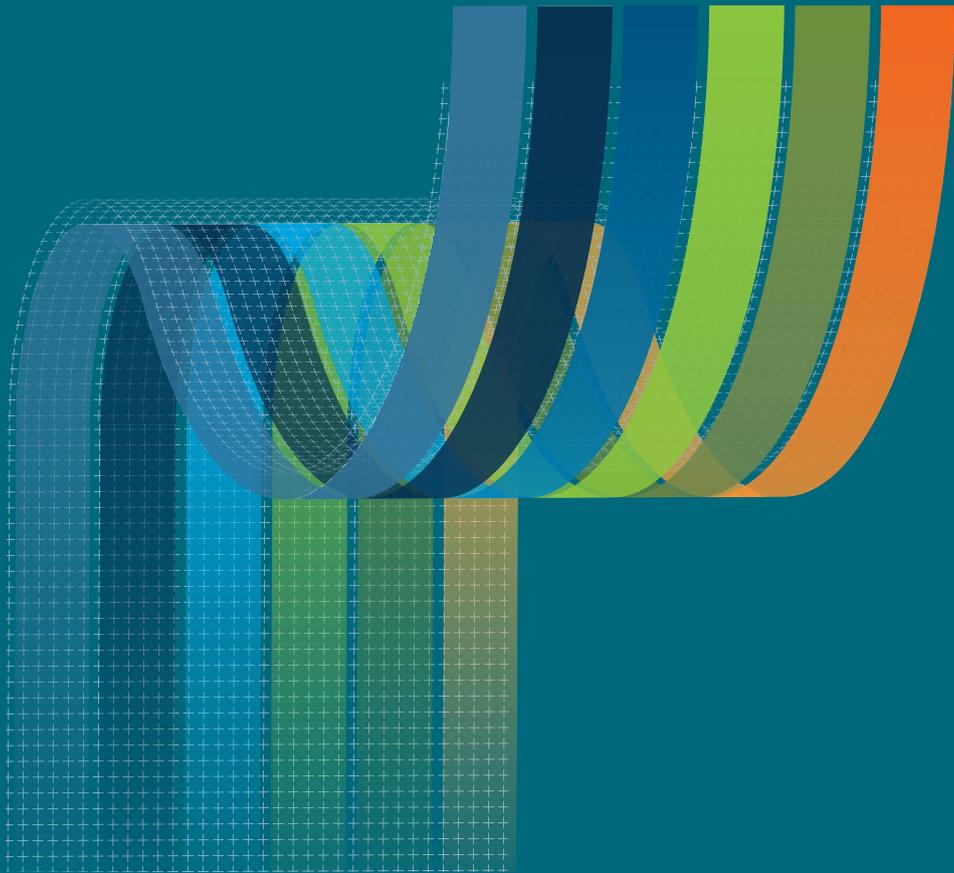
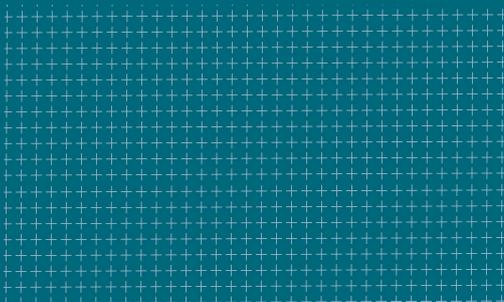


From Education to Employment



Megatrends affecting NZ's working environment





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Economics put simply

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Demographic trends and their challenges

The economic environment in which we operate

The changing nature of education and training

Executive summary

Gareth Kiernan – Chief Forecaster

Technological change is ushering us into the biggest transformation of the working environment since the Industrial Revolution. Our modelling estimates that 31% of current jobs in New Zealand's workforce could be automated over the next 20 years.

This change is occurring in a global economy that is becoming ever more interconnected. The effects on New Zealand are apparent in our trade flows and our increasingly multicultural workforce.

At the same time, there is mounting pushback against the "hands-off" political approach of the last 30 years. For New Zealand's government, this change includes greater emphasis on environmental outcomes, the search for a broader understanding of wellbeing, and a desire to reduce inequality.

A greater focus on inequality is timely given that lower-skilled workers will be most affected by automation. The government has a key role to ensure these workers have access to retraining options as their existing jobs are automated. We see a need for programmes targeted at Māori and Pasifika to ensure current ethnic inequalities are not exacerbated.

There is also increasing pressure on tertiary organisations to provide more skills-based training that better aligns with employers' requirements. Changes are likely to include more flexible online learning, the emergence of smaller qualification modules, and greater collaboration between institutions to target high-quality outcomes for students. These moves sit alongside the need for learning resources to be relevant throughout people's working lives, given the rapidly evolving workplace.

From education to employment: Megatrends affecting NZ's working environment is structured around the following themes.

- **The economic environment in which we operate** covers the overarching external trends affecting the economy and the workplace.
- **Demographic trends and their challenges** looks at population projections and their implications for the labour supply.
- **The changing nature of education and training** examines the future of tertiary education given the findings from the previous two sections.

Change always comes with challenges. But we believe the disruption to the workplace over the next 20 years offers significant opportunity for this country to improve its economic outcomes. Demand for workers with relevant and transferable skills will be stronger than ever. And appropriate planning and innovation in the education sector will help give all New Zealanders the chance to benefit from the economic transformation that is underway.

The image features a teal background with several colored squares. At the top left, there is a small orange square. Below it, a larger orange square is positioned to the left of the text. A horizontal bar composed of five segments (dark blue, brown, olive green, dark blue, and dark blue) spans across the middle. Below this bar, a light green square is centered under the olive green segment. At the bottom center, there is another light green square.

The economic
environment
in which
we operate

The Economic Environment in which we operate

Individuals, businesses, and other organisations operate in an environment that is often largely outside their control. This section looks at three overarching trends that we believe will dominate the economic landscape over the next 20 years.

1. The growing role of "developing" countries in the global economy
2. The rise of automation and its effects on the workforce
3. A change in the political approach to take a more "hands-on" role in managing economic outcomes

Key implications

- China and east Asia will continue to play an increasingly dominant role in the global economy.
- Automation will have a significant effect on the New Zealand workforce, with about 30% of jobs at a high risk of automation over the next 20 years.
- There will be more government intervention to ensure better business behaviour, reduced inequality across society, and a broadening in our measurement of wellbeing to include non-financial outcomes such as the environment.

Key actions

Exporters should continue to pursue opportunities in the Chinese market, but should also be aware of the potential for other growth areas such as India to emerge.

Significant retraining and upskilling of people will be needed as more jobs are automated, with particular attention given to lower-skilled workers, whose jobs are most at risk.

The likelihood that fewer new jobs will be created in provincial areas will require careful management from government to maintain the economic viability of these regions over the medium-term.

Businesses will need to demonstrate a commitment to positive non-financial outcomes or risk facing greater levels of government regulation or intervention.

The changing global economic base

As an exporting nation, New Zealand has benefited immensely from the re-emergence of China as a major economic power, particularly given the free-trade agreement that has been in place between the two countries over the last decade. Although China's size means it will continue to be a major player for the foreseeable future, it is worth considering alternative sources of business activity as China's economic development continues and production costs rise. India has significant potential and is a country with which New Zealand has explored closer trade links. Less likely are South America and Africa, which both have substantial problems to be overcome before either could be considered a viable location for major business investment.

The emergence of China's economic muscle

IN 1820, estimates suggest that Asia represented about 60% of global economic activity. But industrialisation and increasing international trade flows that were often based on colonial connections meant that Asia was left behind. By 1950, Asian activity was only about 18% of the global economy. China, which had been one of the biggest economic bases of the previous 2,000 years, had been superseded by the likes of the US, the UK, the USSR, and Germany.

Fast forward to today, and China is firmly re-establishing itself at the top of the league table. Maintaining average GDP growth of 9.4%pa over a 30-year period will tend to advance you quickly up the list of global economic powers!

China has not been alone in its rapid growth. Many other Asian countries have significantly boosted their shares of world GDP over the last decade, including India, Indonesia, and the Philippines.

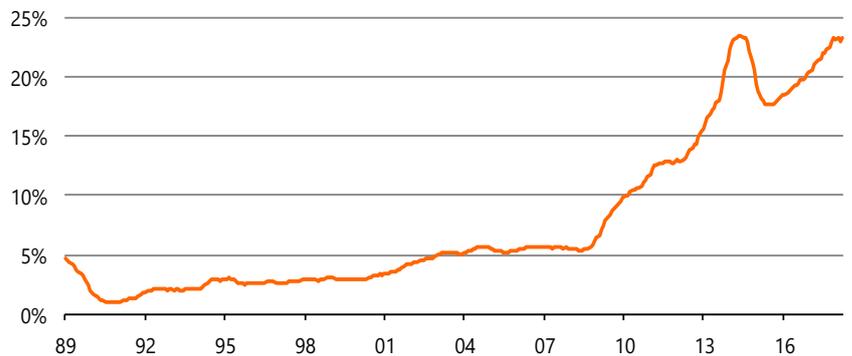
From New Zealand's point of view, the swing in economic power back towards Asia has been particularly beneficial given our geographic location. Furthermore, the free-trade agreement (FTA) between New Zealand and China has enabled New Zealand to effectively tap into this growth via our exports. Since the FTA came into force in late 2008, the share of New Zealand's exports heading to China has lifted from less than 6.0% to 23% (see Graph 1).

The evolution of global industrial production from Europe and the US towards Japan and, subsequently, China, has been driven largely by the pursuit of lower cost structures – particularly labour costs. As Japan

GRAPH 1

The rise and rise of exports to China

China's share of NZ's total exports, annual running totals



developed and labour costs rose, many multinationals transitioned their production to cheaper locations such as China or South Korea. Although China is still some way from becoming a high-wage economy, a similar shift in the focus of growth can be envisaged in the future. For example, countries such as Indonesia and Vietnam are already gaining prominence in some areas of manufacturing.

China's progress towards "developed" status and the sheer weight of its population mean that it will continue to be one of the biggest economic powers in the world. Neighbouring developing nations will be able to piggy-back off China's growth via their trade linkages. As incomes lift and these economies grow in their own right, eastern Asia will increasingly challenge Europe and the US as the predominant driver of the global economy.

Beyond China: India, South America, and Africa

OVER THE LONGER-TERM, the most obvious locations for foreign investment and economic development are arguably India, South America, and Africa.

The World Bank's **Doing Business** report for 2018¹ shows that India is ranked 100th out of 190 economies for ease of doing business, compared to 78th for China. One of China's biggest strengths in this index is the enforcement of contracts, which largely encapsulates the time and costs associated with taking legal action if a contract is breached. China and eastern Asia also score relatively well in the "Registering Property" domain, indicating that the time and costs associated with land ownership are relatively low and that land administration records are of a high quality.

In comparison, India, countries in South America, and countries in Africa generally score poorly across these two domains, which significantly reduces the ease of doing business in these locations.

1. www.doingbusiness.org/-/media/WBG/DoingBusiness/Documents/Annual-Reports/English/DB2018-Full-Report.pdf

Other domains that India fares particularly poorly in are the ease of starting a business, the ease of dealing with construction permits, and the ease of trading across borders. There is clearly a wide range of opportunities for regulatory reform and other improvements to be made to facilitate India's economic development, although some steps have been taken in the right direction over the last decade. The size of India's population means that, like China, any significant progress in its economic development will propel it rapidly up the list of global economic powers.

Although India is not quite as geographically favourable as China for New Zealand to tap into its growth as an economic power, we still see India's development as an opportunity for exporters in this country.

Between 2010 and 2015, the New Zealand and Indian governments worked on the negotiation of a FTA. There has been little progress in discussions since 2015, but the talks indicate that New Zealand officials are cognisant of India's potential as a growth market. For now, though, momentum in exports to India has been lost. After climbing from 0.5% to 2.1% between 2004 and 2011, India's share of New Zealand's exports fell back to 1.4% during 2012 and 2013 and has remained at similar levels since then (see Graph 2).

