

# **Business productivity in New Zealand**

## **Assessing the drivers and barriers in the international context**

NZIER report to ASB

February 2024



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## Key points

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- New Zealand's productivity paradox is well documented and traversed. Despite improving economic growth, productivity growth has lagged that of the other small advanced economies (SAEs).<sup>1</sup> Productivity in New Zealand is driven by increasing labour productivity, which has been driven by an increasing labour force.
- A number of factors have been found to contribute to New Zealand's low productivity. Key factors are capital shallowness, or low investment in both tangible and intangible capital and R&D, and low rates of diffusion of technology and innovation and reallocation of resources from less productive to more productive uses. A low level of dynamic capability within businesses also reduces their absorptive capacity to adopt and implement new ideas or technologies.
- International examples from the Nordic economies, Ireland and Singapore, indicate that exposure to international competition and strong, stable domestic innovation clusters or ecosystems are important in encouraging businesses to innovate and grow. This promotes the diffusion of new ideas and reallocation of resources across the economy.
- Successive policies have not increased innovation in New Zealand. This is, in part, because New Zealand lacks the longstanding ecosystems of business, research institutions and government agencies that support innovation in other SAEs.
- The pressing issue for New Zealand businesses is to build their understanding and appetite for innovation and investment as an engine for growth and sustainability. Geographic distance is not a protection from the effects of digital disruption and international innovation.
- Our findings point to three key levers to driving productivity growth in New Zealand:
  - 1 an innovation ecosystem involving businesses, research institutions and government agencies to collaborate more effectively to develop shared goals and plans;
  - 2 exposure to international competition, such as through exporting, which motivates firms to innovate to compete more effectively;
  - 3 minimal policy or regulatory obstacles when firms are motivated to innovate and scale.
- This provides a prime opportunity for banks to play their part in driving productivity growth by supporting businesses with financial investment in technology, innovation and developing export markets.

<sup>1</sup> Austria, Belgium, Denmark, Finland, Hong Kong, Ireland, Israel, New Zealand, Netherlands, Norway, Singapore, Sweden and Switzerland (see footnote 2).



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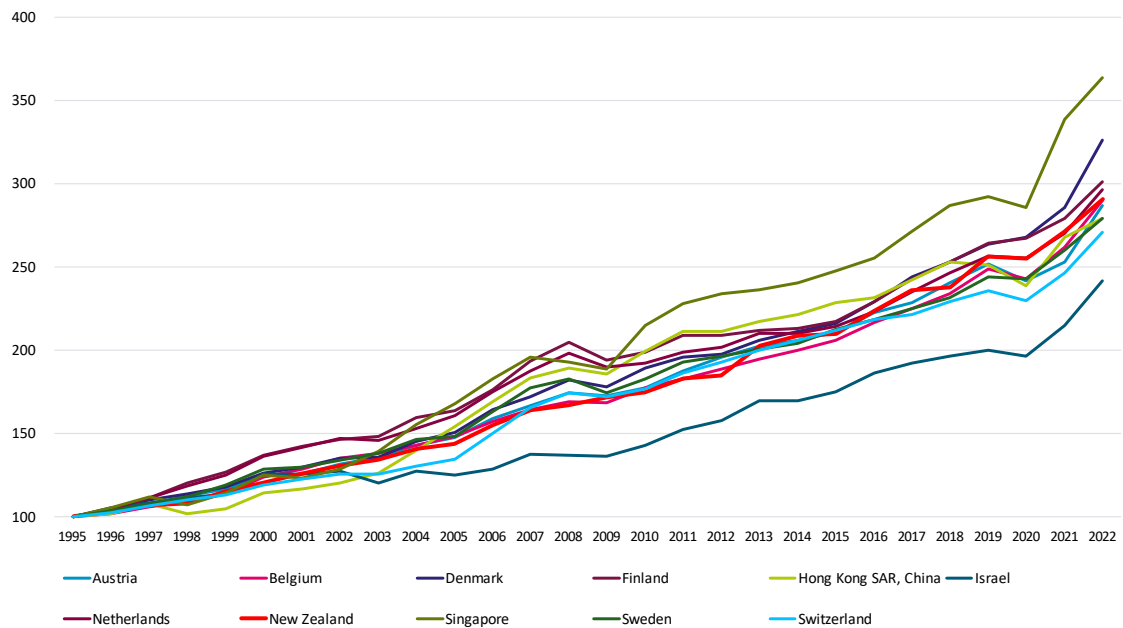
# 1 Background

Economic growth is a function of a range of inputs including natural resources, machinery and technology, people, and tacit knowledge or intangible capital. As our access to natural resources becomes constrained by both scarcity and climate imperatives, we need to be more innovative in how we produce goods and services. This implies that we need to be more productive.

Growth in income and living standards is driven by productivity growth (see section 1.1). As the population in the developed economies ages and labour force participation declines, without productivity growth, the economic resources available to households and government to access and deliver services will decline.

**Figure 1 Real GDP per capita**

Indexed on 1995, see footnote 3



Source: The Economist, NZIER

The New Zealand economy has performed relatively well since 2012 compared with other small advanced economies (SAEs),<sup>2</sup> with the obvious exceptions of Ireland and Norway<sup>3</sup> (Figure 1). Although GDP per capita has improved, productivity (measured as GDP per hours worked) remains relatively low (see Figure 4).

<sup>2</sup> The SAEs are economies with populations between 1 million and 20 million and per capita incomes above USD30 000. This gives a group of 13 SAEs: Austria, Belgium, Denmark, Finland, Hong Kong, Ireland, Israel, New Zealand, Netherlands, Norway, Singapore, Sweden and Switzerland (Skilling 2020; New Zealand Productivity Commission 2021).

<sup>3</sup> Ireland's GDP measure is 'skewed' by the inclusion of multinational investment and its tax regime. Norway's economy has been significantly boosted by its management of North Sea oil revenues via a sovereign fund.



Factors affecting New Zealand's productivity have been well researched and analysed.<sup>4</sup> Successive governments have put in place policies to encourage innovation, such as tax credits for research and development (R&D), but these have not delivered an appreciable improvement.

NZIER has been asked to review the business productivity experience of other SAEs and identify conditions and policies that support the productivity growth of businesses in these countries. This review will identify potential actions and policies that would be appropriate for New Zealand.

## 1.1 What is productivity

*Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker. (Krugman 1994)*

Economic growth is the overall measure of how well the economy is doing. Most commonly, the economy is measured by gross domestic product (GDP), which is calculated by measuring expenditure, income, or output by sector. In turn, dividing GDP by each individual resident in the economy, or per capita, provides a sense of whether the economy is growing faster than the population.

Economic growth is a function of a number of inputs, including physical labour, capital, machinery, technology and knowledge. Productivity is a measure of how these inputs are combined to produce output. Increasing productivity is often characterised as making labour work harder to produce more, but it is a measure of how much growth in output is a function of the better use of all resources or inputs, individually or in combination.

*... productivity growth consists not only of new and improved things to do and ways of doing them, but also the successful reallocation of capital and labor resources toward these more productive uses. (Lindsey 2024)*

Increasing productivity can help address environmental and resource constraints, including labour constraints, and increase incomes and wages. Ultimately, higher productivity expands choices (Nolan, Fraser, and Conway 2018, 4).

Productivity is measured as the ratio of output to inputs – labour and capital. Figure 2 shows New Zealand's productivity measures from 1996 to 2022. Productivity is most commonly reported as the ratio of real GDP to labour, where the labour unit can be individuals employed or hours worked (see Figure 4).

