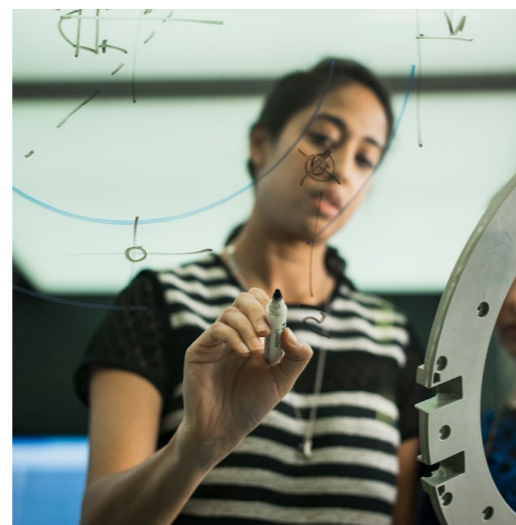




NEW ZEALAND ADVANCED MANUFACTURING REPORT

2023

TIN



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FOREWORD

The importance of manufacturing to the national economy has been made painfully clear to us over the past few years. Global forces – both slow-burning pressures and acute crises – have taken their toll on Aotearoa New Zealand’s industry at all levels, from apprentice to CEO, Fonterra to single owner-operator outfits, Bluff to the Cape. Nevertheless, manufacturing accounts for 60% of all of the country’s exports and 9% of national GDP – it remains the backbone of the economy.

The Advanced Manufacturing Industry Transformation Plan arose out of a taskforce I chaired during the initial COVID-19 response. What became clear was the need – not for a chiropractic quick-fix – but for a long-term plan to strengthen the sector. One that could drive further development particularly as it came to address other challenges beyond the pandemic, such as the effects of climate change, decarbonisation, Industry 4.0, and the need to develop new export markets.

Rachel Mackintosh from the Council of Trade Unions, Paul Stocks from the Ministry of Business, Innovation and Employment, and I co-chaired the ITP Steering Group, and we called out the need to consistently track the ongoing progress and developments within the manufacturing sector. MBIE commissioned this report to provide a system-wide check-up that is repeatable year-on-year.

The New Zealand Advanced Manufacturing Report 2023 is an introduction to the wider horizontal sector. It compares national data with the results of a survey of the top 400 companies by revenue

and employment to present a comprehensive picture. The total sector can be contrasted with the “best in class” companies on key metrics such as business expenditure on research and development (BERD), average hourly wage, and reduction in greenhouse-gas emissions.

There are fascinating insights. Between 2018 and 2022 manufacturing has shed more than 2000 kilotons of carbon emissions output and increased research and development expenditure from \$728m to \$886m: both positive stories for the sector. It is the country’s most internationally connected sector, accounting for \$18.88B, or 13.6% of total foreign direct investment and 31.2% of our offshore assets.

I think you will enjoy the company profiles, with great innovation stories from manufacturers like Miraka, Red Stag, Comfort Group, and Howick, detailing how advanced technology drives these businesses to succeed. Success takes many forms and could mean increasing productivity, retaining staff, or improving sustainability.

Government agencies, unions, and the new Advanced Manufacturing Aotearoa industry body, along with individual enterprises, investors, and entrepreneurs, will be able to interrogate this data to better inform their perspectives and decisions. We hope this will enable us to continue to grow and future-proof the sector.

We look forward to your feedback on the report and how this data can usefully advance your part of this exciting sector and its contribution to Aotearoa’s future prosperity.



BRETT O’RILEY
Co-Chair, Advanced Manufacturing Industry Transformation Plan Steering Group

CEO, Employers and Manufacturers Association

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THIS REPORT ANALYSES KEY PERFORMANCE INDICATORS WITHIN THE NEW ZEALAND MANUFACTURING SECTOR. THE PURPOSE IS TO PROVIDE BOTH A COMPREHENSIVE UPDATE ON THE STATE OF THE SECTOR AND A TEMPLATE FOR MEASURING FUTURE PERFORMANCE.

Specifically, the report covers key indicators across seven manufacturing subsectors: food and beverage; machinery and equipment; chemicals and refining; wood and paper; metals and metal products; plastics and rubber; and “other” manufacturing. These categories are captured within the Australian and New Zealand Standard Industrial Classification (ANZSIC 2006) and are identified in detail within the Definitions section on page 37.

ADVANCED MANUFACTURING DEFINITION

The term “Advanced Manufacturing” is used in this report to cover all manufacturing in Aotearoa New Zealand. This includes both primary and non-primary sector manufacturing. The term “advanced” refers to the use of modern technologies, processes and business practices in the manufacturing operations rather than whether the final products are high-tech. This report therefore covers the making of products as diverse as switchboards and milk powder.

DATA COLLECTION

The report uses two key sources of information to form its analysis. The first “total sector” dataset is drawn from Statistics NZ and covers the totality of New Zealand’s

manufacturing sector. The second “best in class” dataset is the result of a TIN survey of New Zealand’s 400 largest manufacturers by revenue. These datasets are compared and contrasted within the report to better understand the transformation of the sector as a whole.

The report survey was conducted from June to July 2023. Collected data has been aggregated, anonymised, and trended to create an in-depth profile of the advanced manufacturing sector and its performance. Where surveys are not returned or incomplete, publicly available figures have been used. Where gaps remain, figures have been estimated based on staff numbers, revenue per employee ratios, and data from TIN’s own extensive database.

RESEARCH LIMITATIONS

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WELCOME

Welcome to Technology Investment Network’s inaugural New Zealand Advanced Manufacturing Report! We have been quantifying and connecting the tech sector for 19 years with our annual TIN Report, which ranks the top 200 tech companies by revenue. These companies include manufacturers of products like electromagnets, circuit boards, and medical devices. Recent reports have drilled down into the growing agritech and healthtech subsectors. We are excited to build on this work by examining an even broader swathe of the NZ economy.

Advanced manufacturing employs 222,400 people and 11.9% of the NZ workforce. Particularly outside of metropolitan centres, the sector provides a substantial proportion of employment – over 15% in Taranaki and Southland – and is a critical part of the country’s social and economic infrastructure. A robust and modern manufacturing firm can pay healthy social dividends. The 400 “best in class” companies surveyed for this report pay a wage that’s 12.1% more than the national manufacturing average.

This sector covers the creation of goods as diverse as chocolate chips and computer chips, but no matter the end product, technology can advance and improve manufacturing. We surveyed best in class companies about their use of the Internet of Things, robotics and automation, data warehousing and analytics, additive manufacturing and 3D printing, and human-centred technology and safety tech. Leading manufacturers are using these technologies to unlock profit, with the top 400 firms representing 70.8% of all of manufacturing’s total revenue, a total of \$93.38B.

Intergenerational family-owned companies often have a vision that goes beyond quarterly reporting, so they can be truly forward-thinking in their approach to technology and environment. Companies like Douglas Pharmaceuticals and NZ Comfort Group drive their business forward by building flagship facilities and creating communities to support them. Miraka and Untouched World make sustainability and the future of the planet central to their operations.

This report projects that by 2024, manufacturers will drop behind households to become the third largest emitter, leaving agriculture at the top. The effects of climate change create opportunities for manufacturers as they step up to rebuild areas hit by extreme weather events like Cyclone Gabrielle, to supply the creation of renewable energy infrastructure, and above all to test innovative solutions and intellectual property that can help drive change.

TIN believes that making Aotearoa New Zealand a hub for technological innovation diversifies the export economy, lifts the average wage, and transitions us towards a greener future. A rising tide will lift all boats – particularly if manufacturers can ride the wave of technological revolution. We look forward to measuring the progress of the advanced manufacturing industry in the future.



GREG SHANAHAN
Managing Director, TIN

TIN

TOTAL SECTOR REPORT CARD

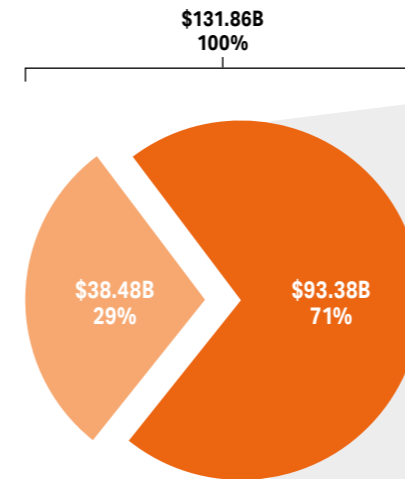
KEY GROWTH INDICATORS (2022)¹

	MANUFACTURING TOTAL	YEAR-ON-YEAR CHANGE	SHARE OF NZ TOTAL		COMPOUND ANNUAL GROWTH (2018-2022)	
					Manufacturing Sector	Total NZ Economy
EXPORTS	\$54.18B	▲ 14.8%	60.3%	EXPORTS	6.20%	1.83%
GDP	\$23.28B	▼ -4.6%	9.1%	GDP	-0.91%	2.55%
JOB	222,400 ²	▲ 4.3%	11.9%	JOB	3.30%	2.63%
AVG. WAGE (HR)	\$35.91	▲ 7.9%	-\$2.28 (below NZ avg.)	AVG. WAGE	4.55%	4.64%
FIRMS	22,476	▲ 2.7%	3.9%	FIRMS	1.61%	2.51%
EMISSIONS	9,177 kt CO ₂ E	▼ -9.5%	12.2%	EMISSIONS	-4.88%	-1.97%
R&D	\$886m	▼ -4.2%	26.8%	R&D	5.03%	11.71%
PROFITS	\$9.47B ³	▲ 65.5%	7.6%	PROFITS	5.13%	5.97%
PRODUCTIVITY	\$51.93 ⁴	▲ 2.3%	-\$22.46 (below NZ total)	PRODUCTIVITY	1.28%	1.54%
INWARD FDI	\$18.88B	▲ 17.7%	13.6%	INWARD FDI	5.36%	6.38%
OUTWARD FDI	\$8.64B	▼ -3.6%	31.2%	OUTWARD FDI	-2.80%	3.24%

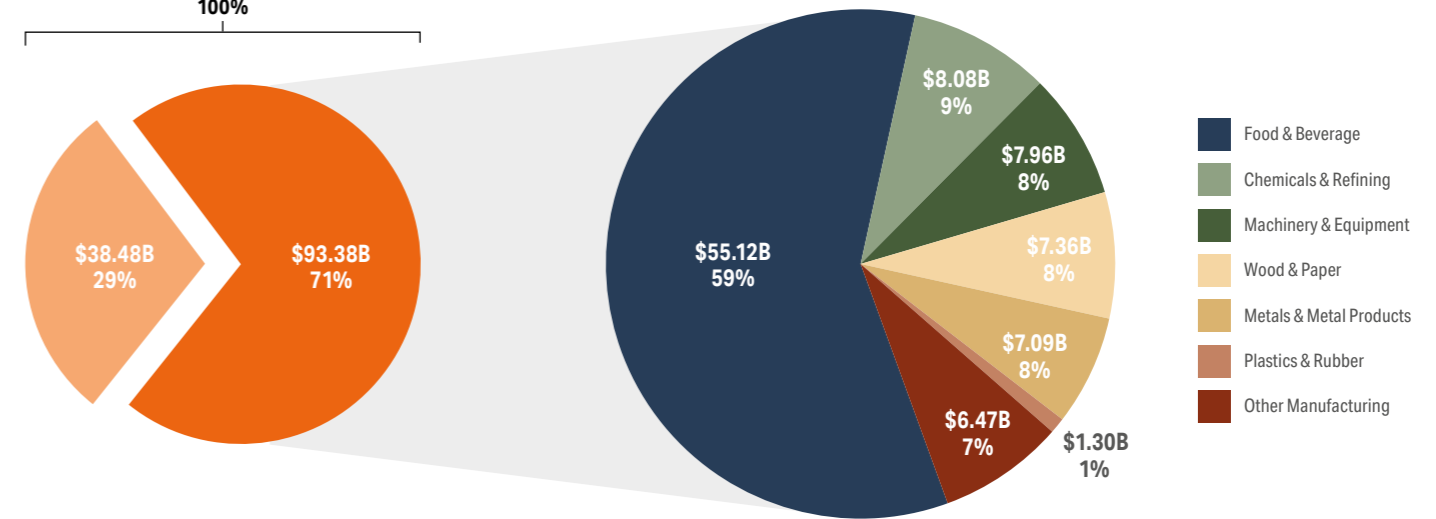
¹ Exports, GDP, Jobs, Avg. Wage, Firms, Emissions at year-end December 2022; R&D at year-end August 2022; Profits, Productivity, Inward FDI, and Outward FDI at year-end March 2022. ² Full-time equivalent. ³ EBIT. ⁴ GDP per hour worked.

BEST IN CLASS (TOP 400 RANKED FIRMS)

TOTAL MANUFACTURING SECTOR REVENUE¹



BEST IN CLASS REVENUE BY SUBSECTOR



CAPTURING 70.8% OF TOTAL MANUFACTURING REVENUE	PAYING AN AVERAGE \$4.34 MORE PER HOUR	EMPLOYING 160,507 FULL-TIME EQUIVALENT STAFF
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BEST IN CLASS REVENUE BAND COMPARISON

COMPANIES	REVENUE BAND	TOTAL REVENUE	TOTAL EMPLOYEES	REVENUE PER EMPLOYEE	AVERAGE WAGE (HR)
1	>\$20B	\$22.95B ²	19,608	\$1,170.59	\$52.94
72	\$200m-\$5B	\$52.10B	97,467	\$534.57	\$38.12
124	\$50m-\$200m	\$13.26B	28,121	\$471.39	\$40.90
122	\$20m-\$50m	\$3.93B	11,891	\$330.81	\$36.22
81	<\$20m	\$1.14B	3,420	\$332.97	\$36.87
TOTAL: 400		\$93.38B	160,507	\$581.81	\$40.25

¹ Total revenue at year-end Sept 2022, Stats NZ. ² Fonterra.

EXECUTIVE SUMMARY

Advanced manufacturing is a critical engine of Aotearoa New Zealand's long-term prosperity, making a vibrant contribution to the nation's economy. However, this industry is undergoing a historically significant transformation worldwide. In this country, the leading and most aspirational firms are deploying Industry 4.0 technologies to overcome geography, game global supply chains, improve competitiveness, and reduce carbon emissions.

Recent global events have had a substantial impact on the pace and scope of the fourth industrial revolution in NZ and the manufacturing sector's role in the national economy – with mixed results:

MANUFACTURING EMPLOYMENT ROSE 4.3% IN 2022, REACHING 222,400 FTE STAFF, OR 11.9% OF NZ'S TOTAL WORKFORCE.

The sector remains a diverse employer, capturing 10.0% (41,200) of the total Māori workforce and 12.1% (21,400) of all Pasifika workers. In the regions, a higher proportion of total employment is in manufacturing. The average sector hourly wage rose 7.9% in 2022 to reach \$35.91, which is \$2.28 below the national average. Employees of NZ's 400 largest firms earn an average hourly wage of \$40.25.

THE VALUE OF NZ MANUFACTURING EXPORTS GREW BY 14.7% TO \$54.18B – ACCOUNTING FOR 60% OF TOTAL NZ EXPORTS AT YEAR-END 2022.

Higher export value is underpinned by inflationary pressure on prices and favourable exchange rates. In many cases, the total volume of exported products actually decreased. Sector exports were dominated by the food and beverage subsector, which added an extra \$6.14B of value over 2021 figures. Meanwhile, companies will be wary of economic headwinds that could beckon fewer orders and lower production for 2024 and beyond.

MANUFACTURERS CONTRIBUTED 9.1% (\$23.32B) OF NZ'S GDP IN 2022, DOWN FROM 12.5% IN 2008.

Manufacturing GDP grew by \$1.85B in the decade to December 2022 at a lethargic 0.83% per year. The sector's current share of total national GDP represents a historic low. This reflects a longstanding trend in advanced economies, as consumption of services and intangible assets has become dominant.

BETWEEN 2018 AND 2022 TOTAL MANUFACTURING EMISSIONS FELL BY 18.16% AND ARE EXPECTED TO FALL BELOW NZ HOUSEHOLD EMISSIONS IN 2024.

This reduction captures the effects of COVID-19 lockdowns, the closure of the Marsden Point oil refinery, and a global economic slowdown, but also reflects manufacturers' efforts to satisfy regulatory pressure and consumer demand for industry's decarbonisation. Indexing emissions and GDP against one another shows that reduced emissions need not come at the cost of decreased economic growth.