GRAPH 2

India's potential, as yet, untapped

India's share of NZ's total exports, annual running totals



Any major transition of production to South America or Africa seems much more far off. The Doing Business report shows that, apart from the domains previously mentioned where China performs strongly, South America also scores particularly poorly for tax systems (rates, the complexity of the tax system, and time associated with compliance); the ease of starting a business and the ease of dealing with construction permits.

Africa also has very little going for it as an environment for doing business. If we look at the five African sub-regions as defined by the United Nations², all of them regularly appear in the bottom five areas in the world across the domains that the World Bank measures in its report. Western Africa and Middle Africa score especially badly. Africa has major problems with government processes, infrastructure, and corruption to address before it will attract much foreign investment and start to make any significant progress in its economic development.

2. See https://upload.wikimedia.org/wikipedia/commons/0/08/United_Nations_geographical_subregions.png.

The automation revolution

We estimate that 31% of New Zealand's jobs are at a high risk of automation over the next 20 years. If anything, the tight labour market and proposed sizable increases to the minimum wage will hasten the adoption of automation in the near term.

Although there is some variation in the proportion of at-risk jobs across different parts of the country, the biggest regional disparities are likely to be in terms of where new jobs are created. It is in this context that the fortunes of provincial and rural economies are most at-risk. Experiences from the economic reforms of the 1980s suggest that the government has an important role to play in mitigating the effects of rapid change, with lower-skilled workers looking particularly vulnerable and having the most to gain from retraining.

Furthering our understanding of the effects of automation

OVER THE LAST FEW YEARS, so much has been written about the increasing role of automation and the "future of work" that we would risk reinventing the robot by trying to conduct our own research. Nevertheless, the idea that we are entering the most ground-breaking phase of economic activity since the Industrial Revolution means that we can't simply ignore the changes that technology will bring over the next 20 years. So we have built on the key findings of other research about how technological change is likely to affect New Zealand: by region, by occupation and industry, and the timeframes over which changes are likely to occur.

How many jobs are we talking about?

Disruptive technologies: risks and opportunities was published in 2015 by Chartered Accountants Australia and New Zealand (CAANZ) and the New Zealand Institute of Economic Research (NZIER)³. The paper estimated that over 885,000 jobs in New Zealand are at a high risk of automation, possibly within the next 20 years. This figure represented about 37% of all jobs in New Zealand at the time.

Earlier this year, PricewaterhouseCoopers (PwC) published **Will robots really steal our jobs?**⁴, estimating the proportion of at-risk jobs in New

3. https://nzier.org.nz/static/media/filer_public/6d/6e/6d6ecf8b-032c-4551-b0a7-8cd-0f39e2004/disruptive_technologies_for_caanz.pdf

4. www.pwc.co.nz/pdfs/2018pdfs/impact-of-automation-on-jobs-Feb-2018.pdf

Zealand at a much lower 24%. PwC's analysis suggests that jobs in New Zealand are less at risk of automation than might have been initially feared "due to relatively high employment rates and education and skill levels across all major demographic groups." Even so, it is still worth taking notice of the potential disruption of about 578,000 jobs in this country due to automation.

Which areas will be most affected, and when?

The work by CAANZ/NZIER estimated that rural regions would be more heavily affected by automation than urban centres. At a regional council level, CANZ/NZIER's modelling showed that West Coast, Southland, and Gisborne had the greatest proportions of jobs at high risk from automation. In contrast, only Auckland and Wellington recorded potential automation rates below the nationwide average.

|| PwC's analysis suggests that jobs in New Zealand are less at risk of automation than might have been initially feared

A particularly useful aspect of PwC's work is that it divides the process of automation into three overlapping waves: the algorithm, augmentation, and autonomy waves⁵. These waves provide a broad framework for considering the timing of potential job losses. We have used this framework and our own regional database of employment by industry, occupation, and skill level to model the possible effects of job automation at a city and district level over the next 20 years.

Graph 3 shows our estimates of the proportion of jobs at high risk of automation for three representative local council areas between now and 2036. We have chosen to show these three areas because they are representative of the range of dynamic outcomes over the next 20 years.

- Mackenzie District has a relatively low proportion of jobs at risk of automation in the near term from the algorithm wave. Only Kaikōura and Westland are likely to have fewer jobs affected by automation in the next six years. This outcome for Mackenzie is primarily due to the District's low levels of employment in the professional, scientific, and technical services industry, which is highly susceptible to automation in the near term. However, over the longer-term, the automation of jobs in Mackenzie will be substantially higher than the nationwide average. We estimate the District has the highest proportion of at-risk jobs in New Zealand during the autonomy wave. Important industries in the District that are likely to see substantial automation in the long term are agriculture, forestry, and fishing and accommodation and food services.

5. The three waves are as follows:

- **Algorithm wave:** focused on automation of simple computational tasks and analysis of structured data in areas like finance, information and communications
- **Augmentation wave:** focused on automation of repeatable tasks such as filling in forms, communicating and exchanging information through dynamic technological support, and statistical analysis of unstructured data in semi-controlled environments such as aerial drones and robots in warehouses
- **Autonomy wave:** focused on automation of physical labour and manual dexterity, and problem solving in dynamic real-world situations that require responsive actions, such as in manufacturing and transport (eg driverless vehicles)

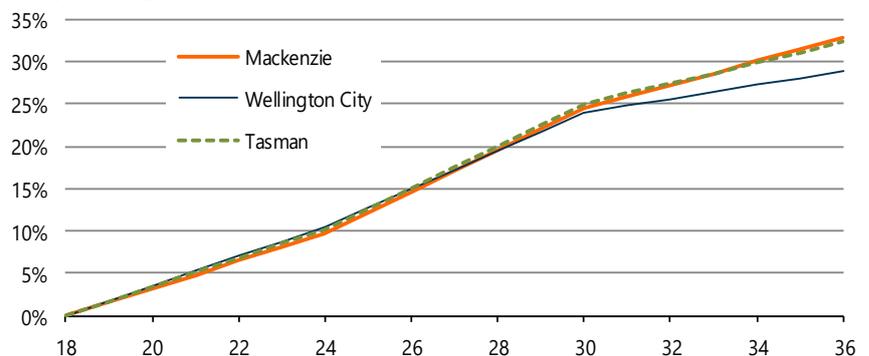
- At the other end of the spectrum, Wellington City has the highest proportion of at-risk jobs in the near term. Professional, scientific, and technical services; public administration and safety; financial and insurance services; and information media and telecommunications are all strongly represented in the Wellington economy and are all ripe for automation in the near term. But later in the forecast period, increased automation in manufacturing and construction will affect the City's workforce less than in other parts of the country. By 2036, Wellington is likely to be one of the areas with the lowest proportion of job losses from automation.
- Tasman District shows a more typical profile of potential job losses over time, even if jobs in the District are more susceptible on average to automation than the nationwide trend. In the near-term, Tasman's underrepresentation in industries such as professional, scientific, and technical services or financial and insurance services is offset by automation in agriculture, forestry, and fishing. The domination of agriculture in the District's economy will be the primary driver of job losses over the longer term, with automation in manufacturing and retail trade also increasing over time.

By 2036, Wellington is likely to be one of the areas with the lowest proportion of job losses from automation

Graph 3

The differing effects of automation

% of jobs at high risk of automation, selected local council areas



Full results for all local authorities are shown in Table 1 in the Appendix.

New jobs might not be created everywhere

There are two key points to make about our projections.

Firstly, there is a relatively high degree of uncertainty, even if most scenarios lie towards the bottom end of this range. Although we have estimated that 31% of jobs nationally are at high risk of automation during the next 20 years, the range of estimated outcomes lies between 29% and 39%. At a local authority level, the range varies between 26% of jobs in Wellington City up to 50% of jobs in Tasman District.

Secondly, the workforce will be significantly affected right across the country. If we concentrate on the central projections as presented in Table 1, the proportion of job losses throughout New Zealand's cities and districts ranges between 28.8% and 35.4%. Therefore, once we have made an assumption about the effects of automation on the nationwide workforce and removed that area of uncertainty, the variation between local authority areas becomes reasonably small.

|| In our view, the biggest contribution that government can make towards the viability of a region is ensuring that it has infrastructure that is fit for purpose in a modern economy

PwC posits that "any job losses from automation are likely to be broadly offset in the long run by new jobs created as a result of the larger and wealthier economy made possible by these new technologies". In broad terms, we concur with this view, although it is not necessarily a given that all the jobs lost to automation in New Zealand will be replaced over time by design, manufacturing, or programming jobs in this country. Nevertheless, even if we assume there is roughly a 1:1 replacement of redundant automated jobs with newly created jobs within New Zealand, it seems extremely heroic to suppose that many of these new jobs will spring up in provincial towns and rural areas.

In the context of New Zealand's long-term trend towards increased urbanisation, along with the concentration of population and economic activity in the upper North Island, automation poses significant challenges for provincial areas. A lack of new job creation outside the main urban centres would make it difficult for the provinces to retain their population. Even projected population growth outside Auckland, Hamilton, and Tauranga over the next 25 years of just 0.4%pa could prove to be too optimistic as automation ramps up. The lure of the "Golden Triangle" contains more discussion of the likely geographic skew in New Zealand's population growth in coming years.

Central and local government need to take a careful approach to regional economic planning. It is easy to spend money on initiatives that fail to implement real change, but only delay the inevitable effects of an irresistible external trend. In our view, the biggest contribution that government can make towards the viability of a region is ensuring that it has infrastructure that is fit for purpose in a modern economy. For example, ever-improving communications technology is making it possible for more people to work remotely, so workers don't necessarily need to be sited in the same physical location as their employer. The government's Ultra-Fast Broadband Initiative and Rural Broadband Initiative are to be applauded in this regard.

Appropriate transport infrastructure is also necessary to enable these workers to travel outside the region easily when required. If these building blocks are in place, then the attractiveness of factors in provincial areas such as the lifestyle or housing affordability can start to be brought into play.

From a business' point of view, access to reliable and fast internet and good transport linkages also reduces the impediments to being sited away from the main urban centres. Nevertheless, the benefits from economic agglomeration (see No end in sight to the upper North Island's domination) mean that it is still going to be difficult to encourage businesses to locate themselves away from the obvious technological hubs in the bigger cities.

Managing the transition: a lesson from the 1980s

“government has the biggest role to play in helping workers retrain and upskill to be able to prosper in the changing workforce

The experience of New Zealand's economic reform in the second half of the 1980s and early 1990s shows that the speed of economic and labour market change matters. New Zealand's unemployment rate, which got as high as 11% in the early 1990s, might have been kept lower by a more gradual and carefully managed transition away from the highly subsidised, regulated, and protected economic environment that had previously existed. It was arguably not until the very strong economic conditions that prevailed during the first half of the 2000s that the legacy of the reforms on the most affected subsection of the labour force was finally overcome. Graph 4 shows that it was 2000 before the proportion of people unemployed for six months or longer fell back to pre-reform levels (below 2% of the total labour force).

Graph 4

Labour market outcomes to be avoided

% of the labour force unemployed for six months or longer, annual avg



Resisting the trend towards greater automation will be futile and, outside of infrastructure provision, the government probably has minimal influence on where new jobs will be created. Rather, the area that the government has the biggest role to play in helping workers retrain and upskill to be able to prosper in the changing workforce. An estimated 44% of people in lower-skilled occupations are at high risk of having their job automated over the next 20 years, compared to about 11% of people in highly skilled roles.

It is incumbent upon the government to ensure that lower-skilled and less well-off workers, in particular, have access to the education and

The tight labour market means the future is now

training that will enable them to make a full contribution to society going forward. Any return to significant levels of long-term unemployment is an outcome to be avoided, given the detrimental effects it has on many levels, including socially, economically, and fiscally. And when long-term unemployment is concentrated within specific regional or ethnic pockets of society, the problems become even more magnified.

THIS SECTION HAS LARGELY DISCUSSED the effects of technology and automation from an overarching perspective. We believe it is also important to think about the trend towards automation in the context of current labour market conditions.

Looking across a collection of recent predictions for the New Zealand economy shows that forecasters expect the unemployment rate to hold between 4.0% and 4.7% over coming years⁶. In other words, the labour market is expected to remain relatively tight for the foreseeable future.

