

Expert Review – Technological Change and the Future of Work

A review for the New Zealand Productivity Commission of its inquiry into technological change and the future of work

Kinley Salmon, July 2020

Summary Assessment

Overall quality

The inquiry is of a very high standard. The various outputs including interim reports, graphic summaries, and final report build a valuable picture of potential technological change in New Zealand and its likely effects on workers and the labour market. The inquiry draws on a wide range of relevant research both domestically and internationally. The latter, importantly, it interprets carefully with regard to New Zealand's economic and social context. The inquiry also provides valuable new research on areas such as occupational churn in New Zealand and the attitudes of New Zealanders towards the future of work. The broad conclusions – that New Zealand does not face an imminent threat of dramatic technological disruption to the labour market but that a number of policy changes are nonetheless needed – are convincing.

With the aim of providing feedback to strengthen an already high quality inquiry, this review considers some areas where it could have been improved. These include building a stronger case for action now, deeper analysis on the distributional impacts of technological change, a better fit between recommendations and the findings, and a reinforced effort to create widespread engagement with the inquiry.

Right focus

The outputs of the inquiry are directly relevant to the Terms of Reference. The two broad questions in the Terms of Reference – what is going to happen, and what can the government do to better position New Zealand – are the main focus of the reports. There are, however, two areas of the Terms of Reference that could have benefited from a more detailed treatment. The first is the near-term potential of some technologies which the Terms of Reference refer to as “the likely scale and pace of technology change, including across regions and industries.”

The second area is the distributional impacts of technological change. The Terms of Reference refer to “Identifying how technological change will affect different groups of workers.” The reports rightly underline the difficulty in assessing likely impacts given the uncertainty about the path of technology. However, greater analysis of New Zealand and international evidence on the recent impacts of technological change and a clearer discussion of the existing work arrangements and experiences of Māori and other groups in New Zealand and how they intersect with technological change could all have shed more light on these questions. A continuation of the scenario analysis in early interim reports could also have helped.

Good process management

The final report was produced on time and a number of interim reports, as requested in the Terms of Reference, were also published. The inquiry team also made time to engage in almost 50

meetings with stakeholders as well as a range of other workshops and conference. The interim reports, about which the Commission requested specific feedback, likely made it easier for detailed engagement by stakeholders and ensured that less was riding in terms of engagement and impact on the final report – a major benefit given the planned deadline and submission ended up in the midst of the covid-19 pandemic. However, producing an issues paper, five interim reports and a final report in just over one year may have been excessive. With a view to future inquiries, this risks tilting the balance too far towards taking public positions early on in the process and too far away from giving the team time to question more fundamentally the range of issues before taking a public position. For a similar length process, fewer and shorter interim reports could be worth considering.

High quality work

The work and analysis was high quality. The breadth and depth of research drawn on is impressive while the new research commissioned filled important gaps. The result is a valuable resource for thinking about the future of work in New Zealand. There are a few areas where the analysis could have been strengthened. Three are worthy of note. First, it would have been helpful to have a stronger framing and explanation of why the actions proposed should be taken by the government despite the report finding that dramatic technological change is not imminent. Second, more consistent use of scenario analysis could have helped address questions about which there is a high degree of uncertainty such as the skills impact of technological change and its distributional impacts. Third, there could have been a better fit between the findings of the inquiry and the emphasis of the recommendations, almost half of which relate to tertiary education which does not appear nearly as prominently in the findings.

Effective engagement

The inquiry team clearly engaged with a wide range of relevant stakeholders through meetings, workshops and conferences. The Futurework NZ blog was an admirable addition to normal methods of reaching interested parties. Responses from stakeholders were positive about the cross-section of parties engaged. Despite these efforts it is difficult not to conclude that the response from interested parties and the broader public was somewhat low. The number of submissions was the lowest of all but one of the Productivity Commission's completed inquiries since April 2012. This likely reflects overall interest in the various topics, but is still surprising. Public interest is difficult to influence, but it underscores the importance of effective outreach. This could be strengthened through greater use of existing media platforms to drive attention and interest to the Commission's output and findings as well as efforts to identify and engage stakeholders who might normally be missed, for example those who are younger and less connected to Wellington policy networks.

Clear delivery of messages

The outputs of the inquiry are well presented and clearly written. The A3 graphic summaries provide an excellent model for simple communication of complex ideas to a broader audience that could be replicated in other inquiries. This review identifies a few areas where communication could be further improved including shortening the length of some interim reports and reducing the number and ways of summarising the findings in the reports in order to have a more consistent narrative thread.

Having intended impact

The inquiry submitted its final report on March 31st 2020 and so it is relatively early to assess the impacts of its work. The report was submitted as concerns about covid-19 dominated almost every aspect of public debate in New Zealand. That made it more difficult for the important messages of this work to be heard. Covid-19 does, however, potentially change the terms of the political debate which may make action on some of the inquiry's more ambitious recommendations, such as changes to income support, more feasible. It certainly makes some of the recommendations more relevant – including income support and the need to adopt more rather than less technology.