LABOUR PRODUCTIVITY REMAINS SLUGGISH, WITH ANNUAL GROWTH OF 0.92% OVER THE LAST 10 YEARS, BELOW THE NZ AVERAGE OF 1.17%.

At year-end March 2022, manufacturing workers produced the equivalent of \$51.93 of GDP per hour worked, compared with \$41.37 in 2002. Among measured sectors, this result confirms manufacturing as the weakest performer on productivity over the last twenty years.

R&D SPENDING HAS BEEN ERRATIC FOLLOWING THE PANDEMIC, WITH MANUFACTURING FIRMS COMMITTING \$886M TO R&D IN 2022, DOWN 4.2% ON THE PREVIOUS YEAR.

Manufacturing remains a key driver of innovation and R&D, contributing a healthy, but diminishing, 26.8% share of NZ's business expenditure on R&D, down from 34.4% in 2015. In 2022, 4,600 R&D staff were employed within the manufacturing sector – 11.8% of NZ's total R&D workforce. Over two thirds of those workers are in the machinery and equipment subsector, with a further 560 working for food and beverage companies.

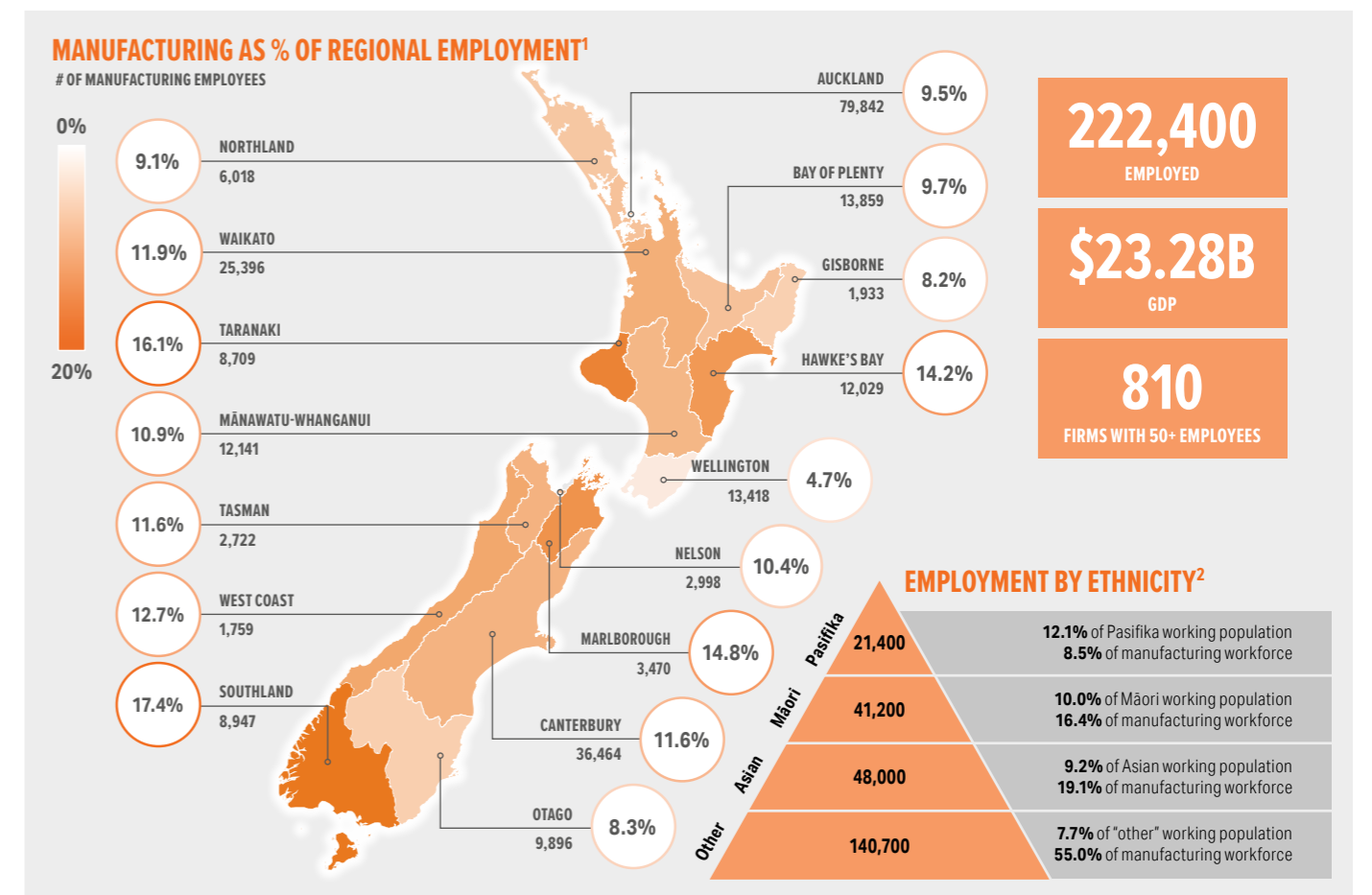
SECTOR PROFITS REBOUNDED TO \$9.47B, UP 65.7% FROM THE DIP CREATED BY COVID-19 IN 2021.

During 2018–2022 local manufacturing earnings suffered unequally. Profitability remained particularly strong in the machinery and equipment sector, while food and beverage's growth rate tumbled. Overall, the sector maintained compound annual growth of 5.13%.

MANUFACTURING REMAINS NZ'S MOST INTERNATIONALLY CONNECTED SECTOR, CAPTURING 13.6% (\$18.88B) OF FOREIGN DIRECT INVESTMENT AND 31.2% (\$8.64B) OF OUTWARD DIRECT INVESTMENT.

Between 2018 and 2022, the manufacturing sector attracted significant investment by NZ standards, growing by \$3.56B at a compound annual growth rate of 5.36%. FDI transactions picked up in 2022, led by higher levels of merger and acquisition activity across the food and beverage sector.

ADVANCED MANUFACTURING IN NZ



The manufacturing sector converts raw materials into finished products through industrial processes. It encompasses various industries and activities, from machinery and electronics to food and textiles, through warehousing, logistics, and utilities. Beyond traditional product sales, manufacturing is increasingly expanding into value-added services, contributing to growth in other parts of the economy, which means that the data tends to under-represent the totality of the sector.

That said, the sector's significance is borne out by the numbers: it contributes \$23.28B to GDP, directly employs 222,400 people and accounts for more than 60% of the country's total export value. A quarter of national R&D spending comes from manufacturing, as does 13.6% of total foreign direct investment. The sector represents more than 9.1% of the total New Zealand economy.

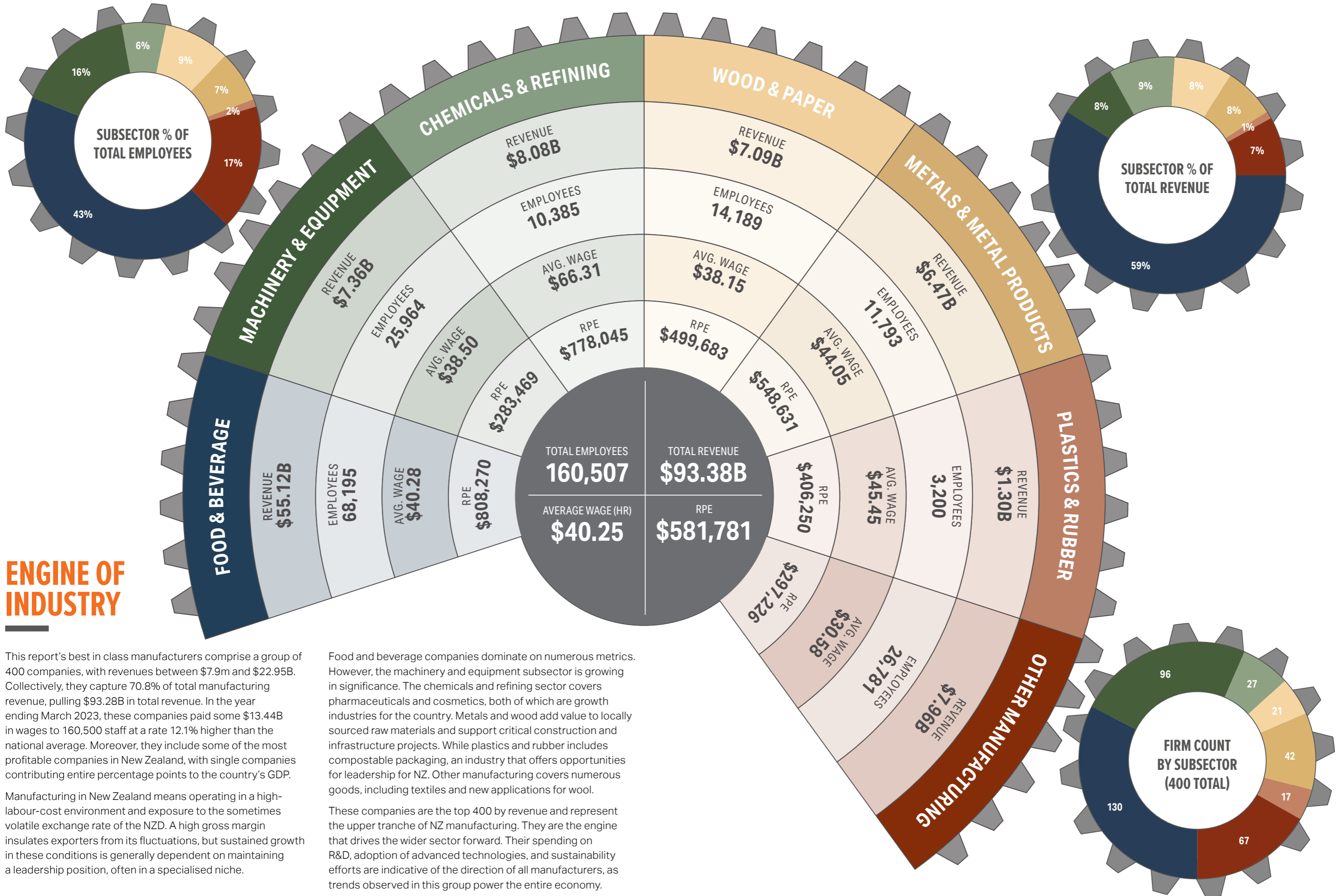
Manufacturing is also a critical part of regional economies, where it contributes a relatively high proportion of jobs and GDP (see above). Moreover, the sector is a diverse employer capturing 10.0% (41,200) of the total Māori workforce and 12.1% (21,400) of all Pasifika workers, as well as a cross section of skilled technicians, trade workers, and labourers.

A number of dynamic forces are impacting manufacturers worldwide, yielding both opportunities and obstacles for New Zealand firms. The country's small size and distance from major markets and supply chains means these forces are keenly felt by operators. The pressure to curb environmental impacts, navigate trade protectionism, mitigate inflated costs of production, avoid supply-chain disruptions, and attract skilled workers are among the key challenges faced by industry.

The advent of Industry 4.0 – the use of advanced technologies in manufacturing – is creating universal disruption. Embracing automation, data analytics, Internet of Things and artificial intelligence is highly desirable for many reasons, not least of which is New Zealand's low productivity. Where expertise and finances allow, many of New Zealand's advanced manufacturers surveyed are transitioning to Industry 4.0 principles. Overall, however, the rate and speed of adoption across the total sector falls short of impacting the figures in this report in a significant way.

¹ At year-end February 2022, Stats NZ.

² Full-time + part-time at June 2023, Stats NZ.



This report's best in class manufacturers comprise a group of 400 companies, with revenues between \$7.9m and \$22.95B. Collectively, they capture 70.8% of total manufacturing revenue, pulling \$93.28B in total revenue. In the year ending March 2023, these companies paid some \$13.44B in wages to 160,500 staff at a rate 12.1% higher than the national average. Moreover, they include some of the most profitable companies in New Zealand, with single companies contributing entire percentage points to the country's GDP.

Manufacturing in New Zealand means operating in a high-labour-cost environment and exposure to the sometimes volatile exchange rate of the NZD. A high gross margin insulates exporters from its fluctuations, but sustained growth in these conditions is generally dependent on maintaining a leadership position, often in a specialised niche.

Food and beverage companies dominate on numerous metrics. However, the machinery and equipment subsector is growing in significance. The chemicals and refining sector covers pharmaceuticals and cosmetics, both of which are growth industries for the country. Metals and wood add value to locally sourced raw materials and support critical construction and infrastructure projects. While plastics and rubber includes compostable packaging, an industry that offers opportunities for leadership for NZ. Other manufacturing covers numerous goods, including textiles and new applications for wool.

These companies are the top 400 by revenue and represent the upper tranche of NZ manufacturing. They are the engine that drives the wider sector forward. Their spending on R&D, adoption of advanced technologies, and sustainability efforts are indicative of the direction of all manufacturers, as trends observed in this group power the entire economy.