Over the last few years, labour cost inflation in New Zealand has been surprisingly muted. However, the current environment of worker shortages should be conducive to accelerating wage growth as businesses are forced to pay more to attract and retain staff.

We also note that the current government intends to increase the minimum wage by 27% over the four years to 2021. Although this increase is smaller than the 33% lift in the minimum wage under the previous Labour government between 2004 and 2008, the policy still has the potential to add to labour cost pressures in the next few years. By definition, the proposed rise in the minimum wage will increase the cost of labour provided by workers filling the lowest-skill roles – the very workers who are most at risk of being made redundant by automation.

Although labour and capital (machinery and equipment) are complementary resources that are both necessary in the broad production process, there is also a degree of substitutability between the two resources. Thus if labour costs are rising faster than the cost of capital, businesses can be expected to implement more labour-saving technology, thereby mitigating the cost pressures they are under and/or increasing production in a less costly manner.

So from the perspective of both cyclical economic conditions and government policy settings, conditions are ripe for greater use of automation sooner rather than later. That being the case, the government needs to be considering how it can best partner with education organisations to manage the workforce transition before it gathers even more momentum.

⁶. Out to 2023 where forecasts are available.

A broader perspective and a more hands-on role for government

There is a growing feeling that the free market approach of the last 30 years has not always produced the outcomes society might have wanted. We anticipate a shift towards increased government intervention to regulate business behaviour and push against the threat of mounting inequality. This trend is likely to last beyond the current government's term. As part of a more hands-on approach by government, we expect greater attention to be paid to environmental and other non-financial outcomes.

Rejecting the political status quo

ANTI-ESTABLISHMENT SENTIMENT seemed to come to the world's attention with the Brexit vote in mid-2016. The desire for something different was further crystallised by the election of Donald Trump as US president later that year. Even our own prime minister, Jacinda Ardern, has unflatteringly been compared to Mr Trump. However, her rise to the nation's top job didn't have a great deal to do with a public backlash against the perceived inadequacies of the current political approach. The more compelling drivers of change were the public's appetite for a fresh face given the typical nine-year lifespan of any New Zealand government, combined with the vagaries of NZ First's decision-making processes when deciding which coalition partner to go with.

Even so, it would be foolish to ignore the change in perspective that the Labour-led government is bringing to the political agenda. The shift in policy direction talked about by the government arguably represents the biggest change in approach since 1996, when the neo-liberal programme of the previous 12 years was significantly tempered by NZ First.

The change in approach can be encapsulated by the assertion that the free market cannot be relied on to always produce outcomes that are optimal, fair, or equitable. Given that politicians over the previous 30 years have taken a laissez-faire approach of varying degrees towards the role of government in the economy, summarising the change with this assertion risks being overly simplistic. However, previously the government's role was largely limited to deciding what was an appropriate amount of income redistribution, with government intervention

in a market requiring a burden of proof that there was a clear market failure. The "hurdle" for determining a market failure seems to be lower under the current government, with an innate suspicion or cynicism that the aggregate actions of self-interested individuals or agents will lead to an optimal economic outcome for society as a whole.

Rather than this recent change in New Zealand only being a function of left-versus-right politics, we believe it represents a change in popular thinking compared with 20-30 years ago. Overly restrictive and interventionist governments prior to the mid-1980s had created conditions ripe for a swing towards more hands-off government. Yet that neoliberal approach has arguably been naïve and too idealistic when trusting the "market" outcome.

Put another way, the assumption of perfect competition that underpins much of the neoliberal orthodoxy very rarely holds true in real life. The imperfections of real-world markets are readily recognised by most economists, although there has often been less agreement about the ability of government intervention or regulation to facilitate better outcomes. However, the appetite for government to take a more hands-on role is now on the increase.

We see four key areas where a change of policy focus is coming to the fore.

- Reducing inequality between households by targeting higher levels of income or wealth redistribution towards the poor
- Taking a more interventionist role in markets, particularly where corporate behaviour is seen to be detrimental to the wellbeing of the nation more generally
- Broadening the assessment of economic prosperity, by incorporating measures other than GDP, to provide a more holistic indication of societal wellbeing
- Placing greater emphasis on environmental outcomes, which might not be adequately accounted for in the short time-horizons over which most individual and business decision-making is conducted

Revisiting what we regard as equitable

DATA PUBLISHED BY STATISTICS NZ IN 2016 showed that the top 10% of households accounted for almost 60% of the nation's wealth, while the poorest 40% of households owned about 3%. Previous data collected by Statistics NZ between 2003 and 2010 suggests that the concentration of wealth in the top percentiles has increased over the last decade.

Trends in personal incomes between the 1950s and the early 1980s show that, in New Zealand, workers' share of economy-wide earnings increased and there was a shrinking gap between the incomes of skilled and unskilled workers. These trends led to a reduction in income inequality during this period. However, capital's share of total earnings rose between 1981 and 2002, higher-skilled workers received larger pay increases on average than their lower-skilled counterparts, and social security benefits were reduced in the early 1990s. These factors all contributed to growing income inequality between the early 1980s and early 2000s.

“ New Zealand society has long been perceived as being relatively egalitarian, and suggestions that it is becoming less so are unsettling

GRAPH 5 SHOWS that, despite a rally between 2002 and 2009, labour's share of total earnings in the New Zealand economy has again been decreasing in recent years.

Graph 5

Labour's share of income gets squeezed

Compensation of employees as a % of GDP, March years



These issues are not unique to New Zealand, with Thomas Piketty's *Capital in the Twenty-First Century* pointing towards the self-reinforcing nature of wealth and income inequality in Europe and the US during the 18th and 19th centuries. The need for government intervention to work against this natural tendency of wealth to become more concentrated in the hands of the few over time was one of the key conclusions of Mr Piketty's book. It seems unlikely that the current government will go as far as introducing a wealth tax as advocated in the book, although it is an area that the Tax Working Group is considering ahead of its report back to government in February 2019.

New Zealand society has long been perceived as being relatively egalitarian, and suggestions that it is becoming less so are unsettling. The key means of maintaining equality, via the redistribution of income or wealth, is the tax and welfare system. The degree of redistribution targeted by the system is effectively a value judgment – a judgment theoretically made by voters and implemented by politicians.

Good corporate citizenship is perhaps not a given

The balance that politicians need to achieve is that the tax and welfare systems have to retain adequate incentives for undertaking work and trying to "get ahead", while seeming to be both "fair" from the individual's viewpoint and sustainable in terms of social cohesion.

Backlash against the apparent failure of the "trickle-down" theory to improve the living standards of the less well-off suggests there could be an appetite among voters for more redistributive policies to be introduced than we have seen over the last 30 years.

HAND IN HAND WITH THE QUESTION OF EQUITY are concerns about the ethical behaviour of some businesses. These worries are generally centred on the abuse of power by corporates to boost returns to their shareholders. Such tactics can include accounting practices that minimise a multinational firm's tax obligations, or exploiting imperfectly competitive markets to boost profit margins.

In one sense, greater returns to shareholders simply represent improved incomes for those people who own the companies in question – fatter profits are not merely an indication of a faceless entity bleeding households dry. But in the case of a multinational minimising its tax, its actions amount to a breaking of the implicit social contract that the company should also contribute to the society where it is earning its revenue. The exploitation of imperfectly competitive markets implies that the powerful are using resources not available to smaller businesses or individuals and exacerbating the gap between the "haves" and the "have-nots".

Furthermore, the fact that the richest 20% of households in New Zealand own 84% of all household financial assets reiterates the likelihood that any occurrences of excessive business profits will mostly be making the rich richer, at the expense of the poor.

In one sense, many New Zealanders can empathise with the plight of the less powerful. From a global perspective, New Zealand firms are often the smaller player in interactions with overseas businesses. The same often applies to New Zealand as a country on the global political stage. New Zealand's position has given rise to an implicit understanding of the importance of treating the less powerful with fairness. Where this fairness is not being shown by businesses or powerful individuals, there is an appetite for government intervention or regulation to curb the exploitative behaviour.

There is arguably an increasing understanding about how markets fall short of the "perfectly competitive" ideal and the ramifications that this outcome has for business behaviour. The inefficiencies generally associated with state provision of services suggest that a return to

Forget GDP, I just want to be happy!

more government-run "enterprises" is unlikely. However, we expect to see a trend over the next 10-20 years of increased regulation by government to correct for perceived market failures.

GDP PER CAPITA is the most widely cited measure of income or prosperity, allowing comparisons between regions, countries, and across time. The highly standardised methodology for calculating GDP and the ease of comparison it allows make it an attractive indicator in this regard. But the measure also has many limitations, meaning it must be used cautiously when assessing economic outcomes at a societal level. Critically, GDP per capita provide no indications about these economic outcomes at an individual or household level.

Over the past 10-20 years, there have been initiatives by various governments and non-government organisations internationally to try and develop more holistic measures of wellbeing. In 2009, the French president at the time, Nicolas Sarkozy, asked his country's statistical office to investigate adding measures of happiness into the nation's GDP calculations. Although this proposed departure from the norm ultimately proved too difficult to implement, other countries have also started to focus on happiness. Over the last 5-6 years, the United Nations and OECD have annually published their World Happiness Index⁷ and Better Life Index⁸ respectively, incorporating other factors such as health and life expectancy, community and social support, and governance and corruption.

Within New Zealand, The Treasury published a working paper on a living standards framework in 2011 and has adopted a vision of achieving higher living standards for New Zealanders. The Treasury's current thinking about the contributors to overall living standards is around based on a "four capitals" approach, focusing on:

- financial or physical capital – closest to the traditional measures of wealth that are currently looked at when assessing wellbeing
- natural capital – aspects of the natural environment that support life and human activity
- human capital – getting beyond the simple monetary return generated by people's work and incorporating skills, knowledge, and health
- social capital – capturing aspects such as trust in institutions, social cohesion, and culture and community.

The Treasury aims to have a full set of indicators available towards the end of 2018 ahead of a full "wellbeing" budget being prepared for the government in May 2019.

7. <http://worldhappiness.report/>

8. www.oecdbetterlifeindex.org/

One perceived shortcoming or danger with the pursuit of "happiness" is the lack of any standard definition of what should or should not be included in the measures. Flowing out of this problem is the ability of politicians or others with a vested interest to manipulate or cherry-pick the indicators to paint themselves in a better light. Although we understand these criticisms, we believe they are being overstated for two reasons.

|| there is an increasing pool of customers looking to support firms demonstrating behaviour that aligns with their own personal values

Firstly, there is no suggestion that financial wellbeing, for which GDP is at least a partial proxy, will be omitted from the broader measure of living standards. However, financial wellbeing is only one piece of a broader puzzle, and the incorporation of more indicators represents a significant step towards a more well-rounded view of prosperity. Any new measures of wellbeing are still likely to be imperfect, but less imperfect than taking GDP per capita in isolation.

Secondly, the difficulties associated with weighting up the various indicators reflect the broader value judgments and trade-offs that are at the core of economics. The OECD's Better Life Index allows the user to change the weightings across the 11 different domains. If health is seen as highly important and its weighting is increased, New Zealand's ranking improves. Conversely, if the weighting of work-life balance is lifted, New Zealand's relatively poor rating in this area drags the country's overall ranking down.

The biggest implication of this broadening in focus by policymakers is that decisions can be made in the context of a more robust and quantifiable framework. It should allow better recognition of the value of activities that don't necessarily have a clear financial pay-off, such as investment in culture and heritage. It should also mean that the trade-offs between targeting economic growth and environmental outcomes, for example, can be better understood, allowing decisions to be made on a more informed basis.

It's not just in government where changes are occurring. Businesses are increasingly recognising their social and environmental responsibilities and considering outcomes in these areas alongside their financial results. Although consumers' purchasing decisions continue to be mostly driven by price, there is an increasing pool of customers looking to support firms demonstrating behaviour that aligns with their own personal values.

Taking real notice of environmental outcomes

ALTHOUGH ENVIRONMENTAL OUTCOMES are captured within the natural capital section of Treasury's Living Standards Framework, we believe that the increasing recognition of the environmental side-effects of economic activity warrants its own separate coverage.

