WORKFORCE 2020

Forces for Change in the Future Labour Market of New Zealand

New Zealand Government

Department of Labour
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newzealand.govt.nz

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CONTENTS

INTRODUCTION AND SUMMARY

This paper is intended to promote discussion on the challenges and opportunities in relation to the future New Zealand labour market. The information provided will have implications for current policy responses and programmes for a future high performing labour market, and will point to areas where new or additional approaches could be considered.

While we cannot predict the future, having a clearer understanding of what the labour market might look like in 12 years will enable the Department to assess the ongoing relevance of current policy settings and to identify windows of opportunity for new or additional responses. We need to start now to research, design and implement the workforce and workplace initiatives, so that New Zealand is well placed to capitalise on the labour market opportunities likely to be available in 2020.

The Department believes there are some notable forces that will affect the New Zealand labour market in the next 12 years, including:

1. Population and labour force changes
    - movement of significant population cohorts (baby blip and baby boomers) into, through and out of the workforce
    - a more diverse workforce
2. Continuing globalisation
    - movement of work and workers internationally
    - growing challenge of matching international productivity gains
3. Technology and changing skill requirements
    - accelerating pace of technological change and innovation and the impact on industries and occupations
    - evolving nature of work, including variety of employment arrangements
4. Climate change and resource pressures
    - mitigation and adaptation to climate change and natural resource constraints
    - green jobs and materials/energy productivity

These forces of change present multiple challenges for New Zealand. If we are well prepared for transition, a skilled and flexible labour force will allow New Zealand to take advantage of a variety of arising opportunities. It is our task to work with partners and stakeholders to better understand new trends and make sure we have the policy environment and tools to respond effectively.

FORCES FOR CHANGE IN THE FUTURE LABOUR MARKET

In the next 10 to 15 years, the labour market in New Zealand will be shaped by a range of forces for change. These will include: big shifts in population size and composition; continued globalisation characterised by tectonic shifts in economic power and the large-scale movement of work and workers internationally; fundamental changes in the nature of work because of new technology and innovation that will drive new skills requirements; and profound environmental and resource pressures that will affect the type of jobs we have and the way we work.

1. Population and labour force changes

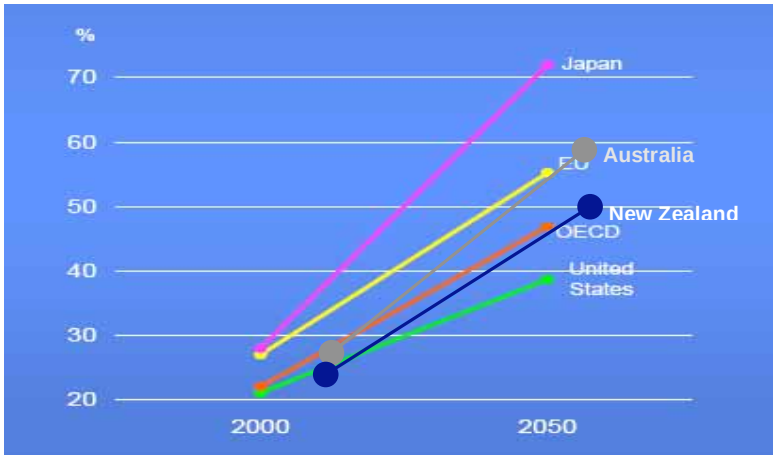
Demography is a logical starting point for telling a story about the future labour market. Key trends of significance for the future labour market are:

- ageing population and a slowdown in labour force growth
- changing ethnic composition
- changing levels of participation across age

1.1. Ageing population

New Zealand is still relatively youthful, but as in many other developed countries, the median age of the population will continue to rise slowly – increasing from 36 years of age now to a projected 39 years in 2020. The ratio of the population aged 65 years and over to the population aged 20 to 64 is likely to grow from 23 percent in 2006 to 50 percent by 2050, catching up to the OECD projected average. This ageing effect is a result of fertility below replacement rates (at least until very recently), increased longevity and the ageing of the baby boom generation.

Figure 1: Ratio of the population aged 65+ to the population aged 20-64



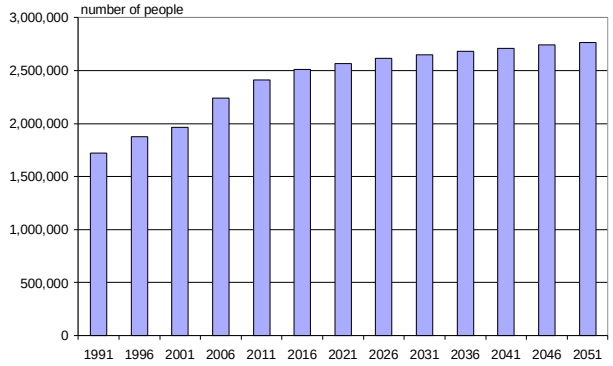
Sources: OECD and Statistics New Zealand.