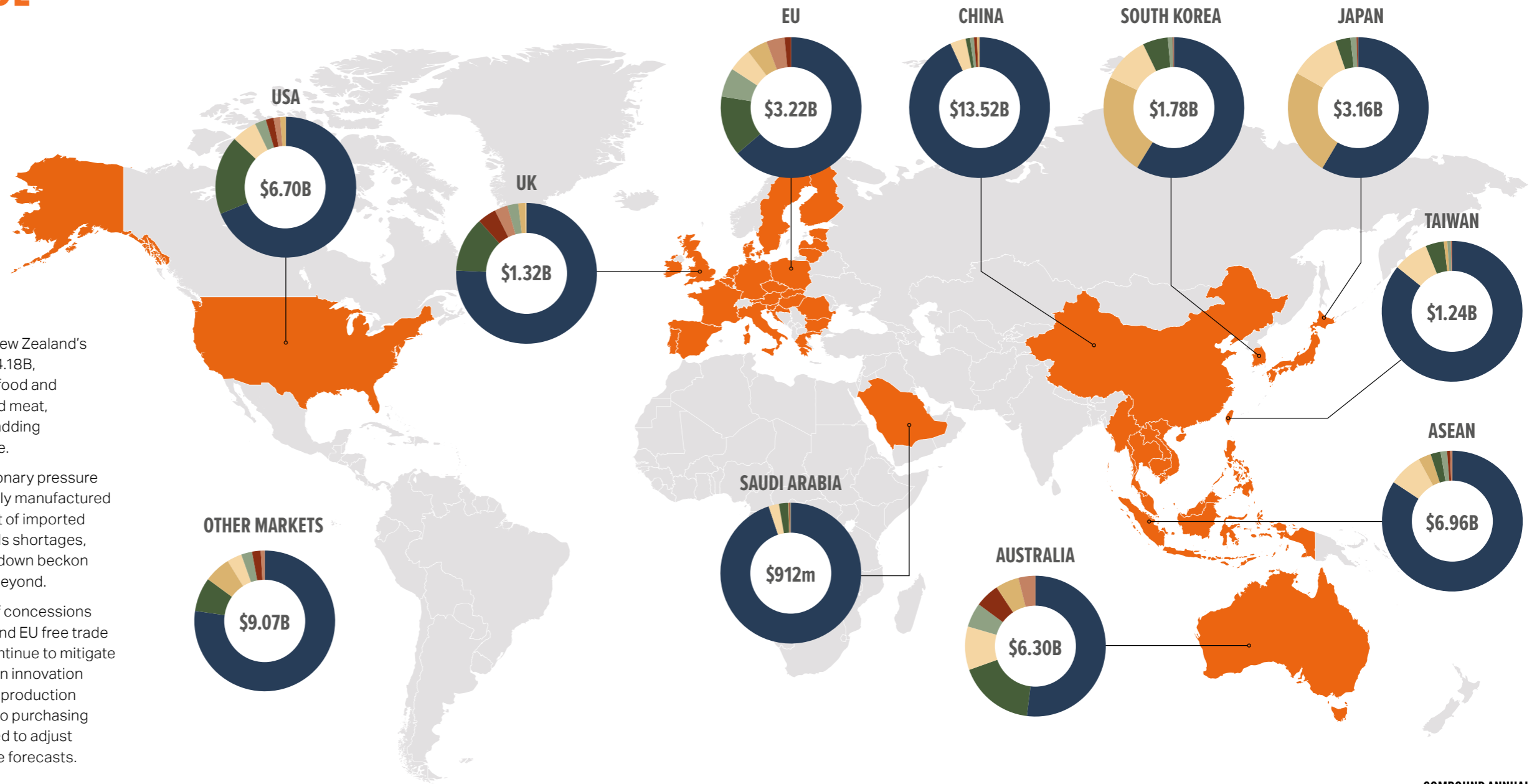
INTERNATIONAL TRADE

2022 TOTAL EXPORTS: \$54.18B
EXPORT GROWTH: 14.7%
COMPOUND ANNUAL GROWTH 2018 – 2022: 6.20%

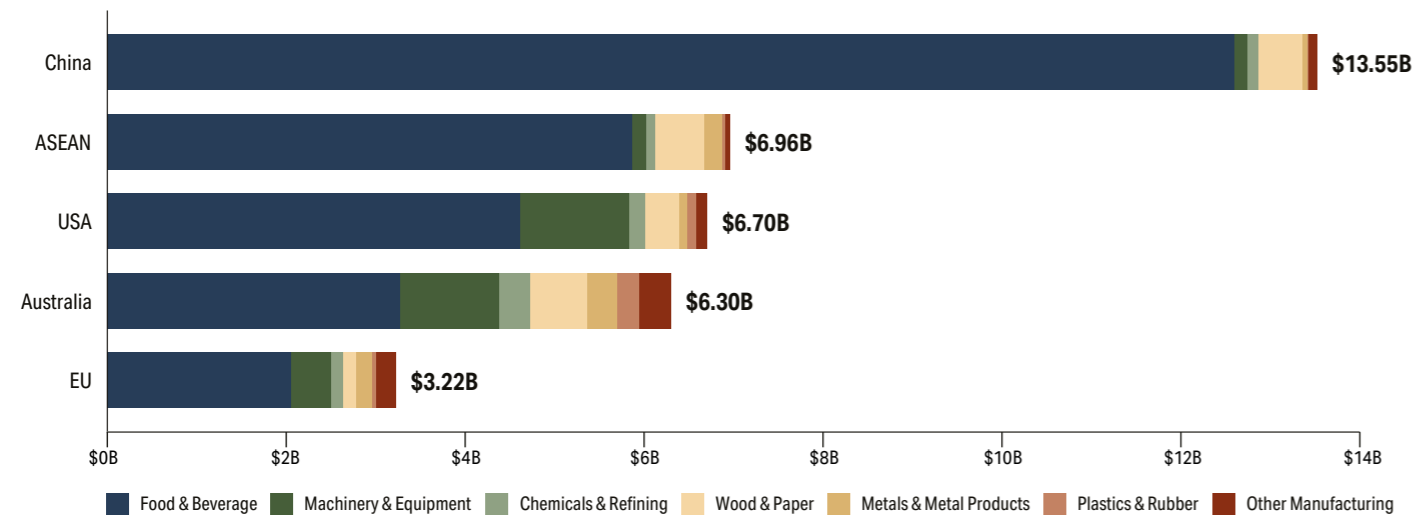
In the year ending December 2022, the value of New Zealand's total manufacturing exports grew by 14.7% to \$54.18B, reaching 23.9% above pre-pandemic levels. The food and beverage sector – milk powder, butter, cheese, red meat, and wine – was the primary driver of this growth, adding an extra \$6.14B to the previous year's export value.

Higher-value exports were underpinned by inflationary pressure on prices; in many cases, the total volume of locally manufactured products actually decreased. Meanwhile, the cost of imported materials, lingering supply-chain issues, local skills shortages, and the reverberations of China's economic slowdown beckon fewer orders and lower production for 2024 and beyond.

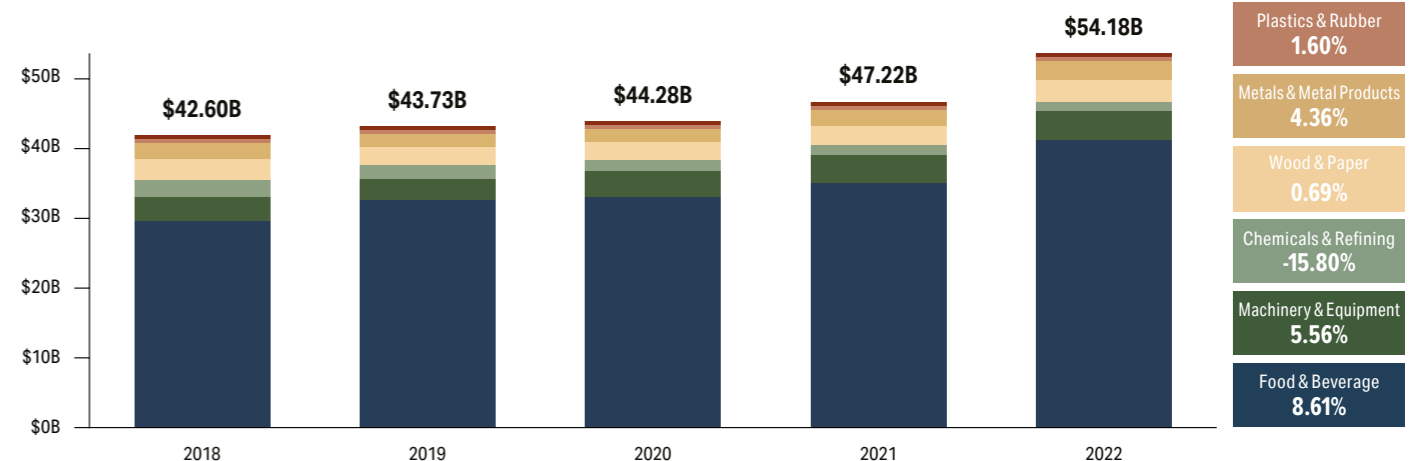
Some manufacturers will take comfort in the tariff concessions and market access offered within the recent UK and EU free trade agreements. Forward-thinking manufacturers continue to mitigate the risks of the current environment by investing in innovation that provides supply-chain resilience, flexibility in production systems, and product customisation. In addition to purchasing tangible assets, some companies will feel the need to adjust their business approach to manage lower revenue forecasts.



TOP 5 EXPORT MARKETS BY SUBSECTOR 2022



EXPORT GROWTH BY SUBSECTOR 2018 – 2022



UPSKILL WORKERS TO KEEP UP WITH THE WORLD

“ROBOTS DO TASKS AND PEOPLE DO JOBS. ROBOTS ARE VERY GOOD AT REPETITIVE TASKS, BUT THEY’RE NOT GOOD PROBLEM SOLVERS.”

BEHIND THE GLOBAL BENCHMARK

Sean Doherty has spent 30 years in manufacturing and has a wealth of experience in educating New Zealand businesses in how to adopt advanced technologies. He tells us that NZ is “well behind the overseas benchmark” when it comes to their adoption. In the 2022 IMD World Digital Competitiveness, NZ ranked 27 out of 63 countries overall, and 18 in populations less than 20 million. Denmark was ranked first in both lists. In the past five years of the ranking, NZ has slipped further behind each time.

“Most of Europe is about ten years ahead of us,” Doherty notes. He says they began actively embracing Industry 4.0 technologies in 2013 and Angela Merkel popularised the term in a 2014 speech. A study from 2018 predicted that by 2023 more than 80% of European companies would have digitalised their value chain.¹ “They’ve got a huge jump-up on the rest of the world. They’re building for the future.”

Doherty highlights “pockets of goodness”, particularly NZ companies “who are exporting and having to compete on a global market”. He picks out Sistema as a great example of a company that simply chose to be globally competitive. “They automated really hard and they’ve got really efficient processes and good on them for making the commitment.” Sistema has a 47,000m² factory in Auckland and employs around 700 workers – and keeping manufacturing onshore was a condition of the sale of the business to American giant Newell Brands.

KEEP JOBS IN NZ BY GIVING TASKS TO ROBOTS

Employers and employees need to see automation as supercharging the local manufacturing sector, not bringing about its demise. A recent

survey from the NZ Productivity Commission found that 50% of Kiwis believe that robots and AI will steal people’s jobs. “At the moment there are significant, unfounded fears around the impact of smart processes on people’s jobs,” Doherty says. He stresses that, “Robots do tasks and people do jobs. Robots are very good at repetitive tasks, but they’re not good problem solvers.”

He cites Buckley Systems and Nautech as exemplars of how to introduce automation. “How well a company upskills its workforce when deploying new technology is the difference between the success or failure of a major Industry 4.0 deployment.” Doherty thinks more employees need microcredentials and we need to offer more of them. Although there are some available through Te Pūkenga, and these are being expanded as part of the Industry Transformation Plan, he says we are once again playing catch-up. Overseas, there is a wider range of offerings by Skills Lab in Australia and Made Smarter and Digital Catapult in the UK.

SMART PRODUCT VS SMART PROCESS

This report highlights a 5.03% four year CAGR for research and development spending, and Doherty posits that “most of that would be in new product development”. His experience running workshops in Industry 4.0 is that leaders are much more drawn to a “smart product” than “smart process”. “I think from a leadership point of view that’s easier for change management. Talking about new products is often more palatable to an organisation than the disruption that might come from changing existing processes.”

But Doherty tells us there are billions of dollars of efficiencies to unlock by improving processes. Once a company can question tribal



SEAN DOHERTY
Industry 4.0 Product Owner,
Callaghan Innovation

CallaghanInnovation

knowledge with hard data, it becomes an easier conversation about how to find improvements. With the basics underway, the next obvious area to look at is digital supply chains and customer insights to tighten up business forecasting and reduce or increase inventory to match demand.

CAPITAL TO INVEST IN NEW TECH

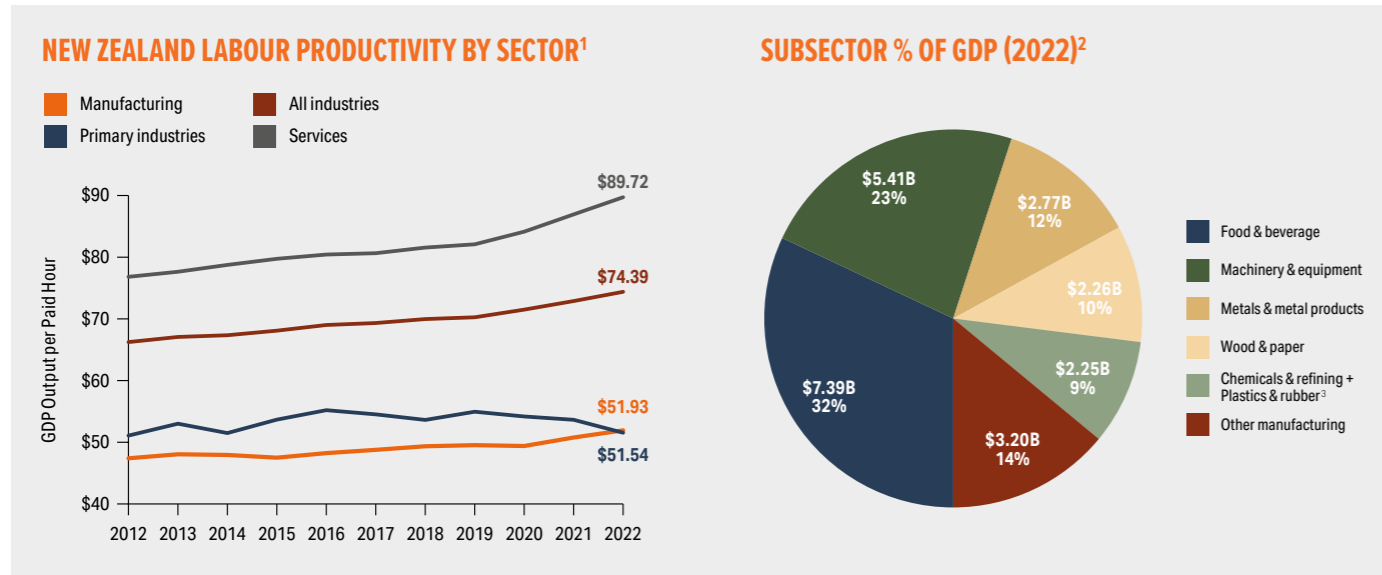
Doherty is cognizant of the fact that for most companies, the barrier to adopting advanced technologies is capital. Doherty stresses that established manufacturers should use their continuous improvement budgets to update their existing plants. But when large capital investment is needed, offshore partnerships and funding can also be an attractive option, “especially if it opens up new markets”. Doherty advises manufacturers to have “a deep relationship with their bank”. He continues, “It’s surprising how flexible some lending rates can be if you’re scaling for the future or trying to achieve ESG goals.”

¹ Reza Hamzeh, Ray Zhong, Xun William Xu, “A Survey Study on Industry 4.0 for New Zealand Manufacturing”, *Procedia Manufacturing*, 2018.

IN DEPTH

PRODUCTIVITY

BETWEEN 2018 AND 2022, THE MANUFACTURING SECTOR HAD ANNUAL LABOUR PRODUCTIVITY GROWTH OF 0.92%, BELOW THE NEW ZEALAND AVERAGE OF 1.17%.



PRODUCTIVITY

New Zealand has a longstanding productivity problem, and continues to grapple with sluggish output per worker, most noticeably within the manufacturing sector. Over the last 20 years, the country recorded annual labour productivity growth of 1.44%. Manufacturing was the lowest performing sector with 1.14%, behind the service and primary sectors on 1.50% and 1.61% respectively. In the year ending March 2022, manufacturing workers produced the equivalent of \$51.93 of GDP per hour worked, compared with \$41.37 in 2002.

GDP

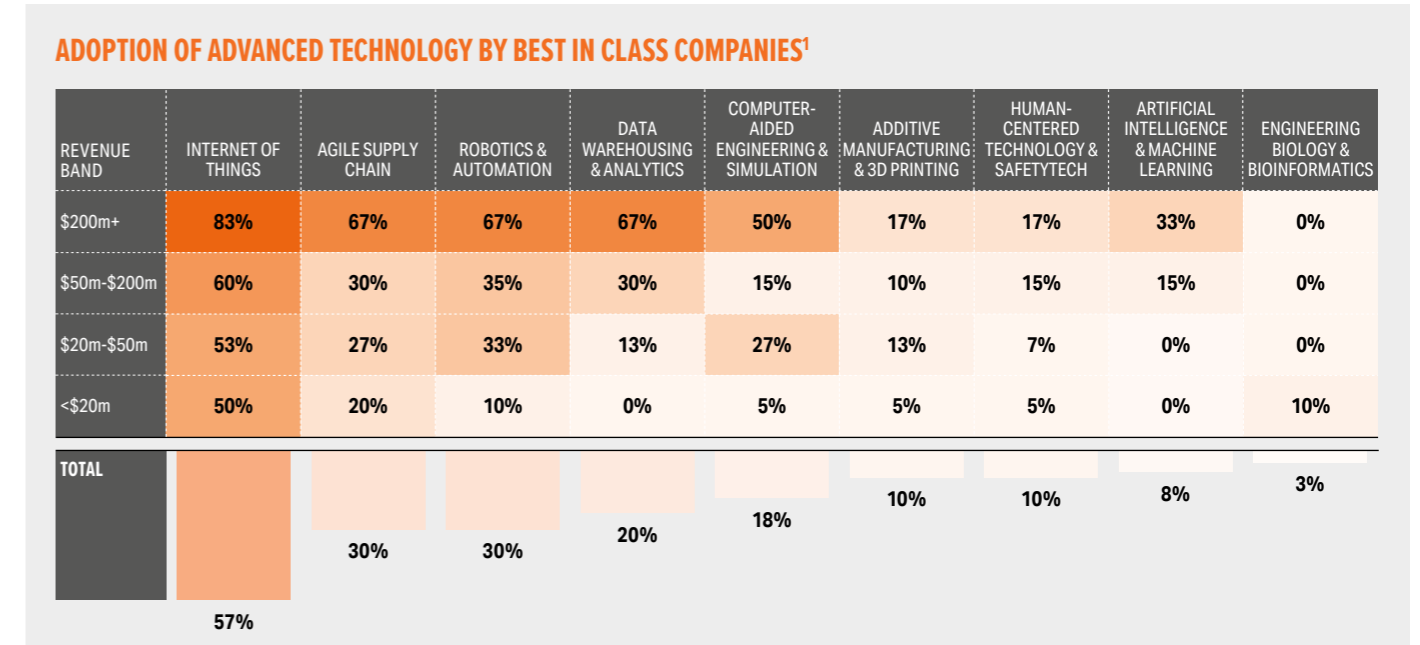
Manufacturers contributed 9.1% (\$23.32b) of NZ's GDP in 2022, down from 12.5% in 2008. Manufacturing GDP grew by \$1.85b in the ten years to December 2022 at a lethargic 0.83% per annum. While the sector's 9.1% share of total national GDP represents a historic low. This reflects a longstanding trend in advanced economies, where consumption of services and intangible assets have taken primacy over goods.