At its most simple, human consumption has effects on the natural environment via the depletion of natural resources and the polluting effects of by-products and waste created during the production, transport, and consumption process. Higher consumption levels use greater volumes of resources and create more waste and pollution. Some of the responses to these effects are as follows.

- The depletion of resources can be mitigated or addressed by using supplies from renewable or sustainable sources.
- The environmental costs associated with by-products are being better regulated than in the past, although there are clear examples where further progress can still be made.
- Households could be forced to face the costs of the long-term environmental damage associated with their consumption decisions.

In an economic environment that has been almost solely focused on increasing standards of living via more production, spending, and consumption, it is difficult to achieve a change in mindset. International air travel is cheaper than ever, but would that still be the case if people were forced to fully take account of the effects of the associated carbon emissions? The growth of cheap imports from China and other parts of Asia over the last 30 years has boosted the spending power of the average New Zealander, but how much attention is paid to the long-term effects of the amount of waste generated by an ever-more disposable society? If the full costs of disposing of a product (and any packaging associated with it) at the end of its useful life were incorporated in the price, how would it change our consumption habits?

Within New Zealand, the most obvious change of attitude in recent times has been around water quality. The previous National government faced increasing criticism for its perceived lack of action about the deterioration in water quality in rivers and streams, with the government's targeted improvements slated as being too weak, and the associated standards overly vague. The side-effects of increasingly

intensive farming practices or the downstream effects of water being drawn off for irrigation have led to greater popular demand for stricter monitoring of water usage and water quality, with potential for the areas to become more heavily regulated. This change in attitude implies a desire from New Zealanders for the country to hold onto its "clean, green" image, suggesting that economic growth is not seen as a goal to be pursued at any cost.

|| a desire from New Zealanders for the country to hold onto its "clean, green" image, suggesting that economic growth is not seen as a goal to be pursued at any cost

Another change has occurred with the phasing out of plastic bags by supermarkets. The decision to remove the bags completely is essentially an acknowledgment that the long-term environmental costs of the bags far outweigh any price that the retailers could realistically place on them. It is possible that the change, which looks like a relatively small one at face value, could be the start of a less tolerant approach to the use of plastic packaging more generally.

In noting the increasing importance being placed on environmental outcomes, we recognise that, from the perspective of both individuals and businesses, these outcomes are typically given the most weight during periods of strong economic conditions. Last decade, for example, there was an increasing desire from businesses to be located in more environmentally friendly "green" buildings. However, when the Global Financial Crisis hit, firms became more concerned about their immediate cashflow, profitability, and survival, rather than whether their building was more energy efficient than their neighbour's building.

Nevertheless, these cyclical variations around the appetite for more environmentally friendly choices should not distract from what, we believe, is a definite trend towards greater incorporation of environmental outcomes in consumer, business, and policy decisions. We expect a longer-term perspective to come to the fore in decision-making, representing a pushback against the highly disposable nature of today's society, and rejecting the elevation of short-term cashflow over longer-term returns.

Key actions

Exporters should continue to pursue opportunities in the Chinese market, but should also be aware of the potential for other growth areas such as India to emerge.

Significant retraining and upskilling of people will be needed as more jobs are automated, with particular attention given to lower-skilled workers, whose jobs are most at risk.

The likelihood that fewer new jobs will be created in provincial areas will require careful management from government to maintain the economic viability of these regions over the medium-term.

Businesses will need to demonstrate a commitment to positive non-financial outcomes or risk facing greater levels of government regulation or intervention.

The background is a solid teal color. On the left side, there is a vertical bar composed of two stacked rectangles: a taller, lighter orange rectangle on top and a shorter, darker orange rectangle below it. Below these, there is a horizontal row of four rectangles: a dark blue rectangle on the far left, a brown rectangle, a green rectangle, and another dark blue rectangle on the far right. Below the green rectangle in this row, there is another green rectangle. At the bottom center, there is a small green square.

Demographic trends and their challenges

Demographic trends and their challenges

Employers and education institutions will need to adapt to changes in the make-up of the population over the next 25 years. This section looks at three demographic trends that are already underway, but will become even more pronounced in coming years.

1. The increasingly multicultural workforce, including significant growth in the Asian, Māori, and Pasifika populations
2. The aging population, and the continuing need to better integrate older people into the workforce
3. The concentration of population and economic activity in the upper North Island

Key implications

- Industries and occupations with relatively low levels of non-European employment will need to develop strategies to attract these workers.
- Older people are an increasingly large and willing component of the labour market, and training is important to make the most of their contribution to the workforce.
- Auckland, Hamilton, and Tauranga will dominate growth in business activity and could heavily influence government policy.

Key actions

Skills and occupation outcomes for Māori and Pasifika need to be improved, with more focus from the government and tertiary education organisations on strategies to achieve this goal.

Some occupationals will need to work hard to attract more Asian workers and tap into this fast-growing subsection of the labour force.

There is scope for more retraining and upskilling opportunities aimed at older people, helping them to maximise their contribution to, and stay integrated in, the workforce.

Businesses must be aware of the growth opportunities offered by the expanding population in the upper North Island and plan their investment accordingly.

Government investment in communications and transport infrastructure has a significant role to play in the medium-term viability of other parts of the country.

Towards a more multicultural workforce

The labour force is becoming more globalised, with increased international migration flows a reflection of the wider and more diverse pool of workers available to businesses. The more multicultural workforce presents opportunities for growth, but also several challenges. Current occupational preferences mean that some industries are struggling to tap into the rapidly growing group of Asian workers. The underrepresentation of Māori and Pasifika in more highly skilled and high-paying jobs also risks exacerbating the socioeconomic divide that already exists in New Zealand.

Increased migration flows reflect globalisation

THE LABOUR FORCE HAS BECOME increasingly globalised as economies around the world have become more interconnected. Easier international travel and falling travel costs have significantly enhanced the ability of people to move to, and work in, other countries. After adjusting for overall consumer price inflation, the real New Zealand dollar price of international air travel has declined by 60% over the last 30 years (see Graph 6).

Graph 6

The ever-decreasing relative cost of air travel

Real international air travel prices (NZ\$), annual avg, yr to Jun 17 = 1,000



In developing countries, the decline in the relative cost of air travel is likely to have been even greater, as incomes have risen rapidly in line with economic growth. Increased access to cheaper air travel has

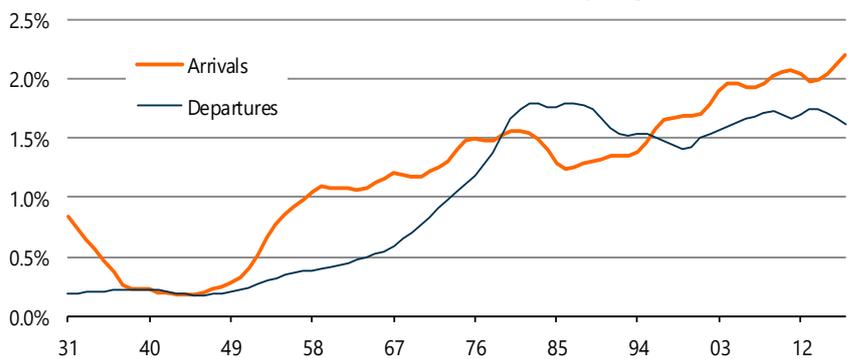
enabled people with greater wealth, incomes, or skills in developing countries to migrate to countries with better lifestyles or higher standards of living.

Graph 7 shows that, since the 1940s, there has been a steady upward trend in immigrant numbers coming to New Zealand as a proportion of the overall population. In this regard, the recent migration boom simply appears to be an extension of a much longer-term trend.

Graph 7

Migration's upward trend

International arrivals and departures as a % of population, 10-yr avgs



Of course, migration is not a one-way street. There is also a long-term upward trend in departure numbers, although this trend is less obvious due to the massive outflows that occurred during the 1970s and 1980s due to the poor performance of the New Zealand economy.

Up until the 1980s, immigration policy largely favoured European migrants and therefore preserved a large degree of homogeneity in New Zealand's population. Immigration policy changed in the late 1980s and became more skills-focused, and with international migration flows continuing to increase, the acceptance of more immigrants from a wider range of countries has led to a more multicultural workforce.

Our interconnectedness with Asia

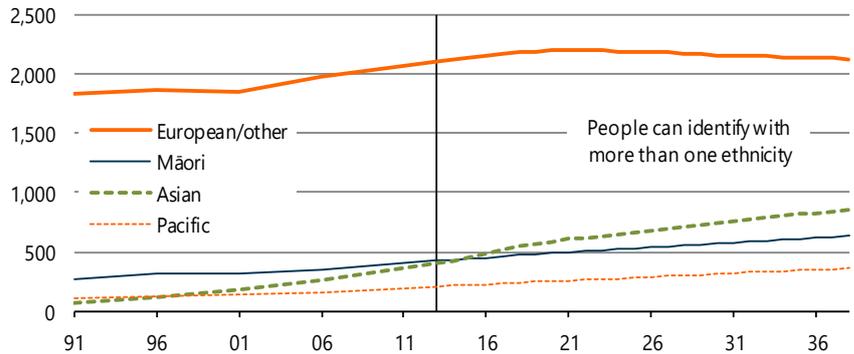
GRAPH 8 SHOWS THE EVOLUTION of New Zealand's population⁹ by ethnicity between 1991 and 2013, along with Statistics NZ's projections out to 2038. Recent high immigration levels have accelerated the growth in the Asian population, which is now estimated to be 142% larger than it was back in 2001. By 2038, Statistics NZ estimates that the number of people identifying as being of Asian ethnicity will have climbed to 860,100, compared with 172,100 in 2001 (a 400% increase).

9. All statistics in this section refer to people aged between 15 and 64 years.

Graph 8

Europeans' diminishing dominance

NZ's population by ethnicity, people aged 15-64



Broader demographic trends suggest that labour is likely to remain in relatively short supply over the medium to longer term. Consequently, growth in the Asian ethnic population potentially creates challenges for industries and occupations that don't have a large uptake of Asian workers.

The reasons for people's career choices can be complex and varied, but the lack of occupational role models or people with a similar cultural background to associate with at work can be an impediment. Of the 100 largest occupations in New Zealand, parts of the agricultural sector stand out as being areas where people of Asian ethnicity are underrepresented – as is the case for most non-European ethnicities when it comes to parts of agriculture. Other occupations that face a challenge to attract Asian workers include builders, plumbers, teachers, and police officers.

Table 2 in the Appendix shows the occupations out of the 100 largest in New Zealand for which Asian workers are most overrepresented and underrepresented. Table 3 and Table 4, also in the Appendix, contain similar figures for Māori and Pasifika workers.

Reversing the marginalisation of Māori and Pasifika

BOTH THE MĀORI AND PASIFIKA labour forces have grown considerably over the last 20 years. Since 1996, the Māori population has grown by 50%, while the number of Pasifika has more than doubled.

Although growth in the Asian population is largely a function of immigration, larger family sizes are a key contributor to the projected increase in the number of Māori and Pasifika of working age. Immigration is also a factor behind growth in the Pasifika workforce.

Between now and 2038, the number of Māori aged 15-64 will increase by 36% (about 167,000 people). The number of Pasifika in the same age bracket will rise by more than 50% (over 123,000 people).

As with people of Asian ethnicity, there are some occupations in which Māori and Pasifika are underrepresented. Outside parts of agriculture, these occupations include real estate agents and property managers, areas of computer programming, and accountancy.

At first glance, the systemic marginalisation of Māori and Pasifika from some of these occupations might not appear to be a problem if labour supply requirements are being met by growth in other ethnicities such as the Asian population. However, where this phenomenon results in Māori and Pasifika being pigeonholed into lower-skilled occupations such as meat process workers, forklift drivers, and container fillers (occupations in which Māori and Pasifika are overrepresented), it presents socioeconomic problems, with ethnic inequalities being perpetuated and exacerbated.