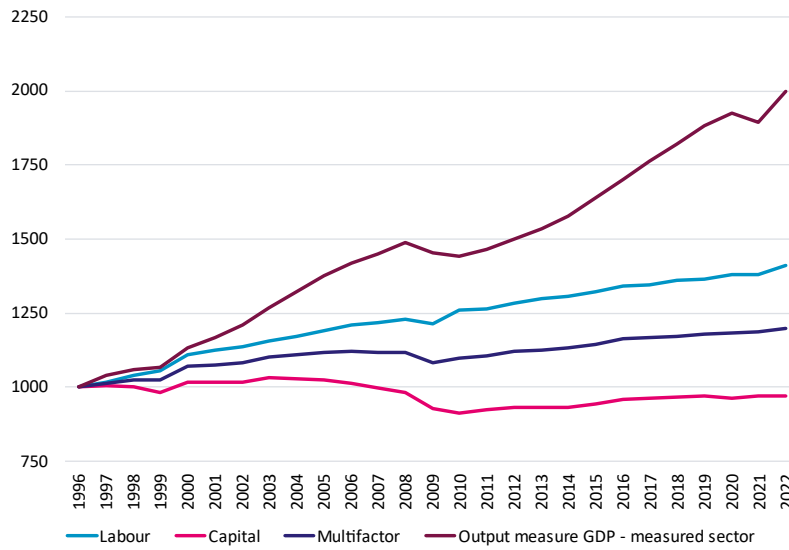
Multi-factor productivity (MFP, sometimes referred to as total factor productivity) is the residual in total productivity growth after the contribution of labour and capital have been accounted for. MFP captures technical and organisational innovation and the efficiency with which firms combine inputs. This has become more significant as firms invest in digital technology and applications, because the impact is often not easily measured.

<sup>4</sup> For the most comprehensive listing see <https://www.productivity.govt.nz/publications/>. See also the Briefing to the Incoming Finance Minister (The Treasury 2023).



**Figure 2 Productivity indexes and output measure, New Zealand 1996 to 2022**

Productivity in the measured sector<sup>5</sup>, indexed on 1996



Source: Stats NZ, NZIER

The so-called digital transformation of the economy has not delivered immediate improvements in productivity. It is argued that this is because investing in digital technology is insufficient in itself, and organisations need to develop their internal capability to use the technology and applications. Once this capability has been developed, it is expected that there will be an increase in productivity so that productivity growth follows a J-curve (Brynjolfsson, Rock, and Syverson 2021). There will be a decline in productivity following the initial investment in digital technology, followed by an improvement in productivity.

An organisation’s knowledge and capability are part of its intangible capital, as opposed to tangible or physical capital such as buildings or machinery. Intangible capital is increasingly significant for organisations, but it is very difficult to measure effectively. Intangible capital, which accounts for about 70% of GDP, is potentially more important in the services sector. This implies that productivity growth may be underestimated if the impact of intangible capital is masked or unmeasured. Equally, a lack of investment in intangible capital will reduce the opportunity for productivity growth.

Productivity improvements will not necessarily generate increased output and income. It is possible that increased use of digital technologies, such as AI, will improve productivity in some sectors by displacing human inputs. This may or may not be compensated for by those humans moving to other sectors or developing new roles with the existing sector.

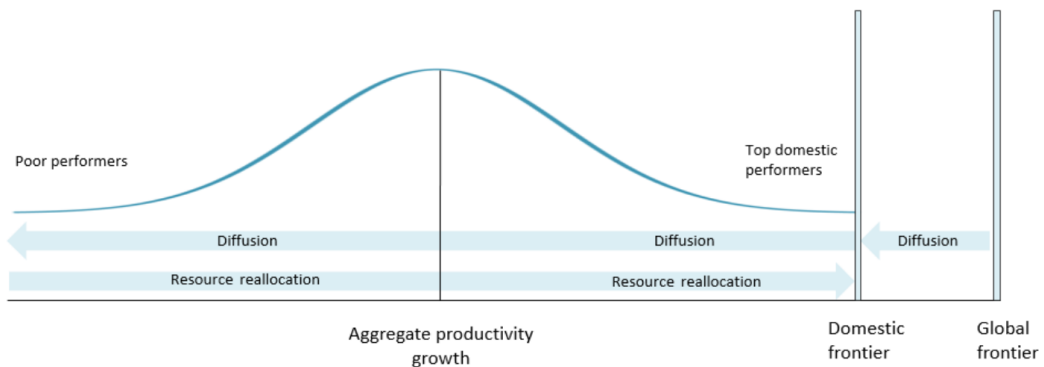
<sup>5</sup> The measured sector the industry sectors: agriculture; mining; manufacturing; electricity, gas, water and waste services; construction; wholesale and retail trade; accommodation; transport, postal and warehousing; information media and telecommunications; financial and insurance services; rental and hiring services (not real estate); professional, scientific, technical, administrative and support services; and arts, recreation and other services.



## 1.2 Firm productivity

Overall productivity performance comprises the performance of individual enterprises or firms. Figure 3 provides a stylised model of the relationship between firm productivity and overall productivity. This does not represent the current state of firm productivity.

Figure 3 A stylised model of firm productivity



Source: Conway (2016) based on OECD (2015), from Allen (2018)

There are two frontiers. The global frontier is where the most productive firms in the world operate. There is a gap between these and the most productive domestic firms, which are operating at the domestic frontier. Domestic firms will fall somewhere on the distribution depending on how close or far away they operate from the domestic frontier. A successful exporter will operate close to the domestic frontier and possibly close to the global frontier. Firms that provide local services to domestic consumers often operate well inside the domestic frontier.

The model has two drivers of productivity growth: the spread of technology, ideas and practices (diffusion) and the movement of labour and financial resources between firms (reallocation). Diffusion from the global frontier to the domestic frontier and then to domestic firms will bring firms towards the global frontier, increasing productivity. Reallocation allows the redistribution of resources from less productive to high-productivity firms and activities (Allen 2018, 5); if a lower-productivity firm closes, its workers can move to a higher-productivity firm.

The ability of a firm to improve its productivity by taking up technology diffusion is a function of the firm's 'absorptive capacity' or the ability to internalise external knowledge. A firm with a high absorptive capacity has invested in its knowledge base by investing in its own R&D and human capital, which in turn makes it more open to and able to bring external knowledge, including technology diffusion, skilled or specialist labour on board (Harris and Le 2018, 5).

## 1.3 Industrial policy

Government policies to promote innovation and productivity growth have been taken under the umbrella of industrial policies. There has been a resurgence of interest in industry policy in the past decade (Crisuolo et al. 2022). Industry policy was largely discredited in the developed economies as inward-looking, protectionist and inefficient.

Recently, the experience of economies like Korea and a reassessment of the role of government investment in driving innovation in the digital sector, such as the development of the internet, has led to some reassessment (Juhász, Lane, and Rodrik 2023).

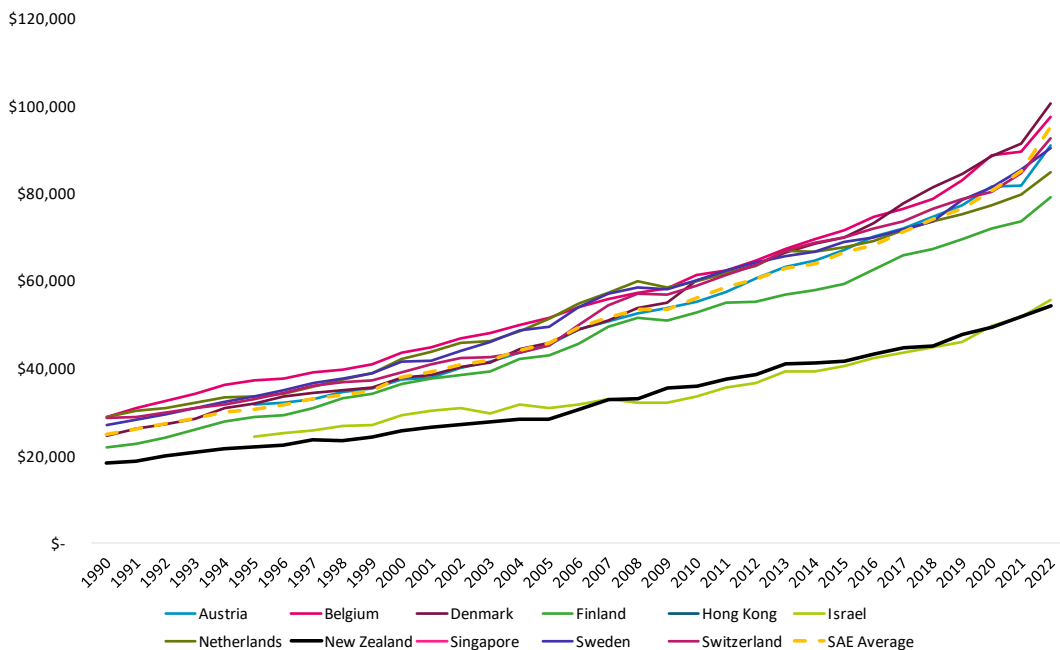
It is still debatable whether industry policy is effective, especially if there are no good mechanisms to monitor and reorient the policy or implementation. For example, it is argued that innovation in the United States has been heavily supported by government investment in research led by the Defense Advanced Research Projects Agency (DARPA), under whose auspices the internet was developed. This implies that increasing government investment in research will promote innovation, but it is not clear that this approach is successful if it is not part of a wider ecosystem.