Given the disruption experienced throughout the reporting period, it's unsurprising to see that all manufacturing subsectors have experienced a relative decline in GDP growth. Machinery and equipment performs best, achieving annual GDP growth of nearly 5% since 2015. In the remaining subsectors, growth has been tepid.

¹ GDP per hour worked at year-end March, Stats NZs, TIN. ² At year-end December 2022, Stats NZ. ³ Sectors have been combined due to data limitations. ⁴ Compound annual growth, Stats NZ, TIN.

ADVANCED TECHNOLOGY

BEST IN CLASS COMPANIES USE TECHNOLOGY TO OVERCOME GEOGRAPHY AND NAVIGATE THE GLOBAL SUPPLY CHAIN WITH AGILITY.



Internet of Things refers to sensors and software that are used for real-time data gathering and monitoring in the physical world. With over 50% of companies using it, this is the technology most readily deployed by advanced manufacturers in NZ. Within the \$200m+ revenue band, an extremely high adoption rate of 83% shows that Internet of Things acts as a force multiplier – corresponding to higher adoption rates of other technologies such as automation, data analytics, and artificial intelligence. These have their potential unlocked when combined with the data collection capabilities of Internet of Things implementations.

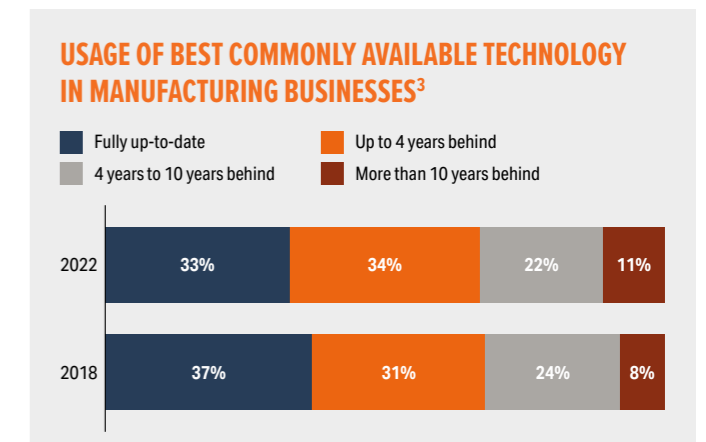
Companies in the highest revenue band have deep pockets to invest in these and other technologies, while the rest have adoption rates of less than 50% across eight of the technologies surveyed. The wider manufacturing sector still lags behind: over 60% of manufacturers feel they are not up-to-date with available technology.²

Top-earning manufacturing companies are working smarter not harder, using technology to overcome New Zealand's natural disadvantages. While the optimisation of inputs to outputs has always been a part of manufacturing, recent disruptions have shown the importance of an agile supply chain that is driven by data and responsive to sudden shifts in the market. Technology enables a highly customisable production line that can be adapted to market shifts as well as to customers' demands.

¹ Based on 62 responses to this question. ² "Business operations survey", Stats NZ, 2022. ³ Ibid.

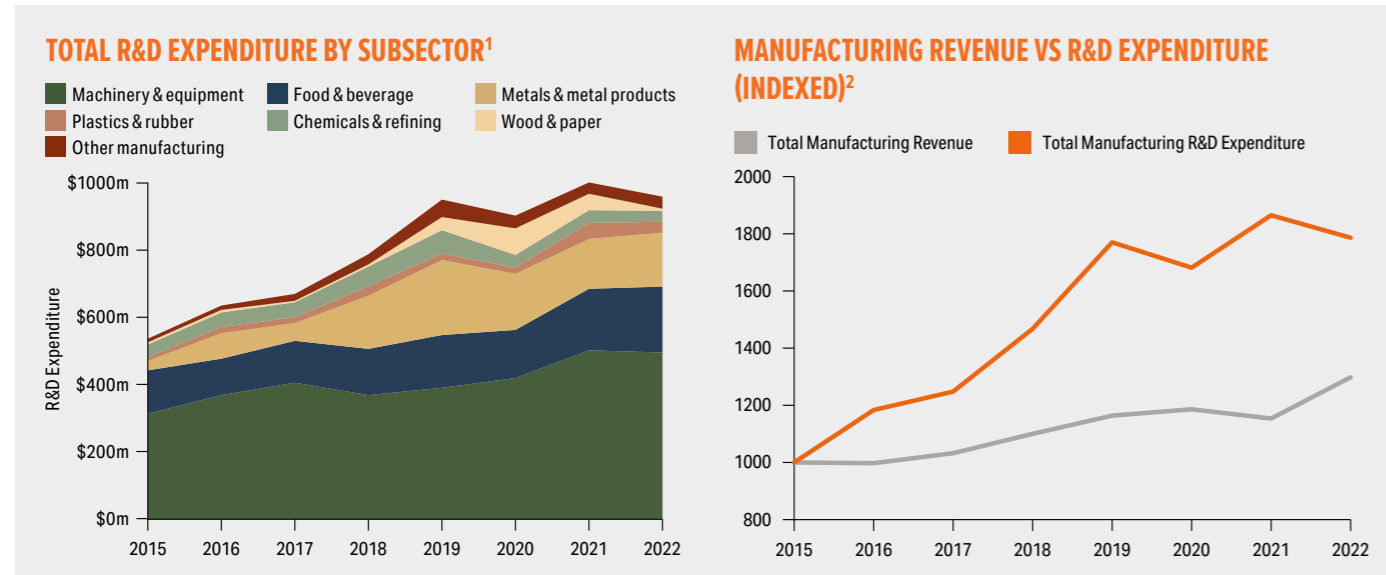
Increased customisation is in line with a global trend of servitisation in manufacturing. Small advanced economies – such as New Zealand – are increasingly service-based. But the lines between manufacturing and services are blurring, as companies offer related pre- and post-production services like installation, logistics, repair, recycling, and engineering.

In sectors such as machinery and equipment, the diffusion of digital technology can bring about new value-added revenue streams. The use of advanced technology in manufacturing allows continuous service offerings such as real-time data on the status of equipment, maintenance of services, and software upgrades.



RESEARCH & DEVELOPMENT

26.8% – OR \$886M – OF NEW ZEALAND’S TOTAL BUSINESS EXPENDITURE ON R&D IN 2022 WAS SPENT IN THE MANUFACTURING SECTOR.



Research and development spending by manufacturing firms totaled \$886m at year-end September 2022, representing a healthy but diminishing share of national business expenditure on R&D (BERD). This was led by the machinery and equipment sector, which invested \$458m in 2022. Between 2015 and 2022 manufacturing R&D spend grew at a rate of 8.64%, but this has slowed to 5.03% since 2018.

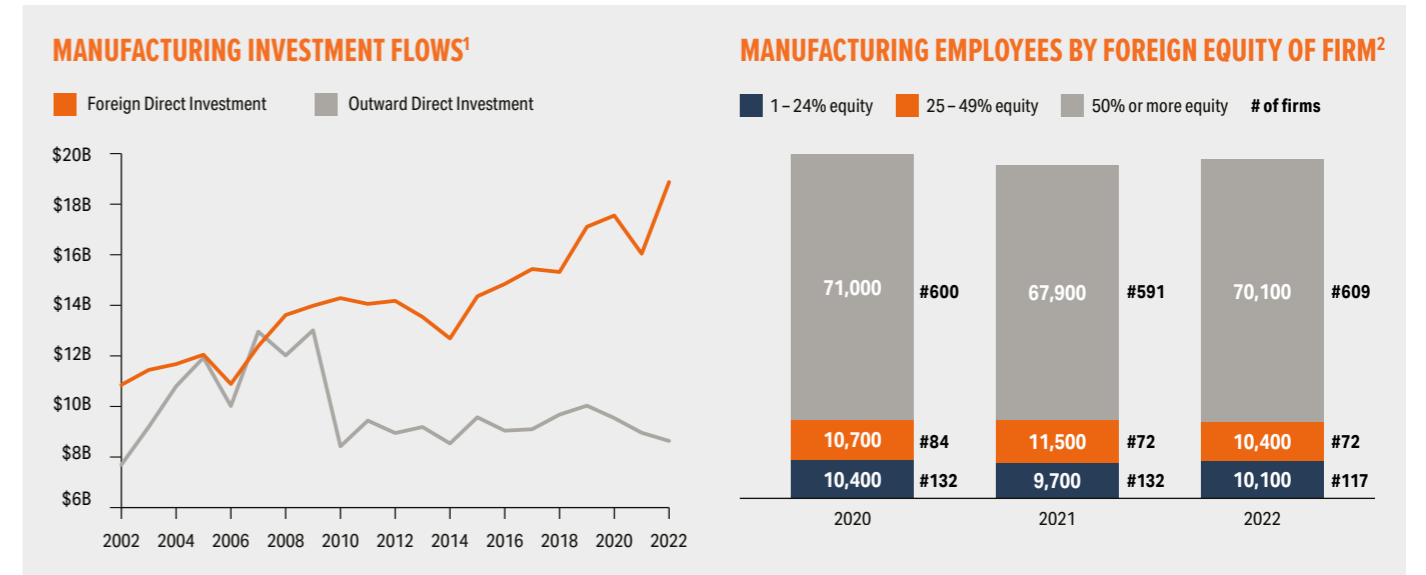
Generally speaking, COVID-19 tended to increase R&D intensity across the international manufacturing landscape, with spending growing faster – or at least falling slower – than revenue. In New Zealand, manufacturers initially handbraked R&D spending, following a sustained period of growth, before committing a record \$925m in 2021 to achieve efficiencies and new growth opportunities.

All subsectors except two (wood and paper, chemicals and refining) have enjoyed high annualised growth in R&D expenditure over the last eight years. Most notably, metal manufacturers grew spending from \$26m in 2018 to \$148m in 2022 – a fivefold increase. Likewise, R&D outgoings within the plastics and rubber subsector tripled from \$10m to \$30m over the same period. These subsectors, as well as “other manufacturing” (which captures the textile industry), exceeded the national BERD figure of 12.56% during this time.

¹ At year-end September 2022, Stats NZ.
² Ibid.
³ Compound annual growth, NZ Stats, TIN.

FOREIGN DIRECT INVESTMENT

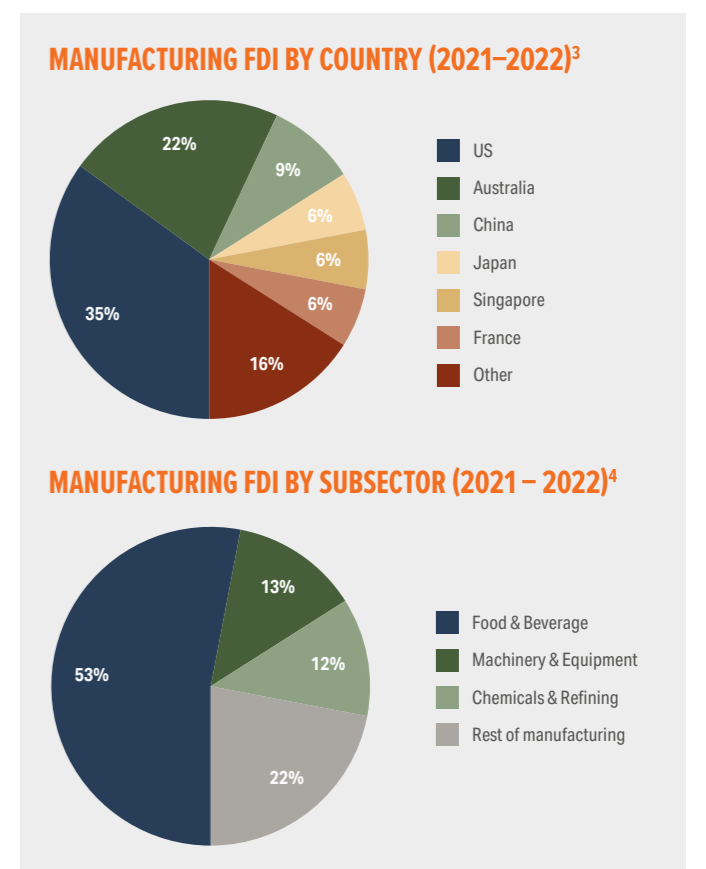
MANUFACTURING IS THE COUNTRY’S MOST INTERNATIONALLY CONNECTED SECTOR, CAPTURING 14%, OR \$18.88B, OF TOTAL FOREIGN DIRECT INVESTMENT.



Both foreign direct investment (FDI) and outward direct investment (ODI) make an important contribution to New Zealand’s international connections. Most obviously, FDI helps the country meet domestic investment needs which exceed available national funding. Through ODI, firms can take advantage of investment opportunities offshore which enable them to grow. Beyond access to capital, direct investment encourages efficiency in a host nation by exposing domestic markets to new technology and management techniques that drive productivity growth.

Between 2018 and 2022, the manufacturing sector displayed strong investment performance by New Zealand standards, growing by \$3.56B at an annualised rate of 5.36%. Direct investment transactions picked up in 2022, led by higher levels of merger and acquisition activity across the food and beverage subsector. Manufacturing is also New Zealand’s largest investor abroad, holding \$8.64B or 31.2% of total offshore direct investment stock.

As of February 2022, there were about 800 manufacturing firms operating in New Zealand with some foreign equity – up from 522 in 2016. These firms employed around 90,600 people, more than a third of the manufacturing sector. The 609 firms with 50% or more foreign equity captured 27.5% of total sector employment, but accounted for only 2.4% of total manufacturing enterprises. The same firms, many of which were surveyed for this report, are among the largest and most productive. On average they employ more people, pay higher wages, and dedicate greater sums to research and development.



¹ At year-end March 2022, Stats NZ.
² At year-end February 2022, Stats NZ.
³ January 2021 – December 2022, Overseas Investment Office, TIN.
⁴ Ibid.

SUSTAINABILITY

BETWEEN 2018 AND 2022 NZ MANUFACTURING EMISSIONS FELL BY 18.1%, AND ARE EXPECTED TO FALL BELOW HOUSEHOLD EMISSIONS IN 2024.

ADOPTION RATES OF SUSTAINABILITY METHODS BY BEST IN CLASS COMPANIES¹

REVENUE BAND	ENERGY EFFICIENCY	SUSTAINABLE SUPPLY CHAIN	CIRCULAR ECONOMY	RENEWABLE ENERGY	LOW-CARBON MATERIALS	CARBON OFFSETTING
\$200m+	83%	83%	67%	67%	50%	50%
\$50m-\$200m	76%	57%	48%	38%	38%	29%
\$20m-\$50m	50%	69%	31%	31%	44%	13%
<\$20m	52%	38%	43%	33%	24%	14%
TOTAL	77%	69%	54%	46%	44%	27%

As well as fulfilling the requirements of recently updated domestic policies like the Zero Carbon Act, Emissions Trading Scheme (NZ ETS), and the National Direction on Greenhouse Gas Emissions from Industrial Process Heat (ND-GHGIs), NZ manufacturers are striving to satisfy the needs of environmentally conscious communities.

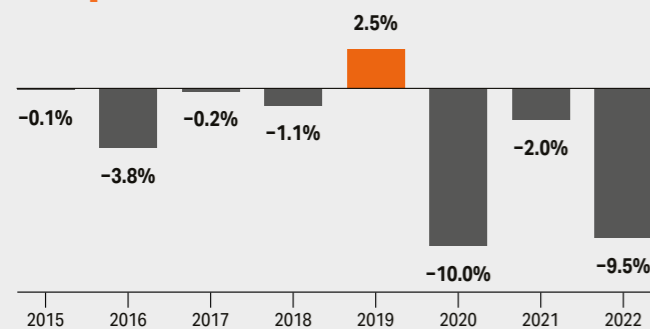
Pressure to adopt sustainable strategies is being felt from above and below, from consumers, employees, lenders, trade regulators, and shareholders. NZ's leading manufacturers are acting accordingly.