1.2. Slowdown in labour force growth

Largely because of population ageing, New Zealand will experience a slowdown in labour force growth. The labour force grew by about half a million in the period

1991 to 2006, whereas the period from 2006 to 2020 is projected to see growth of only about 320,000. Out of this projected growth, net migration will contribute about 70,000, increases in labour force participation will contribute about 80,000 and changes in age structure will contribute about 170,000 because more people will move into ages with higher participation rates. Beyond 2020, the labour force will plateau in size. Around 80 percent of the current workforce will still be in the workforce in 2020.

Figure 2: Projected NZ labour force

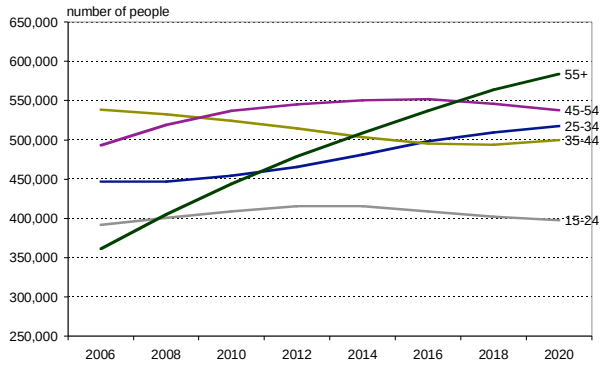


Source: Statistics New Zealand Labour Force Projections, May 2008, series 5M (2006 base).

1.3. More older workers

General population ageing will also lead to a significant increase in the number of older people in the labour force (those aged 55 and over). Currently, there are about the same number of older people in the labour force as younger people aged 15-24, with both age groups containing around 400,000 people. By 2020 the older aged labour force is likely to have risen to about 600,000 persons, whereas numbers in all other age groups will increase fairly modestly if at all. By 2020 around one in four people in the labour force is likely to be aged 55 years and over, including many more people likely to be working beyond the traditional "retirement age" of 65 years.

Figure 3: Labour force projections by main age band 2006 - 2020



Source: Statistics New Zealand Labour Force Projections, May 2008, series 5M (2006 base).

1.4. Greater ethnic diversity

The ethnic mix of New Zealand's population will change in the next 10 to 15 years. The proportion of Maori and Pasifika is expected to grow because of their higher fertility rates and because their populations are younger. The Asian population share should grow even faster, driven by net migration. However, we should note that because a substantial and increasing proportion of the population identifies with more than one ethnic group, projections of changes in ethnic composition are more uncertain than those relating to the general population.

Table 1: Ethnic share of New Zealand population 2006 and 2021(1)

	European or Other	Maori	Asian	Pasifika
2006	**76.8%**	**14.9%**	**9.7%**	**7.2%**
2021	**71.3%**	**16.2%**	**14.5%**	**9.1%**

(1) People can and do identify with more than one ethnicity, and SNZ includes these people in each ethnic population, hence the percentages sum to more that 100 percent.

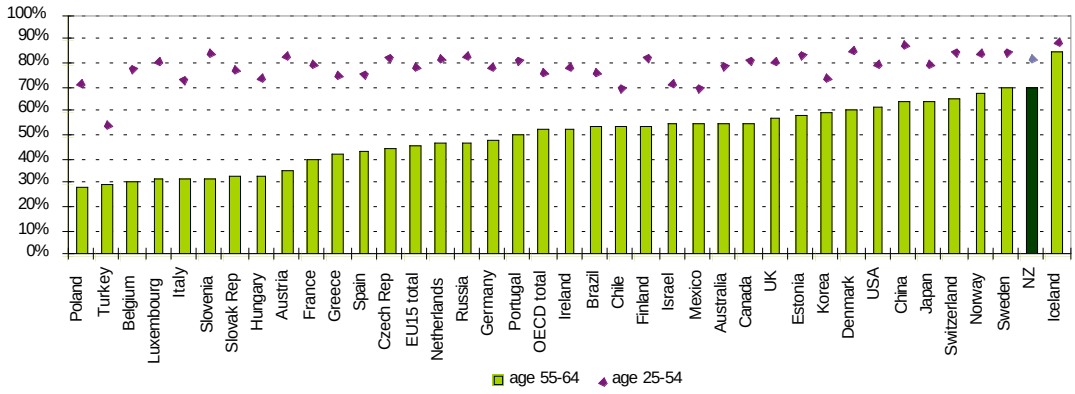
Source: Statistics New Zealand Ethnic Population Projections, April 2008, series 6 (2006 base).