## 2 New Zealand's productivity lags other countries

New Zealand's productivity has lagged other SAEs, as measured by real GDP per hours worked (see Figure 4). This is despite relatively strong economic growth over the past two decades (Figure 1). Economic growth from the early 1970s through to the early 1990s was low compared with other developed economies. Since 1994, New Zealand's productivity growth rate has been more comparable with its SAE peers (Grimes and Wu 2023).

**Figure 4 Real GDP per 1000 hours worked**

Ireland and Norway have been removed as outliers



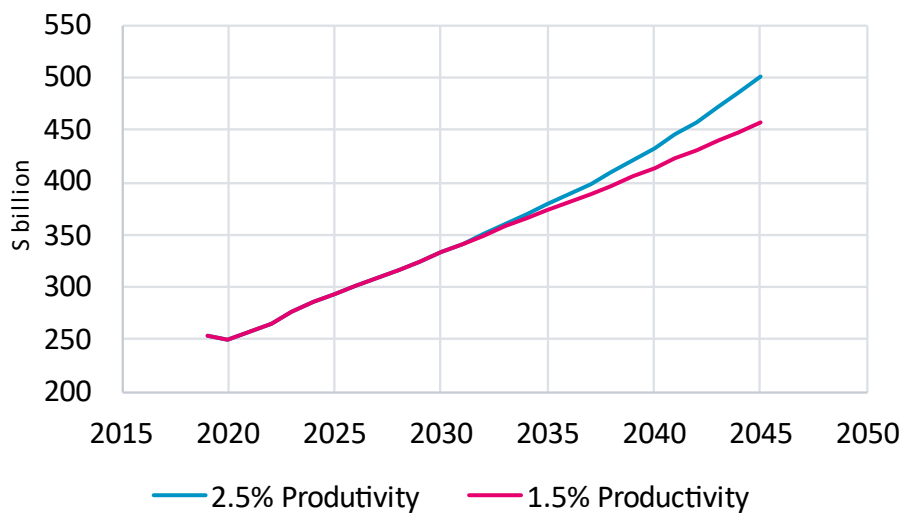
Source: The Economist, NZIER

The most used base of measurement for productivity is the production-based measure of GDP. Using other measures can generate subtly different results. For example, New Zealand's real net national income (NNI) per capita was equivalent to 85% of the median scores of 19 OECD economies, compared with 62% using GDP (Galt 2023). NNI captures the

growth in the share of the population in employment, the rising terms of trade, a reduction in the net international income deficit, and no significant change in the level of depreciation (due to the low level of capital investment). On this measure, New Zealand is not such an outlier, but this does not imply that we are gaining ground.

Because New Zealand's economy grew more slowly until the mid-1990s, when economic growth rates improved, the economy was growing from a relatively low base. If the productivity growth rate had also increased the economy would have grown faster, delivering better outcomes for New Zealanders. Increasing productivity growth from 1.5% per annum to 2.5% per annum would increase real GDP by 5% or about \$43 billion over 25 years (The Treasury 2021).

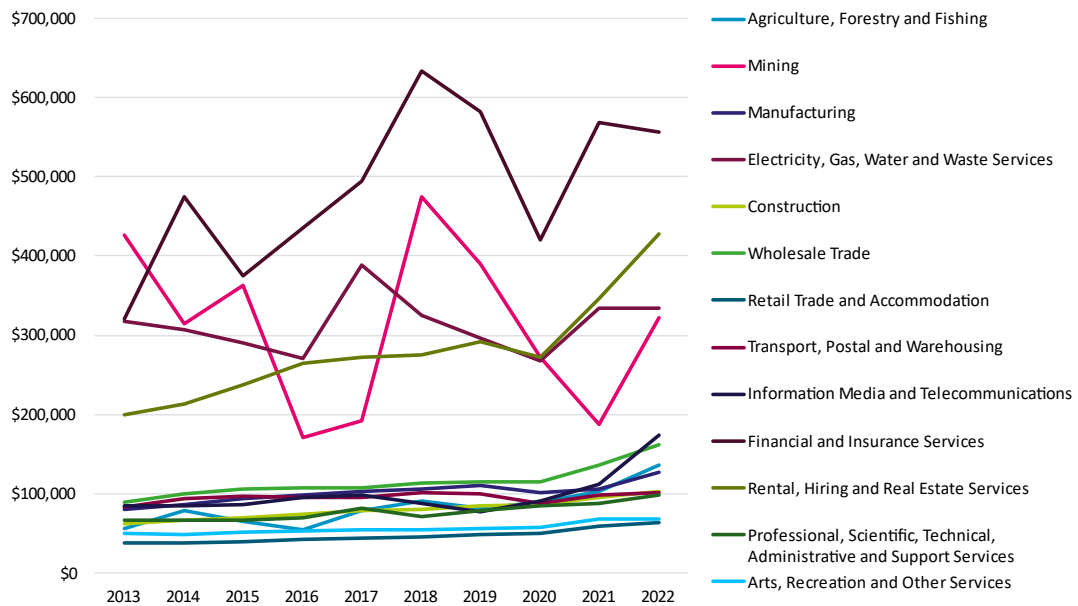
**Figure 5 Real GDP (2019 \$)**



Source: The Treasury; NZIER

We have used Stats NZ Annual Enterprise Survey data to estimate income-based GDP for New Zealand enterprises. This provides a time series by both business size (using employee size groups – see Figure 9) and industry (see Figure 6). Figure 9 indicates a significant difference in productivity in larger firms, while small and mid-sized firms have similar productivity levels. Figure 5 shows that productivity in the finance sector is relatively high. The other sectors with higher productivity are mining, electricity, gas, water and waste services and rental and hiring services (excluding real estate). This implies that productivity is low across much of the economy.

**Figure 6 Industry GDP by employee**



Source: Stats NZ (2023), NZIER

### 3 Key drivers and barriers to productivity growth from overseas experience

As a member of the OECD group of developed economies, New Zealand often uses the OECD average as a benchmark. The OECD average does not always accurately reflect the experience of small economies. A more appropriate comparison is with the group of SAEs. These are defined as advanced economies with populations between 1 million and 20 million and per capita incomes above USD30 000. This gives a group of 13: Austria, Belgium, Denmark, Finland, Hong Kong, Ireland, Israel, New Zealand, Netherlands, Norway, Singapore, Sweden and Switzerland. All but Hong Kong and Singapore are also members of the OECD.<sup>6</sup>

In its most recent country survey of New Zealand, the OECD focused on the potential for boosting productivity by using digital technology more effectively (Yashiro, Carey, and Purwin 2022). That report highlighted that New Zealand ranked low to average against its fellow OECD SAEs and all OECD members. SAEs like Ireland, Sweden, Finland and Israel are among the top performers in adopting digital technology. However, digitisation by itself may not be sufficient to promote productivity growth. Israel has a successful digital economy, but its overall productivity performance based on GDP per hours worked is like New Zealand's (see Figure 4).

Excluding Ireland and Norway, overall productivity growth rates in the other SAEs have been consistent, albeit greater than New Zealand (see Figure 4). When looking specifically at the experience of the SAEs, two significant factors explain differences in productivity: the

<sup>6</sup> In the Asia Pacific region comparisons are often made with Korea because of the significant improvement in its economic performance over the last 40 years. This has been driven by a rapid period of economic development from a much lower GDP per capita base, so it is not directly comparable with the New Zealand experience.

presence of frontier firms and the existence of innovation clusters or ecosystems. We look at both factors below.