Between 2018 and 2022, NZ manufacturing emissions fell by 18.1% (2032 kt) to a low of 9,178 kt CO₂e. Over the same period, the sector's share of national emissions fell from 13.7% of total emissions to 12.2% – a trajectory that will see manufacturing drop below 'households' as the country's third largest emitter group in 2024.

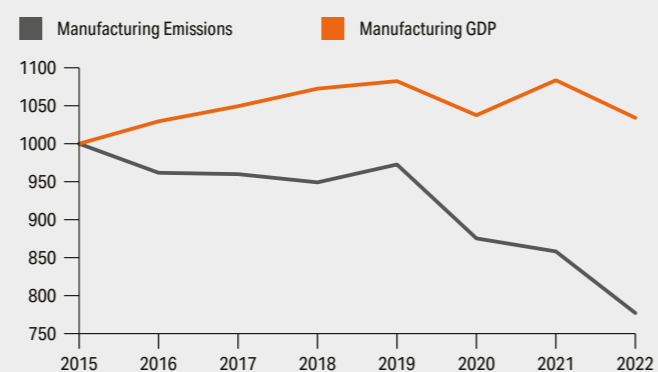
These figures capture the combined downward pressure of major events like COVID-19 lockdowns, the closure of Marsden Point oil refinery, and a global economic slowdown, but also the broader impact of consumer and regulatory pressure to manage environmental impacts. The graph below shows that reduced emissions need not come at the cost of decreased economic growth.

In terms of sustainable trends, New Zealand's 'best in class' manufacturers are adopting energy efficiency measures at the highest rate. Solar, sensory, and conversion technologies have accessible price points and the justifiable appeal of reducing production costs. In general, surveyed firms have high adoption rates of a wide range of sustainability methods regardless of revenue earned. However, in lower revenue bands adoption rates of several sustainability methods noticeably drop below 50%.

PERCENTAGE CHANGE IN MANUFACTURING EMISSIONS (KT CO₂E)²



CHANGE IN MANUFACTURING EMISSIONS & GDP (INDEXED)³



¹ Based on 65 responses to this question. ² Stats NZ, TIN. ³ At year-end December 2022, Stats NZ, TIN.

EMPLOYMENT

222,400 FTE STAFF ARE EMPLOYED BY NZ MANUFACTURERS, REPRESENTING 11.9% OF THE TOTAL WORKFORCE.

A common thread emerged from best in class manufacturers: invest in technology so you can invest in people and invest in people so you can invest in technology.

According to a 2020 report by the New Zealand Productivity Commission, 73% of the country is concerned that technologies such as robotics and AI will eliminate more jobs than they create.¹ The popularity of ChatGPT and the increasing availability of AI-based tools will have impacted the attitudes of employers and employees alike since then. Fears about AI may be pronounced in those from disadvantaged backgrounds, a 2023 study has noted – perhaps because they particularly fear its impact on their employment prospects.²

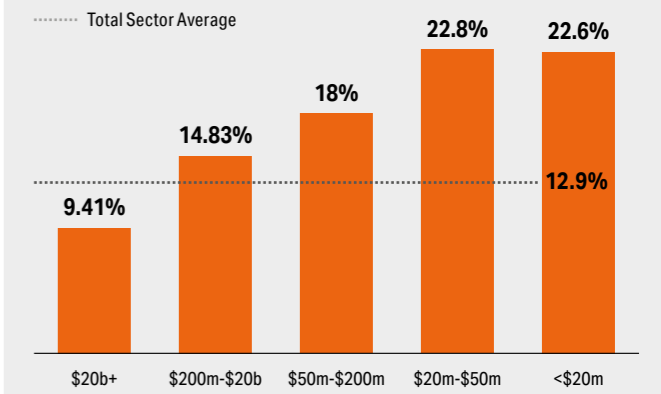
Many of New Zealand's 400 largest manufacturers have already deployed these advanced technologies. Collectively these companies employ a total of 160,507 people – and, crucially, pay an average of \$4.35 (12.1%) above the average hourly manufacturing wage.

Best in class companies also have higher than average productive capital, inferring a strong connection between remuneration rates and technology investment.

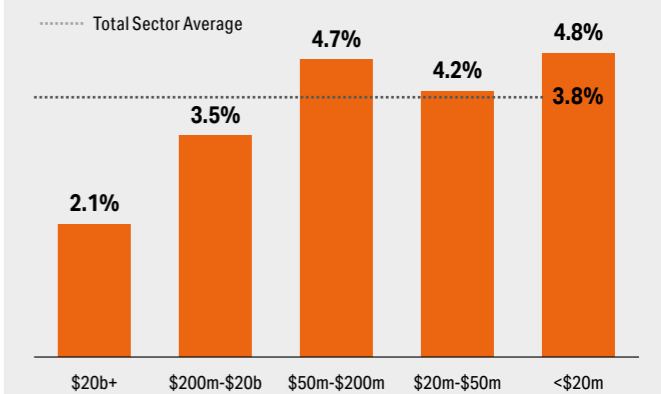
In 2023, a high expenditure on both capital and wages is pronounced in companies with revenue under \$20m. It would appear large companies tend to have either already implemented advanced technologies or are in the process of adopting them, while companies with smaller revenues are making these investments in an effort to catch competitors.

Best in class manufacturers who have reached this level seem to maintain their position by investing capital into new technologies and in staff retention and training. These top companies are leading a transformation of the NZ economy.

WAGE AND SALARIES AS % OF REVENUE (BEST IN CLASS 400 BY BAND)



CAPITAL EXPENDITURE AS % OF REVENUE (BEST IN CLASS 400 BY BAND)



¹ Dave Heatley, "New Zealanders' attitudes towards robots and AI", New Zealand Productivity Commission, 2020.

² Christoph Bartneck, Kumar Yogeewaran & Chris G. Sibley, "Personality and demographic correlates of support for regulating artificial intelligence", *AI and Ethics*, 2023.

MANUFACTURING: THE ROCK STAR OF NZ EMISSIONS REDUCTION

MANUFACTURING IS DOING MORE TO REDUCE THEIR CARBON EMISSIONS THAN ANY OTHER SECTOR, SAYS DR TROY COYLE.

MORE LOVE FOR MANUFACTURING

Dr Troy Coyle is the CEO of the NZ Heavy Engineering Research Agency (HERA), the first woman to hold this position in the organisation's 47-year history. She is also a Kiwi born in Australia, so "comes from a country where manufacturing is loved and has a prominent face to it within the economy." She is concerned that across the Tasman, we don't have the same respect for the manufacturing sector, even though it accounts for nearly double (9.1%) the national GDP as compared with Australia's (5.5%).

Coyle believes we need to start talking about our manufacturing capabilities differently. "We somehow always seem to link them to the primary industry as though they're a justification for the primary industry. But maybe we should start talking about them as value-adding to the primary industry."

She notes that much of this added value emerges from research and development. As this report shows, manufacturing accounts for 26.8% of the total NZ business expenditure on R&D. "This means that manufacturing is undoubtedly the rockstar for business investment on R&D. And just the one project with New Zealand Steel makes manufacturing the rock star of emission reductions, as well as the circular economy."

In May, NZ Steel announced a \$300m move to produce steel using an electric arc furnace process that recycles steel, thereby reducing NZ's total emissions by 800 kt a year. Then in June, Fonterra committed \$790m to halving coal use by 2030. Both projects are co-funded via the Government Investment in Decarbonising Industry Fund, alongside another 81 recipients covering sawmilling, meat and dairy

processing, textile, and chemical manufacturing firms, among others.

Coyle says that although manufacturing needs to transition towards being a cleaner part of the economy. "It's definitely doing so," and we can use that to position ourselves internationally.

EXPORT CIRCULAR ECONOMY IP

Coyle believes that NZ is uniquely placed to export intellectual property (IP) and sustainable solutions to the world. "Through the Industry Transformation Plan, we have identified the need to focus on a circular economy. There's going to be a lot of IP developed in that process, that is going to solve the global problems in other nations."

This is where New Zealand has an edge: "I think that's where it becomes an advantage to be a small nation. Essentially, because we're such a small nation, it becomes less risky to do R&D. If you're doing it here, our market can become a low-risk pilot program for new products, new services, new IP, new ways of doing things."

"I think that there are some really great examples where New Zealand has initially focused on solving a domestic problem, but has been able to export the IP and build up international businesses." She points to Carbonscape and Better Packaging Co. as some of the country's "amazing waste reduction export companies".

EQUITABLE TRANSITION OF EMPLOYMENT

Coyle stresses the need for concerted action to ensure intergenerational wellbeing. "The transition to high-tech, low-carbon technologies is not automatically equitable. It has



DR TROY COYLE
CEO, Heavy Engineering Research Agency (HERA)



to have considered approaches in order to be equitable."

A 2021 Sustainable Steel Council report noted that the effects of the 2008 economic shock on the steel industry disproportionately affected Māori and Pacific people. Between 2006 and 2013, the number of Māori employed in the steel industry decreased by 19% and Pacific people employed in the steel industry decreased by 22%.

Coyle says that the revolution in technology could have the same disproportionate effect. "Unless employers are actively looking at developing people so that they can take on those new technology opportunities, we're going to find that some communities are disproportionately impacted by new technologies being adopted."

She's pleased to see that the ITP has a focus on Māori and Pacific engagement, and that the number of Māori and Pacific people employed in high-skilled occupations has increased significantly, with a 700% increase in Pacific peoples employed as steel professionals from 2013 to 2018.

Coyle says that the questions that employers should ask themselves are: "If you're thinking about investing in any kind of automation or new technology, how do you upskill your current staff to use it, rather than bringing in new staff?"

INNOVATORS IN MANUFACTURING

INNOVATORS IN MANUFACTURING – CASE STUDIES

FOOD & BEVERAGE

MIRAKA



CEO: Karl Gradon **REGION:** Taupō
YEAR FORMED: 2010 **REVENUE:** \$300m
EMPLOYEES: 145 **www.miraka.co.nz**

Miraka is New Zealand's first Māori-owned milk processing company and the first in the world to use renewable geothermal energy to process milk. The company was established in 2010 by a group of Māori trusts, including Wairarapa Moana and Tuaropaki Trust, and was founded upon Te Ao Māori principles.

Miraka places kaitiakitanga – the care of the land, people, and environment – at the heart of their business. They seek to engage with customers and suppliers who share the same values and who take a long-term intergenerational outlook. Their farming excellence programme, Te Ara Miraka, invites their milk suppliers to prioritise animal welfare, milk quality, and the environment. They have around 100 suppliers within a 100 km radius of the factory.

Miraka processes 300 million litres of milk per year. Their range of milk products are created for an international market: exporting to Asia, the Middle East, and Africa. Although their core business is whole milk powder, they have invested in the technology to produce high-quality UHT milk, frozen milk concentrate, and frozen cream, diversifying their products.

In 2022, CEO Karl Gradon, accompanied then Prime Minister Jacinda Ardern on a trade mission to Vietnam. Vinamilk, the biggest Vietnamese dairy business, has been a cornerstone investor in Miraka since its inception, as they share similar values to Miraka. As global interest in sustainable products increases, Miraka aims to connect with a customer base which values nutrition with a low carbon footprint.

"By using renewable geothermal energy, Miraka has one of the world's lowest manufacturing carbon footprints, emitting 92% less carbon compared to traditional coal-fired plants.



That's equivalent to taking 7,000 cars off New Zealand roads for a year. Kaitiakitanga – caring for the natural environment as best we can – is one of our core values and guides everything we do."

KARL GRADON, CEO

SILVER FERN FARMS



CEO: Simon Limmer **REGION:** Nationwide
YEAR FORMED: 1948 **REVENUE:** \$3B
EMPLOYEES: over 6,000 **www.silverfernfarms.com**

Silver Fern Farms is New Zealand's largest processor and marketer of lamb, beef, and venison. They have 14 plants and pay over \$450m in wages and salaries.

They recently partnered with Scott Technology – listed company and fellow Dunedin locals – to deliver a fully automated lamb processing system, capable of processing 600 carcasses an hour, for one of their plants in South Otago. This \$11.2m investment will improve efficiency and increase the yield of high-value cuts. It uses advanced x-ray and vision technology to deliver higher accuracy cutting, while also enabling important improvements in health and safety by removing much of the heavy manual activity. Investment in automation and advanced technologies is being rolled out across all their plants, with around \$140m of investment budgeted for 2023.

Another Dunedin-born company, Oritain, partnered with Silver Fern Farms to provide a traceability system. This investment in digital technology was driven by increased desire for a transparent, sustainable food supply chain. End consumers can scan the QR code on the packet to see the NZ region where the product originated, local farmers' stories, and relevant recipes.

Silver Fern Farms exports to over 60 countries. Around 90% of their revenue comes from offshore sales, with China and the United States the two largest markets. In 2022, the company launched a range of angus beef products, which are certified as net carbon zero by Toitū, an internationally accredited NZ government body.

"Over the last few years Silver Fern Farms has invested significantly into the business to ensure our success continues over a longer-term horizon. The bulk of this investment is going into infrastructure at our sites, which in some instances have a history going back over 100 years. Scott's automated meat processing technology is world-class, and this modernisation will help drive a positive return to our farmer suppliers and our consumers the world over."



SIMON LIMMER, CEO

MACHINERY & EQUIPMENT

BUCKLEY SYSTEMS



CEO: Arron Sands **REGION:** Auckland
YEAR FORMED: 1978 **EMPLOYEES:** 550
www.buckleysystems.com

Buckley Systems is a precision manufacturer specialising in electromagnets. Their products have applications in medical devices, scientific research, and semiconductors.

They have more than 50 computer numerical control (CNC) machining centres, spread over an 18,000m² workshop. However, they point out that merely owning the most advanced tools is not enough – they make significant investments into training and development, so that the hands on the tools are also the most advanced in the industry. They see the combination of people and plant as their recipe for success.

Their commitment to apprenticeships is a guiding philosophy of the company. Places are highly sought after, with specialisations in CNC machining, fabrication, and electrical engineering. The company consequently benefits from a highly skilled, loyal workforce. Existing staff are given the opportunity to continually upskill themselves, for example by applying for adult apprenticeships. They recently offered a workshop in digital skills for manufacturing, Skills Shift. Chief People Officer Dion Orbell says they didn't want their tradespeople with forty years of experience to be left behind by technology.

They are committed to reducing their Scope 2 carbon emissions, running their manufacturing on 100% renewable energy and using energy-efficient lighting. They also provide EV charging for their staff, extending their emission reduction programme to cover Scope 3 as well.

"Buckleys is embracing Industry 4.0 with its ongoing investment in CNC machines which are bigger, faster, more accurate, and can process more than one job. Continued development with senior operators on their use of digital tools is an ongoing programme, ensuring the investment is fully realised. Additionally, the business has purchased an enterprise resource planning system, enabling better data-driven manufacturing and processing improvements. This digital investment enables Buckley Systems to maintain its growth trajectory." **ARRON SANDS, CEO**



HOWICK



CEO: Nick Coubray **REGION:** Auckland
YEAR FORMED: 1978 **REVENUE:** \$20.6m
EMPLOYEES: 53 **www.howickltd.com**

Howick's customers are primarily construction businesses, and in their major markets, such as the UK, light-gauge steel is the construction material of choice. Howick manufactures machines that produce steel framing, as well as custom-built roll-forming machines. Their tools are compatible with a range of computer-aided design and engineering softwares.

Howick believes that construction lags behind manufacturing when it comes to productivity and their technology enables efficiency in the built environment by automating and industrialising part of the process. This helps with the skilled labour shortages in the construction industry: enabling workers to adapt to digital fabrication and reducing the need for traditionally trained tradespeople. Framing can be produced and assembled – and consequently whole buildings finished – much faster and more efficiently.

Modern methods of construction increase productivity, safety, and sustainability, and Howick's product enables other companies to develop Industry 4.0-style workflows. Another one of the ways Howick inspires and champions innovation is through their thought leadership initiative, STEEL HORIZONS.

Although 95% of their sales are made offshore, their products are 100% NZ made and they are committed to keeping highly skilled manufacturing jobs onshore. Howick offers apprenticeships for machine fitters and turners and CNC operators and also recruits graduate software and design engineers. Many staff grow their career within the company and continue into more senior roles.