The growing international demand for both higher and lower skilled workers will change the nature of migration, with more people moving between countries for short-term contracts, rather than permanently migrating. The changing nature of work will intensify this trend, with a continuing move to flexible workforces with shorter term or temporary employment arrangements, particularly for high skilled workers with internationally transferable skills. The pattern of greater diversity in source countries for our migrants will continue. New Zealand will increasingly compete with other countries which are moving to develop policies to attract and retain these highly skilled visitors, such as attracting top quality international students. Many international students are likely to remain in New Zealand after their studies.[1]

1.5. Record participation and employment

Currently New Zealand has one of the highest labour force participation rates in the OECD and its rise over recent years has been a substantial contributing factor to labour force growth. One trend has been the strong improvement in the participation rates of older workers since the beginning of the 1990s. Another trend has been steadily greater female participation and slowly abating male participation. Employment rates are also high by international standards, especially for older workers, as shown in Figure 4.

Figure 4: Employment rate of people aged 55-64 and 25-54 in 2006



Source: OECD Factbook 2008.

[1] See Department of Labour, *International students: Studying and staying on in New Zealand*, Wellington: Department of Labour, May 2007

However, the Department's analysis suggests labour force participation rates will decline from their current peak. Aggregate labour force participation rates in New Zealand are projected to fall to 63 percent by 2020, from the current rate of 68 percent. The trend of rising female participation rates will fall off and start to reverse – down from the current all-time high of 62 percent to around 57 percent in 2020 (and 50 percent in 2050) driven by an ageing population. Slower labour force growth or even contraction will exacerbate skill and labour shortages, slow economic growth and may lead to unsustainable increases in public social expenditures.

2. Continuing globalisation

New Zealand's connectedness to the international market place, particularly in trade and people, means we are exposed to both the benefits and costs of globalisation. Globalisation affects the New Zealand labour market via the demand for jobs and via the supply of skilled workers through migration, with both positive and negative employment impacts depending on sectors and regions. It also places prime importance on labour productivity.

2.1. Increase in global labour supply

The International Monetary Fund (IMF)[2] has estimated that the effective global labour supply increased almost four-fold from 1980 to 2005, with most of the growth occurring since 1990. East Asia has contributed half of this increase because of a large rise in the working age population and greater trade openness.[3]

The increased mobility of highly skilled migrants, particularly in the context of international skill shortages, is likely to become a more important factor influencing migration policies in the future. We can expect a growing proportion of our workforce to be internationally mobile – both short-term overseas visitors or temporarily domiciled New Zealanders.

2.2. Impact on New Zealand jobs

The industrialised economies, including New Zealand, can counter their slowing domestic labour force growth by tapping into this increased pool of global labour both through immigration and offshoring.

A key concern is whether more intense global competition will cause net job losses in the advanced economies, especially with the emergence of offshoring. However, over the last ten years globalisation has not had a negative net impact on New Zealand jobs and New Zealand has enjoyed one of the lowest unemployment rates worldwide, with this pattern likely to continue.

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[2] IMF, *World Economic Outlook April 2007*, Washington, D.C: IMF, April 2007, p. 162.

[3] Ibid.

2.3. More offshoring

The relocation of business processes from one country to another has been viewed as having negative impacts on New Zealand jobs, yet the employment effects of offshoring are complex. Offshoring can raise productivity, lower prices and lift profits of the firms concerned and allows their sales to expand. The new jobs resulting from this improved competitiveness and higher sales and output can offset the prior job losses. Adjustments may result for some since the new jobs may not be in the same firm, sector or region as the old. The skill requirements for these new jobs may not be identical to the old and could call for higher qualifications than those required in the jobs lost. It is possible that offshoring disproportionately affects lower skilled workers in a negative manner. In recent history a number of New Zealand manufacturing jobs were offshored, while at the same time New Zealand benefited from offshoring from larger economies (for instance in the area of call centres).

Advances in information and communication technology and the falling costs of such technologies in the years up until 2020 are likely to make offshoring even more of a global phenomenon.

Yet in future years, job turnover in New Zealand is likely to continue to be driven more by technological change and domestic circumstances than by international competition. For example, the IMF[4] considers that the globalisation of labour forces contributes to rising wages in industrialised economies through higher productivity and output. The IMF[5] also noted, however, that globalisation is one of several factors acting to reduce the share of national income accruing to labour. Rapid technological change was thought to have a bigger impact, especially in the lower skilled sectors.