### 3.1 Frontier firms

Frontier firms are those that operate close to the domestic or global technology frontier, as was described in section 1.2. They can be catalysts for the diffusion of technology, ideas and practices across the economy to boost productivity. In assessing the role of frontier firms in the SAEs, The New Zealand Productivity Commission (2021) reported that relative to other SAEs, New Zealand had a low number of large firms and a relative paucity of firms that are internationally engaged at scale. In one of the studies commissioned for that report, Skilling (2020) found that three characteristics contribute to high productivity levels and growth rates in frontier firms:

- internationally oriented sectors that provide growth opportunities to support sustained productivity growth
- the role of large firms in driving improvement and international engagement
- a limited number of world-class, internationally oriented clusters. (Skilling 2020, 7)

Exports are an indicator of the international orientation of an economy. Exporting firms must be internationally competitive, and the greater the international orientation of the economy, the more domestic businesses are subject to international competition. In the SAEs, exports of goods and services as a percent of GDP grew from 1995 to 2019, except for New Zealand and Israel. Exports of goods and services measured as a percentage of GDP were the lowest in New Zealand (Exhibit 4 Skilling 2020, 8).

These countries also put a strong emphasis on skills and innovation, represented in part by spending on R&D. R&D as a percentage of GDP varies from more than 4% in Israel to just over 1% in New Zealand and Ireland. The variation in expenditure in R&D is reflected in the level of exports (Skilling 2020, 9).

Large firms are more likely to invest more, spend more on R&D, innovate, pay higher wages, and, as a result, be more productive. These firms are also more likely to operate across borders. Growth in such firms helps to drive wider economic growth. There are a number of large firms domiciled in the SAEs, such as Nestle in Switzerland and Maersk in Denmark. These firms significantly contribute to economic outcomes in these economies because they have scale to operate internationally and are integrated into the domestic infrastructure of medium and small businesses. Fonterra is the New Zealand example, but it has not achieved the scale that Nestle, for example, has.

The final characteristic that Skilling identifies is that successful SAEs have *“pronounced” clusters of firms organised around areas of existing strength and capabilities* (Skilling 2020, 11). These clusters support innovation and tacit knowledge transfer, i.e. diffusion. More importantly, they enable small economies and the relatively small firms within those economies to offset the disadvantage of size with external scale economies. These clusters link supply chains, help to develop a deep pool of specialist labour and skills and develop strong relationships with universities and research institutions.

The clusters, in turn, help develop capabilities within businesses and the economy, which is especially important in knowledge-intensive activities. The more widespread and sophisticated these clusters are, the more dynamic and resilient the economy. There are



examples of smaller, more focused clusters in economies such as Israel and Ireland, meaning the economic impact is not as widespread.

### 3.2 Innovation policy

Governments in most SAEs take a *more deliberate approach to innovation policy than has been in the case in New Zealand* (Crawford 2021). The distinction is in the approach rather than the policies. In successful SAEs, the approach has been in place for some decades so that there is significant institutional knowledge supported by consistent methods of practice. Promoting innovation is regarded as a continuous process that is, nevertheless, very adaptable. Initiatives are designed to 'fail fast' if necessary to free resources for the next opportunity.

Another key characteristic of these approaches is that they have built on the cluster or ecosystem model, bringing together business, research and government entities to collectively determine the focus and investment strategy. The innovation regimes have been in place for some decades but have evolved to meet changing conditions. When changes have been made, they have been made within the existing structures.

### 3.3 Nordic countries' software sector

The Nordic countries – Denmark, Finland, Norway and Sweden – are SAEs, which have firms that operate at the frontier, supported by innovation ecosystems. In a recent report on the Nordic software sector, which is experiencing strong export growth, McKinsey found that the factors that have contributed to the development of frontier firms have underpinned the growth of the software sector (Bjørndalen et al. 2024). These are:

- high digital adoption rates
- a growing base of founders and high-net-worth individuals contributing actively to the tech ecosystem as mentors, investors, role models, serial founders, and community builders
- funding from venture and private investors
- Nordic economies have a number of global industrial firms that support hubs or clusters for talent, sector-specific funding, and routes to market
- Nordic policies on education and social welfare also appear to provide critical support for the software sector

The Nordic software firms have adopted different markets. Some have a global market perspective from the start, while others have focused on a regional market (i.e. the domestic and geographically adjacent economies). Others focus on a specific industry, often one with a low level of digital maturity, to develop solutions for managing processes, such as in construction, or to support sales for traditionally non-digital products. Many of these solutions are focused on doing things better rather than finding novel solutions.

### 3.4 Singapore

The Singapore state has actively supported economic development since the 1960s, when it gained independence. Singapore is geographically concentrated and has been governed by a single party since independence, which has contributed to the development of strong

networks between business, government and knowledge institutions. These are exemplified by the formation of the Committee for the Future Economy in 2016, now the Future Economy Council,<sup>7</sup> to drive the growth and transformation of Singapore's economy for the future. It is chaired by the Deputy Prime Minister and Coordinating Minister for Economic Policies, and includes members from government, industry, trade associations and chambers, unions, and educational and training institutions.

An example of Singapore's approach to innovation policy is the National Science and Technology Board, which was established in 1991 to develop high-technology activities and build a base of scientists, engineers and technologists. The Board created a five-year National Technology Plan in 1991, which has been renewed every five years. The latest Research, Innovation and Research 2025 Plan had a budget of about 1% of Singapore's GDP or Singapore \$25 billion (National Research Foundation 2020).

### 3.5 Ireland

Ireland often has been cited as an example for New Zealand (most recently in Hartwich 2023). In the past three decades, Ireland's GDP per capita has increased from \$13,744 in 1990 to \$126,905 in 2022. In the same time frame, New Zealand's GDP per capita increased from \$14,836 in 1990 to \$51,967 in 2022.<sup>8</sup>

Ireland appears to be comparable to New Zealand because of its relatively small population and traditionally rural economy. At independence in 1922, its external trade was predominantly with Britain, exporting agricultural products and importing manufactured goods. Like New Zealand, it worked to diversify its economy and trade.

Ireland has benefited from its geographic location and membership in the European Union. It also implemented policies encouraging foreign direct investment, including its corporate tax regime. Although the global financial crisis had a significant impact, there has been considerable continuity in Irish economic policy since the 1990s, if not earlier. For example, IDA Ireland has been in operation for over 70 years. Initially established as the Industrial Development Agency, it has evolved to support inward foreign direct investment.

## 4 The New Zealand score in this international context

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As set out in section 2, New Zealand's productivity growth has been below the median for selected OECD economies and the SAEs for some decades. A considerable body of work by various New Zealand government agencies, university academics, and business researchers has been devoted to understanding why productivity growth has remained slow despite improved economic growth. One OECD study found that New Zealand's economic settings should have generated GDP per capita 20% above the OECD average when the actual outcome was 20% below the average (Barnes et al. 2011, quoted in de Serres, Yashiro, and Boulhol 2014).

<sup>7</sup> <https://www.mti.gov.sg/FutureEconomy/TheFutureEconomyCouncil>

<sup>8</sup> The data is from the World Bank and is adjusted for purchasing power, expressed in current international dollars (Hartwich 2023, 4). Hartwich does note that because Ireland's GDP measurement is skewed by the inclusion of international flows related to foreign investment etc, it is not directly comparable with New Zealand, or even United States, experience.

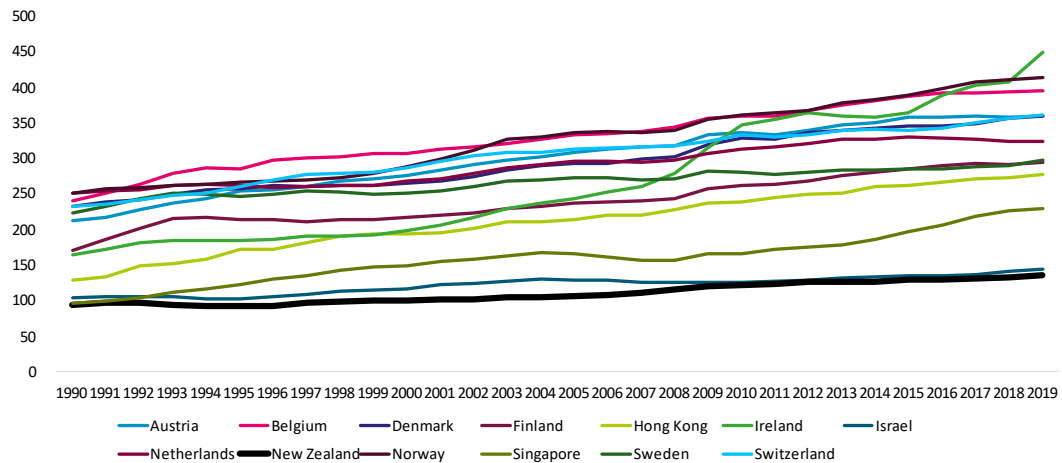




This research has highlighted that productivity growth in New Zealand in the past two decades has been driven by expanding the workforce, increasing workforce participation rates and immigration. There is a relatively low level of capital investment. There is also a low level of investment in intangible or knowledge-based capital. Low capital investment is countered by high hours worked (New Zealand Productivity Commission 2023).