“Continued tightness in the labour market over the longer-term will lead to increased pressure on educators and employers to assist the growing Māori and Pasifika populations to fully realise their potential

Continued tightness in the labour market over the longer-term will lead to increased pressure on educators and employers to assist the growing Māori and Pasifika populations to fully realise their potential. The concentration of Māori and Pasifika people in lower-skilled jobs also means these workers are more at risk of their roles being lost to automation over the next two decades (see the earlier section entitled **The automation revolution**). In this context, the need for strategies and programmes to achieve better workforce outcomes for Māori and Pasifika is now more critical than ever.

Making the most of the aging population

There is a growing appetite from people aged over 65 to continue working, with most of these people choosing to do so for social and lifestyle reasons. The tight labour market has encouraged businesses to make more use of this pool of labour. With the number of older workers growing substantially over the next 25 years, we see the need for an increasing emphasis on maintaining the skill base of these people. This training will help alleviate future skill shortages in the tight labour market and alleviate the fiscal pressures associated with the aging population. A focus on retraining will also help expand the options of people in more physically demanding roles, which cannot easily be continued by workers into their 60s and beyond.

The size of the over-65 workforce

ONE OF THE SIDE-EFFECTS of the migration boom during the last few years is that the median age of New Zealand's population has edged downwards since mid-2013 (see Graph 9). This decline, from 37.6 years to 36.9 years by the end of 2017, contrasts with the long-term upward trend that has been in place since 1970, when the median age was 25.6 years. Nevertheless, Statistics NZ's projections expect the upward trend to resume by 2020, with the median age climbing to over 40 years by 2032 and 43 years by 2043.

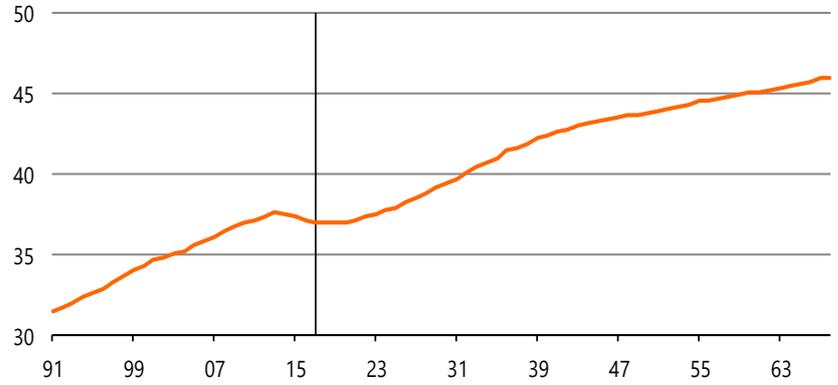
The aging population is perhaps best encapsulated by the number of people who are 65 or over. Between 1999 and 2042, the number of people in this age bracket will have trebled (see Graph 10). Put another way, the proportion of the total population aged 65 or over has lifted from 11.7% to 15.2% since the turn of the millennium, and will climb to over 23% by 2042 (see Graph 11).

Many of the issues posed by the aging population are well known and have been well canvassed. For example, increased healthcare and superannuation demands could see government expenditure on these fiscal categories expand from 11.0% of GDP in 2015 to 15.5% of GDP by 2045. An increase in the eligibility age for NZ Superannuation would only go some way towards mitigating these increased fiscal costs.

Graph 9

We're all getting older

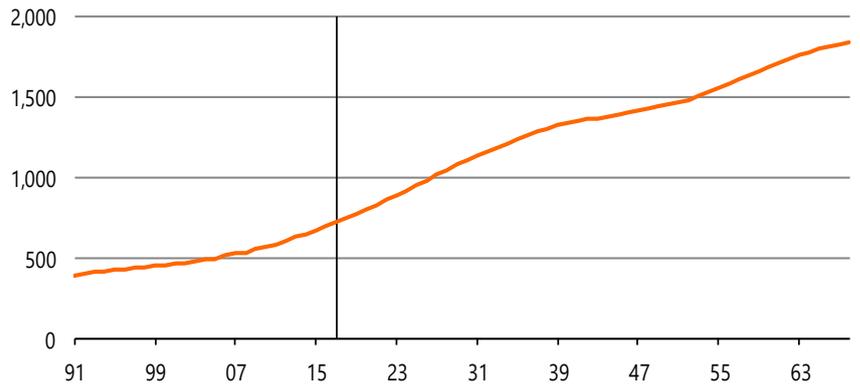
Median age of NZ's population, June years



Graph 10

The growing pool of over-65s

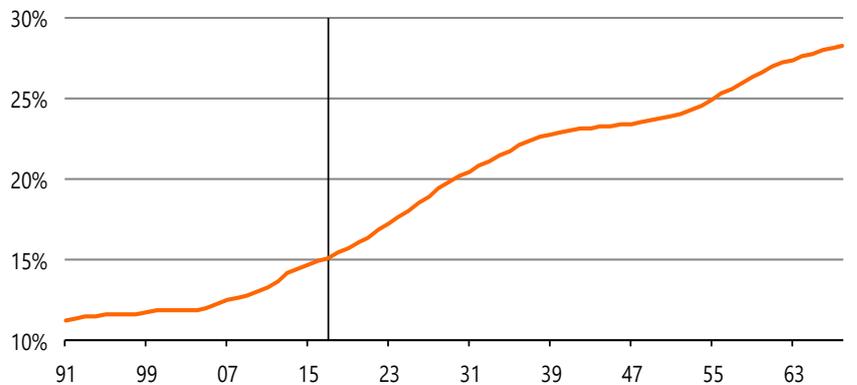
People in NZ aged 65 or over, 000s, June years



Graph 11

Too big a resource not to be utilised

% of NZ's population aged 65 or over, June years



Continuing to work, even in “retirement”

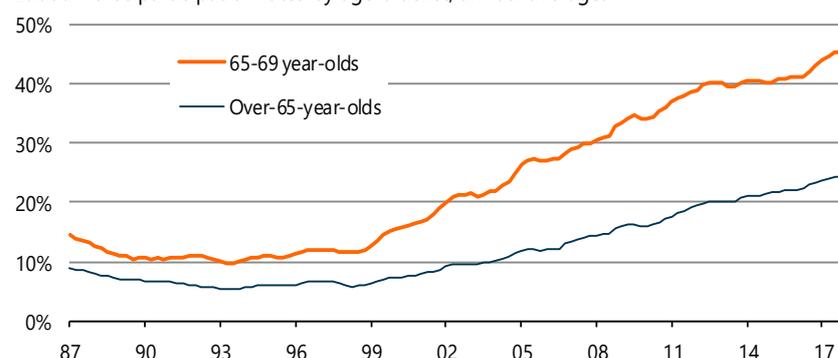
PUTTING ASIDE the Beehive's lack of action regarding the legislated retirement age, a recent BNZ Financial Futures survey showed that 46% of New Zealanders want to keep working past 65. Almost one-third of those respondents aged over 65 who are still working stated they are doing so for financial reasons. This result implies that nearly 70% of those still working past 65 have chosen to do so for the sense of value and satisfaction, the ability to use their skills and talents, and for social contact.

Since the age of eligibility for NZ Superannuation was set at 65 in 2001, the labour force participation rate of over-65-year-olds has lifted from 7.9% to 24%. Graph 12 shows that the participation rate for people aged 65-69 has increased from 17% to 45% over the same period. These figures equate to over 168,000 people aged over 65 who are still currently in employment.

Graph 12

Who said I should be retired?

Labour force participation rates by age bracket, annual averages



The growing role of older people in the workplace, and the fact that much of this worker involvement is by choice, suggests that many employers have successfully found ways to incorporate the experience and skills that these people can bring to an organisation. Better utilisation of this group of workers partly reflects a tight labour market – the unemployment rate has not been higher than 6.7% during the last 18 years. As a result, firms have been forced to make the most of every worker available. In some cases, this change has required a culture shift in the workplace to:

- recognise the skills and experience that older people can bring to an organisation
- provide more flexibility around working arrangements, given that many older people only want to work part time
- ensure that appropriate assistance and training is provided, given technological advancements and rapidly changing workplaces.

Making allowances for more physically demanding roles

THE CULTURAL SHIFT outlined in the bullet points above is an issue that can be addressed over time in workplaces relatively easily. A more critical problem relates to the ability of older people to continue working in more physical occupational roles. Even with the retirement age nominally set at 65, there is a substantial proportion of workers who find it difficult to continue working until they are eligible for NZ Superannuation. Working beyond age 65, whether by choice or due to financial need, is not a realistic consideration for some people.

At times when the possibility of raising the retirement age has been debated, there have been suggestions of having two different eligibility ages for NZ Superannuation based on the physicality of a person's work. A slightly less prescriptive approach by government would be to have different superannuation rates payable to people depending on whether they chose to draw down their super from age 65 or 67.

A higher weekly rate for the later drawdown would provide a financial incentive for people to keep working longer, which has positive spin-offs in terms of tax revenue and overall wealth leading into retirement. However, such a policy could also exacerbate inequality between lower-paid manual workers, who on average might be expected to retire earlier due to physical and health considerations, and higher-paid office workers who could comfortably work until age 67 or beyond.

Changes in the nature of New Zealand's economic activity and the ongoing evolution towards a more service-based economy suggest that the share of the workforce in manual jobs will continue to shrink over time. Nevertheless, society has a duty of care to ensure that people in more physically demanding occupations have a genuine and viable choice about working past 65.

In some industries, such as construction, the transition away from physical work often occurs as onsite workers move into supervisory or management and ownership roles. But not all occupations lend themselves to this sort of progression. We believe that clear pathways for retraining need to be created for manual workers in their 50s to enable them to continue working in less physically demanding roles.

Naturally, the focus of most training programmes tends to be on getting young people established in the workforce and upskilling to enable their career advancement. But a partnership between government, training organisations and institutions, and employers to target older workers needing to retrain would effectively expand the supply of usable labour. The payoffs are multifaceted, and include a greater availability of workers for businesses, greater social inclusion for older workers, and potential reductions in superannuation and healthcare costs for government.

The lure of the “Golden Triangle”

The upper North Island is commanding an increasingly dominant role in terms of New Zealand's population, economic activity, and fiscal and voting base. This growth presents massive opportunities for businesses, albeit with challenges in areas such as housing affordability and infrastructure. The dominance of the upper North Island also creates challenges for the economic resilience of other parts of the country, as businesses will find it easier to tap into the high-growth areas rather than seeking opportunities in the more stagnant regions. Government attention could also be captured by the voting majority in the north of the country, even if the government's Provincial Growth Fund currently contradicts that prospect.

No end in sight to the upper North Island's domination

DATA FROM THE 2018 CENSUS is likely to show that, for the first time, the combined population of the Auckland, Waikato, and Bay of Plenty regions represents more than half of New Zealand's total population.

The increasing concentration of the country's population in the top half of the North Island is nothing new. One has to go back to the 1926-36 census period to find the last time that the combined population of the Auckland, Hamilton, and Tauranga urban areas¹⁰ (the “Golden Triangle”) grew more slowly than the nationwide average (see Graph 13). Even then, the gap was tiny.

We see several broad drivers that have underpinned the growth of the largest metropolitan centres in the upper North Island.

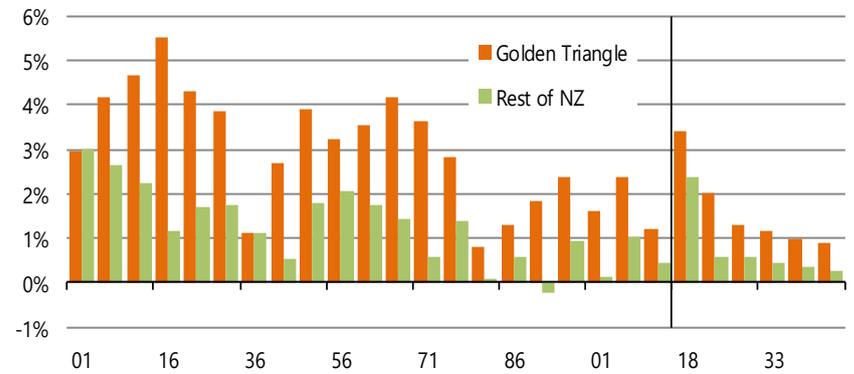
- **Increasing urbanisation** has seen the proportion of New Zealand's population living in rural areas dip from 27% to 14% since 1951 (see Graph 14). During that period, New Zealand's rural population has grown by just 11%, while the urban population has increased by 160%.
- **Economic agglomeration**, facilitated by improved transportation and communication, has encouraged greater centralisation

¹⁰ We have used urban areas for this long-term calculation due to changes in local council boundaries making it difficult to undertake broader regional comparisons.