2.4. Growing international labour flows

Migration of people is the other side of the globalisation process. International migration of workers (both higher and lower skilled) is on the rise, driven by technological change and skill shortages in OECD countries. New Zealand is a land of migrants – one in four workers in New Zealand was born overseas, and in Auckland this figure is more than one in three workers. While New Zealand is currently able to easily attract and select the skilled migrants it needs, demographic changes in developed and developing economies will intensify the international competition for skilled migrants.

It is estimated that in 2006 there were over a half-million New Zealanders living overseas, representing 14 percent of the New Zealand-born population.[6] New Zealanders living overseas form one of the more highly skilled expatriate groups in the OECD, with around 45 percent holding a tertiary qualification. Even if many New Zealanders do not wish to return home, absentee Kiwis provide a potential

[4] Ibid p. 161.

[5] Ibid.

[6] See Population and Sustainable Development,, *Myth: There are at least 1,000,000 New Zealanders living overseas*, Statistics New Zealand, retrieved from http://www.population.govt.nz/myth-busters/MythDiaspora.htm

source of connectedness to international markets. There is also a growing trend in temporary flows: people shifting offshore for a few months or a few years. Immigration is not always the permanent move it once was thought to be.

New Zealanders who do return home tend to be attracted back for family reasons such as older parents and bringing up children as well as lifestyle factors, safety and security and recreational and social opportunities.[7] Conversely, the primary reasons cited for New Zealanders remaining overseas are economic and work-related factors including salary, career and business opportunities.

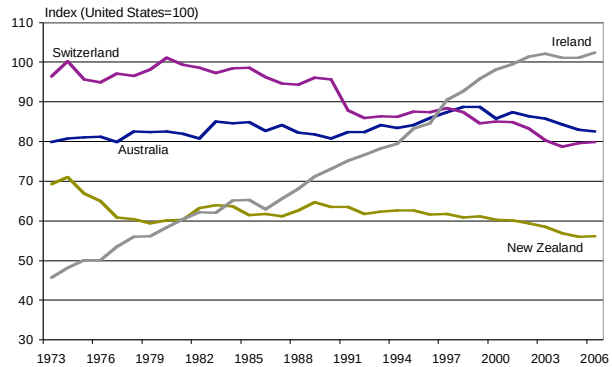
The trans-Tasman labour market is likely to become an even more important influence on our ability to increase the quality and supply of skilled people. In the last ten years, nearly half of all New Zealanders departing the shores on a long-term basis have gone to Australia, an average net migration outflow to Australia of 20,000 people a year since 1998. Further work is needed to better understand how the New Zealand labour market in 2020 will be affected by the growing connectedness of the two labour markets and on how much we are becoming a component of a broader trans-Tasman labour market.

2.5. Pressures to raise labour productivity

Labour productivity is becoming a more important nexus for globalisation and demographic forces of change and is a key determinant of future living standards. While much of New Zealand's recent economic success has depended on a growing labour force, constraints in labour supply mean future economic growth will depend on improved labour productivity. At the same time, because of international competition, labour productivity will also be an increasing determinant of export success.

However, New Zealand has experienced a consistent gap in labour productivity since the 1970s when compared internationally.[8] Taking the United States as the global industrial and technological leader, New Zealand has lagged far behind the United States and other OECD countries, such as Australia, Switzerland and Ireland, as shown in Figure 5.[9] While Ireland has experienced rapid catch-up from the late

Figure 5: GDP per hour worked as percentage of United States



Source: OECD Compendium of Productivity Indicators.

[7] Much of the available information on the circumstances and motivations of New Zealand expatriates is anecdotal. However, information is available from the Massey University's '*New Zealand Talent Flow Programme*' Massey University (Kerr Inkson, Stuart Carr, Margot Edwards, Jill Hooks, Duncan Jackson, Kay Thorn and Nicola Allfreem), May 2004 survey of 2,201 highly-skilled New Zealanders overseas.

[8] See New Zealand Treasury productivity papers http://www.treasury.govt.nz/publications/research-policy/tprp.