"Manufacturing in and exporting from NZ is key to developing and maintaining highly skilled jobs and increasing productivity. A robust manufacturing sector helps us be a more self-sufficient country, less reliant on imports to increase our quality of life. New Zealand's small market allows us to develop and market-test in a small scale before scaling up to export to larger markets. Manufacturing onshore means we have more control over quality and our IP, and we support local suppliers, which all helps grow the economy." **NICK COUBRAY, CEO**



INNOVATORS IN MANUFACTURING – CASE STUDIES

MACHINERY & EQUIPMENT

PEC



CEO: Richard Coxon **REGION:** Rangitikei

YEAR FORMED: 1939 **EMPLOYEES:** 90

www.pec.co.nz

PEC was established in 1939, acquired by Gallagher in 1999, and rebranded back to PEC in 2021 after Richard Coxon completed a management buyout. The company manufactures 90% of the fuel pumps in New Zealand and 25% of the fuel pumps in Australia. Their ultra-reliable equipment has created the opportunity for unmanned retail fuel stations, with the ability to add remote monitoring ensuring maximum uptime of their equipment.

PEC is also a contract manufacturer for many other NZ companies exporting high-value electronic products. Coxon says, "We see ourselves as enabling other companies to focus their resources and efforts on R&D and sales around the world. Control and confidence in their supply chain is critical, so we deliver transparency for them to go into their markets with confidence." PEC has highly sophisticated manufacturing infrastructure and can produce a range of components and products using robotics, 3D printing, and other advanced technologies.

They are one of the largest employers in Marton, a small town in the Rangitikei district. Coxon says, "We are proudly in rural New Zealand, offering good high-tech careers." Over 40% of their staff have been with them for 10 years or more, and they offer opportunities for development and upskilling.

Coxon is also passionate about developing the future of hydrogen. He wants to see an increased focus on fuel cell electric vehicles, which use hydrogen rather than lithium batteries. The company seeks to deliver the technical solutions for a future that may be generations away, to achieve intergenerational wellbeing for the country.

"It's a tragedy that people think you have to go offshore to get your product made, missing out on developing a sustainable economy in the country you live in. We have to think about how we can sustain manufacturing in New Zealand. I believe we need that manufacturing bloc to provide jobs to create positive social outcomes for our country."

RICHARD COXON, CEO



RAKON



CEO: Dr Sinan Altug **REGION:** Auckland

YEAR FORMED: 1967 **REVENUE:** \$180m

EMPLOYEES: 1,000 www.rakon.com

Rakon's frequency control and timing solutions are critical to managing flows of data that connect people, networks, and machines. They enable the lightning speeds of 5G networks, precision positioning for autonomous vehicles, synchronisation for cloud computing, and more.

Rakon's products continue to work in extreme heat or cold, under extreme pressure, while maintaining accuracy and stability of performance in those environments. That's why they've been used for over 50 international space programmes, including NASA's Mars Perseverance rover, European Space Agency's mission to study Jupiter's moons, and more recently, Indian Space Research Organisation's mission to explore the Moon's South Pole.

Rakon was founded in Auckland, where their head office and around a third of their workforce are based. The company has manufacturing sites in New Zealand, France, and India – where they recently opened a new facility. Rakon's NZ operations continue to be the centrepiece for its culture of innovation. The company is continuing its investments to further expand its capabilities in technology and IP creation – ensuring NZ remains and thrives as Rakon's Innovation Centre of Excellence.

The company is continuing to lower the environmental impact of its operations globally. The 2023 financial year saw the delivery of a step reduction in its greenhouse-gas emissions for the NZ operations, through the planned transition from using CO₂ to liquid nitrogen in manufacturing processes.

"A pillar of our strategy is high-quality, world-class manufacturing. We are maintaining and building on this by continuing to invest in our manufacturing capabilities and ensuring we can adapt and respond to the dynamic demands of our customers swiftly and efficiently. As we grow on the world stage our 'heart' will continue to beat strongest in New Zealand as Rakon's Innovation Centre of Excellence."

DR SINAN ALTUG, CEO



METALS & METAL PRODUCTS

NZ STEEL



CEO: Robin Davies **REGION:** Auckland

YEAR FORMED: 1965 **EMPLOYEES:** 1,400

www.nzsteel.co.nz

NZ Steel is the country's largest steel manufacturer and supports over 4,000 jobs in its local community. They partner with Franklin schools to open career pathways and upskill their people with a variety of programmes. In 2022, approximately 10% of their workforce participated in a formal leadership training programme and most participants finished with an NZQA qualification in business.

Robotics and automation are used across various stages of production for precision and consistency and to enhance workplace safety by minimising human exposure to hazardous environments. Wireless sensors collect real-time data on temperature, pressure, vibration, and other critical parameters in applications that were traditionally cost- or access-prohibitive. This data enables AI predictive maintenance and reduces downtime. The company also uses computer-aided engineering and design, an agile supply chain model, and data analytics.

NZ Steel recently announced it was undertaking an accelerated feasibility study to build a new electric arc furnace with a target of being operational by 2026. This \$300m project will be co-funded through the Government Investment in Decarbonising Industry Fund and will reduce the country's total annual emissions by 1%, roughly equivalent to permanently removing all the cars from Christchurch.

The arc furnace melts scrap steel using electricity, instead of converting iron sands by using coking coal to remove oxygen. This upgrade will not only halve the company's coal use but also divert 300,000 tonnes of scrap steel from export to NZ Steel for local recycling, contributing to a circular economy.

"The best example of how technology keeps jobs in NZ is our proposal to change up the way we make steel by switching to an electric arc furnace. While not new technology, it has advanced considerably and the furnace we are looking at uses cutting-edge technology, which secures steelmaking – and the corresponding jobs – in New Zealand for the long term."

ROBIN DAVIES, CEO



STEEL & TUBE



CEO: Mark Malpass **REGION:** Nationwide

YEAR FORMED: 1953 **REVENUE:** \$589.1m

EMPLOYEES: 851 www.steelandtube.co.nz

Steel & Tube has been distributing and manufacturing metal products in New Zealand for nearly 70 years. The company has 27 sites across the country, of which 13 have a manufacturing capability.

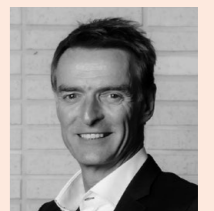
They are currently expanding their product offering: targeting high-value products and value-added services that enable them to leverage their existing network. Aluminium was a logical product extension for the company as it has a similar customer base. After investing in a new high-specification plate processor, they will continue to develop this service portfolio. They cite automation of machinery as the most beneficial Industry 4.0 technology, but they are also implementing smart processes to minimise manual entry of customer data, which will create business efficiencies and reduce errors.

The listed company's leadership has identified two key opportunities in a warming world: an increased need for steel as green infrastructure is built, such as supplying 2,900 tonnes to the Harapaki Windfarms, and increased need for steel products to rebuild after extreme weather events, such as Cyclone Gabrielle. The company is closely following emerging research and development that will enable coal-free green steel.

12% of their workforce identify as Māori and 15% as Pasifika. They have engaged a Future Director to develop their Te Ao Māori strategy and they deliver Māori Cadetships in partnership with Te Puni Kōkiri.

"History shows that New Zealand is well placed to produce truly innovative solutions which perform well on the global stage, and the advanced manufacturing industry is no exception. Steel plays an essential role across the manufacturing spectrum, and we work with some incredible NZ businesses that are at the cutting edge of the industry. We believe that the vision for a high-performing, globally ranked industry is more than achievable and this is definitely something that Steel & Tube are proud to be a part of."

MARK MALPASS, CEO



INNOVATORS IN MANUFACTURING – CASE STUDIES

WOOD & PAPER

RED STAG GROUP



CEO: Marty Verry **REGION:** Auckland & Rotorua
YEAR FORMED: 2003 **REVENUE:** \$300m
EMPLOYEES: 435 www.redstagtimber.co.nz

When the Waipa Mill near Rotorua went into receivership in 2003, Phillip Verry and his son Marty purchased it and formed Red Stag Timber. The company has bounced back to supply 25% of the structural timber market in the country and become the Timber Supplier of the Year at the 2023 Hardware Awards. It is now the largest sawmill in the Southern Hemisphere, employing around 400 full-time staff in Rotorua, making it a key local employer.

It is also one of the most sustainable providers of timber in New Zealand: not just due to forestry management but because all on-site electricity is powered by waste wood. Their investment in technology drives business, not just sustainability. In 2023, they expanded their capacity by 10% by installing new equipment and they are halfway through building a second boron treatment plant.

Red Stag recently acquired TimberLab, merging their mass glulam, LVL, and CLT manufacturing capabilities, in order to create a one-stop-shop for the most sustainable building structures in New Zealand. They are at the cutting edge of engineered timber, with state-of-the-art 3D CAD modelling and four 5-axis CNC processing centres. They have won numerous awards for projects like the He Tohu Document Room at the National Library, which houses the Treaty of Waitangi. In collaboration with Studio Pacific Architects and other partners, Red Stag TimberLab created a wooden “cave” out of individually profiled laminated panels. The striking effects of Red Stag TimberLab’s value-added products has resulted in strong international demand.

“Technology has underpinned Red Stag’s 20-year turnaround journey from receivership to being one of the highest performing companies in the sector. We have invested in excess of \$300m to maximise volume and conversion of logs to high-value timber. In that time staffing levels have increased around 50% while production has more than tripled to 600,000 cubic metres of timber. That is the type of productivity one needs to stay competitive long term, and technology is a key enabler.”



MARTY VERRY, CEO

WHAKATĀNE MILL



CEO: Ron Hooper **REGION:** Bay of Plenty
YEAR FORMED: 1939 **EMPLOYEES:** 185
www.wml.biz

Whakatāne Mill manufactures folding boxboard, which is mainly used as packaging for food and beverage products. Demand for their product is only increasing as consumers look towards recyclable packaging made from renewable resources. Around 40% of their product is destined for the Australian and New Zealand markets and the balance exported to the US, Asia, and Europe.

The company came under threat of closure in 2021, but a consortium of international and local investors purchased the business. It’s Whakatāne’s largest private employer and keeping the mill open saved almost 200 jobs.

The new owners have invested over \$70m in advanced technologies to increase production by about 35%. This marks the company’s most significant capital expenditure since 2004. The automated and robotised equipment has been sourced from Germany, Finland, and Italy, and will improve the drying process, the application of coating substances, and the wrapping line.

The investment will improve sustainability as well as productivity. The company received \$4m from the Government Investment in Decarbonising Industry Fund to install a closed loop circular water system, which increases process temperature without using additional energy. Additionally, the improved heat exchange system introduced as part of the upgrade will retain more heat within the process. The finished product will now be wrapped in kraft paper instead of plastic, reducing annual plastic usage by 200 tonnes.

“This extensive technological upgrade of the plant will deliver a more cost-efficient and environmentally sustainable product, enabling the mill to compete on a global stage. As the only folding boxboard producer in Australasia, it’s critical that we invest to stay ahead of the technology curve, thereby ensuring business continuity and local jobs for decades to come. This is a significant commitment to the region and the local fibre industry.”



RON HOOPER, CEO

CHEMICALS & REFINING

DOUGLAS PHARMACEUTICALS



CEO: Jeff Douglas **REGION:** Auckland
YEAR FORMED: 1967 **EMPLOYEES:** 720
REVENUE: \$230m www.douglas.co.nz

Douglas is NZ’s most significant pharmaceuticals manufacturer. Export sales contribute to almost two thirds of the group’s total turnover. They are the world’s largest supplier of generic isotretinoin, a molecule primarily used to treat skin conditions. As a family-owned business, they are committed to onshore manufacturing in Henderson, with additional manufacturing capability in Fiji.

In June 2021, the Douglas Innovation Building was completed, adding another 4,500m² of research and development capacity to their existing campus. This is the largest medical R&D facility in the country. It includes pilot scale product development suites and laboratories, as well as specialised capabilities to handle highly potent and toxic products.

To support the growth of their export business they scaled up their workforce, roughly doubling their staff over the last seven years. They invest in a digital technology to track employee engagement and are now using it to foster innovation and identification of continuous improvement opportunities. Technical training has always been crucial to the success of their pharmaceutical business, as is the focus on personal development plans to ensure people can grow within the business. 40% of their vacancies are now filled internally.

They are upgrading and adding to their production lines, which is providing opportunities for staff to retrain and develop new technical skills. They see automation as an opportunity, with particular emphasis on integrated business planning and the streamlining of documentation procedures. Documentation is a key part of meeting regulations within the pharmaceutical space, and supervisory control and data acquisition (SCADA) and manufacturing execution systems (MES) present significant business efficiencies.

“Automation levels the playing field between low-labour-cost environments and high-labour-cost environments. The biggest challenge in NZ is that we don’t have all the workforce that we need to continue to grow. Automation unlocks and releases capacity so that we can retrain people to do higher paying jobs.”



ROD DE SPONG, COO

SHIELING LABORATORIES



MANAGING DIRECTORS: Liam Taylor and Chris Marshall
REGION: Auckland **YEAR FORMED:** 1978
EMPLOYEES: 110 www.shieling.co.nz

Shieling is a contract cosmetic manufacturer, developing and producing a range of products for clients such as Ecoya, Ethique, Emma Lewisham, and Ashley & Co. Shieling see themselves as the innovation engine room for cosmetics in New Zealand. Brands will come to them with an idea and they will turn that into a commercially viable product.

Research and development is crucial to their business model, not only because they’re formulating products at a chemical level and keeping up to date with the newest cosmetic science, but because they’re also engineering a manufacturing process that can deliver the product at a commercial scale. Shieling needs to be widely diversified in the size of their production runs as well as their product range.

They employ a wide range of Industry 4.0 technologies. 3D printing is one of the most obvious. Customisation of their Oracle enterprise resource planning software system enables an agile supply chain and adaptive forecasting across a range of raw materials. Data analytics are extensively used to plan and track production, monitor and optimise costs, and support decision making. They are also developing an Internet of Things data capture system that can work across manual filling lines as well as automated ones.

Approximately 70% of Shieling’s products are sold overseas. Sustainability is a key trend in the global cosmetics industry, so the clean, green NZ reputation has enabled growth. However, cosmetic manufacturing needs to remain internationally competitive on cost and efficiency, which may become challenging under proposed changes to the regulatory environment, such as the introduction of the recent Therapeutic Products Bill.

“Like most manufacturing businesses, we require a diverse range of skills, from highly educated cosmetic chemists and engineering expertise through to more entry level jobs involved with the manual packing of products. Having a team with the skills to adapt a process and the manufacturing equipment is critical to delivering innovative products.”



CHRIS MARSHALL, MANAGING DIRECTOR

INNOVATORS IN MANUFACTURING – CASE STUDIES

PLASTICS & RUBBER

CONVEX NEW ZEALAND



CEO: Owen Embling **REGION:** Waikato
YEAR FORMED: 1976 **EMPLOYEES:** 107

www.convex.co.nz

Convex began making compostable packaging over 25 years ago when it made “zero commercial sense”, as CEO Owen Embling says there was almost no demand. But with the support of key early clients like Trade Aid, Prima Roastery, and Kōkako, Convex have developed and refined their compostable products. Their continuous improvements to their consistency and quality are almost always driven by the diverse needs of their customers. Their Econic® Classic is believed to be the world’s first high-barrier compostable bag. The expanded range can now hold moist materials like meat and fresh-cut produce and meets the US, UK, Australian, and European compostability standards.

Around 20% of Convex’s business is offshore, and increasing their export business is largely dependent on capacity – and the only way to increase that is by continuing to invest in top-of-the-line automated machinery. Recently, they have spent \$6m on a new printing machine and around \$1m on a heavy-duty bag machine. Not only are these automated machines twice as fast, they also reduce wastage in the process.

Not content with simply cutting waste at the source, Convex also wants to reclaim plastic at the end of its life. Embling says, “We want to be part of a circular economy. The way we do that is by taking full custody of our plastic.”

Convex have a longstanding apprenticeships programme. When they invest in new technology, they commit to upskilling their people into new roles that can operate that technology. Convex staff were trained to operate their new printing machines by instructors from the German company that sold them the equipment. 20% of their staff have been with them for over 15 years.

