How technology is impacting on work - Implications for NZ’s future and policy.

1.0 Introduction

Technology is transforming vast numbers of New Zealand jobs. Many existing jobs will be replaced by computers and automation. Work done in entirely new technology businesses, the huge range of knowledge and media endeavours, the factory floor, and even family businesses have been reshaped by new pathways to information and new ways of selling goods and services. For most office workers now, life on the job means life online. For New Zealand whole new challenges are emerging as prosperity increasingly attaches to technology.

This paper looks at how technology is impacting on the world of work in New Zealand, the challenges and opportunities that are emerging, and the possible options for addressing them. Measures to improve the rate and value of innovation are dealt with in other papers.

This is one of six papers that are being produced as part of Labour’s Future of Work Commission. The others cover the Security of Income and Work, Education and Training, Māori, Pasifika, and Economic Development and Sustainability.

These papers are designed to stimulate discussion and generate ideas for policies to achieve the objectives of the Future of Work Commission:

- Decent Work
- Lower Unemployment
- Higher Wages
- Greater Economic Security
- High-Skilled, Resilient Workers

The Future of Work Commission seeks to ensure New Zealanders can confidently face the changing nature of work and have sustainable, fulfilling and well-paid employment in the coming decades.


Authorised by Andrew Little, Parliament Buildings, Wellington
2.0 How Technology is Impacting Work in New Zealand

2.1 NEW ZEALAND’S DIGITAL ECONOMY

The technology sector is New Zealand’s fastest growing sector and supports tens of thousands of jobs. Exports have doubled over the past six years and are now worth more than $6 billion. Within this, the digital economy and the weightless sector is now estimated to be worth $1.3 billion. It is the country’s third largest export earner behind dairy and tourism and touches on every other major market segment.

All around us massive leaps in technology are redefining frontiers of productivity. While some progress is being made in the fast growing ICT sector and there are promising areas of research, New Zealand continues to under-invest in research and development and is in danger of being left behind.

Technology is having an uneven impact on the nature of work in New Zealand. Recent research shows that small and medium sized enterprises are missing the tech wave with most stating it has little to no impact on their business. The Productivity Commission has found our businesses are not adapting their structures as quickly as their overseas counterparts.

New Zealand lacks a vision for how technology will support a smarter, higher value and fairer economy. There is no widely held, compelling vision for how New Zealand’s economy and society could guide choices about the future of work, or how society should adapt to massive technology change. Nor is there a roadmap of sound policy choices that will future-proof us and fulfil our potential as a small, smart country. To date, addressing the issues of disruptive technology change to business and jobs has been reactive and slow.

We have the opportunity to be extraordinarily successful at “riding the tiger” of innovation, if the vision, strategy and investment exists.

2.2 WORK AND WORKERS

Wages and salaries in the ICT sector are twice the New Zealand average and are growing at a faster rate. Yet the sector faces an officially declared long-term skills shortage.

A recent NZTech member survey suggested there was a deficit of around 10,000 jobs. These are creative thinkers and business analysts who can help transform our businesses and institutions and make us a digital tech-savvy nation.

Workers of all generations want flexible working conditions and a flexible working environment. Younger workers rate flexible conditions twice as important as other work factors. Yet organisational practices are lagging behind technological change.

Employers are often concerned about the costs flexible work can create and the additional management skills needed. There are also negatives to remote working such as loss of career and training opportunities and social isolation which need to be tackled.2

There has been considerable growth in digital work hubs – often called co-working – in our cities. Many of these hubs and co-working places are in city centres with a focus on highly curated, collaborative, innovative spaces (Biz Dojo, EPIC in Christ church, Waikato Innovation Park, Dunedin Centre for Innovation). We need such hubs in our provinces too.

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3.0 EMERGING CHALLENGES AND OPPORTUNITIES

3.1 JOB LOSSES

Computers, robotics, and automation are driving more and more of production. In turn this is leading to an enormous impact on the number and type of jobs. An Australian report released in June 2015 found that 40 per cent of the Australian workforce – or around 5 million jobs – are at high risk of being replaced by computers.

In the next 10-15 years. This backs up the Oxford Martin School’s 2013 study finding 47 per cent of jobs in the United States are at risk of being automated using artificial intelligence. We need to move urgently from a discussion about protecting the jobs of today, to creating the jobs of the future.3

3.2 COMMERCIALISATION AND INNOVATION

There are significant emerging opportunities and challenges for commercialisation and innovation resulting from technological changes to becoming a more sustainable, broad- based economy:

1. Reducing the tyranny of distance, boosting trade and creating new business models but also promoting outsourcing of work overseas.
2. Internationalising labour markets are expanding the skilled labour pool.
3. Developing commercially functional goods and services from new technologies often takes a lot longer than expected.
4. Leveraging clean technologies to improve sustainability.
5. Fostering entrepreneurship and addressing constraints for Kiwi companies.
6. Addressing slow uptake of new technology due to redundancy risks or ease of sticking with the status quo and supporting workforce mobility.
7. Managing business change in a disruptive and dynamic business environment.