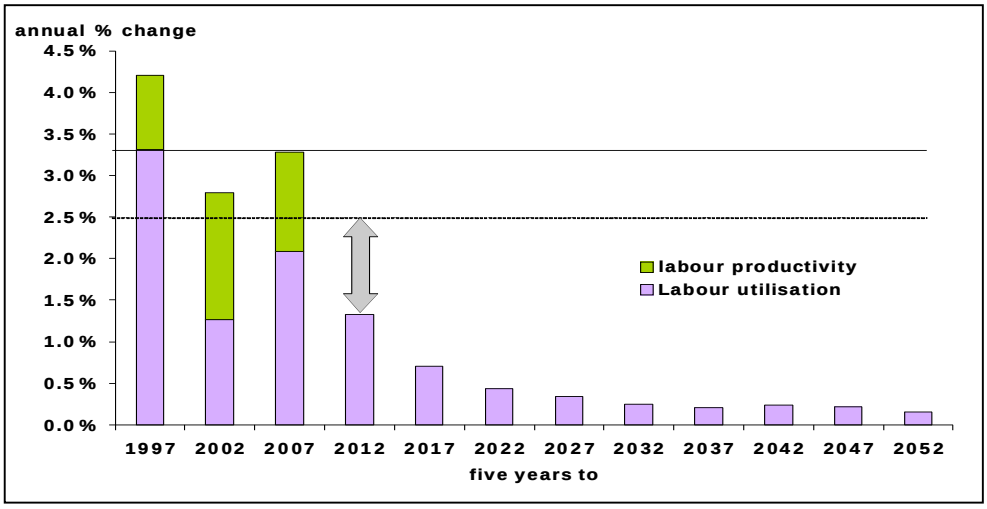
[9] See OECD (2003, 2004, 2008) for discussions of the OECD member countries as a whole.

1980s, and Australia has performed fairly steadily in comparison to the United States, New Zealand's GDP per hour worked has declined from an already low base, falling by 13.1 percentage points to 56.1 per cent of that of the United States by 2006. Although most of this decline in labour productivity was in the 1970s, New Zealand is now in the unenviable situation of having a large labour productivity gap with the United States and most of its OECD trading partners. For example, in 2006 an hour worked in New Zealand produced 27 percentage points less output than an hour worked in Australia.

Ironically, New Zealand's success in employment may actually be lowering labour productivity indices. Mare and Hyslop (2008) found that less skilled people taking up lower paid jobs might be depressing growth in average labour productivity in New Zealand.

To illustrate how significant productivity growth is for our future, Figure 6 shows that much of the recent strong growth in GDP has been due to the addition of more people into employment (labour utilisation) rather than labour productivity.

Figure 6: Current and future composition of GDP growth



Source: Department of Labour.

Increased employment growth has had many economic and social advantages, but labour force growth cannot be relied upon to sustain long-run growth. Future economic growth will increasingly need to be derived from increases in labour productivity.

2.6. Towards improved labour productivity

There is still considerable uncertainty about the key drivers of labour productivity. Many of the factors are interrelated and may act in synergy. For example, increases in labour productivity can reflect the fact that each worker is equipped with more capital (a higher capital-labour ratio). Increases could also reflect gains in multifactor productivity – for example, innovation, managerial skill, business organisation, research and development, as well as changes in the characteristics and efforts of the labour force and even good luck and good weather. At the level of the individual firm or industry, key influences include technological advances

and improvements to the quality of labour, or to management practices and work arrangements. The increased availability of microeconomic analysis of productivity using firm-level data is increasing our understanding of the dynamics of productivity growth.

3. Technology and changing skill requirements

Globalisation has also been accompanied by massive technological change which is transforming the workplace and bringing new skill demands. The development of existing technologies and the creation of new technologies have proceeded at a remarkable pace over the last 10 to 15 years. This has contributed to the development of new products, new services and new markets. It has helped transform entire industries, as well as the operations of numerous individual workplaces and enterprises.

3.1. The pace of technological change

Information technology changes have been most visible – rapid increases in computer power and capacity and the speed at which information can be transmitted have been matched by plummeting prices. These developments have enhanced the ability of individuals to take advantage of computer technology while also aiding networking within and across firms and between customers, producers and service providers.

While there have been significant advances, some industries, such as transportation, communications and the financial services sectors, have been faster to take up and invest in new computer technologies than others. There remain significant opportunities for other sectors such as farming, forestry and fisheries to make greater use of information technology to improve the quality of their products and the profitability of their ventures.

The pace of change driven by new technologies and technological advances looks set to continue and even accelerate, meaning that existing skills in the most high-value sectors of the workplace will need to be frequently upgraded. However, the implications of advances in the newest technologies – the genetic, robotic, information and nano processes (GRIN) – are much less well understood. These four intertwining technologies are interacting with one another, and how they will individually and collectively change the work that we do, and the way that we do that work, is clearly an area for focused attention by the Department.

On a number of indicators such as business R&D spending, rates of information and communications technologies (ICT) investment, broadband uptake and international patenting rates, New Zealand is below the OECD average.[10]

New Zealand's industrial production remains concentrated in what the OECD classifies as low-technology sectors, for example, the primary industry, although our technology intensity in these sectors is higher than that in other countries.