“New Zealand’s leadership in compostable packaging stems from our unwavering commitment to sustainability and our nation’s profound environmental awareness, coupled with our thriving agricultural sector and innovative research institutions. Conscious consumers drive our success in all cases, and by being customer-centric we listen and respond.”



OWEN EMBLING, CEO

GYRO PLASTICS



CEO: Trudi Duncan **REGION:** Manawātū
YEAR FORMED: 1967 **EMPLOYEES:** 15

www.gyroplastics.com

Family-owned company Gyro Plastics is a leading plastics manufacturer in NZ. The 55-year-old business has grown year-on-year since the global financial crisis, and current owner Trudi Duncan bought it from her father in 2014. They specialise in rotational moulding and sell power distribution components for the electrical infrastructure sector including the first NZ-made range of EV charger mounting kiosks, pedestals, and posts. Sister company Mouldsmith also offers mould manufacturing for the plastics industry.

With the support of clients such as WEL Networks, Powerco, Downer, and Omexom, Gyro recycles their own products. Because Gyro supplies other businesses, this makes the collection of decommissioned products far easier to coordinate. Duncan says that as a result of this, “It is realistic to say that our goal is to be an eco-friendly plastics manufacturer: to receive 100% of Gyro products removed from service, recycle them and re-use 100% of the reprocessed material.” In partnership with Vision Plastics, they are able to strictly control the quality of recycled plastic and ensure that the product is just as robust as when virgin material is used.

After going through a Smart Industry Readiness Index (SIRI) assessment, they have thoroughly embraced Industry 4.0. They use Aspect Productivity Technology as a manufacturing execution system, allowing planning and scheduling of production, capturing data from the factory floor, and resulting in a more efficient use of materials and workforce. The next steps are to install sensors to track their utility use and a vacuum filling system for automating the handling of their raw material.

“We’ve installed a lot of newer tech and the whole idea of this was to allow our people to do what they’re skilled at, instead of handling data and moving paper around. A large part of our business is physical labour work and we wanted to provide more skilled, meaningful work and take some the tasks away that didn’t add value or add to a person’s day.”



TRUDI DUNCAN, CEO

OTHER MANUFACTURING

LANACO



CEO: Nick Davenport **REGION:** Auckland
YEAR FORMED: 2011 **EMPLOYEES:** 16

www.lanaco.co.nz

Lanaco has taken New Zealand wool technology to the moon on a NASA rocket. Wool is a heritage backbone of the national economy but has struggled in recent years to compete on value. Lanaco has taken this abundant natural material and created high-tech products, highly skilled jobs, and significant revenue. CEO Nick Davenport says, “It’s not about how many more million sheep can we add to New Zealand but how many more dollars can we get per sheep.”

With knowledge from a fourth-generation Wanaka-based breeder and investor in Lanaco, a genetics programme produces wool to specifications the market requires. Fleeces are then processed in the Auckland-based factory into high-performance air filter media.

After being put through a 12-month evaluation by NASA, they were eventually chosen as the supplier for the manned Artemis mission programme. The filters protect astronauts in the event of a fire: a plastic filter will clog after 10 minutes, but Lanaco’s can last up to an hour.

Their technology was already being supplied to anti-pollution masks aimed at the Asian market. When 2020 rolled around, Lanaco geared up to support the nation and manufactured their own face masks on-site and even supplied the New Zealand team at the Tokyo Olympics. Now their focus has shifted back towards supplying industry, as the technology has applications in appliances, automotive, electronics, heavy machinery, and HVAC. In 2023, Lanaco is hiring more staff and scaling up.

“One of the early constraints to growth was the poor state of the local wool processing industry, which principally catered to traditional markets. We collaborate with other Kiwi wool technology companies to build world-class manufacturing capability onshore.”



Our success is driven by customers in Europe and North America who are demanding products that not only perform, but also have a small environmental footprint. We are now well positioned to provide what the market demands.”

NICK DAVENPORT, CEO

UNTOUCHED WORLD

CEO: Peri Drysdale **REGION:** Christchurch
YEAR FORMED: 1981 **EMPLOYEES:** 115

www.untouchedworld.com

Untouched World’s luxury knitwear is worn on the world stage by figures like Bill Clinton, Barack Obama, and Queen Elizabeth II.

The foundation for all this international attention is sustainable, innovative fabrics. When they first began working with possum fibre in 1992, initial trials suggested that it wasn’t suitable for commercial production. CEO Peri Drysdale enlisted the expertise of Mitsuboshi woollen mills in Japan. After a lot of research and development, the Merinomink brand was born in 1996, a blend of possum and merino.

They have continued to develop the possibilities of possum fibre in their pilot textile plant. Kapua and Cassum, which blend cashmere and silk alongside possum and wool, began development in 2000 and were launched in 2014.

Other NZ clothing companies have moved their manufacturing offshore, citing increased demand and the lack of skilled staff. But Untouched World manufactures in Christchurch, and Peri Drysdale says the brand “favours quality over quantity as a key driver of the business”. They continually upskill their people by providing in-house training. “Regardless of what new technology we invest in, people are still our most important asset, so we do what we can to support our staff in a variety of ways,” Drysdale says.

The Christchurch plant invests in an accurate, real-time stock reporting system, which is required for a “lean” manufacturing philosophy. They also use wholegarment knit machines, described as “3D printing for the fashion industry”.

Drysdale estimates that since the launch of Merinomink, possum knitwear and yarn has contributed an estimated \$2.8 to \$3 billion in foreign exchange to the NZ economy.

“Innovation lies at the heart of what we do, particularly when it comes to fabrics and fibres, so the advances in technology in this area are exciting. We are now able to see 3D modelling of garments before we even knit a stitch. This enables us to design smartly with less time and material wasted.”



PERI DRYSDALE, CEO

INNOVATORS IN MANUFACTURING – CASE STUDIES

OTHER MANUFACTURING

TASMAN TANNING



CEO: Neville Dyer **REGION:** Whanganui
YEAR FORMED: 1953 **REVENUE:** \$86m
EMPLOYEES: 220 www.tastan.co.nz

Tasman Tanning is one of the only end-to-end leather processors in Australasia. They transform raw leather hides from their meat industry partners into high-value finished leather, which they supply to the footwear, upholstery, and aviation sectors. After 70 years in operation, they are the largest producer of finished leather in NZ.

Tasman Tanning have collaborated with Mindhive to automate the grading of hides, using a tool that combines machine vision and neural networks. This has increased productivity by significantly improving the accuracy and consistency of the grading, while also speeding up the process. They are also developing a system which allows the hide to be traced back to the farm of origin, using the ear-tag that identifies all cattle on NZ farms. This increased transparency can be leveraged into premium clients who are seeking to display their sustainability credentials.

Tasman Tanning is meeting their own environmental goals through investment in infrastructure. In 2023, they installed four infrared dryers, which significantly reduce energy consumption. In 2022, they spent over \$2m in upgrading the dyehouse with new imported drums, increasing production and decreasing water consumption. Throughout the plant, meters have been introduced to monitor water and energy use. Having established baseline records, they are now able to target areas for reducing the use of all inputs to the operation.

A recent innovation has been the production of collagen from hides. They currently supply this protein to a range of export markets, sectors, and clients, due to its value in the food, cosmetic, and pharmaceutical sectors. Farm-to-end-product traceability technology has made this possible.

"Technology has opened markets for us, as in the collagen business, but also meant that we are able to meet the ever-increasing demands from export markets for traceability, providence of the product, and sustainability."



NEVILLE DYER, CEO

NEW ZEALAND COMFORT GROUP



MANAGING DIRECTORS: Graeme and Craig Turner
REGION: Auckland and Christchurch **YEAR FORMED:** 1935
EMPLOYEES: 900 www.thecomfortgroup.co

The Comfort Group is Australasia's largest bedding and foam manufacturer, a fourth-generation family company. Although they're perhaps best known for the Sleepyhead mattresses made in Otahuhu, their subsidiary Dunlop Foams produces foams for a diverse range of needs that include furniture, healthcare, sports, packaging, transport, and cleaning.

They are investing into the R&D necessary to recycle mattresses at the end of their life so that their products can truly be part of a circular economy. In the meantime, they operate a zero-waste policy in their factories, with scrap foam being recycled into carpet underlay and sold as Sleepyhead Flooring.

Their manufacturing relies on computer-aided engineering and design, among other Industry 4.0 technologies: the mix of chemicals required to produce the foam is digitally determined. Their Otahuhu plant saw a recent upgrade to more automated machinery, and the workers received on-the-job training from the German suppliers of the equipment. The Comfort Group commits to upskilling its people: they offer apprenticeships but also targeted programmes like Auckland Pacific Skills Shift, which prepares Pasifika workers for the future of work.

The Comfort Group has a bold, forward-thinking vision: the Sleepyhead Estate. Earthworks have begun on a new 100,000m² factory in Ohinewai in north Waikato and the company will develop a residential community to support it. In partnership with Waikato-Tainui iwi, this \$1.2 billion, 178-hectare manufacturing hub will create up to 2,600 jobs in the area and provide up to 1,100 new homes.

"The vision behind the Sleepyhead Estate is to create a genuine community in a beautiful setting for people who want an affordable, quality home, a stable job and a thriving community they can be part of. As far as we know a development of this scale and type being driven by a private company is unique in New Zealand and we hope it will be an enduring legacy for many decades to come."



CRAIG TURNER, MANAGING DIRECTOR

DIRECTORY & DEFINITIONS

MANUFACTURING ECOSYSTEM DIRECTORY

GOVERNMENT MINISTRIES, ENTITIES & NGOS	LOCATION	WEBSITE
Callaghan Innovation	Auckland	www.callaghaninnovation.govt.nz
Energy Efficiency & Conservation Authority	Auckland	www.eeca.govt.nz
Immigration New Zealand	Wellington	www.immigration.govt.nz
Ministry for Primary Industries	Wellington	www.mpi.govt.nz
Ministry for the Environment	Wellington	www.environment.govt.nz
Ministry of Business, Innovation & Employment	Wellington	www.mbie.govt.nz
Ministry of Foreign Affairs & Trade	Wellington	www.mfat.govt.nz
New Zealand Product Accelerator	Auckland	www.nzproductaccelerator.co.nz
New Zealand Trade & Enterprise	Auckland	www.nzte.govt.nz

INDUSTRY ASSOCIATIONS AND UNIONS	LOCATION	WEBSITE
Aluminium Extruders Association of New Zealand (ALENZ)		alenz.nz
Beef + Lamb New Zealand	Auckland	www.beeflambnz.com
Dairy Companies Association of New Zealand (DCANZ)	Wellington	www.dcanz.com
E tū	Auckland	www.etu.nz
Employers and Manufacturers Association (EMA)	Auckland	www.ema.co.nz
FIRST Union	Auckland	www.firstunion.org.nz
Maintenance Engineering Society of New Zealand (MESNZ)	Wellington	www.mesnz.org.nz
MAKE NZ	Christchurch	www.makenz.org
ManufacturingNZ	Wellington	www.manufacturingnz.org.nz
Meat Industry Association of New Zealand	Wellington	www.mia.co.nz
Medical Technology Association of New Zealand (MTANZ)	Auckland	www.mtanz.org.nz
Metals New Zealand	Auckland	www.metals.org.nz
New Zealand Beverage Council	Auckland	www.nzbeveragecouncil.org.nz
New Zealand Dairy Workers Union	Hamilton	www.nzdwu.org.nz
New Zealand Food and Grocery Council	Wellington	www.fgc.org.nz
New Zealand Meat Workers and Related Trades Union	Auckland	www.nzmwu.org.nz
New Zealand Paint Manufacturers Association	Tauranga	www.paintman.org.nz
New Zealand Pet Food Manufacturers Association (NZPFMA)	Auckland	www.petfoodnz.co.nz
Plastics New Zealand	Auckland	www.plastics.org.nz
Responsible Care New Zealand (RCNZ)	Wellington	www.responsiblecarenz.com
Window & Glass Association New Zealand (WGANZ)	Auckland	www.wganz.org.nz
Wood Processors and Manufacturers Association of NZ	Wellington	www.wpma.org.nz

GRANTS & CO-FUNDED PROGRAMS	LOCATION	WEBSITE
Auckland Waste Minimisation Funding	Auckland	www.aucklandcouncil.govt.nz/grants-community-support-housing/grants/regional-grants/Pages/default.aspx
Circularconnect Fund (Plastics NZ)	Auckland	www.plastics.org.nz/environment/circularconnect
Decarbonisation Funding (EECA GIDI Fund)	Wellington	www.eeca.govt.nz/co-funding/industry-decarbonisation/
Digital Lean Skills Funding (Callaghan Innovation)	Auckland	www.callaghaninnovation.govt.nz/learning/digital-lean-programme
Energy Feasibility & Business Case Assistance (EECA)	Wellington	www.eeca.govt.nz/co-funding/energy-and-carbon-reduction/
Energy Optimisation Funding (EECA)	Wellington	www.eeca.govt.nz/co-funding/energy-and-carbon-reduction/
Gisborne Waste Minimisation Funding	Gisborne	www.gdc.govt.nz/council/funding-streams/waste-minimisation
Green Investment Finance	Wellington	www.nzgif.co.nz

MANUFACTURING ECOSYSTEM DIRECTORY

GRANTS & CO-FUNDED PROGRAMS	LOCATION	WEBSITE
International Growth Fund (NZTE)	Wellington	my.nzte.govt.nz/article/co-funding-and-investment-services
Lean Skills Funding (Callaghan Innovation)	Auckland	www.callaghaninnovation.govt.nz/learning/lean-programme
New To R&D Funding (Callaghan Innovation)	Auckland	www.callaghaninnovation.govt.nz/grants
Plastics Innovation Fund (MFE)	Wellington	www.environment.govt.nz/what-you-can-do
R&D Tax Incentive (Callaghan Innovation/IRD)	Auckland	www.rdti.govt.nz
Regional Economic Development & Investment Unit	Wellington	www.mbie.govt.nz/business-and-employment
Sustainable Food and Fibre Futures (MPI)	Wellington	www.mpi.govt.nz/funding-rural-support/
Wellington Waste Minimisation Funding	Wellington	wellington.govt.nz/community-support-and-resources/community-support/funding/council-funds

RESEARCH PROVIDERS	LOCATION	WEBSITE
AgResearch	Christchurch	www.agresearch.co.nz
Aqualinc Research	Christchurch	www.aqualinc.co.nz
Chronoptics	Hamilton	www.chronoptics.com
Heavy Engineering Research Association	Auckland	www.hera.org.nz
HIT Lab NZ	Christchurch	www.hitlabnz.org
Lincoln University	Christchurch	www.lincoln.ac.nz
Massey University Industry 4.0 Research	Palmerston North	www.massey.ac.nz
Plant and Food Research	Auckland	www.plantandfood.com
Scion Research	Rotorua	www.scionresearch.com
University of Auckland Laboratory for Industry 4.0 Smart Manufacturing Systems	Auckland	www.lisms.auckland.ac.nz
University of Canterbury Department of Mechanical Engineering	Christchurch	www.canterbury.ac.nz/engineering
University of Waikato Hamilton Campus	Hamilton	www.waikato.ac.nz

TRAINING & SKILLS (SHORT COURSES)	LOCATION	WEBSITE
AcademyEX	Auckland	www.academyex.com
Competenz	Auckland	www.competenz.org.nz
Heavy Engineering Research Association	Auckland	www.hera.org.nz
The Learning Wave	Auckland	www.thelearningwave.com

SMART INDUSTRY READINESS INDEX ASSESSORS (SIRI)	LOCATION	WEBSITE
Beca	Auckland	www.beca.com
Callaghan Innovation	Christchurch	www.callaghaninnovation.govt.nz
Heavy Engineering Research Association	Auckland	www.hera.org.nz
If Else Cloud	Auckland	www.ifelsecloud.com
LMAC Group	Auckland	www.lmac.co.nz
Worley New Zealand	Auckland	www.worley.com

DIGITAL LEAN CONSULTANTS	LOCATION	WEBSITE
Beca	Auckland	www.beca.com
IMS projects	Auckland	www.ims-projects.co.nz
Intent Group	Auckland	www.intentgroup.co.nz
LMAC Group	Christchurch	www.lmac.co.nz