**Figure 7 Real capital per hour worked**

2017 US\$, thousands



Source: Penn World Tables 10.01 from Feenstra, Inklaar and Timmer (2015)

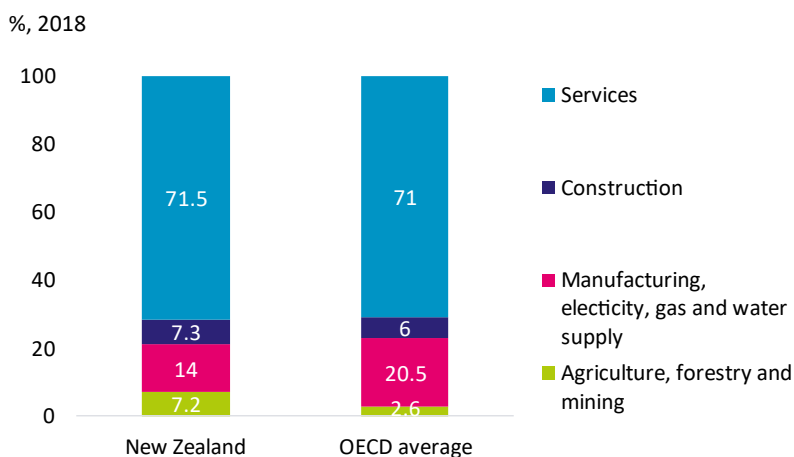
Arguably, New Zealand could be falling further behind as investment in digital transformation appears to be lagging, so firms are missing out on opportunities to innovate (NZIER 2020; Datacom 2023; CCL, n.d.; NZIER and Spark 2024).

#### 4.1 Characteristics of New Zealand’s economy

In comparing with other economies, we need to recognise that we are not always comparing like with like. The New Zealand economy is broadly similar to the OECD average, but some differences in the structure could be contributing to lower productivity growth (see Figure 8). In particular, the agriculture sector contributes more to value add in New Zealand, as did construction in 2018. The construction sector is very volatile, so this contribution does fluctuate from year to year. The manufacturing sector is relatively small.



**Figure 8 Industry contribution to value added**



Source: Galt and Stevens (2023)

The structural difference in the New Zealand economy could impact productivity, partly because of the strong focus on the agriculture sector, which is not characterised by high productivity (see Figure 6). The services sector, including government services, is often regarded as not easily susceptible to productivity improvements. Opportunities to increase labour productivity by increasing capital are limited in sectors such as hospitality. On the other hand, as digital technology and its applications spread into services we should see productivity improvements, in large part driven by the increase in human capital and capability.

Investment in knowledge-based capital includes innovation and investment in R&D. Spending on R&D has been consistently below the OECD average (see Figure 4.1 in New Zealand Productivity Commission 2023). Equally, although traditionally, New Zealand has been characterised as an open economy with a strong export orientation, in practice, much of the economy is not internationally oriented and, therefore, not internationally competitive (Skilling 2020).

New Zealand is generally considered to have a business-friendly environment by international standards, but inward foreign direct investment is falling, which has been characterised as evidence of a business-unfriendly environment (Hartwich 2023). At the same time, outward foreign direct investment has always been low.

#### **4.1.1 Distance from the frontier**

The tyranny of distance from New Zealand to international markets has often been cited as an issue in increasing exports and international competitiveness. This has to be taken as a given, but investment in digital technology could overcome this, as technology-based exports can be weightless.

Compared with other SAEs, New Zealand does not score well on the frontier firm criteria (see Frontier firms, section 3.1). Although traditionally, New Zealand regards itself as an open economy with a strong export sector, exports of goods and services have been largely static at about 24% of GDP, matched by a similar (but rising) level of imports.

There has been a marked shift in the composition of New Zealand exports and export markets since the 1970s. However, few domestic firms are exposed to international



competition, which would drive productivity improvements and capability. Of the top twenty companies in the 2023 Deloitte Top 200, only seven are exporters or have international operations: Fonterra, EBOS Group, Air NZ, Mainfreight, Zespri, Silver Fern Farms and Alliance Group (Deloitte 2023). Four of these businesses are linked with the agriculture sector, selling predominantly partly processed products.

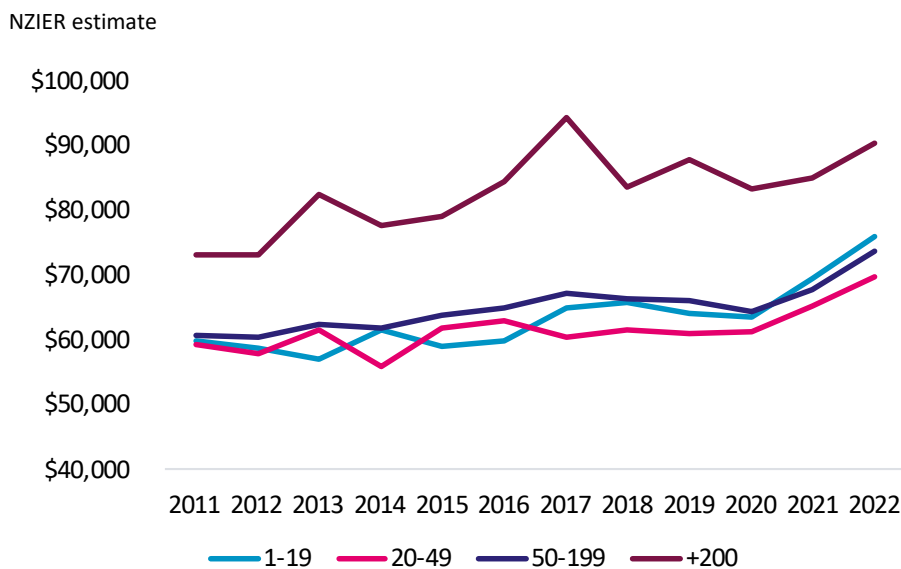
The situation is different for New Zealand’s top technology firms. In 2023, New Zealand’s top 200 Tech Export firms earned 76% of their \$17.1 billion in revenue offshore and employed 63,874 people globally (‘TIN Report Technology Industry Analysis’ 2023), suggesting a strong international orientation.

A related issue is that New Zealand's R&D investment often does not have an international focus and is focused specifically on New Zealand uses and applications. These often do not scale to international use. For example, the Agritech sector is developing an innovation ecosystem which will support diffusion in the agriculture sector, but it does not have a strong export focus (Yashiro, Carey, and Purwin 2022, 1707:54). Yashiro et al. argue that the Agritech sector needs to orient itself to international markets.

New Zealand is an economy of small or micro businesses by international standards. Only 0.5% of businesses employ more than 200 people (the international definition of a large business). Figure 9 shows that productivity, as measured by real income per employee, is higher in businesses that employ more than 200 people.

New Zealand’s small businesses are not very efficient or productive. The large number of micro-businesses has possibly hampered efforts to drive innovation, in part because these businesses tend to have less dynamic (or managerial) capability, which supports innovation and openness to new ideas (Teece and Brown 2020).

**Figure 9 Real firm GDP per rolling mean employee (RME)**



Source: StatsNZ, NZIER



#### 4.1.2 Innovation ecosystems

New Zealand does not have the ecosystems that support frontier firms in the SAEs, with some exceptions in the agriculture and horticulture sectors. The New Zealand University research establishment is strongly oriented to agriculture research and is supported by a number of specialist research organisations. Outside the agriculture (primary) sector, the linkages are limited, so access to research funding is often very competitive and proprietary.