Graph 13

Consistently faster population growth

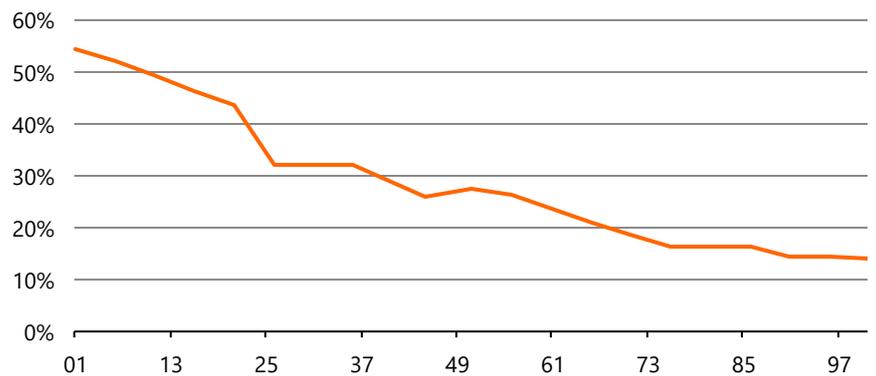
Average annual % changes between censuses



Graph 14

Not many of us live rurally any more

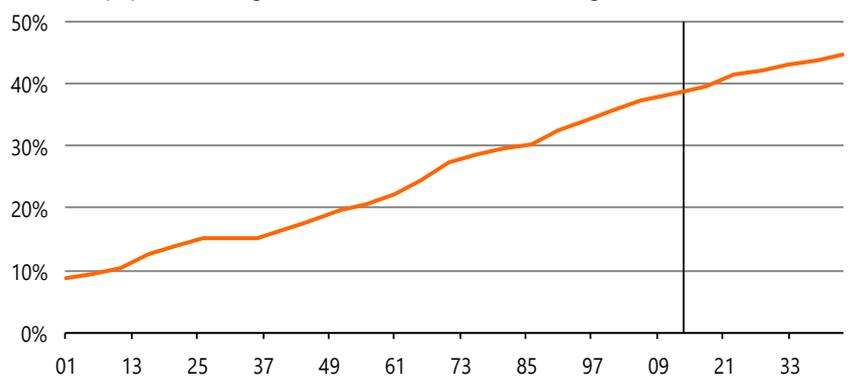
% of NZ's population living in rural areas



Graph 15

Concentrated in the upper North Island

% of NZ's population living in Auckland, Hamilton, and Tauranga



of business activity. Auckland has been the location of choice for head offices in New Zealand, which has naturally encouraged growth in complementary businesses nearby.

- **Demographic factors** such as higher birth rates and lower mortality rates favour stronger population growth in the North Island. The majority of immigrants also choose to settle, at least initially, in the North Island (particularly Auckland).
- **More temperate climatic conditions** in the north are also likely to encourage the northward drift of New Zealand's population.

Statistics NZ's projections show that the combined population of Auckland, Hamilton, and Tauranga is expected to lift from 40% to 45% of the country's population by 2043 (see Graph 15). Put another way, the number of people in these three urban centres is expected to grow by 1.3%pa between 2018 and 2043, compared with population growth of just 0.4%pa across the rest of the country.

The benefits and challenges of such concentrated growth

THE CONCENTRATION OF POPULATION GROWTH and, by extension, economic growth in this relatively limited part of the country can be both a curse and a blessing. The side-effects of Auckland's rapid population growth over the last few years have included highly stretched infrastructure and a significant deterioration in housing affordability.

Yet the benefits for a business of being where people want to live and work are obvious. An outlook of continuing growth provides a degree of surety for business investment decisions. Businesses can plan in the knowledge that their customer base and, by extension, demand for their products and services will keep expanding. Firms are likely to be able to tap into labour resources relatively easily given the growing population. And the infrastructure requirements and networks associated with a large or growing population will also provide good access for businesses to their inputs.

Expenditure on expanding and upgrading an area's infrastructure is a key facilitator of population and economic growth. For example, the long-running construction of the Waikato Expressway, which is due to be completed in 2020, has significantly enhanced the connectivity between Hamilton and Auckland. Business numbers in Hamilton have grown as firms have been able to reduce overheads by locating in Waikato, while still enjoying a good supply of workers and maintaining relatively good access to the large and growing Auckland market. In this environment, Hamilton has become an increasingly attractive, yet relatively affordable, alternative to living in Auckland.

Other key areas of infrastructure investment that have contributed to the growth of Hamilton and Tauranga include major roading projects in and around both cities, as well as ongoing expansion at the Port of Tauranga. Furthermore, the current government is looking to enhance connectivity between the three cities by potentially re-establishing rail commuter services and/or investing in additional rail infrastructure.

From the point of view of central and local government, the biggest challenge lies around the timely provision of adequate infrastructure given the concentration of growth in the area. New Zealand has a poor track record in terms of future-proofing its infrastructure, often constructing facilities after demand pressures have become almost unmanageable, and leaving little capacity to cope with much growth beyond current demand levels. Current congestion in Auckland is a prime example of a roading and public transport system that has had insufficient capacity to cope with the unexpectedly strong population growth of the last few years. Similar capacity pressures are likely to be present in stormwater and wastewater systems, particularly as housing intensification takes place, even if those pressures are less visible on a day-to-day basis.

What about the rest of the country?

THE STRENGTH OF GROWTH in the "Golden Triangle" area potentially creates questions of fiscal equity between the upper North Island and the rest of the country. There are already occasions when Auckland is perceived by some people to be getting a disproportionate share of central government capital expenditure. The ongoing concentration of spending in the upper North Island has the potential to create political discontent in other parts of the country, even if this focus by the government is justified and is not out of step with the broad regional make-up of its tax revenue.

Indeed, the current government's focus on regional economic assistance, via the Provincial Growth Fund, arguably represents a disproportionately greater focus on shoring up regional economies. The government needs to be careful to find the balance between the maintenance of services in provincial areas, to ensure smaller towns remain economically viable, and appropriately catering for population and economic growth in faster-growing regions.

For businesses and other non-government organisations outside the upper North Island, the challenge is to remain profitable or viable in the face of a steady population and static demand conditions. The communications advancements in the past that have driven greater centralisation of business activity threaten to continue to undermine the viability of businesses in more outlying areas.

Online purchasing means that consumers and other businesses in provincial areas have access to a wider range of goods and services, often at significantly better prices, than local firms can provide. In smaller provincial towns and more outlying areas, these market dynamics threaten to hollow out retail and other services that contribute to a community's broader economic infrastructure. A resultant lack of employment opportunities would potentially add momentum to the population's drift towards the larger urban centres where growth is occurring, reinforcing the conditions that are already contributing to the economic struggles in the provinces.

Key actions

Skills and occupation outcomes for Māori and Pasifika need to be improved, with more focus from the government and tertiary education organisations on strategies to achieve this goal.

Some occupationals will need to work hard to attract more Asian workers and tap into this fast-growing subsection of the labour force.

There is scope for more retraining and upskilling opportunities aimed at older people, helping them to maximise their contribution to, and stay integrated in, the workforce.

Businesses must be aware of the growth opportunities offered by the expanding population in the upper North Island and plan their investment accordingly.

Government investment in communications and transport infrastructure has a significant role to play in the medium-term viability of other parts of the country.



The changing nature of education and training



A decorative graphic consisting of several colored blocks. At the top left is a solid orange square. Below it, a horizontal bar is divided into three segments: orange, olive green, and dark blue. From the bottom of the olive green segment, a vertical bar extends downwards, divided into three segments: olive green, light green, and a darker olive green. To the right of the horizontal bar, a dark blue square is partially visible.

The changing nature of education and training

The previous sections have contained several areas where the role of training has been highlighted as a key for managing the trends that are underway. In light of these findings, this section examines ways the education sector can adapt to better meet the needs of employers and workers.

1. The shift towards education and training becoming more online-based
2. The breakdown of qualifications into smaller chunks and how this fits with a model of lifelong learning
3. The opportunity for more collaboration across New Zealand's tertiary education sector

Key implications

- Online-based learning provides tertiary organisations with the opportunity to become more flexible and innovative.
- Employers and workers are increasingly demanding skills-based training that is more relevant to the workplace.
- More collaboration between tertiary institutions could help make the sector more robust and improve the quality of outcomes for students.

Key actions

Tertiary organisations need to adapt their teaching models and cost structures to compete with new education offerings and better meet the needs of employers and workers.

Providers need to place more emphasis on the role of education throughout people's working life by providers, especially considering technological change and the rapidly evolving workplace.

The traditional framework of larger qualifications needs to be broken down into smaller skills-based courses to help training become more relevant to the workplace.

The government should provide greater strategic oversight of skills and training in New Zealand via a national skills strategy.

Education institutions and training organisations should be encouraged to focus on their core areas of expertise, with greater specialisation enabling more collaboration and potentially resulting in higher-quality outcomes.

Taking education online

The internet has revolutionised much of the economy and the education sector is no exception. Improved access to information and increasing access to education across national borders is forcing innovation, particularly in tertiary education. We expect to see pressure for lower cost structures, as well as a greater need for institutions to focus on their strengths.

Distance learning and the emergence of MOOCs

BACK IN THE DAY, options for "distance" learning in New Zealand were very limited. The needs of primary and secondary students were covered by Te Aho o Te Kura Pounamu (formerly The Correspondence School), while The Open Polytechnic and Massey University provided tertiary courses. However, the advent of the internet and the accompanying information revolution are changing the way education is delivered.

One of the more radical innovations has been massive open online courses (MOOCs). These courses generally aim to have open access and unlimited participation via the internet. Therefore, at first glance, MOOCs have a similar relationship to traditional education vehicles as Wikipedia had to the now-defunct multi-volume encyclopaedias.

However, in the MOOC space, it is not clear how the rise of free online learning can be sustained. In some cases, such as edX or Peer 2 Peer University, the provision of courses is done on a non-profit basis, so commercial viability is less of a priority. Nevertheless, while edX still provides access to its courses for free, students must now pay to be issued with their qualification certificate upon completion of the course.

In other words, there is generally a trade-off between the cost of a course faced by the student and the quality or usefulness of the qualification received by the student. For example, an edX course is likely to be of a reasonably good quality, but not obtaining the certificate will limit the student's ability to put the course on their CV and use it to enhance their employment prospects. Other free alternative courses run the risk of being less well-regarded or recognised by potential employers.

The balance between improving accessibility to information and education and maintaining a viable business model is a particularly interesting one in the context of New Zealand's tertiary education sector. Changes in the delivery of information and the way students interact with educators are resulting in pressure for reductions in tutor numbers, for example. Initiatives by the New Zealand Qualifications Authority (NZQA) suggest that it supports a gradual transition towards more online-based learning, and several polytechnics and industry training organisations are acting to broaden their online presence.

Growth in the accessibility of overseas-based qualifications is, to some extent, a competitive threat to existing tertiary education institutions within New Zealand. However, at this stage, qualifications offered by MOOCs, for example, are not recognised or mapped to the New Zealand Qualifications Framework (NZQF) by NZQA. This situation can largely be explained by NZQA's mandate to uphold the credibility and robustness of New Zealand's qualification system. Nevertheless, we note that the competitive limitations implied by the current regulatory set-up are unlikely to last indefinitely. Udacity, a US-based MOOC, has been involved in a pilot project for NZQA over the last year around micro-credentialisation.

