors such as construction and infrastructure; in particular, a common view is that a career in this sector is either for those who are physically strong (in trades-related careers) or for those who have exceptional skill in STEM fields (in professional careers) (Waihanga Ara Rau and Ipsos 2024). That survey also found that, for older respondents "… the *perceived costs* … and *personal circumstances* …" are seen as barriers to entering training. Nonetheless, Ministry of Education data[28] shows that around 60% of those taking level 4 industry training are over the age of 25 and nearly 20% are over 40. Similarly, ConCOVE's data dashboard shows 57% of those training while working in construction and infrastructure had entered training from work in other industries, a majority (59% of all trainees) are over the age of 25 while a significant minority (23%) are over the age of 35 years.

There have been efforts in recent years to shift these attitudes (notably, the series of witty BCITO advertising campaigns) and the Ipsos poll noted gradual reduction over the years in prejudice (Waihanga Ara Rau and Ipsos 2024). However, it is possible that the disparity may never disappear. James Relly (2021) notes that

[28] Ministry of Education, VET statistics

disparity of esteem has not been achieved despite 70 years of advocacy; she argues that, given the focus of higher education as the route to social mobility, parity of esteem is a "pipe dream". She concludes: "The worth lies in making the vocational route valuable to young people, their parents, and employers through investment in quality, higher-level vocational and technical education and training in well-resourced vocational institutions …. Only then will the vocational route be given the esteem it deserves." If that is correct then employers, providers and advisors will likely always need to advocate for this pathway.

8.2 Access and participation

Māori and Pacific peoples participate in workplace-based TVET at around their share of the national population[29], (although at higher levels in TVET – for instance in degrees in engineering and architecture – both groups are very much under-represented) (Smart 2018).

However, women are under-represented; only 30% of trainees are women and women represent only 21% of those taking level 4 qualifications. The imbalance is especially severe in construction-related training; only 5% of trainees supervised by BCITO are women, while most of the women in industry training are clustered in service industry paths (such as the health sector, social and community services and hairdressing etc)[30].

Efforts to make construction workplaces welcoming and suitable for women are incomplete so far. While much construction activity occurs in make-shift facilities on building sites, the problem of providing facilities for women, as well as male workers, is compounded. Construction has faced problems of hostile environments for and harassment of women, with a high proportion of workers reporting having experienced harassment, often by a colleague in a more senior position (Hurd and Dyer 2024). Guidelines for safe and respectful conduct in the workplace, produced by two of the Workforce Development Councils aim to help employers, supervisors and employees address the issues (Waihanga Ara Rau and Hanga-Aro-Rau 2023).

The third pressing access issue relates to questions of language, literacy and numeracy (LLN) competency, neurodiversity and physical disability (All is for All 2024). Lack of LLN skills is a particular challenge for trainees who are required to complete course work and assessments while located in the workplace, remote from sources of academic support; self-directed learning is a challenge for anyone who lacks LLN skills (Farrell et al 2016)[31].

Transitions from pre-trades and foundation programmes to TVET

Polytechnics and some private training establishments (PTEs) run pre-trades programmes designed to prepare young people to transfer to trades training. The TEC also funds the MPTT programme, designed to help rangatahi and talavou gain initial trades training as a stepping stone to a full TVET programme. In addition, there is a multiplicity of programmes run by government agencies – MSD, MPP and TPK for instance – for people at risk of unemployment (MartinJenkins forthcoming).

The principal outcome sought by those agencies is employment. Yet research raises questions about whether

[29] Ministry of Education *op cit* and SNZ 2023 Census national data

[30] Ministry of Education *op cit*

[31] See also Education Unlimited which provides support for firms that need LLN support for their employees and trainees and BCITO which provides resources that support neurodiverse trainees. The Workplace Literacy and Numeracy Fund, administered by the TEC, offers some support – see Alkema (2020)

that is appropriate in the longer term; many of those who participate in those programmes face the risk of "long-term limited employment", years of low-skill, minimum-wage short-term employment punctuated by spells on Jobseeker Support (McGirr and Earle 2019) [32].

Sustained long-term employment is likely to require skills, suggesting that transfer to advanced training should be seen as an equally valid outcome. There is no systematic attempt by the organisers of those programmes to identify those with the potential to transfer to TVET.

There is also no mechanism that brings those agencies and the education agencies together to ensure coordination or to create deliberate, clear articulations between those programmes and higher level TVET study. Few young people facing the risk of long-term limited employment have access to a "navigator" (MartinJenkins 2025).

