Submission on NZPC Issues paper: *Technological Change and the Future of Work*

This paper provides TEC's view on the New Zealand Productivity Commissions' (NZPC) Issues paper for its inquiry into Technological Change and the Future of Work. It responds only to questions that TEC has interests in.

Detailed responses to the relevant questions are provided in the Appendix. An overview of TEC's views on the tertiary education changes required to support New Zealand in responding to technological disruption is provided below.

Overview

Responding to technical changes from a knowledge and skills perspective requires action in the following five areas. All five areas are currently subject to sector-wide consideration and work is required to further explore appropriate policies, interventions and initiatives. The NZPC's paper is thus timely and welcome.

Increase focus and support for lifelong learning beyond transition points

› The changes caused by digital disruption will include jobs being replaced by automation, changes to the skills required to complete tasks and jobs and the increased importance of soft skills (particularly relationship and critical thinking skills).

› These changes will occur throughout a person's lifetime, and ensuring they remain relevant and in work will require constant learning and upskilling. Our current system of front-loading education is beneficial but not sufficient to sustain a person throughout their life.

› Significant changes will occur within jobs. A quick analysis of civil engineering jobs indicates that over the last five years, up to 40% of the top 20 skills required for an engineer are new or have significantly changed in importance. These include new technical skills or competencies, as well as a higher importance being placed on soft skills such as teamwork, leadership and mentoring. This means for people to remain in their current roles they will need to continually upskill and acquire new knowledge. It places greater importance on developing a flexible, highly effective and efficient in-work learning system that fits time and cost constraints and meets the needs of employers.

› Such a system will encompass greater use of micro-credentials and will need to take into account prior formal and informal learning.

› Our current system focuses on providing support at the point of redundancy. A more effective system would be to ease such transitions by ensuring people are prepared and interventions occur prior to a catastrophic event. This would help individuals avoid a large dip in income and a prolonged career recovery.

› Young people's expectations are formed early and can be constrained by their environment. Youth in communities that are particularly at risk of digital disruption have the most to gain from a wider frame of reference. This includes directing them to more future-proofed interest areas, skill areas and jobs.

› The current Reform of Vocational Education (RoVE) proposals are designed to improve the effectiveness and efficiency of in-work training through better industry input into this training.

In order to promote and enable lifelong learning as a means to cope with digital disruption, the education and careers sector will need to recalibrate and realign itself to a different paradigm.

› The system will need to move from a high focus on front-loaded start-of-life education to one which encompasses an all-of-life education philosophy.

› Degrees and other qualifications will move from the current one-off continuous period/multi-year qualifications to those which are broken into smaller period units, eg, mini, maxi, micro-credentials.

› The current funding system will need to become more flexible, agile and nimble with an ability for investment to be quickly and easily redirected to more relevant areas and courses as the economy shifts and is disrupted.

› The current "theory first, practice later" courses may need to move to a "practice first, theory later" approach in which learning first focuses on immediately applicable, practical skills (including digital literacy) that boost employability and success in the workforce. Once practical experience is built, this would be augmented by more advanced up-to-date skills, and following this, more holistic, theoretical elements.

Enable people to make optimal learning and career decisions throughout their lives with better career services, individualised tools and information on post-study outcomes.

› In order to make better career decisions, people need timely, easily accessible information on options and pathways. This information needs to take account of an individual's situation and background, and provide personalised pathways highlighting next steps. Learning options – such as courses, places of study, types of study – and information on various forms of support and funding available are also needed.

› In addition, people need transparent and relevant information on post-study outcomes at a job, course and institution level.

› Providing quality post-study outcomes (PSO) information to learners requires effective and accessible learner information and careers services. Learner study choices can also be enhanced by more sophisticated and coordinated skills forecasting.

› The potential pathways in and through learning and employment need to clearly show all users the steps required to achieve an outcome and what they need to do next.

Increase the level and applicability of knowledge and skills, both foundational knowledge and also specific digital knowledge.