Embracing innovation in tertiary education and training

THE TREND TOWARDS more online-based learning and increasing access to education across national borders will continue to affect education provision throughout the next 20 years, particularly in the tertiary space. Even if MOOCs remain as a relatively unconventional education alternative, they encompass a range of innovations that are likely to be increasingly incorporated in more traditional tertiary institutions.

- Learning is likely to become less classroom or lecture-based. Many of the more successful MOOC providers have moved away from the simple replication of lecture-style presentations to make better use of the multimedia opportunities that online learning offers.
- Online learning provides greater scope for combining theoretical learning with practical on-the-job training. This outcome is particularly relevant for trades-based qualifications, providing trainees and apprentices with more flexible access to information that can arguably be better aligned with the practical work they are doing.
- MOOCs have also provided students with increased flexibility about the content and courses that they choose to study. We have delved further into the demand from employers for more skills-based qualifications that better fit the needs of the modern working environment in a later section entitled: Micro-credentialisation: bite-sized, more useful education.

- Requirements around teaching and tutoring resources could be significantly reduced by the move of more resources and communication online. For example, the traditional university demarcation between lectures and tutorials could become more blurred, with fewer teaching resources devoted to the mass delivery of information, enabling lecturers to devote more time to the specific needs of individuals. In addition, the facility for greater student communication and collaboration potentially reduces some of these tutoring needs and individual demands on teaching staff.

The opportunities for change offered by online learning

THIS FINAL POINT is particularly important with regards to the cost of education. By making tertiary education less labour-intensive, the reduced cost potentially opens up training opportunities for a higher proportion of the population. As a result, the overall skill base of New Zealand's workforce is likely to be boosted - an important outcome given that there will be significant automation of lower-skilled jobs throughout the next 20 years. Any changes that make it easier for lower-skilled people to remain integrated in the evolving workforce need to be embraced.

We note that the increased access to courses from education providers, independent of a student's location, implies a potential increase in competitive pressures for tertiary institutions, even just within New Zealand. We believe this growth in competition will lead to greater specialisation, encouraging providers to focus on the areas of study in which they have a competitive advantage. We cover this issue in more detail in a later section entitled: Making the tertiary education sector more robust.

Any moves by tertiary education providers towards a more on-line-based platform have the potential to shore up international student numbers and revenue streams. This outcome is currently highly relevant given the government's proposed policy changes around international student visas and international migration flows into New Zealand.

The fact that the NZQF is well regarded internationally means that an accessible option for students based overseas could mitigate the effects of tighter immigration rules. However, it is unclear how much appetite there might be for New Zealand-based qualifications for foreign students who were not then able to come and use those qualifications in the New Zealand or Australian workforce.

Micro-credentialisation: bite-sized, more useful education?

Taking an approach to training and education that is more focused on skills and structured around smaller courses is necessary given the rapidly evolving workplace. The need for upskilling and retraining throughout people's working lives will be further emphasised by increasing automation over the next 20 years. Micro-credentialisation could be a key feature for education to enhance its relevance to the workplace and improve the flexibility of the sector in New Zealand.

Keeping learning throughout one's working life

TODAY'S WORKING ENVIRONMENT and career paths are very different to what they were two or three generations ago when people were often in a job for life. Instead, research shows that people now typically hold 10-15 jobs throughout their working life. Furthermore, many people will change career at least once during their lifetime, even if the often-cited estimates of 5-7 career changes seem rather overblown.

Continued changes in the workplace and the associated skills required by employers emphasise workers' need to access training. It is likely that the technological changes that have become increasingly rapid over the last 60 years, and their effects on the workplace, will pale into comparison beside the revolution of the next 20 years (see the earlier section entitled **The automation revolution**). The emergence of widespread automation means that many occupations in existence today are unlikely to be around by 2040 - we estimate that 31% of jobs in New Zealand are at high risk of automation. In this environment, the abilities of people to upskill or retrain and remain relevant to the evolving labour market are paramount.

In general, options for upskilling have often been configured around the needs of the education organisation and a rigid qualifications structure. We see three negative effects arising from this approach to training.

- Learners have often been **restricted in their study choices** and have been required to take some papers or courses that are of little relevance to their expected occupational roles.

- **Tertiary education options often lack the flexibility required** to meet the needs of people who are looking to retrain or gain specific skills to boost their competency in their current role.
- Employers have found that many **students or trainees are not particularly "work ready"** because of an educational focus on knowledge and broad transferable skills, rather than specific skills that can be utilised in the workplace.

Indeed, the transition from tertiary education to the workplace is probably one of the most poorly managed parts of New Zealand's education system. Programmes have been set up to ease the transition for students between primary and secondary school, as well as between secondary school and tertiary study. Yet there remains something of a disconnect between tertiary education institutions and the needs of employers.

The gap between formal qualifications and employers' requirements is arguably at its widest with regards to universities. Universities have traditionally been quite prescriptive in terms of their course options and, often, less cognisant of workplace needs. However, the university sector has made small moves to try and address this problem in recent years.

Making education outcomes more relevant to the workplace

IN THIS CONTEXT, there is increasing demand from employers for courses and qualifications made up of smaller "bite-size" pieces built around the skills that are required of staff in the workplace. NZQA has been working with three providers in a pilot scheme over the last year to better understand the role that this approach to training, known as micro-credentialisation, could play in the education system in the future.

From the perspective of both the employer and employee, the introduction of micro-credentialisation has potential benefits and disadvantages. The likely benefits include addressing the shortfalls outlined above.

- People entering the workforce could be expected to have skills that better enable them to use the knowledge acquired throughout their education. Training that is targeted more closely at assisting people's transition into the workforce would improve the immediate productivity of new workers, with higher output boosting the business' profitability as well as the worker's own near-term earning potential.
- People would have better access to training relevant to their changing needs as the workplace, and their role within it, evolves.

Businesses would be able to address skill deficiencies in particular areas, knowing that smaller, bite-size parts of qualifications were specifically tailored with the working environment in mind.

- A strong education focus in micro-credentials would potentially provide employees with skills that are more transferable between workplaces. This outcome contrasts with on-the-job training that can often be highly employer-specific.

Nevertheless, the benefit outlined in the final bullet point is not guaranteed. One of the criticisms of micro-credentialisation is that the small and potentially disparate pieces of learning that people will do could leave them struggling to apply their new skills in a different context. Care needs to be taken in designing micro-credentials so that there is an appropriate balance between teaching the skills needed to undertake particular tasks in the workplace and providing the broader concepts that feed into those process-specific skills.

To move down the micro-credentialisation route, the biggest challenge to be overcome is the potential for the structure of qualifications to become highly piecemeal, leading to a dilution of the strength of information that qualifications provide to employers. Although current programmes have their shortcomings, employers have a clear understanding of the requirements associated with various qualifications such as degrees, diplomas, and apprenticeships. In contrast, it could be significantly harder for an employer to assess the appropriateness of a job applicant with a CV containing a disparate collection of micro-credentials.

Helping make NZ's tertiary education sector more nimble

IN OUR VIEW, though, the potential benefits of micro-credentialisation, and its contribution towards enhancing the skills and productivity of workers, far outweigh any concerns that employees' educational achievements might get "lost in translation". Furthermore, greater adoption of micro-credentialisation fits in neatly with the other key educational trends we have identified in this report.

- Udacity is a MOOC operated out of the US and is one of the partner organisations in NZQA's micro-credentialisation pilot programme. As part of a trend towards more online-based learning (see the earlier section entitled **Taking education online**), the MOOC model neatly lends itself to independent mini-qualifications that might be customisable as part of a larger qualifications framework.
- The current tertiary education funding model in New Zealand is based around larger bundled qualifications, which can often

force education and training institutions to offer overlapping courses and compete for students. As covered in the following section entitled: **Making the tertiary education sector more robust**, we believe greater collaboration is needed across the tertiary education sector in New Zealand, and moves away from the current bundling of qualifications would help this change to occur.

Making the tertiary education sector more robust

Continuing with a competitive volume-based model in the tertiary training sector appears to be unsustainable. Some attention is now being paid to employment outcomes for graduates, but greater focus needs to be given to skills and labour market outcomes in the context of the rapid technological changes that are already underway. A more strategically planned collaborative approach across the education sector could help improve the pay-offs for students and businesses from investing in training. Collaboration could also make the education sector more resilient during periods when its operating environment becomes more challenging.

Facing up to a more challenging operating environment

IN OTHER SECTIONS of this report, we have touched on some of the key challenges faced by New Zealand's tertiary education sector in coming years. In particular, the system has tended to be more knowledge-based than skills-based and, as a result, is not well-g geared towards lifelong learning. But the rapidly evolving workplace and occupational changes being produced by technological advancement make it imperative that tertiary institutions are equipping trainees with the skills they need when entering the workforce.

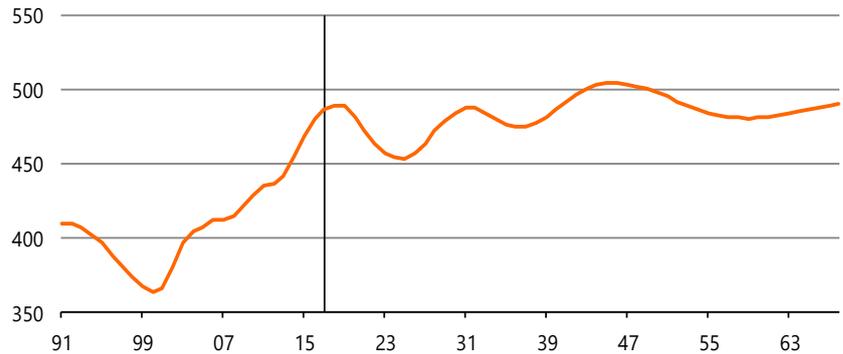
Even more importantly, having a strong focus on the changing skills required by businesses and workers will boost the relevance and usefulness of tertiary institutions in the retraining space. As a swathe of jobs become obsolete over the next 20 years, reintegrating these people into the workforce in a timely fashion will be critical.

A greater focus on retraining and the skill needs of the broader workforce would help the tertiary education sector get through market conditions that look to be particularly tough between now and 2025. Graph 16 shows that the number of people aged 18-24 is projected to shrink 7.4% over the next seven years. This decline would be the biggest contraction in the "core" target market for tertiary institutions since 1994-2001.

Graph 16

No more growth in tertiary's traditional market

People in NZ aged 18-24, 000s, June years



Twenty-five years ago, tertiary institutions arguably had easier conditions to expand their penetration of the overall market. At that time, a growing proportion of young people were entering tertiary study, partly in response to the very high unemployment rates of the late 1980s and early 1990s. Furthermore, the international education sector in New Zealand was relatively small and therefore had significant room for growth.

Neither of those conditions currently hold true. Firstly, the ratio of domestic equivalent full-time students to the total population for people aged 18-24 has dropped from 30% to 26% since 2014 as the labour market has tightened up. Young people have found it more attractive to directly enter the workforce rather than continue with tertiary study. With the unemployment rate expected to remain low over the medium-term, attracting a higher proportion of young people into tertiary study appears unlikely.

Secondly, conditions for growth in international student numbers are difficult. The international education market in New Zealand is much more developed than it was 25 years ago, and achieving any growth while maintaining the quality of the service would be challenging. But even more importantly, government policy is actively looking to reduce the number of foreigners studying in New Zealand. The proposed reduction of post-study work visa entitlements for people who have studied lower-level qualifications is likely to hit student numbers. It will become more difficult to use study as a back-door entry for obtaining a work visa and, subsequent, residency – making it less attractive for some students to come here at all.

The government has other proposals aimed at foreign students as part of its current consultation on migration policy, although these proposals generally appear less stringent than some changes the Labour Party had suggested over the last 12 months. Nevertheless, foreign student numbers were already coming under downward pressure due

Competition rather than collaboration

to changes introduced by the previous government in 2015/16. So the latest push for a reduction in immigration makes the operating environment for tertiary institutions targeting international students that much more difficult.