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[10] Ministry of Economic Development. *Growth through Innovation: Economic Development Indicators 2005. Wellington:* Ministry of Economic Development and the Treasury, February 2005.

Among the drivers of increased availability and access to technology will be the growing two-way flow of high-tech brain power between developing countries and developed countries, the increasing size of the technologically literate workforce worldwide, and efforts by multinational corporations to diversify their high-tech operations (offshoring high-skilled work as well as low-skilled enterprises).

3.2. Increasingly educated workforce

To respond to globalisation, productivity and technology challenges, a workforce with a greater range of skills, experience, knowledge and aptitudes is needed to lift the value of work. New Zealand's overall level of investment in education and training will require ongoing monitoring to determine the best mix of interventions for society and the economy. For example, in thinking about the workforce of 2020, we need to decide if investment in primary and secondary schools be increased now, or if the focus should be on upskilling those already in the workforce.

The New Zealand workforce has become more educated. A rising proportion of young people are entering the workforce with tertiary qualifications, and there is a declining share of the workforce with no qualifications, down from 40.5 percent of the working age population in 1986 to just 19 percent in 2006.[11]

While New Zealand's participation in tertiary education has risen significantly in recent years, with the highest ever level of enrolments in tertiary education, only half of those enrolling complete their qualifications.[12] Furthermore, despite the trend of rising tertiary education participation, a substantial part of the adult population still has low levels of foundation skills (literacy, numeracy, language and general social skills),[13] and 11 percent of students leave school with few or no formal qualifications. There are significant social and economic challenges for New Zealand if the long tail of educational underachievement persists into the future.

A question that is rarely raised, and remains unanswered, is "what proportion of the workforce needs to be skilled to deliver a step-change in economic performance?" Around 80 percent of the current workforce will still be in the workforce in 2020. This means it makes sense to continually try to develop and raise the skills of people currently in work.

3.3. Linking education and training to workforce needs

The pace of change will also be an issue for educators and trainers in ensuring people have the necessary skills for the changing scope of work, as well as the ability to be ongoing learners in a faster moving world. A coordinated approach is

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[11] As measured by the Census of Population and Dwellings, 2006.

[12] Ministry of Education. *How long do people spend in tertiary education? A study of people in tertiary education from 1998–2003* and Department of Labour *Review of 16 Trade Occupations*, April 2005.

[13] The 2006 Adult Literacy and Life Skills Survey found that approximately 43% of New Zealanders aged 16 to 65 have literacy skills below those needed to participate effectively in a knowledge society. The survey also showed that 51% of New Zealander adults have low numeracy.

needed to make sure that skills development and use is aligned to the needs of industry and the economy. There are already initiatives in some countries such as the United States for more corporate development programmes and corporate engagement with the tertiary sector, including industry training, to ensure that tertiary graduates have the skills necessary for working in particular sectors.

The level of investment and the time it takes to train the professionals needed in a knowledge economy is considerable. For example, it takes approximately 12 years to train a scientist. Consequently, we need to provide greater assistance to young people to ensure they make good choices in their initial tertiary education and that what they study is relevant to the needs of the future labour market. Equally important is the need for employers to establish good practices in the workplace to ensure that graduates and trainees can continue to build upon their formal training through the informal training that occurs in a work setting.

3.4. Workplace training and skills development

To ensure we remain competitive in a global environment we will also have to focus increasingly on skill development at work. An increasing proportion of jobs (both among the lower and higher skilled) will require continuous updating of knowledge and skills.

A gap in our current knowledge is the extent to which changes in employment arrangements and practices will affect access to ongoing training in the labour force. For example, if the strongest growth occurs in part-time and casual/temporary employment, there will be implications for life-long learning by workers. Changing employment arrangements and a changing mix of people in the workforce will affect the methods of in-house training provided in workplaces.

Workplace training often tends to favour professional and managerial workers rather than those at the bottom of the ladder with few skills. Ensuring equal educational opportunities in the workplace will be required to more fully harness the range of technological change. For instance, the growth in satellite communication and inventory control systems makes traditionally low skilled work in the warehousing and goods distribution a far more complex task than it used to be.

3.5. Non-standard work arrangements

The world of work will evolve rapidly as we move towards 2020 and beyond. Technological advances and globalisation are both changing the way the workplace is structured. The changing nature of labour supply (with more older workers, people with caregiving reponsibilities and persons with disabilities working) will create greater demand for less traditional and more flexible working arrangements. Increasing numbers of employees, both highly skilled and low skilled, will have non-standard work arrangements. The flipside of this is that there may be greater insecurity and uncertainty for the workforce, particularly among the lower skilled working in areas where they have less control.