##### Innovation ecosystem case study – the kiwifruit industry

The New Zealand kiwifruit industry is an example of an innovation ecosystem, that has built scale and exports, based on partnerships between growers, processors, the research sector and Zespri.

New Zealand was the first country to commercialise kiwifruit, developing the export trade from the 1960s. Since the changes in the industry that led to the formation of Zespri in 1997, the industry has been transformed and represents “a textbook case of how to turn a worthless food commodity into a high-value product” (Campbell 2018, 88).

Zespri is the anchor for the wider kiwifruit industry and its innovation ecosystem which includes the Crown Research Institute (CRI) Plant & Food Research and academic research institutes, growers, and the packhouses and service industries. This has been complemented by the open innovation model that operates among New Zealand kiwifruit growers. This can take a new, protected variety, and quickly develop and share best growing and vine management practice across the industry.

The development of packhouse technology to sort and pack kiwifruit and other horticulture products for domestic and international markets has been supported by the transformation of the kiwifruit industry. Packhouses are investing in automation to keep up with the quantity of fruit. It is estimated that the industry may have spent \$1billion to grow capacity and automation, and it might cost as much as \$800 million to fully automate post-harvest infrastructure (Uys 2023).

The industry response to the introduction of the kiwifruit vine disease Psa that threatened production in 2010 illustrates the strength of the ecosystem and how the ecosystem also contributes to resilience and sustainability in the industry. A sustained research programme identified new varieties of which one, Gold 3, proved Psa resistant. This was rapidly released to growers and is the cornerstone of the industry’s recovery.

The processes of diffusion and reallocation do not appear to work well in New Zealand (Nolan, Fraser, and Conway 2018, 7). This could be because of the prevalence of small, independently-run businesses. Ecosystems support the diffusion of innovation, sometimes referred to as ‘spillover effects’.

It has been argued that New Zealand firms are reluctant to invest in new ideas because they believe the spillover effects will limit their return on investment (for example, MBIE 2023b; 2023a). This is a zero-sum argument. Successful ecosystems, like Silicon Valley, have benefited from the revolving door of ideas and people.

Looking at the experience of the SAEs in Europe (especially Scandinavia) and Singapore, the major difference in the New Zealand experience is the lack of a continuous engagement



between business, research institutes and government to promote innovation. Callaghan Innovation was established in 2013 to support New Zealand entrepreneurs in creating world-class companies by funding, upskilling, and connecting entrepreneurs and founders. It works with start-ups and supports established firms to innovate. Callaghan Innovation has a number of success stories, but there is little evidence of spillover effects that have boosted productivity in the wider economy. Callaghan Innovation can support individual firms, but it is not a substitute for an innovation ecosystem that drives positive spillover effects.

The continual changes to government policy, albeit often replaced with very similar policies, may discourage non-government organisations from engaging. Unfortunately, our analysis of Stats NZ *Business Operations Survey* data does not suggest that New Zealand businesses are pursuing innovation and productivity growth of their own volition, except in some very limited cases.

#### **Impact of COVID-19 pandemic**

The COVID-19 pandemic shock impacted economic data across the world, largely by generating a lot of ‘noise’ in the data. It is too early to determine if there have been significant structural economic shifts that would impact productivity (see Figure 2).

The impact of social distancing restrictions and stay-at-home measures was to reduce hours worked, especially in sectors where ‘work from home’ was not an option. These were often lower-productivity industries in the services sector, like arts and hospitality, so the effect was to increase average labour productivity. The return to work and the strong labour market following the removal of lockdown restrictions have tended to favour low-productivity jobs and workers, which reduces labour productivity.

Analysis of the impact of ‘work from home’ on labour productivity is, at best, inconclusive. Some studies report increased productivity, especially those using hybrid or flexible options. In contrast, fully remote work options may reduce productivity by reducing the potential for developing knowledge capital across the firm (Wood and Robson 2023).

New waves of COVID-19 and long COVID may also affect post-infection productivity, as vaccination rates appear to be declining.

Closed borders placed severe restrictions on the availability of labour. When businesses maintained production despite labour shortages, labour productivity increased, but again, as the labour constraint eased there is a likely fall in labour productivity.

The acceleration of digitisation during the pandemic and fast-changing circumstances highlighted the importance for businesses to operate in an environment where they can readily adapt and pivot to new opportunities. Our findings show a key lever in improving productivity is having minimal obstacles for businesses when they do make the decision to innovate and scale, and the changing nature of businesses highlights this during the pandemic.

#### **4.1.3 The ‘productivity paradox’ solved?**

In 2018, Nolan, Fraser, and Conway (2018) argued that New Zealand’s productivity paradox, whereby strong economic growth had not been supported by strong productivity growth,



could be explained by two factors: capital shallowness and limited reallocation of resources and diffusion of ideas and knowledge as shown in Table 1.

**Table 1 Explanations for New Zealand’s productivity problems**

Factor 1	Factor 2
Capital shallowness reflecting: <ul style="list-style-type: none"> <li>• High long-term real interest rates</li> <li>• High off the shelf cost of capital goods</li> <li>• Fast population growth</li> </ul>	Impaired reallocation and diffusion (firms that are disconnected and stuck) reflecting: <ul style="list-style-type: none"> <li>• Weak international connections</li> <li>• Small size of domestic markets</li> <li>• Low investment in knowledge-based capital</li> <li>• Firm’s limited ability to learn</li> <li>• Weaknesses in the allocation of labour</li> </ul>

Source: Nolan, Fraser, and Conway (2018, 8)

#### 4.1.4 Impaired reallocation and diffusion

There are a number of issues that contribute to impaired reallocation and diffusion, but a key issue is the low level of dynamic capability, or, more generally, management skills, within New Zealand organisations. This was highlighted in 2010 (Green 2010), and there has been little improvement since (Teece and Brown 2020; Sanderson 2022). Firms with strong dynamic and managerial capabilities are more resilient and productive, allowing them to pay higher wages and support innovative cultures (Barth et al. 2016, quoted in Teece and Brown 2020). They also have higher levels of absorptive capacity. Low absorptive capacity impacts the level of exporting, innovation and willingness to undertake R&D (Harris and Le 2018). A decision not to invest in innovation is a symptom of the low level of dynamic capability across New Zealand businesses.

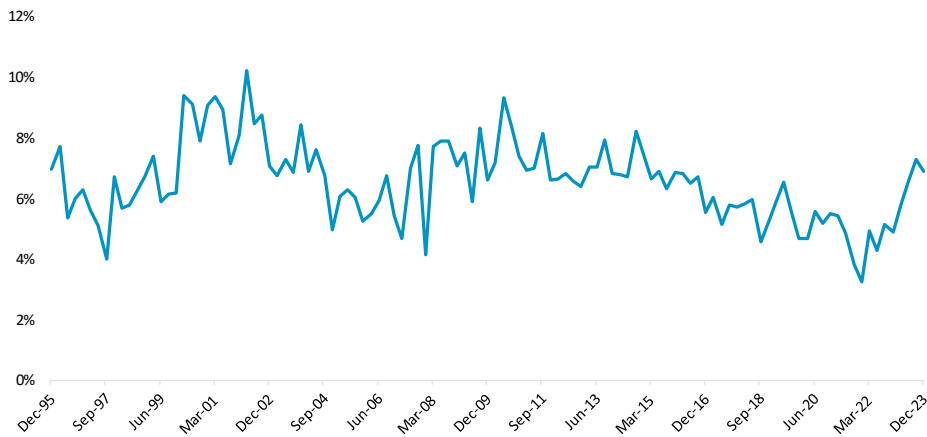
Low dynamic capability is now being amplified by declining education outcomes, as measured by the OECD’s Programme for International Student Assessment (PISA) scores (Galt and Stevens 2023). In 2022, the most recent survey, New Zealand students’ performance in maths had declined markedly (Ministry of Education 2023). Although New Zealand students are performing above the OECD average, the continued decline in performance is a concern.

#### 4.1.5 Capital shallowness

Factors such as high real interest rates and the high cost of capital goods that were identified as contributing to capital shallowness have possibly become less of a constraint. Drawing on NZIER’s longitudinal *Quarterly Survey of Business Opinion* data, we found that access to finance has become less important for the survey respondents over time (see Figure 10) when compared to other constraints such as labour supply and demand or sales. Although the trend has been declining since 2009, there was a notable increase in the most recent 12 months, which may reflect rising interest rates. Finance is a more significant constraint for businesses employing less than 20 people.