› The *Hidden Links, New Opportunities* study states that "jobs in New Zealand, even when in seemingly unrelated occupations, have more in common than people may think. The core skills demanded by employers often overlap, meaning that a range of occupations – be it a chef, mechanic, farm manager or lawyer – share a surprising number of skills." This means there is the potential for people to be far more mobile within the labour market. For this to happen, the labour market and skills ecosystem needs to create a mobile, agile workforce where:
  - learners/employees have a greater scope of opportunities than they realise
  - employers have a far larger talent pool to tap into
  - the education sector creates skill-bridging qualifications and micro-credentials

- Government agencies ensure operational and policy setting support and enable workers, employers and education providers to be far more agile and responsive to potential disruption.

› To remain current within their roles, and to ensure their skills and knowledge will continue to be valued, it is essential for everyone in the system to develop and retain their ability to learn throughout their lives. Evidence shows that people who have undertaken higher-level education are more likely to continue to take up learning opportunities throughout their lives.

› For many New Zealanders their learning journey will start with focusing on the foundational skills of literacy and numeracy. By increasing their foundational skills, those New Zealanders will be more able to take upskilling and reskilling opportunities offered by their employer or a provider.

› The courses, programmes and services offered should support both the imparting of new technical skills and the deliberate development of the core soft skills which are increasing in importance.

Increase awareness of digital disruption and its relevance to people's lives

› Research by TEC in 2018 indicates 63% of people have given little serious thought to digital disruption. Further, in talking to respondents, many were concerned for their children but not for themselves.

› This indicates people's expectations and time horizons may not be realistic, leaving them vulnerable to changes occurring much faster than they anticipated.

› Increased awareness will need support from across the sector.

In addition to these five areas, TEC believes it may be useful to explore New Zealand's ability to proactively capitalise on digital disruption in a way that bigger nations cannot and thus create a competitive advantage.

› New Zealand is small, and its weakness is also its inherent advantage – it is structurally more agile and nimble – easier to strategically pivot than larger nations.

› Can New Zealand monitor and anticipate disruption (it is likely to happen in other more advanced digital-leading countries first), and respond proactively, in a strategic manner? Examples of how this can be done include:
  - shifting people into sectors that have or could have an inherent advantage due to unique national resources and assets, eg, food and fibres, tourism and filmmaking
  - taking advantage of the disruption to make a once-in-a-generation recalibration of New Zealand's portfolio of skills and capabilities instead of merely coping with the change.

Appendix: Responses to questions

Q1: Are the scenarios developed by the Commission useful for considering the future labour market effects of technological change? How could they be improved?

1. All scenarios are subject to uncertainty and can only be aids to thinking. The scenarios are good at triggering thinking, and allow exploration of both the positive and negative aspects of change.

2. Scenario 2 posits greater sharing of existing jobs and increased employment protection for those in work. This suggests something akin to a "lump of labour fallacy" that has been discredited in economics.

3. Scenarios 1 and 2 appear to ignore the contribution of human capital. A significant portion of productivity growth stems from information-based goods, intangible skills and intellectual property, and not purely industrial plant, equipment and natural resources.

4. The scenarios could be strengthened by more explicitly exploring how technological change can work to New Zealand's advantage and the opportunities to leverage these on the international stage. In addition, the scenarios could address the capabilities people need in order to benefit from technological change and how distributional consequences can be managed.

Q2: What other consequences might be expected under each scenario?

5. Demographic trends will affect all scenarios and influence how we respond to them. For example, an ageing population increases the need to focus on upskilling to sustain the labour market participation and productivity of older workers. It also requires higher economy-wide productivity gains to maintain living standards in the face of a rising dependency ratio.

Q3: How might the impacts of each scenario vary across different groups in society or across different locations in New Zealand?

6. Evidence from TEC's work on the Careers System Strategy indicates that almost half of New Zealand's workforce either have no education credentials or are at Level 3 or less. They are at higher risk from digital disruption as they lack the skills and resilience to navigate and adapt to the changes required. People with school leaver credentials also tend to earn significantly less than people with vocational training. Furthermore, children in hardship are likely to continue the cycle of low education and skills unless their aspirations and motivations are changed.

7. Core groups who are most at risk and who will be less able to respond to the changes and impact of digital disruption are people from low socioeconomic backgrounds (many of whom are Māori and Pacific), people with disabilities and people who are not in education, employment or training (NEET). Others at risk include older learners whose skills are becoming outdated, and people in regions where there is a lack of depth and range in tertiary sector provision. These groups lack the resources and resilience to absorb the impact and navigate the changes.