MANUFACTURING ECOSYSTEM DIRECTORY

CONSULTANTS & SYSTEM INTEGRATORS	LOCATION	WEBSITE
Autoline Automation	Blenheim	www.autoline.nz
Automate-X	Auckland	www.automate-x.nz
Automation for Industry (AFI)	Lower Hutt	www.afi.co.nz
Beca	Auckland	www.beca.com
Brightwater Engineering	Nelson	www.brightwater.co.nz
Clive Wilson Switchboards	Invercargill	www.clivewilson.co.nz
CTEK Combined Technologies	Hamilton	www.ctek.co.nz
Control Focus	Dunedin	www.controlfocus.co.nz
CR Automation	Hastings	www.crautomation.nz
Dalton Electrical	Auckland	www.daltonelectrical.co.nz
Datanow	Napier	www.datanow.co.nz
Delloite	Auckland	www.deloitte.com/nz
Design Energy	Christchurch	www.designenergy.co.nz
DETA Consulting	Christchurch	www.deta.global
Dimension Software	Auckland	www.dimensionsoftwarenz.com
Dsifer	Auckland	www.dsifer.com
eCAD	Nelson	www.ecad.co.nz
EIS	Invercargill	www.eis.co.nz
ESP	Auckland	www.esphq.com
EY	Auckland	www.ey.com/en_nz
Facteon Intelligent Technology	Auckland	www.facteon.global
Falcon	Napier	www.falconltd.co.nz
FlexWare	Auckland	www.flexware.co.nz
Global Design and Production	Matakana	www.globaldesign.co.nz
Icon Automation	Hāwera	www.iconautomation.co.nz
IMS Projects	Wellington	www.ims-projects.co.nz
IMWT Maintenance Innovation & Consulting	Wellington	www.maintenancesystem.app
Industrial Controls	Timaru	www.icsc.co.nz
Industrial Marine Electrical	Nelson	www.inmar.co.nz
InfoScada	Dunedin	www.infoscada.com
JMP Enginereing	Auckland	www.jmp.co.nz
KANDO	Auckland	www.kandoinnovation.com
KPMG	Auckland	www.kpmg.com/nz
LMAC Group	Auckland	www.lmac-group.com/home-nz
Loop Technologies	Hamilton	www.looptechnologies.com
MHM Automation	Christchurch	www.mhmautomation.com
Motion Design	Waimauku	www.motiondesign.nz
Mott MacDonald	Auckland	www.mottmac.com
Nemesys	Hamilton and Invercargill	www.nemesys.co.nz
New Zealand Electrical Solutions	Nelson	www.nes.co.nz
Nind Electrical Services	Invercargill	www.nindelectrical.co.nz
Novo Management Consulting	Auckland	www.novomc.com
NZ Controls	Auckland and Tauranga	www.nzcontrols.co.nz
Pareto Toolbox	Auckland	www.pareto-toolbox.com
Prolec	Christchurch	www.prolec.co.nz

MANUFACTURING ECOSYSTEM DIRECTORY

CONSULTANTS & SYSTEM INTEGRATORS	LOCATION	WEBSITE
PW Engineering	Mosgiel	www.pwengineering.co.nz
PwC New Zealand	Auckland	www.pwc.co.nz
Reynolds Group	Auckland	www.rgl.co.nz
Robotics Plus	Whakamārama	www.roboticsplus.co.nz
SapienX	Auckland	www.sapienx.co.nz
Scott Technology	Dunedin	www.scott.co.nz
SGS ECL	New Plymouth	www.ecl.co.nz
Solnet	Wellington	www.solnet.co.nz
Solnet Auckland	Wellington	www.solnet.co.nz
Stellar Consulting Group	Auckland	www.stellarconsulting.co.nz
Streat Automation	Christchurch	www.streat.co.nz
Swarm Intelligence	Christchurch	www.swarmintelligence.co.nz
Switchbuild	Dunedin	www.switchbuild.co.nz
Tait Controls	Hamilton	www.taitcontrols.co.nz
The Instillery	Auckland	www.theinstillery.com
Thelning Design Innovation	Christchurch	www.thelning.co.nz/industry-automation
Thred	Auckland	www.thred.co.nz
Tomra (Compac Sorting Equipment)	Auckland	www.compacsort.com
TradeWindow	Auckland	www.tradewindow.io
Verbrec	New Plymouth	www.verbrec.com
Wilson Electro Services	Dunedin	www.wesautomation.co.nz
Worley New Zealand	New Plymouth	www.worleyparsons.com

TECHNOLOGY VENDORS	LOCATION	WEBSITE	TECHNOLOGY TYPE
● Internet of Things ● Robotics & Automation ● Data Warehousing & Analytics ● Additive Manufacturing & 3D Printing ● Human-centred Technology & Safetytech			
3DPmaven	Auckland	www.3dpmaven.com	●
ABB New Zealand	Auckland	www.new.abb.com/nz	● ● ●
AMS NZ	Lower Hutt	www.amsls.co.nz	●
Aspect Productivity Technology	Auckland	www.aspectpt.com	●
Autoline Automation	Blenheim	www.autoline.nz	●
AWS	Auckland	www.aws.amazon.com/manufacturing	●
Balluff	Auckland	www.balluff.co.nz	● ● ●
Business Distributors	Christchurch	www.bdlcopiers.co.nz/our-products/3d-printing-solutions	●
Beckhoff Automation	Auckland	www.beckhoff.com/en-nz	● ● ●
BlueLab	Tauranga	www.bluelab.com/new_zealand	●
Bosch Rexroth	Auckland	www.boschrexroth.com/en/nz	● ●
Chronoptics	Hamilton	www.chronoptics.com	●
Creative Design and Additive Manufacturing Lab	Auckland	www.cdamlab.com	●
CSE-W Arthur Fisher	Auckland	www.cse-waf.nz	● ●
Cuthbert Stewart	Auckland	www.csl-online.nz	●
Datacom	Auckland	www.datacom.com	●
Datanow	Napier	www.datanow.co.nz/product	●
Define Instruments	Auckland	www.defineinstruments.com	● ●
Eaton New Zealand	Christchurch	www.eaton.com/nz/en-gb.html	●
EllisCo	Auckland	www.ellis.co.nz	● ●
EMC Industrial Group	Auckland	www.emc.co.nz	● ●

MANUFACTURING ECOSYSTEM DIRECTORY

TECHNOLOGY VENDORS	LOCATION	WEBSITE	TECHNOLOGY TYPE
● Internet of Things ● Robotics & Automation ● Data Warehousing & Analytics ● Additive Manufacturing & 3D Printing ● Human-centred Technology & Safetytech			
Emerson Automation Solutions	Auckland	www.emerson.com/en-au/automation/home	● ● ●
FANUC Oceania	Auckland	www.fanucoceania.com.au	●
Festo	Christchurch	www.festo.co.nz	● ●
Fi Additive	Invercargill	www.fiadditive.co.nz	●
FlexWare	Auckland	www.flexware.co.nz	●
GE New Zealand	Auckland	www.ge.com/apac/ge-newzealand	●
HITLab	Christchurch	www.hitlabnz.org	●
HiLo	Dunedin	www.hilomonitoring.com	●
Honeywell	Auckland	www.honeywell.com	● ● ●
IBM New Zealand	Wellington	www.ibm.com/au-en/industries/manufacturing	●
IFM Efector	Auckland	www.ifm.com/nz/en	● ●
iMonitor	Auckland	www.imonitor.net	● ●
LEAP Australia New Zealand	Auckland	www.leapaust.com.au	● ●
Levno	Palmerston North	www.levno.com	●
Loop Technologies Hamilton	Hamilton	www.looptechnologies.com	●
Mantis Systems	Dunedin	www.mantis-sys.co.nz	● ●
Microsoft HoloLens	Auckland	www.microsoft.com/en-us/hololens/industry-manufacturing	● ●
Mitsubishi Electric Automation	Lower Hutt	www.mitsubishielectric.com/fa	● ●
Mixt Studio	Wellington	www.mixtstudio.co.nz	●
Motion Design Insights	Auckland	www.myinsights.nz	●
NHP Electrical	Auckland	www.nhpnz.co.nz/en	● ● ●
Omron Electronics	Auckland	store.omron.co.nz	● ● ●
Pilz New Zealand	Auckland	www.pilz.com/en-NZ	● ●
PiP IoT	Christchurch	www.pipiot.com	●
Radfords	Tauranga	www.radfords.global/home	●
RAM3D	Tauranga	www.rapidman.co.nz	●
Rockwell Automation	Auckland	www.rockwellautomation.com	● ● ● ●
SAP New Zealand	Auckland	www.sap.com/australia/index.html	●
Schneider Electric	Auckland	www.se.com/nz/en	● ● ●
Scott Technology	Dunedin	www.scott.co.nz	●
SEW-EURODRIVE (NZ)	Auckland	www.sew-eurodrive.co.nz	●
Siemens	Auckland	www.siemens.com/au/en.html	● ● ●
SMC Corporation (NZ)	Auckland	www.smcworld.com	● ●
Southern Technology Wireless Connectivity	Christchurch	www.southerntech.co.nz	● ●
Spark 5G Lab	Auckland	www.spark.co.nz/5g	●
Thinextra NZ	Auckland	www.thinextra.com	●
Thred	Auckland	www.thred.co.nz	●
TURCK	Auckland	www.turck.com.au/en	● ●
Ubiquios Technology	Hamilton	www.ubiquiostechnology.com	● ●
United Machinists	Dunedin	www.unitedmachinists.co.nz	●
One NZ Wireless Connectivity	Auckland	www.one.nz/iot	●
Waxeye	Auckland	www.waxeye.co.nz	●
Yokogawa NZ	Christchurch	www.yokogawa.com/au	● ● ●
Zenith Tecnica	Auckland	www.zenithtecnica.com	●

DEFINITIONS

Australian and New Zealand Standard Industrial Classification (ANZSIC) was jointly developed by the Australian Bureau of Statistics and Statistics New Zealand in order to make it easier to compare industry statistics between the two countries and with the rest of the world. This report categorises New Zealand manufacturing company data by the following divisions, subdivisions and assigned colour.

FOOD AND BEVERAGE

C111	Meat and Meat Product Manufacturing
C112	Seafood Processing
C113	Dairy Product Manufacturing
C114	Fruit and Vegetable Processing
C115	Oil and Fat Manufacturing
C116	Grain Mill and Cereal Product Manufacturing
C119	Other Food Product Manufacturing
C117	Bakery Product Manufacturing
C118	Sugar and Confectionery Manufacturing
C121	Beverage Manufacturing
C122	Cigarette and Tobacco Product Manufacturing

MACHINERY AND EQUIPMENT

C231	Motor Vehicle and Motor Vehicle Part Manufacturing
C239	Other Transport Equipment Manufacturing
C241	Professional and Scientific Equipment Manufacturing
C242	Computer and Electronic Equipment Manufacturing
C243	Electrical Equipment Manufacturing
C244	Domestic Appliance Manufacturing
C245	Pump, Compressor, Heating and Ventilation Equipment Manufacturing
C246	Specialised Machinery and Equipment Manufacturing
C249	Other Machinery and Equipment Manufacturing

CHEMICALS AND REFINING

C170	Petroleum Refining and Petroleum and Coal Product Manufacturing
C181	Chemical Manufacturing
C182	Basic Polymer Manufacturing
C189	Other Basic Chemical Product Manufacturing
C183	Fertiliser and Pesticide Manufacturing
C184	Pharmaceutical and Medicinal Product Manufacturing
C185	Cleaning Compound and Toiletary Preparation Manufacturing

WOOD AND PAPER

C141	Log Sawmilling and Timber Dressing
C149	Other Wood Product Manufacturing
C151	Pulp, Paper and Paperboard Manufacturing
C152	Converted Paper Product Manufacturing

METALS AND METAL PRODUCTS

C211	Basic Ferrous Metal Manufacturing
C212	Basic Ferrous Metal Product Manufacturing
C213	Basic Non-Ferrous Metal Manufacturing
C214	Basic Non-Ferrous Metal Product Manufacturing
C221	Iron and Steel Forging
C222	Structural Metal Product Manufacturing
C223	Metal Container Manufacturing
C224	Other Sheet Metal Product Manufacturing
C229	Other Fabricated Metal Product Manufacturing

PLASTICS AND RUBBER

C191	Polymer Product Manufacturing
C192	Natural Rubber Product Manufacturing

OTHER MANUFACTURING

C131	Textile Fibre, Yarn and Woven Fabric Manufacturing
C134	Knitted Product Manufacturing
C132	Leather Tanning and Fur Dressing
C133	Textile Product Manufacturing
C135	Clothing and Footwear Manufacturing
C161	Printing
C162	Reproduction of Recorded Media
C201	Glass and Glass Product Manufacturing
C202	Ceramic Product Manufacturing
C203	Cement, Lime, Plaster and Concrete Product Manufacturing
C209	Other Non-Metallic Mineral Product Manufacturing
C251	Furniture Manufacturing
C259	Other Manufacturing

ABOUT TIN

TECHNOLOGY INVESTMENT NETWORK (TIN) IS A PRIVATE COMPANY WITH A SIMPLE MISSION: TO FACILITATE THE GROWTH OF THE TECHNOLOGY SECTOR IN NEW ZEALAND.

RESEARCH AND ANALYSIS

TIN is the leading source of information on New Zealand's technology sector. We have been independently collecting and analysing data on New Zealand technology exporting companies for 19 years. The annual TIN Report includes detailed analysis of the sector's performance for the year. It also ranks the top 200 technology companies by revenue and publicly recognises high-growth achievers with a series of annual awards.

In addition, TIN is commissioned for bespoke analysis and research projects for industry participants,

professional services firms, investors, TIN member companies and government-related clients. This is the company's inaugural Advanced Manufacturing Report.

All TIN publications are available on our website. Tin100.com

TIN also produces TINWire, a free monthly electronic news update on the New Zealand technology sector.



TIN TEAM



GREG SHANAHAN – As captain of Team TIN, Greg's dedication and passion for the technology sector led him to establish the Technology Investment Network in 1999. Under his direction, the TIN Report has enjoyed growing recognition and influence since its inception in 2005. A well-known figure in the tech sector, Greg's in-depth industry knowledge is underpinned by his role as co-founder and MD of medical device company Veriphi.



BETTINA SINCLAIR – Commercial Manager
Bettina works closely with TIN's Research Team, developing opportunities, engaging with report sponsors, and promoting TIN's growing membership community.



ALEX DICKSON – Head of Research
Alex leads TIN's research team and is responsible for research design, research and authorship of TIN publications and consulting reports.



LUCY DIVER – Editor and Publication Lead
Lucy manages the publication process for all of TIN's reports and writes their editorial content. She holds degrees from the University of Oxford and King's College London.



DR ALVARO GUNAWAN – Data Scientist
Alvaro's PhD focused on artificial intelligence and game theory. His academic background supports TIN's rigorous research and analysis process.



NEHAAL RAM – Research Analyst
Nehaal's years of experience in international investment and banking support TIN's qualitative and quantitative research.



WYNTON BRICK – Intern
Wynton brings his quantitative research knowledge and experience to TIN.



ABBY SATHYENDRAN – Intern
Abby contributes her knowledge and experience of data-driven research to TIN.



CHELSEA MCDONALD – Digital Marketing Manager
Chelsea manages TIN's communications and presence across all digital platforms. Her focus is driving the evolution of the TIN brand.



JENNIFER MILLER – Events Manager
Jennifer is responsible for TIN's events schedule – organising engaging events, and bespoke networking opportunities.



MEAGAN ROOTMAN – Office Manager
Meagan manages all TIN administration and its accounting and human resource functions.

TIN MEMBERSHIP

Technology Investment Network has two distinct membership offerings, one for New Zealand technology companies, and for affiliated businesses that support them.

Benefits include access to bespoke reports, exclusive networking opportunities, discounts on TIN events and publications, and introductions to investor networks.

INCREASED PROFILE

Be recognised as part of a highly influential international network of New Zealand technology export leaders, through featuring in TINWire and the online TINTech directory.

MEANINGFUL INSIGHTS

Enhance your company's performance with insights from New Zealand's definitive source of information on the technology sector.

EXCLUSIVE NETWORKING

Regularly connect with industry and investor experts, and with other technology export executives, to exchange ideas and key learnings.

Our current members



To join the companies that are already members of New Zealand's premier technology export network and view the full benefit entitlements, visit:

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