Yet to a large extent, current policy settings governing work, the workforce and the workplace assume a traditional employment relationship, characterised as

"full-time jobs of indefinite duration at a facility owned or rented by the employer".

Shifts in organisational form and the use of non-standard work arrangements will alter the nature of the employer/employee relationship. However, there is increasing recognition on the part of employers of the importance of human capital to business success. How can employers value and retain workers of the future in this more volatile working environment? For example, how will employers provide benefits that come with traditional employment relationships, such as workplace education and training, or safe and healthy workplaces? With the greater mobility of a skilled workforce, how can firms retain and disseminate the knowledge generated by these workers once they move on?

3.6. Changing nature of work

The nature of jobs will continue to change, and, in an economy as open as New Zealand, it is difficult to say which industries, sectors and occupations are going to grow the most during the next 12 years. The Department's sector and regional engagement and workplace productivity work programmes are both about ensuring that we are responsive, and continue to build our knowledge, around the changing nature of work.

Overseas analysis[14] points to increased demand for more highly skilled occupations (eg managers and professional occupations) and skills associated with "knowledge work" (eg cognitive skills such as abstract reasoning, problem-solving, communication and collaboration). As jobs become less physically demanding and repetitive but more knowledge-intensive, personal traits such as communication skills and attitudes will become increasingly important.

At the same time, demographic and social factors are likely to substantially increase the demand for lower skilled workers in service, personal care and retail. Education and vocational training systems will need to cater for the increasing demand from both sides of the skill spectrum. Furthermore, as technologies emerge and change, and as working lives lengthen, arrangements, management styles, workplace cultures and training the workforce (of all skill types) will need to be adaptable and retrainable throughout their working lives.

3.7. New health and safety concerns

Emerging technologies and industries present new health and safety concerns. While there are likely to be fewer physically demanding "blue collar" jobs, the continuing shift towards service-based work will mean that many jobs may become more mentally stressful. The changing composition of the workforce and the emergence of new organisational structures will also change the way we address health and safety issues. Future occupational health and safety systems

[14] Leitch. S. *Skills in the UK: The long-term challenge, Interim report,* Leitch Review of Skills, December 2005. http://www.hm-treasury.gov.uk/independent_reviews/leitch_review/review_leitch_index.cfm and Karoly, L.A. and Panis, C.W.A. *The 21st century at work- Forces Shaping the Future Workforce and Workplace in the United States,* Rand Corporation, 2005, retrieved from http://www.rand.org/pubs/monographs/2004/RAND_MG164.pdf

will need to cater for emerging occupational health and safety risks and a greater diversity of workplaces and employment arrangements

Health factors will become an increasingly important factor for many older workers in terms of their decisions about where and for how long they will keep working. The increased participation in work of people with disabilities and ill health is also an ongoing issue in terms of improving the access to quality work for many people especially as the workforce ages.

3.8. Changing values and aspirations

The role of work in peoples' lives is likely to continue to evolve over the next 12 years. New population cohorts will enter the workforce with different values and aspirations around how they want to engage in work and the type of work they want. Recognising and valuing diversity in the workplace will also become more important, as we can be sure that the New Zealand workforce in 2020 will be more socially and demographically diverse than ever before.

4. Climate change and resource pressures

Environmental pressures, especially climate change and natural resource constraints, will also be powerful forces for change in the New Zealand job market in the years up to 2020 and beyond. New Zealand's long-term economic viability is closely tied to its natural environment and the availability of resources, including energy. The transition to a sustainable, low-carbon economy will involve major shifts in employment, skill sets and workplace practices – all of which need to be better understood if New Zealand is to take advantage of a variety of new opportunities. Future success will involve supporting sectors and skills to foster leadership and capitalise on arising opportunities.

4.1. Adapting to climate change and reducing emissions

Over the coming decades, climate change will affect New Zealand industries and occupations – either directly, through changing conditions for sectors such as agriculture, fisheries and forestry – or indirectly, as industries are affected by mitigation policies and adapt to markets influenced by climate change.

Reducing greenhouse gas emissions is a high priority. New Zealand's emissions trading scheme (ETS) will cover all sectors and gases, making it the world's most comprehensive scheme. Different sectors will be phased into the scheme over the next five years, and the government will continue to assist industry and agriculture adjust to the scheme until 2025.

New Zealand has a unique emissions profile compared to other developed countries. Agriculture composes 48% of our emissions compared to around 12% in other developed countries, while the energy sector represents 44% of emissions in New Zealand compared to 70-80% in other countries. However, the largest growth in our emissions has been in the energy sector. The ETS will provide New Zealand businesses with a flexible way of reducing their carbon footprint at minimum cost and help put New Zealand on the path to a sustainable future.