8. In addition to the impacts on different groups, it would be useful to consider the potentially disproportional impact of digital disruption to certain jobs and demographics, and the flow-on effect on existing undisrupted sectors. For example, there are not enough undersupplied sectors to absorb disrupted workers, and the absorption will come at a high social cost to displaced families.

Q15: How might the effectiveness of active labour market policies (ALMP) change under the future scenarios? What changes would be needed to the design of active labour market policies under each scenario? What other active labour market policies might be needed?

9. Good foundational skills provide the base for ALMP initiatives to be effective. Without literacy, numeracy, digital and critical thinking skills, individuals lack the ability to access and take up the opportunities provided by ALMPs.

10. The international literature suggests job search initiatives based on better information and labour market matching services are typically more successful than centrally-planned retraining of displaced workers for employment. Further, the research indicates governments would be better off investing in encouraging active career management earlier rather than at the point of redundancy. This indicates that a key plank with ALMP should be high-quality careers system information and services along with associated labour market information.

11. The current system focuses on transition points, including redundancy. However, there are high costs in terms of loss of income, lower earnings when back in work, stunted career trajectories and a raft of mental health issues associated with redundancies. A greater focus on building transferable skills and lifelong learning to maintain work-skill relevance could smooth transitions and mitigate these outcomes.

12. Given the importance of acquiring and maintaining relevant and up-to-date skills in a rapidly changing world, a broader view of the initiatives which comprise ALMPs could be useful. For example, initiatives which support people to invest in lifelong learning are worth exploring. Examples of such initiatives in other countries include Individual Development, Personal Learning and Lifelong Learning Accounts. In the New Zealand context, such initiatives could be linked to learner achievement records and past learner consumption of taxpayer-funded education.

Q17: How well do the current outcomes from the education and skills system position New Zealand to respond to changing technology and different future scenarios?

13. While adult literacy and numeracy scores have slowly increased over the past two decades, we continue to see many adults with low literacy, numeracy and problem-solving abilities. Around 12% of adults can only perform basic literacy tasks, and 19% can only perform basic numeracy tasks. Acquiring the new skills necessary to respond to digital disruption relies on people having basic literacy and numeracy skills, and for the 12 to 13% of people who do not have these skills, the system is not positioning them for the future.

14. New Zealand generally has high numeracy and literacy OECD rankings. However these figures mask significant variance, with tertiary providers and schools often underperforming for people from low socioeconomic backgrounds, and Māori and Pacific learners.

15. The current Reform of Vocational Education (RoVE) indicates that the system is split and does not always meet the needs of learners, employers and rural regions. As a result, learners are confused and have difficulty entering, progressing and transferring across the system. Employers are concerned that those in the system are not acquiring the technical and employability skills required to function in the workplace and that learners are kept off the job in learning for longer than they need to be. These concerns have led to the RoVE proposals that the government is currently working on.

Q19: What, if any, further measures are needed to improve skills among adults with low proficiency to enable them to successfully participate in any future labour market?

16. Foundational education such as literacy and numeracy is best delivered from early childhood on, rather than at adult level. However, there is still a need for foundation-level education for adults. With many in the population lacking core literacy and numeracy skills, improvements in the effectiveness, range and quality of support for adults to access foundational skills training are needed.

17. Current research indicates barriers to accessing learning (in terms of time, cost and location), and a lack of understanding and ability to navigate the variety of different education and career pathways are holding people back from making optimal choices and participating as fully as they could.

18. Course completion rates are particularly low for Māori and Pacific learners. Research and anecdotal evidence indicates that greater pastoral care of these students early on has significant benefits. System incentives need to be put in place to encourage institutions to emphasise pastoral care and invest in the data and analytics to quickly identify those who need support.

19. TEC is currently working on a range of tools and interventions to support people to participate in learning and to transition successfully into the labour market. Successful participation is based on a myriad of factors, and as a first step TEC is undertaking market research to understand the needs of different segments of the learner population. Any interventions will be designed based on a sound understanding of each segment.

Q20: What evidence is there of digital divides in New Zealand? What are the consequences for labour market participation and which groups are most disadvantaged?