8.3 Supporting trainees in the workplace: training advisors and on-site mentors

Training advisors have been central to the industry training model that New Zealand has followed since the passage of the Industry Training Act 1992. Their role is to provide learning and pastoral support to apprentices and other trainees in workplace-based industry training (Ministry of Education 2012, Murray 2005, Alkema 2016, Chan 2011).

Research on learner performance in workplace-based training suggests that the relationship between the learner, the training advisor and the employer and/or the on-site mentor is critical to the success of the training (Chan 2011, Allen and Clarke 2024, Alkema 2016, Squires et al 2015).

Successful completion of training also depends on the motivation of (often young) trainees, much of whose work is, in effect, self-directed learning (Alkema 2016). At the same time, there is variability in the ability of on-site mentors' ability to explain and supervise; the qualities required of a successful mentor (such as openness, trust, and having an ability to guide rather than direct) are not necessarily related to the technical skills that the earned on-site mentor his or her role in the firm (Messam 2024, Allen and Clarke 2024). Many on-site mentors are expected to take on the training role without adequate preparation and with limited support from the employer (Messam 2024). In her analysis of how the on-sit trainer role works in practice, Messam (2024) points to productivity pressures and operational demands sometimes getting in the way of the on-site mentoring and supervision. This all means that training advisor performance is all the more critical to successful learning.

Under the industry training funding system that operated until 2021, the trainee to advisor ratio was around 80 to 1 in many ITOs[33]. That provided for around four site visits to each trainee each year – 16 face-to-face contacts over the course of a four-year apprenticeship. Each site visit entails learning advice, discussion of assessment issues, liaison with the employer and/or the on-site mentor/supervisor. With some ITOs having moved to online delivery of the off-job component of their delivery, some trainees were effectively undertaking self-directed learning (Alkema 2016) – a challenge for some learners who may struggle without

[32] McGirr and Earle (2019) argue that the risk of long-term limited employment is associated with the poorest outcomes. That suggests that the best option for many youth at risk is acquiring employment-related skills, such as are created through TVET; there is a risk that many of these employment programmes may deal with the short-term issue of unemployment but do not fully address the participants' underlying skill needs.

[33] These estimates were provided by some of our key informants.

guidance from advisors (Chan 2011).

Māori and Pasifika trainees may be less comfortable asking for help than those of Pākeha/European ethnicity (Holland 2013, Allen and Clarke 2024). And Māori face cultural barriers; supports not designed to meet the needs of ākonga Māori are likely to be ineffective for ākonga Māori (Ihimaera Smiler 2023). It is significant that the credit achievement rate of trainees identifying as Māori and Pasifika was several percentage points lower than the average for the system, while the proportion of inactive trainees is higher than the average[34].

8.4 Attrition

One lead indicator of attrition risk is credit accumulation. In level 4 industry training, on average, learners gain around 25 credits a year – amounting to about 75% of credits attempted (though the credit achievement rate fell to around 62% in 2022 and 2023, the years affected by the Apprenticeship Boost). But around a third of trainees typically achieve zero credits in a year[35].

Our key informant interviews suggest that factors that increase the risk of attrition are:

- High trainee to advisor ratios (which may make it difficult for training advisors to intervene early)
- Off-job courses which may be offered at a distance from the trainee's location (creating difficulties for some trainees who have caring/family responsibilities, likely disproportionately to affect groups like women, older trainees, and Māori and Pacific learners.

8.5 Completion rates

Completion rates are relatively poor in work-based TVET. Apprentices in New Zealand, like their counterparts in Canada, Australia and England, have relatively low completion rates – 43% after five years in building and 49% in electrical[36].

Completion rates in some European countries, such as Germany and Austria are much higher, where the completion rate of apprentices is around 75%[37]. In Scotland, construction apprentices have a completion rate of 74% apprentices in construction-related trades in Ireland have completion rates of more than 65% (MartinJenkins 2025).

Alkema (2016) suggests that the main reasons for the low completion rates relate to the quality, delivery and support for the training delivered in the workplace – the extent to which workplace supervisors have the capability and the opportunity to train and the extent to which they and the trainee are supported in the training function[38].

Alkema (2016) also quotes British research that found that some employers are indifferent to whether trainees complete a qualification; their interest is in the trainee's skills, not the credential, and thus, some

[34] Ministry of Education, Achievement in workplace-based learning statistics 2024
[35] Ibid. Note that the rate was higher in 2022 and 2023, years in which participation patterns were affected by the pandemic.
[36] Ibid.
[37] Data on completion rates in Austria and Germany were sourced from Cedefop.
[38] Note that some non-completions will relate to factors unrelated to the actual training, factors like redundancy, jobs changing etc

employers don't encourage or facilitate completion.