Right Focus: the relevance and materiality of the final inquiry report in meeting the Terms of Reference

Overall, the Commission's reports squarely meet the Terms of Reference. The two broad questions in the Terms of Reference – what is going to happen, and what can the government do to better position New Zealand – are a clear focus of the reports. The eight sub-questions the Terms of Reference lays out are also in general well-addressed. There are two areas where it seems the Terms of Reference could have been more directly answered.

The first is that there was room for greater focus is on the near-term potential of certain technologies. The Terms of Reference include “the likely scale and pace of technology change, including across regions and industries, and the distributional impacts within the population.” The final report is particularly strong on the direct and secondary effects on the economy and society of changes in technology but its treatment of ‘the scale of pace of technology change’ is somewhat lighter.

This may reflect a broader divide in the debate about the future of work between economists and, for want of a better word, ‘technologists.’ Economists tend to focus more on economic and statistical evidence that is already visible while technologists often focus on the capabilities of specific technologies and how they could *in the near future* change the economy significantly. The Terms of Reference focus primarily on questions which economists are well placed to answer and thus the overall focus of the report is appropriate.

There was though, in my view, room to engage those with a ‘technologists’ mind set and arguments more strongly in the report. As this review will later discuss, the conclusions of the report are convincing. But a stronger discussion of the capabilities and progress of some specific technologies that could be influential New Zealand would have made the conclusions more robust still by demonstrating that the overall non-alarmist conclusions were arrived at despite a stronger engagement with arguments that claim the opposite – at least for some technologies.

A second related area where the focus could have been stronger was on issue 5 in the Terms of Reference “Identifying how technological change will affect different groups of workers, and therefore what are the appropriate types and levels of support required.” The specific challenges that Māori and Pasifika New Zealanders and other groups may face in the future of work are discussed relatively lightly. The final report notes that predicting the impact for individual groups is “all but impossible.” Detailed predictions would almost certainly suffer from false specificity.

Yet issue 5 could still have been more thoroughly addressed in a different way. One possibility would have been a discussion of the characteristics of those who have been adversely affected by technological change in the recent past both in New Zealand and abroad, and the extent to which

these characteristics intersect with the Māori or Pasifika population in New Zealand. This need not have been predictive (future technologies may be different) but descriptive facts of past experiences could have helped engage and prompt debate about ways to mitigate potential negative impacts and maximise benefits in ways that are specific to Māori and Pasifika (or indeed other groups).

Other extensions could have shed light, too. It would have been interesting to see whether Māori owned business show differences in the extent and speed of adoption of new technologies, the average size of the businesses which Māori and Pasifika work for or own (given the struggles small firms often have to adopt new technologies), and the sectors in which Māori and Pasifika workers are heavily represented. Even if we are unable to predict where technology change may arrive most rapidly, setting out the sectors in which, if it were to arrive quickly, Māori and Pasifika people would be most affected would have been valuable.

In considering the specific challenges for Māori and Pasifika the inquiry is strongest in its discussion of educational outcomes and, to a lesser extent, unemployment. Separately, the report finds that “Raising school performance to increase overall skill levels and close achievement gaps is important for young New Zealanders’ participation, adaption and success in the future labour market.” Given the well documented existing disadvantages for Māori and Pasifika in education and employment, and the clear conclusion on the importance of education, the report could have gone further to discuss and provide an (appropriately caveated) answer to whether this is a reasonable basis for expecting that Māori and Pasifika might have more difficulty than other groups in the face of technological change.

That would also have provided a strong basis for a discussion of whether any additional and specific efforts to support Māori and Pasifika young people for the future could be justified beyond the general support advised for all young New Zealanders.

Good process management: the timeliness and quality of the inquiry process

Overall process management was strong. The Terms of Reference were issued on the 25th of February 2019 and requested a final report by March 31st 2020. This was delivered on time. In addition the Minister of Finance encouraged the Commission to “publish a series of shorter reports throughout your inquiry.” The Commission did this, providing an issues paper on April 18th 2019 and five interim reports between the 12th of September 2019 and the 31st of January 2020.

The Commission was also encouraged to engage a broad range of stakeholders such as the Future of Work Tripartite Forum, NZCTU and others. By engaging almost 50 interested parties in meetings, attending 17 conferences and forums as well as receiving 85 submissions the Commission achieved this. It is also admirable that in its review process it has solicited interview-based feedback from a range of stakeholders including Uber, MBIE, and the former CEO of the AI Forum.

The Commission specifically requested a view on “the effectiveness of having shorter thematic or subject matter reports throughout the course of the inquiry, and a shorter (by our normal standards) final report.” These interim reports were of a high standard and provided an important vehicle to gather feedback on specific ideas from the broader public as evidenced by the fact almost half of the submissions received were on the interim reports.