20. Evidence suggests people from low socioeconomic backgrounds, older people, and people in some isolated rural areas are less engaged with digital technology and less able to create value from it. However, the term "digital divide" is too simplistic. Many people have good digital access and are well-connected to social media and gaming. However they may not use digital skills for productive learning or as a work/business tool, and as a result may face a higher threat of redundancy and greater difficulty in gaining future work, particularly at the same level.

Q21: What, if any, further measures are needed to address any digital divides in New Zealand?

21. There are many local and community-oriented IT access and literacy initiatives. However, there is little hard evidence on what works best and no systematic way of identifying and mainstreaming at scale the best-performing initiatives. A more outcomes-oriented, strategic and government-enabled process may be needed. This could include specific, focused initiatives, for example, working with iwi in a post-Treaty settlement context to lift whānau digital capabilities.

22. Over and beyond existing initiatives, the digital divide can be addressed through having more upskilled and IT-literate teachers, promoting home internet access, and developing and delivering to New Zealanders the core capabilities needed for digital inclusion and information literacy.

Q22: What factors underpin New Zealand's apparently poor matching of skills with jobs? To what extent are mismatches a problem?

23. A key factor in mismatches is weak vocational pathways. This includes pathways high-level professional careers as well as trades careers. The proposed RoVE reforms are intended to give industry a greater voice in the skills training which will then improve the flow of students with appropriate skills and ensure better skills matching.

24. The financial incentives created by the current funding model – which is based on funding equivalent full-time students (EFTS) rather than post-study outcomes or labour market matching – can pull tertiary education organisations (TEOs) towards attracting enrolments to current course offers and retaining students, rather than directing students to areas of future high skill needs.

25. Learners' study decisions are not always well informed by the post-study outcomes of various career options. We need both a better mechanism to capture and analyse post-study outcome and labour market insights and a better mechanism to share this information with learners.

26. Various officials' forums and research articles (for example the Tripartite Future of Work Forum) have posited a variety of different reasons for New Zealand's poor performance in skills matching. One example is the structure of our economy and its reliance on the primary sector. TEC is currently focused on developments to ensure that the information provided on skills pathways is easily accessible, transparent and has relevant content. Providing information, raising aspirations and creating awareness of options and pathways will enable individuals to make optimal decisions. The longer-term aim is to provide individualised online pathways which illuminate a variety of options tailored to an individual's specific situation.

Q23: What future scenarios are most likely to accentuate poor matching? What policy options are available to improve matching in the New Zealand labour market?

27. A scenario that would accentuate poor matching would be technological change moving so fast that our tertiary system (and perhaps occupational regulation) cannot keep pace. This means there may not be clearly articulated industry demand and regulatory signals for the system to respond to. Options to deal with this include adaptive, transferable foundational skills; speed and flexibility in qualification development; and innovation in how education is delivered, assessed and certified.

28. A recent report on the "hidden links" between different jobs and skills highlights the transferability of skills across roles. The current system focuses on roles and jobs rather than building skills and understanding how these skills can transfer across different roles. The changes needed to move to a skills or competency-based model span the entire sector and include changing values and attitudes within the recruitment industry, employers, education providers and government agencies.

Q24: How well does New Zealand's education and training system reflect the changing skill needs of industry? Is the education and training system able to effectively respond to changing technology and different future scenarios?

29. New Zealand appears to be an OECD outlier in weak matching of skills to industry demand. This suggests that our education and training (and perhaps our immigration) system do not respond well to skill needs. One issue is that in a small economy, new skill needs may not generate the volume demand required for TEOs to develop new qualifications and programmes in niche areas. In some cases, this can be addressed by new qualification design, such as micro-credentials; in other cases, immigration settings may need to change.

30. Overall, the education and training system can respond to different scenarios with better learner information and careers services, and more system flexibility and innovation in qualification design, pedagogy and delivery modes.

31. The recent RoVE work indicates the current system is relatively siloed, and it is difficult for learners to easily move around and across the system. The system also does not coordinate and collaborate particularly well, and as a result, the main institutions develop their own offerings in isolation.