In addition to reducing greenhouse gas emissions, responding to climate change may include adapting to rising sea levels, changing rainfall patterns, increased storminess and different migration patterns spurred by environmental factors. These changes could bring opportunities to New Zealand, for example by growing horticultural crops in new regions or for longer seasons. Emission intensive industries will need to either reduce emissions or meet the cost of those emissions.

We should bear in mind that some overseas ecosystems (such as those in the Pacific islands and possibly Australia) are more vulnerable to the effects of global warming than ours. This increases the prospect of environmental migration in the longer term. It may be necessary to respond to these migration pressures through adjustments to existing migration schemes or the development of new schemes. This may impact the future supply of labour in New Zealand and would present further opportunities and challenges for New Zealand employers.

From a labour market perspective, climate change is likely to impact on employment, skills and productivity. There will be sectoral shifts but exactly how they unfold is unknown. Initial economic modelling of how climate change will affect the labour market is now being undertaken, though a full understanding of the issues will involve a range of approaches that will be developed over time.

4.2. Decarbonisation and green skills

Along with climate change, future decarbonisation of the economy will be driven by resource constraints and likely increases in the prices of fossil fuels. While the exact timing of the peaking of world oil and gas supplies is still debatable, there is increasing acceptance that the global flow of these crucial non-renewable resources, especially oil, will reach a maximum level before 2020. Combined with increasing demand pressures, especially from developing countries, New Zealanders are likely to experience ongoing high increases in commodity prices, led by rising energy prices which directly influence food and other commodities.

To adapt to these climate change and resource pressures new green skills will be needed in both emerging and established industries. These will be jobs that help to protect and restore ecosystems and biodiversity, reduce energy, materials and water consumption through high efficiency and avoidance strategies, de-carbonize the economy, and minimize or avoid other forms of waste and pollution.

Although environmental protection has often been seen as leading to job losses, evidence from both macro-economic modelling and sector-based technological studies suggest that moves to a decarbonised economy could be job-creating overall.[15] [16] In fact, the move to a green economy offers business opportunities,

[15] See Hatfield-Dodds, S., G. Turner, H. Shcandl, and T.Doss, *Growing the green economy: Skills and labour challenges in reducing our greenhouse and national environmental footprint*. Report to the Dusseldorp Skills Forum, June 2008. CSIRO sustainable Ecosystems, Canberra.

especially in sectors such as renewable energy, energy efficient buildings, public transport and food production.[17] A move towards a low-carbon economy would stimulate a focus on both labour productivity improvements, as well as energy and materials productivity. Leadership in green innovation could reap substantial economic rewards for New Zealand. However, to take advantage of new business opportunities it will be important for the New Zealand government, educational institutions and businesses to understand new environmental trends and actively support the development of green skills.

CONCLUSIONS

The pace of economic, social and technological change will continue to increase over the next 12 years.

- Significant population cohorts, baby blip and baby boomers, will move through into, through and out of the workforce, with an eventual petering out of labour force growth after 2020.

- Globalisation will continue to produce large economic shifts as international product and labour markets expand. Competition across borders will intensify and offshoring, especially of services, will be even more prevalent.

- Globalisation of markets, combined with new technologies, will influence international labour flows, at the same time expanding labour market options for New Zealand workers who will be able to market their services in cross-border labour markets.

- Increased labour productivity will be required to keep pace with our global competitors and to compensate for reduced labour force growth.

- New technologies will also continue to drive demand in skill requirements. There will be an increased demand for higher education and for skills which are more generic. At the same time, there will also be more demand for low-skilled service jobs. More jobs will require continuous updating of skills and knowledge.

- The nature of work itself will continue to evolve, with more employees experiencing frequent transitions between jobs and occupations and being employed in non-standard work arrangements.

- Environmental pressures, particularly climate change and emerging resource constraints, will play a larger role in technology and skills

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[16] European Trade Union Confederation. 2007. *Climate change and employment: Impact on employment in the European-Union-25 of climate change and CO2*.

[17] United Nations Environment Programme. 2007 *Green jobs: towards sustainable work in a low-carbon world*. Preliminary Report.

development. Although overall employment will not change considerably, the move towards a low-carbon economy will require new skills and considerable labour market flexibility to allow New Zealand industries to take advantage of new opportunities.

In a future labour market where skills and flexibility are fundamental characteristics, the New Zealand Skills Strategy[18] will provide a key opportunity for setting out the challenges and opportunities to support future increases in economic growth through improvements in labour productivity.

[18] Visit the NZ Skills Strategy web page at http://www.skillsstrategy.govt.nz/ for more information.

New Zealand Government

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