3.3 ON-DEMAND ECONOMY

Stable, permanent fulltime jobs are increasingly being replaced by an anywhere, anytime work model, facilitated by digital technology which is resulting in a shift towards more contract work and a more rootless and flexible workforce.

The “on-demand economy” is the result of pairing that workforce with smartphones and other devices, which now provide far more computing power than the desktop computers which reshaped companies in the 1990s, and reach far more people.4

The on-demand economy is starting to revolutionise commercial behaviour in cities around the world. Fast-moving tech companies competing in this arena have developed new models – such as Uber, Handy and AirB&B – that are transforming industries which have been historically slow to innovate. Transportation, grocery, restaurant and personal service industries are seeing hyper-growth in the on-demand world.5

However this means a growing gap emerging between workers and their ultimate boss. Ensuring workers retain their voice within their company is crucial to ensuring new business models remain responsive. Emerging technology provides more ways than ever to ensure that this remains possible.

The on-demand economy gives consumers more choice. Consumers may be winners, as can workers who value flexibility over security such as younger workers, those with portable skills in demand who attract higher wages, or those who don’t want to work fulltime.

But those who value security over flexibility, have families or have mortgages are all threatened. In addition, there are inequities for those who work in the on-demand economy but do not qualify for superannuation and other benefits. Care is needed to minimise the impact of change on employment rights and health, safety and environmental protections. Smart policy makers can’t stand in the way of change. We can’t outlaw on-demand firms. But we can improve the ways in which we measure employment and wages, and we must stop treating contractors and freelancers as second class citizens. In effect every contractor is a small business with the insecurities, demands and potential that goes with that title.

### 3.4 REDEFINING WORK

Increasing use of digital business models alongside automation and computerization of jobs will see organisations shift to a smaller number of highly skilled people with scarce skills working in very different patterns, in order to enhance their competitiveness. Risk and change management will be crucial to ensuring success here. This has implications not just on how we manage work but also on the quality of life for our workforce. An AUT study into mobile technology found it contributes to irregular patterns of work, amplifies social pressures making boundaries between work and non-work indistinguishable, brings more work into personal time, and speeds up the way organisations function. Defining when a person is working and when they are not will be an increasing challenge.

### 3.5 ACCESSIBILITY

Cheap computing power is transforming the way consumers and workers access technology as even more sophisticated and powerful hand-held smartphones become available. This eliminates some of the barriers for how work is done. Complex tasks such as programming a computer or writing a legal brief can now be divided in component parts and subcontracted to specialists around the world. It also gives greater flexibility – providing an opportunity for workers and workplaces to create flexible working arrangements.

### 3.6 BIG DATA

Big data is changing the way big business operates. Big data involves data collection and mining to ascertain consumer preferences and behaviour trends that assist companies to customise their offerings and specifically target their markets. Prompts on Amazon.com for related book titles are one example of this.

Big data creates new markets and new opportunities. It also drastically increases privacy risks and raises issues of resilience of cloud based applications and storage to hacking and other vulnerabilities.

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7 Ibid.
Our education system will need to adapt. There is a tension between a model of education which is aligned to current industry demands churning out work-ready drones who will ‘hit the ground running’ and a model which enables rounded professional development and boosts worker’s capacity to learn and think in a world where creative and critical skills are at a premium.

New Zealand is rolling out ultrafast broadband which is transformational. However there are roadblocks to UFB roll-out and uptake. There are huge opportunities for smaller geographically distant countries like New Zealand where IT has reduced the tyranny of distance.

Many people and businesses still lack basic access to broadband particularly rural, Maori, and Pasifika communities. The cost of access to the internet, digital devices, and big data also means many small businesses and lower income households miss out. This means some of our kids don’t get the education they need because they can’t access the internet at home, our small businesses are held back and too many New Zealanders miss out on their right to enjoy access to emerging technologies. Technology is now essential to modern life and learning. This divide applies not just within society but between countries and New Zealand must ensure it remains on the winning side of that divide. We are failing to deal with the growing digital divide. We are losing ground because of lag in the ultra-fast broadband rollout. Schools, businesses and homes need access to high speed internet as soon as possible while free WiFi access in more community areas would do much to bridge the digital divide. Options like Google’s Project Loon to use high-altitude balloons to deliver internet to rural areas also need to be explored further. 8

Our challenge is to work out how to lift New Zealand’s future economy beyond it’s current struggle with technological developments and make it a pathway to success. Our best approach to the future of work is to create jobs – that is also our best chance of preserving existing ones.