32. New Zealand's economy is based on small businesses (many micro by international standards). These businesses are focused on ensuring they meet customer demands and remain afloat. As such they often do not have the time, information or access to future signalling to forecast future skills needs. In this situation there is a role for government agencies and large tertiary education institutions (TEIs) to coordinate and support in skills forecasting.

Q25: What programmes exist to support people to retrain, upskill or adapt to changing technology, and how effective are they?

33. Most training related to digital upskilling is in-work professional development, which is mainly firm or industry-funded and delivered. This includes professional courses delivered by TEOs on a fees-paying basis. The Government's recently launched digital blueprint indicates that New Zealand (and the supporting digital skills training system) still has some way to go in building the digital skills needed for the future.

34. TEOs also provide publicly-funded certificates of proficiency and training schemes. These are small learning packages that meet a specific need rather than full qualifications. They can respond to a need created by occupational regulatory change, technological developments or changing workplace practices. The 2018 Digital Skills Forum report forecasts significant skills shortage and indicates that the current programmes will not deliver for NZ's future needs.

35. Micro-credentials support lifelong learning and can also facilitate recognition of prior learning (RPL), for example, through the Edubits system pioneered by Otago Polytechnic. NZQA and TEC have developed new regulatory and funding policy settings to support micro-credentials for upskilling purposes.

Q26: How well-equipped is New Zealand's education and training system to support people to adapt to technological change over the course of their careers?

36. Foundational initiatives are currently being deployed. For example, moves towards a more flexible and responsive NZQA system, ongoing development of RPL and micro-credentials, and advances in blended delivery and e-learning all contribute to enabling more relevant and accessible digital training. However, these alone will not provide New Zealand with the required digital skills envisioned by the Digital Inclusion Blueprint or fill the gap forecast by the Digital Futures Forum.

37. The proposed ROVE reforms are designed to improve the vocational system, ensuring it delivers more equitable outcomes, and the volume of students with the vocational skills New Zealand needs for the future.

Q28: What changes are needed to provide prospective students, including adults and those already partway through a career, with the skills needed to make informed decisions about education and careers?

38. We need to give learners and workers the best possible information on returns from education and training, labour market demand, job and career prospects, and the learning pathways available to them. This information must be timely, clear and robust enough to be acted on. See the comments on TEC's Careers System Strategy in response to Q22 and Q23 above.

39. A number of improvements have already been covered in this response. However, there is also merit in investigating how digital literacy and the capability to solve problems in technology-rich environments could be fostered in a wide range of settings, such as at home, at work, and in the community.

40. In addition, improvements and changes to the current vocational system could include making better provision to formally recognise prior learning and learning achieved through a variety of formal and informal means (including on the job). This would prevent duplication, ensuring that learners access the training they need to increase their skills (and not just qualify existing skills).

Q31: What changes, including to government funding of R&D, might be needed to improve the returns to firms from innovation?

41. Better links between university research and firms, including through joint research can improve the returns from innovation. TEO (especially university) research efforts are driven by an incentive structure created by the PBRF and the Marsden Fund, as well as by Centres of Research Excellence (CoREs) and MBIE-funded research. Industry has a relatively weak influence on university research directions, except in some areas of strength such as in food and fibres research.

42. University researchers bear high administrative and compliance burdens, and are particularly driven by publications, citations and world rankings more than their contribution to technological innovation and national economic productivity. Encouraging more university focus on supporting firm-level innovation could improve both returns to firms from innovation and help better match skills supply to industry need.

Q32: What steps should be taken to promote technology transfer and build absorptive capacity in New Zealand firms?

43. Technology adoption, transfer and extension is influenced by many factors, including trade connections, customer relationships, market structure and dynamics, management capabilities, and links to universities and other sources of knowledge and skills. Universities which have good international linkages and are technologically ahead of New Zealand industry could be more active in fostering technology transfer and building absorptive capacity in firms.

Q33: What steps should be taken to strengthen the international connections of New Zealand firms?

44. New Zealand universities can help facilitate these connections. Postgraduate and other higher research functions deliver the "co-produced goods" of new knowledge and human capital, and much of this research has deep international connections. University research needs to be better aligned to New Zealand's needs and opportunities, better linked with industry and focused on clear pathways from science to technology that are developed and applied productively.