**Figure 10 Businesses for whom access to finance is a primary constraint to growth**

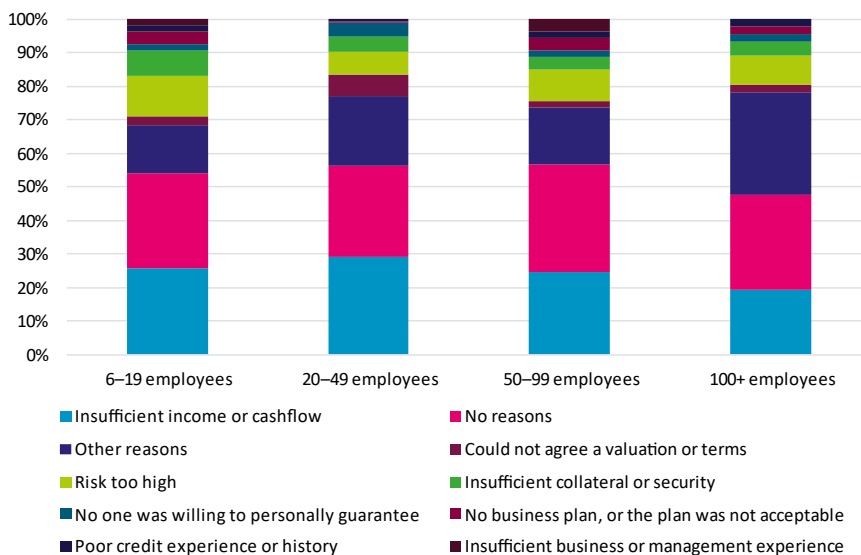


Source: NZIER, QSBO

The Stats NZ Business Operation Survey data suggests that about 27% of respondents applied for debt finance in 2022. About 60% of respondents did not apply for debt finance because it was not needed. For firms that employed less than 100 people, the next most significant reason to not apply for finance was “don’t like to be in debt”.

Of firms that applied for debt finance, about 40% indicated that they did not receive the full amount.<sup>9</sup> Of these, about 30% did not know why they did not receive the full amount. For those that did know, “insufficient income or cash flow” and “other reasons” are most important (Figure 11). This means it is difficult to assess whether firms are being constrained in how they operate by their inability to access debt finance.

**Figure 11 Reason for not receiving the full amount of debt finance, 2022**



Source: Stats NZ, NZIER

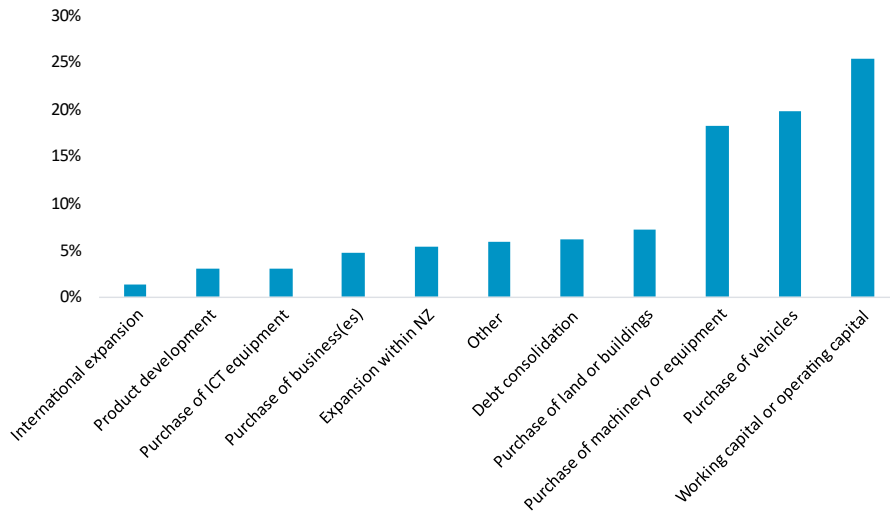
<sup>9</sup> It is possible that respondents have provided more than one reason, so this is a maximum. There does appear to be a high level of “don’t know” responses in these questions.





Of those with debt finance, it is mainly used as working or operating capital for the purchase of vehicles and machinery or equipment (not ICT equipment).

**Figure 12 Intention for the use of debt finance, 2022**



Source: Stats NZ, NZIER

These findings suggest that capital shallowness stems from a lack of demand to invest rather than a lack of supply or difficulty in accessing funds. The important thing is that when businesses are motivated to invest in innovation, there are minimal obstacles to accessing funding to enable this.

## 5 Insights

Despite longstanding concern about New Zealand’s economic performance and a range of initiatives to address it, starting with the Economic Development Conference in 1968, the approach to date has not yielded significant results, as evidenced by the data. The increase in productivity over the past twenty years has been driven by increasing the labour force, and we have not developed a deep culture of innovation in New Zealand.

In 2018, Nolan et al. identified that to resolve the productivity paradox, the answer was a *reform agenda focused on skills, flexibility, openness and receptiveness to new technology* (Nolan, Fraser, and Conway 2018, 8). In 2023, the New Zealand Productivity Commission pointed to the need for investment in *physical, intangible, human, social, cultural and environmental capital, as well as in governance and the institutions...* (New Zealand Productivity Commission 2023, 82). Investment in R&D and innovation processes is also important.

There appears to be a limited appetite for change. For example, a program to help business leaders develop dynamic capabilities was piloted in 2021, but it has not continued due, in part, to a lack of interest (Wilson 2024, 7). New Zealand businesses appear to be focused on maintaining the status quo, pursuing the longstanding approach of protecting their proprietary interests and economic rents.



Digital transformation is bringing disruption to the international economy and this will affect New Zealand businesses. Disruption is no longer held at bay by the geographic distance from competitors or innovators. If New Zealand businesses do not innovate and increase productivity they will be vulnerable to overseas competitors who will be able to offer better and cheaper services.

## 5.1 Helping businesses to improve productivity

Following the announcement that the New Zealand Productivity Commission was to be disestablished, it was observed that its usually respected research findings have resulted in few actions. Recent reports have focused on what the government can or should do, but there has been little guidance on how businesses and organisations can improve their productivity (Gordon 2023).

New Zealand firms pivoted in response to the impact of the COVID-19 pandemic and lockdowns by changing their operating models and introducing technology in a relatively short time (Carroll 2022). The challenge is to use this experience to continue to adopt new technology and systems to innovate. Instead of continuously fixing things with number 8 wire, there is a need to consider other uses.

Based on our analysis, we believe there are three key levers to drive productivity growth in New Zealand:

- 1 Build innovation ecosystems that bring together businesses, research organisations (universities and government and industry research organisations), government agencies and the finance sector to support innovation, identify opportunities and develop plans.
- 2 Develop their dynamic or managerial capability and ability to absorb and develop new ideas and increase their international focus to compete more effectively;
- 3 Ensure there are no policy and regulatory obstacles to firms' ability to adopt new technology and digitise, adapt and innovate once they have decided to innovate and scale.

## 5.2 The role of government

Much of the analysis of the productivity problem in New Zealand and elsewhere has focused on identifying what government should do to fix the problem. Government policy is important to ensure that the necessary conditions for productivity growth are in place by ensuring that the regulatory framework is supportive and does not create obstacles to investment, but it is not sufficient in itself.

One argument for government incentives is to promote R&D or other wider economic or social goals, such as investing in climate change mitigation. This may still be an agreed national objective, but the business decision to invest more in R&D has to be based on evidence of a clear benefit to the business beyond the ability to access a subsidy or tax benefit. If the business cannot or does not recognise the need to innovate its products or processes, then no government incentives will make a difference.

More broadly, government invests in infrastructure, such as fibre broadband networks, which facilitates economic activity and innovation. By financing services such as education, the government supports the development of human capital. There is certainly a need to



consider productivity in providing government services, such as health, to maximise the delivery given our limited labour and capital resources.

We believe that government – politicians and officials – needs to move away from a primary focus on identifying focus sectors and incentives to support the development of a culture of innovation across the economy. Working with businesses and the research community to develop longstanding innovation ecosystems would facilitate this. Furthermore, innovation and productivity growth are not just about novel technology or inventing the next big thing but about taking existing processes and products and making them better, possibly by adopting new technologies and digitisation.