Technology is an enabler of education, adaptability, agility and competitive advantage. It has a central role in our economy. It is having profound effects on our behaviour, interactions and communities.

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8 More information on Project Loon can be found here: http://www.google.co.nz/loon/where/
The pace of change is coinciding with an explosion in computer processing power, mass connectivity amongst a high proportion of the population, globalisation of supply chains and an ageing population willing and needing to work longer coupled with increasingly high youth unemployment.

We are entering an era of technological unemployment different to past eras where leaps in technology displaced workers but also created new kinds of work, better quality of life and productivity gains. The burning question is whether today’s innovations continue that or displace workers without creating opportunities to employ them elsewhere?

The role of government becomes essential with important challenges around the redistribution of incomes and ensuring the state maintains a share of the intellectual property it protects in order to address rising inequalities.

Agility is critical to both business and government so they can both respond swiftly to change but also create change. It will also be essential within the public sector to improve public services and to facilitate new models of social entrepreneurship.

We need a nationwide strategy for New Zealand that will make us a highly prized boutique nation of tech-savvy businesses, with a joined up and efficient public sector and a tech-capable workforce where there is no such thing as a digital divide. Where everyone, no matter their background, age, ethnicity or geographical location, has access to technology and opportunities to develop and realise their potential and access important services to lead fulfilling lives.

At the moment, there is no roadmap for our digital future. Our kids are leaving school ill-equipped for the digital environment or aware of career options. Our nation’s small businesses are too busy keeping their heads above water to take advantage of the immediate productivity gains from an online presence.

The opportunity for New Zealand is to shape and sustain the technology sector to build higher value jobs, create opportunities and to sell our brain capital to the world.

Success is ensuring that technology is delivering decent work and higher wages for Kiwis. For public policy makers, there are ‘good bets’ in terms of Government investment in R&D and education. But there are no guarantees that specific technological applications developed here will become the market leaders.

Government investment therefore needs to take both a strategic (where are we headed) and tactical (what can we do now) perspective to its policy and funding. It also means that investing in blue skies research with the potential for IP development is therefore just as important as backing specific applications.

4.2 QUESTIONS AND IDEAS

What are the likely technology industry trends that will impact us?

- Nano, 3D, immersives
- Clean tech, biotech, biology based technology
- Potential consumer shift to Organics, traceability, carbon miles etc
- Online experiential technology, gaming
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<th>How can government play a leadership role in supporting a high growth technology sector?</th>
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<td>• Establish a Chief Technology Officer akin to the Chief Science Officer to advise the Prime Minister.</td>
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<td>• Ensure MBIE and Statistics NZ collect and analyse data for the Innovation and ICT sector</td>
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<td>• Support for research and development</td>
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<th>What do we need to have to support the development of new digital business models?</th>
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<td>• Understanding of workforce needs</td>
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<td>• Competitive online environment</td>
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<td>• Resilience, security, privacy concerns</td>
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<td>• User confidence and capability</td>
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<td>• Competition loopholes</td>
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<th>How do we encourage flexible work practices that ensure employees are still protected and supported?</th>
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<td>• Create digital work hubs</td>
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<th>What will best ensure we have a highly skilled, resilient workforce to tackle new technology?</th>
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<td>• Teach coding and basic programming in schools</td>
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<td>• Teach the teachers to teach tech</td>
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<td>• Career development for digital workforce</td>
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<td>• Digital apprenticeships</td>
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<td>• Immigration policy</td>
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<th>How do we ensure digital infrastructure (broadband) is fit for purpose in both urban and rural NZ?</th>
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<td>• International connectivity</td>
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<td>• Resourcing communities to improve connectivity</td>
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<td>• Ensuring affordability of fast broadband</td>
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<td>• Ease of access</td>
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How can we bridge the digital divide which is affecting those who cannot afford access, or who are constrained through geography, age, disability?

- Building individual capability, useful or desirable content, and ubiquitous connectivity
- Community benefit requires participation, clustering
- Free Wi-Fi in community centres
- Better infrastructure

What sort of regulatory framework do we need for big data?

- Ensure consumers are protected and firms maximise productivity

How do we encourage, sustain and mature our technology innovation?

- Protecting software from patent restrictions
- Freeing up venture capital, crowdfunding
- Improved R&D
- Interest free loans for start-ups
- Government procurement targeted to small businesses

How do we reduce the negative social impacts of technology?

- German model limiting contact outside working hours
- National training strategies to retrain workers losing jobs
- Singapore Sectoral Manpower Plans for long-term planning and retraining