ONE OF THE BIGGEST problems with the tertiary education sector in New Zealand over the last 25-30 years is that it has operated in an environment that has encouraged more competition than collaboration. From an economic perspective, competition can be beneficial, as it fosters innovation and rewards efficiency at an organisational or business level. But in a market as small as New Zealand, it can also lead to the unnecessary or unsustainable duplication of resources. For example, there is limited demand from students to study medicine in New Zealand. Having teaching resources concentrated at a couple of large institutions is likely to result in better outcomes than providing medical studies in a highly fragmented fashion, where no single institution would have the resources to properly meet students' needs.

Historically, New Zealand's education funding model has been largely based around student numbers. Recent years have seen the government take steps to help change the sector's focus, placing greater emphasis on the employment outcomes of graduates. But in general, the volume-based model has meant the growth that tertiary institutions have been encouraged to pursue has often been at the expense of other institutions. So there has been increasing overlap in provision between the courses and qualifications offered by universities, institutes of technology and polytechnics (ITPs), and industry training organisations (ITOs), with ITPs arguably at the most risk of being squeezed in the middle. In some cases, private training establishments (PTEs) add to the duplication that exists.

Education is not the only sector where the duplication of resources occurs, possibly to the detriment of society as a whole. The operation of 20 district health boards in New Zealand for a population of fewer than 5m people arguably leads to too much effort being devoted towards lobbying and "patch protection", rather than achieving better health outcomes. Similarly, efforts to boost international visitor numbers in specific cities via investment in infrastructure such as convention centres or larger airports risks cannibalising markets in other parts of the country, resulting in no net benefit to New Zealand overall.

Ultimately, the education system should be focused on enhancing the outcomes of graduates. Positive graduate outcomes have some correlation with, but are certainly not wholly determined by, the size or profitability of the tertiary institution they attended.

Encouraging specialisation for higher-quality outcomes

IN OUR VIEW, a step back should be taken in the education sector to re-evaluate how the needs of students, workers, and employers can be best met. We believe that a more collaborative approach across New Zealand would ensure that tertiary organisations are focusing on those fields and aspects of study in which they have a competitive advantage. This specialisation could apply:

- across tertiary institution subtypes, allowing ITOs to focus on arranging the practical aspects of training, and enabling ITPs to contribute towards the more theoretical or classroom-based skills, for example
- within tertiary institution subtypes, allowing viticulture studies to be concentrated in Marlborough or horticulture studies in Hawke's Bay, for example.

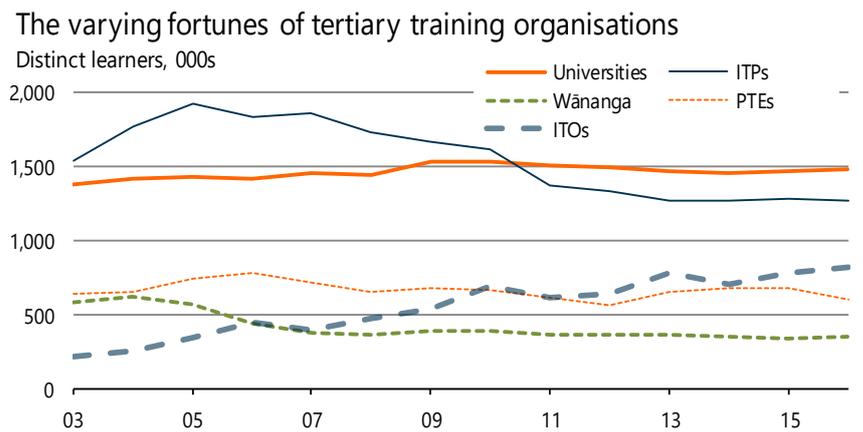
The regional aspect of specialisation implied by the latter of these two points sits comfortably alongside the government's current aim of looking at skills and skill shortages in a more regional context.

Accompanying this approach, there would need to be a robust framework of oversight to ensure that courses and education continued to be high-quality, given the likely reduction in competitive discipline. However, having a clear focus on the skills required by employees and businesses could provide a solid benchmark for measuring the effectiveness of the training being provided. In this regard, a well-researched, dynamic, and coordinated skills strategy overseen by the Ministry of Education and the Ministry of Business, Innovation and Employment would have the potential to greatly improve education sector outcomes.

The current lack of collaboration across the education sector means that there is almost always some part of the sector that is being squeezed at any point in time. Universities typically find it easier to attract students when the economy is performing poorly, such as in the wake of the Global Financial Crisis, but this is the precise moment when ITOs are being squeezed. In contrast, the boom in the economy over the last few years has seen a lot of resources devoted to attracting

more people into trades, largely at the expense of student numbers at ITPs (see Graph 17).

Graph 17



A more collaborative approach would provide greater opportunity for tertiary organisations to assist each other through periods when market conditions were more challenging. It would also allow central government to recognise the contribution that specific subsectors make to the overall education and skills picture within New Zealand, stepping beyond the current volume-based funding model to maintain capacity across the broader education offering throughout the economic cycle.

Finally, encouraging specialisation among tertiary education and training providers has the potential to enhance their ability to tap into the international education market. The concentration of teaching resources and skills for a specific subject at one or two institutions would increase the likelihood of a high-quality and internationally regarded qualification being provided. Growth in domestic student numbers is set to be limited by demographic trends, and there is the threat of increasing competition from overseas education and information providers. Enhancing the ability of New Zealand institutions to tap into the education export market, even via internet-based offerings, would help increase the resilience of the education sector over the medium term.

Key actions

Tertiary organisations need to adapt their teaching models and cost structures to compete with new education offerings and better meet the needs of employers and workers.

Providers need to place more emphasis on the role of education throughout people's working life by providers, especially considering technological change and the rapidly evolving workplace.

The traditional framework of larger qualifications needs to be broken down into smaller skills-based courses to help training become more relevant to the workplace.

The government should provide greater strategic oversight of skills and training in New Zealand via a national skills strategy.

Education institutions and training organisations should be encouraged to focus on their core areas of expertise, with greater specialisation enabling more collaboration and potentially resulting in higher-quality outcomes.

Appendix

Table 1

Jobs at risk due to automation

% of jobs at high risk over the next 18 years, Infometrics estimates

	2024	2030	2036
Far North District	9.6%	23.6%	30.6%
Whāngārei District	9.7%	24.0%	30.7%
Kaipara District	10.2%	25.2%	32.7%
Auckland	10.2%	24.5%	31.0%
Thames-Coromandel District	9.6%	24.1%	31.5%
Hauraki District	9.8%	24.1%	31.2%
Waikato District	10.1%	24.6%	31.7%
Matamata-Piako District	10.7%	26.4%	34.2%
Hamilton City	9.7%	23.4%	29.6%
Waipā District	10.1%	24.5%	31.4%
Ōtorohanga District	10.6%	25.7%	33.0%
South Waikato District	10.0%	24.8%	31.8%
Waitomo District	10.3%	25.4%	33.2%
Taupō District	9.8%	24.1%	31.2%
Western Bay of Plenty District	10.3%	25.2%	33.0%
Tauranga City	9.9%	24.3%	31.2%
Rotorua District	9.6%	23.8%	30.4%
Whakatāne District	9.6%	23.5%	29.8%
Kawerau District	10.6%	27.0%	35.4%
Ōpōtiki District	9.9%	24.3%	32.3%
Gisborne District	9.8%	23.9%	30.7%
Wairoa District	10.1%	24.8%	32.1%
Hastings District	9.9%	24.4%	31.3%
Napier City	9.8%	24.1%	30.9%
Central Hawke's Bay District	10.5%	25.8%	33.6%
New Plymouth District	9.9%	24.4%	31.4%
Stratford District	9.9%	24.3%	31.3%
South Taranaki District	10.7%	26.8%	34.6%
Ruapehu District	9.9%	24.4%	31.5%
Whanganui District	9.7%	24.1%	30.8%
Rangitikei District	10.3%	25.5%	33.3%
Manawatū District	10.3%	25.2%	32.1%
Palmerston North City	9.6%	23.5%	29.8%
New Zealand	10.0%	24.4%	31.0%

Table 1 (continued)

Jobs at risk due to automation

% of jobs at high risk over the next 18 years, Infometrics estimates

	2024	2030	2036
Tararua District	10.4%	25.5%	33.1%
Horowhenua District	10.0%	24.7%	32.0%
Kāpiti Coast District	9.5%	23.3%	29.9%
Porirua City	9.2%	22.5%	28.8%
Upper Hutt City	10.0%	24.5%	30.9%
Lower Hutt City	9.9%	24.0%	30.6%
Wellington City	10.5%	24.1%	28.9%
Masterton District	9.6%	23.5%	30.1%
Carterton District	10.0%	25.1%	33.1%
South Wairarapa District	10.0%	24.4%	31.6%
Tasman District	10.2%	25.0%	32.3%
Nelson City	9.9%	24.2%	30.8%
Marlborough District	10.2%	25.1%	32.2%
Kaikōura District	9.6%	24.3%	32.3%
Buller District	9.9%	24.6%	32.5%
Grey District	9.8%	24.4%	31.7%
Westland District	9.7%	24.6%	32.6%
Hurunui District	10.1%	24.9%	33.0%
Waimakariri District	9.9%	24.6%	32.1%
Christchurch City	10.1%	24.5%	31.4%
Selwyn District	10.1%	24.6%	31.5%
Ashburton District	10.3%	25.5%	32.9%
Tīmaru District	10.2%	25.4%	33.0%
Mackenzie District	9.7%	24.5%	32.9%
Waimate District	10.4%	25.5%	33.6%
Waitaki District	10.1%	25.2%	32.8%
Central Otago District	10.0%	24.7%	32.1%
Queenstown-Lakes District	9.6%	23.8%	31.5%
Dunedin City	9.4%	22.9%	29.3%
Clutha District	10.4%	25.7%	33.4%
Southland District	10.7%	26.5%	34.9%
Gore District	10.2%	25.2%	32.7%
Invercargill City	9.9%	24.5%	31.3%
New Zealand	10.0%	24.4%	31.0%

Table 2

Occupations favoured and not favoured by Asian workers

% of employees identifying as being of Asian ethnicity

Chef	41.6%
Taxi driver	40.8%
Baker	34.5%
Café or restaurant manager	30.2%
Resident medical officer	29.4%
Cook	25.8%
Sewing machinist	25.3%
ICT customer support officer	25.2%
Retail manager (general)	23.6%
Developer programmer	23.6%
All employment	11.0%
Police officer	3.6%
Plumber (general)	3.6%
Primary school teacher	3.5%
Dairy cattle farmer	3.2%
Project builder	3.1%
Mixed crop and livestock farm worker	2.8%
School principal	2.7%
Agricultural and horticultural mobile plant operator	1.8%
Mixed crop and livestock farmer	1.2%
Sheep farmer	0.3%

Table 3

Occupations favoured and not favoured by Māori workers

% of employees identifying as being of Māori ethnicity

Meat process worker	39.4%
Forklift driver	28.7%
Social worker	25.6%
Labourers nec	23.6%
Welfare worker	23.2%
Truck driver (general)	21.3%
Security officer	19.9%
Bar attendant	19.8%
Machine operators nec	19.1%
Community worker	19.0%
All employment	11.2%
ICT project manager	5.0%
Systems analyst	4.9%
Mixed crop and livestock farmer	4.9%
Sheep farmer	4.4%
Resident medical officer	4.3%
Real estate agent	4.3%
Accountant (general)	3.9%
Software engineer	3.8%
Developer programmer	3.7%
General medical practitioner	3.6%

Table 4

Occupations favoured and not favoured by Pacific workers

% of employees identifying as being of Pacific ethnicity

Container filler	27.1%
Machine operators nec	22.4%
Forklift driver	20.2%
Storeperson	19.7%
Security officer	17.7%
Meat process worker	13.7%
Despatching and receiving clerk	12.5%
Welfare worker	11.4%
Bus driver	10.6%
Labourers nec	10.5%
All employment	5.0%
Property manager	1.4%
Mixed crop and livestock farm worker	1.4%
Accountant (general)	1.4%
Software engineer	1.3%
Developer programmer	1.2%
Chief executive or managing director	1.2%
Real estate agent	1.0%
Dairy cattle farmer	0.7%
Mixed crop and livestock farmer	0.4%
Sheep farmer	0.2%

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ECONOMICS PUT SIMPLY