Those factors reinforce the importance of the training advisor role in helping to motivate the learner, the employer and the supervisor.

8.6 Outcomes for trainees of workplace-based training[39]

Completion of a level 4 qualification through industry training results in an earnings premium as well as non-financial advantages over comparable people (Crichton 2009, Pacheco et al 2023 and 2024, Sweet Analytics nd). Those who complete more quickly have a higher earnings premium (Sweet Analytics nd).

Across all industries, around three quarters of those who were still in New Zealand seven years after they started their training were working in the same industry they started training in (Sweet Analytics nd).

However, there are concerns about longer-term retention of those who complete training – both in the industry and in New Zealand. ConCOVE data shows that around a quarter of the workforce leave the sector every year; and of the 15,500 people who left the construction and infrastructure sector having worked in that or related fields for five+ years, a quarter were aged under 35[40]. Some of our informants said that there needs to be better monitoring of attrition from the industry and probing into the data.

One of the consequences of the low retention of skilled staff in the sector is that the inflow of workers to the industry must cater for retirements, for the expansion of the sector *and* for the loss of skills either to other industries or to other countries. The fact that the training system can produce 9,800 trained people a year but not meet the need is down to the poor retention.

This summary draws from Green et al (2003), Maurice-Takerei (2016) Ministry of Education (2012), Murray (2004) and Murray (2001)

Box 1: A history of the funding of workplace-based training in New Zealand until 2019

The findings in this report take account of the history of TVET funding in New Zealand.

Before the 1992 reforms …

… industry training was largely directed at school leavers.

Workplace-based training was overseen by a network of national apprenticeship committees, each of which had a set of local committees through the country. Their focus was largely on the conditions of employment of apprentices.

In addition, two boards (the Trades Certification Board (TCB) and the Authority for Advanced Vocational Awards (AAVA)) were responsible for setting standards and defining the content of training.

Apprentices undertook off-job courses (typically 9 weeks over the course of a four-year apprenticeship), with employers receiving a wage subsidy when their apprentices were attending off-job courses (paid by the Department of Labour and, after 1990, by the Education and Training Support Agency – later called Skill NZ).

The polytechnics were funded for the training by a complex formula derived from a count of "weighted hours" – replaced, after 1990, by EFTS.

[39] We noted above the gaps in our ability to measure outcomes of training, especially, outcomes for firms.
[40] See the ConCOVE workforce journey indicators data dashboard.

The 1992 reforms

The Industry Training Act 1992 led to a radical change in the approach in response to changes in the labour market and deregulation of the economy and reflecting the need to increase productivity. Workplace-based training would henceforth be competency-based, not based on hours served. It would no longer be the preserve of the young.

The apprenticeship committees disappeared, and the new legislation established industry-owned (and industry funded) Industry Training Organisations. Industries had to create organisations which would then be recognised by government as an ITO.

Skill NZ was to fund the ITOs who would set standards, arrange work-based training and purchase off-job courses for trainees. The number of ITOs grew and grew, reaching 52 by 1996 before mergers and rationalisation brought the number down to 38.

The roles of the TCB and the AAVA were taken by NZQA, with qualifications all recast to fit the new NZ Qualifications Framework.

The term "apprentice" began to fade …. The focus was on *trainees*.

The funding formula was adjusted multiple times in the following years in an effort to create a fair system …

Modifying the system

After the turn of the century, the government resurrected the term "apprentice" creating Modern Apprenticeships, within the industry training framework, but focused on particular industries and on younger trainees, and assigning modern apprentices to a broker called a Modern Apprenticeship Coordinator.

Better information on the performance of industry training – especially, completion rates – led to a further review in 2012. That review accelerated a pre-existing trend toward greater consolidation of the ITOs – with the 38 ITOs being merged into 12. The modern apprenticeship scheme was scrapped and replaced by the NZ apprenticeship scheme, which was not confined to young trainees, which was focused on particular types of qualification and which attracted higher funding than less structured training.

RoVE

In 2019 the government embarked on the Review of Vocational Education (RoVE) which set out to address two related but quite distinct issues:

1. to resolve the precarious financial problems of the polytechnics

2. to improve the performance of the vocational training system by bringing workplace-based training and provider-led vocational programmes at levels 3-7 into a common framework.

This led to the creation of Te Pūkenga – an institution that incorporated all the polytechnics and most of the workplace-led VET. And to the creation of the Unified Funding System (UFS) for all qualifications (VET and otherwise) at Levels 3-7 (non-degree).

That reform is now being undone, with the demerging of Te Pūkenga.