A culture of innovation will be underpinned by a shared understanding that without innovation and rising productivity, New Zealanders will face stagnant incomes and will be increasingly unable to access services such as health and education. This will also help to address our environmental and climate change goals. Underlying this is the need for New Zealanders to understand that productivity growth is not a matter of simply increasing inputs, particularly labour, but about how we get smarter at using our resources.

### 5.3 Role for the business community

The government cannot fix the productivity problem on its own, and it is time for the non-government sector in New Zealand to take leadership by being more ambitious. Businesses and other organisations can work to develop skills, become more flexible and open, and adopt new technology without waiting for government policy to be developed.

Businesses can take the lead in building sustained innovation ecosystems to engender the diffusion of new ideas, practices, capital, and opportunities, as well as create better forward and backward supply chains. These ecosystems can identify obstacles and barriers that need to be addressed, either by government or other institutions.

Innovative New Zealand businesses need to think about developing products and processes that meet the needs of offshore markets, as well as domestic demand, to be able to export successfully. Despite the lack of comprehensive innovation ecosystems, there are private sector entities that are working on innovation and taking them to market ('TIN Report Technology Industry Analysis' 2023; EY 2023). The more limited innovation ecosystem makes this difficult and limits the diffusion impact.

There are many reports of failure, for example, PowerON (Pointon 2024). These need to be assessed to understand if the failure is a function of market conditions or constraints in New Zealand, or whether the product did not have a market after all. Most venture capital investors expect 95% of their investments to fail. Failing is a means of releasing resources, especially skilled labour, to go on to other opportunities.



### Investing for Productivity Case Study Bon Accord, Auckland

Established in 2002, Bon Accord supplies beverage products to the hospitality industry: including hot chocolate, frappe and smoothie bases, real fruit pulps, iced tea syrups and more. It has a strong domestic and international customer base.

Their international business includes branded and Private Label products sold throughout the world. Major export markets are in Australia, the Middle East, Japan and the Pacific Islands.

Bon Accord is adding value to New Zealand milk powder by investing in R&D and developing and marketing products across New Zealand and the world. It works with its major international customers operating in New Zealand and in international markets to meet its clients' needs and develop new products. "Innovation is important" and collaborating with customers creates new opportunities.

The company continues to invest in its supply chain, processes and plant to manufacture new products and efficiently increase production to meet increasing demand. This investment has been supported by its relationship with ASB, so that finance does not constrain the company's ambitions as it continues to innovate and invest in productivity-enhancing equipment.

The business also invests in its internal capability across R&D and quality management. As a food exporter, it must meet stringent international food standards, such as FSSC 22000. These are audited in New Zealand by Asure Quality.

As part of the New Zealand food manufacturing sector, Bon Accord are working with their suppliers and customers in New Zealand and across the global distribution system. NZTE supports their export relationships.

## 5.4 Role for banks

New Zealand start-ups and innovators tend to look to overseas investors or buyers when they are ready to scale their product. This could be because the domestic ecosystem does not support access to expansion capital or management experience, for example, to scale. Foreign investment and tax rules may be a factor in limiting the movement of capital and expertise to New Zealand.

Established businesses have different financial needs from start-ups. Banks have a role in supporting existing businesses to innovate and scale their innovation by helping businesses secure capital in mainstream and innovative financing solutions. Based on their relationships with their clients, they often have useful insights across the ecosystem, which they can use to encourage business leaders to change their risk appetite for innovation and lending. Working with their clients, banks can support New Zealand businesses to take action to boost productivity and economic growth.

## 5.5 Actions

Drawing together our research findings, we have developed an intervention logic (Table 2) for promoting productivity in the New Zealand business sector. This has been developed with a primary focus on interventions that the business sector, including the finance sector, can implement. This logic identifies that productivity growth is not the end but a



contribution to improving economic performance and increasing the resources available to New Zealanders to live well.

**Table 2 Intervention logic – actionable insights**

What	Who/Why/How
Impact	Improved economic performance → income growth → resources to live well
Goals/outcomes	<ul style="list-style-type: none"> <li>• More effective and efficient use of resources/inputs to achieve better outcomes</li> </ul>
Intermediate outcomes	Productivity growth
Potential interventions or activities	<ul style="list-style-type: none"> <li>• Access to finance</li> <li>• Build dynamic capability across management and organisations, to increase absorptive capacity</li> <li>• Diffusion of ideas across ecosystem</li> <li>• Reallocation of resources</li> </ul>
Values/principles	Partnership; Agency; Te ao Māori
Building blocks	<ul style="list-style-type: none"> <li>• Human capital – education, training</li> <li>• Ecosystem of business, research institutions and government identifying shared goals</li> <li>• Investment in technology</li> <li>• Regulation and tax policy</li> </ul>
Issue (foundation for intervention)	Support New Zealand businesses to innovate, invest in new methods

Source: NZIER

### 5.5.1 Building blocks

This logic identifies four building blocks. Building human capital across the workforce and management is the base. This points to the role of education and training, with an emphasis on lifetime learning. As technology, knowledge and systems continuously change businesses, management and employees need to be able to pivot to the next development.

Building effective ecosystems within sectors is also important. These ecosystems encourage the diffusion of innovation and the reallocation of resources. They are also the means of developing shared goals, and identifying and addressing bottlenecks. Regulation and tax policy settings can create bottlenecks. Government officials can work with businesses and researchers to identify solutions.

New Zealand businesses tend to be capital shallow and lack digital maturity. Investment in appropriate technology will support productivity growth, potentially freeing over-worked labour resources to more innovative opportunities.

### 5.5.2 Principles

Te ao Māori is identified as an underlying principle, along with ensuring that businesses take agency and work in partnership. Māori business often have a long term timeframe, which potentially makes them more open to investing in change and innovation. Building productivity is key to delivering the growth and well-being outcomes that Iwi desire.



### 5.5.3 Potential interventions

Although few businesses report that access to finance is a constraint, making them aware of the options available and working with them to find the best financing options may be a means of encouraging greater ambition. Businesses that view debt as a constraint will narrow their investment options so that they limit their opportunities, and ultimately their income.

Building human capital is a basic building block but New Zealand needs to build its dynamic capability across management and organisations. Encouraging New Zealand business leaders to invest in their own capability and that of their employees is key to making them more responsive to change and open to innovation. Increasing this openness would increase absorptive capacity.

Businesses can start to build their own ecosystems, by identifying other firms that are part of their supply chain or have similar interests. In turn, these groups may identify opportunities to fund research which can be applied across the sector. This is not about encouraging collusion but recognising that there are spillover effects that deliver wider benefits.

Being part of an ecosystem will make businesses aware of innovation opportunities, including new technologies and applications. By adopting these opportunities businesses will support the diffusion of innovation and challenge them to compete more effectively in both domestic and international markets. This will also encourage greater awareness of the need to build dynamic capability.

Businesses, investors and banks need to be at the centre of any reallocation of resources, whether capital, technology or labour. Processes or policies that support “zombie” businesses prevent the reallocation of resources and act as a drag on productivity.

### 5.5.4 Conclusion

By growing productivity, businesses can meet rising costs and improve their profits. We believe that New Zealand businesses have to take agency to increase productivity by building their understanding and appetite for innovation as an engine for growth and sustainability. This implies they need to raise their level of ambition across national and international markets. Research has found that when firms do invest in innovation or new technology, they often wish that they did it earlier (Fiftyfive5 SME study, 2018).

Businesses can invest in technology, knowledge and human capital to increase their capabilities at governance, management and worker levels. Developing their absorptive capacity so that they can better absorb new ideas and skills into their business is also important. Being part of an ‘ecosystem’ that facilitates the spread or spillover of ideas and skills will encourage this. Businesses can also lead by identifying where constraints need to be addressed and working to identify priorities with research organisations and government.

The NZIER *Quarterly Survey of Business Opinion* and Stats NZ *Business Operations Survey* data suggest that capital shallowness results from a lack of investment by New Zealand businesses and is not constrained by access to finance. Given minimal obstacles when businesses decide to innovate and scale is a key lever for improving productivity, banks have an important role in stepping up with funding and support once businesses are motivated to invest to innovate.



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