There are also clear advantages to producing detailed reports, in terms of the specificity and detail that can be included, compared to using only presentations or workshops. Judging on the submissions on the interim reports this helped garner similarly detailed and specific feedback. From the perspective of generating engagement this approach appears stronger than the alternative of having more weight put on a longer final report.

Having a series of interim reports also reduced the disadvantage of having the final report arrive in the middle of the covid-19 pandemic. While the response to covid-19 does open a political window for some of the more difficult reforms recommended by the commission to be seriously considered, it is difficult not to conclude that the final report got less attention as a result of the pandemic than it might have otherwise. However, a range of policy makers and stakeholders had already seen important parts of the Commission’s findings thanks to the interim reports. This was a real benefit and interim reports reduce the risk that unexpected political events reduce the impact of the final report.

However, there is an important downside to this approach. The interim reports, including the first one, indicate fairly clearly the Commission’s views on a range of the core questions in the Terms of Reference. The pressure to publicly take a position on aspects of the terms of reference in time for the interim reports means that any inquiry team will have less time to consider evidence in order to come to a position that they are willing to state publicly.

In addition, the team produced five interim reports in a four and a half month period that also overlapped with the Christmas and New Year period. Getting each of those out to a publishable standard surely meant that more of the team's time had to be spent refining analysis to a standard that could be made public rather than stepping- back to ask fundamental questions. The tight time frame and length of each interim report is also likely to have reduced the ability of interested stakeholders to engage fully with each report.

The analysis is impressively deepened and broadened over the course of the reports but the core position of the Commission on many issues changes relatively little from the first to the final report. Even the issues paper, which was issued just six weeks after the Commission's Terms of Reference were issued, gives a strong foregrounding of the analytical frame and answers to some key questions. To be clear, as discussed elsewhere, I find the overall conclusions compelling. But this process does appear to limit the time for team members to have their minds changed by the evidence they are studying. That creates a risk that the existing experience and prior beliefs of team members have a stronger impact on the positions taken by the Commission than might be intended. Of course, the first report solicited feedback on questions and the team could have made an about face on major issues even once they were made public in the first report, but that tends to be harder and less likely.

Given the overall time frame, slightly fewer, perhaps three, interim reports might have allowed the balance between public engagement and fundamental research and analysis without the pressure of a public position already taken to be better struck. The first interim report (and even the issues paper) could have focused even more on asking questions rather than providing early answers. Engagement with the public through the blog and workshops, for example, also meant that there were still important opportunities for feedback even without the full number of interim reports.

High quality work: the quality of the analysis, guidance and recommendations in the final report

The overall work was of a very high quality. The reports draw on a wide range of studies and data and carefully build a clear and compelling case: that there is little sign of impending technological unemployment or massive changes to the future of work and that in fact technology can help New Zealand and New Zealanders, but that there are important steps that can be taken now to make the most of the possibilities ahead while minimising the potential pitfalls.

This section will outline a few high level reflections on the reports and then discuss some specific aspects of the final report.

Framing

The framing of reports for an inquiry with these conclusions is difficult. The Commission aims to both debunk alarmism about the future of work while also advising the government to make changes to a range of areas to better prepare for the future. Urging change, of course, would be easier if the Commission were arguing that technology *is* rapidly changing work in New Zealand and that sweeping change is upon New Zealand. The Commission makes the case that the evidence for dramatic change is weak. Despite its accuracy, the difficulty with this position is that it can make any subsequent recommendations easier to dismiss. Yet the Commission argues that a number of changes are needed, including some that would represent large alterations to New Zealand's labour market such as a rethink of income support for those out of work. In my view, this case could have been more powerfully made with some adjustments to the framing.

One framing option that would have been consistent with the overall message would be to have emphasized that while major technological impacts are not here yet New Zealand has a window of opportunity in which it can make changes to adjust before technological change does indeed arrive more significantly. Failure to do so now, such a frame could show, and it may be much more difficult to do so once technological change is more advanced.

Another option would have been to emphasize more strongly the costs of inaction on these matters by underscoring the costs today of low productivity growth, wage stagnation, and educational inequality. Both these cases could have been plausibly made in my view. In short, I think the Commission would have been well justified in more clearly outlining a 'burning platform' for change – even if it is not one created by robots at the gate – which would have added urgency to their recommendations.

Scenarios

The use of scenarios in the first interim report as a way of grappling with the uncertainty inherent in the future of work is effective. The scenarios help acknowledge uncertainty about the future

without relying solely on evidence from existing data, which is inevitably historical and limits the possibilities of a sudden change, or simply declaring it unknowable. The submissions received on the scenarios made a range of comments on how to use or expand them, but largely engaged with them as a useful tool. However, while the scenarios appear in the second draft report, they do not appear explicitly in the final report at all.

This is a loss. Their absence seems to be because the Commission comes to a clear position on the future in the next 15 years – that technological change is likely to be limited – such that scenarios were not seen as useful. However, in commenting on important aspects of the future of work such as the skills bias of technological change and the impact on particular groups within New Zealand of changing technologies, the final report also emphasises how unknowable the future is (pp.10 and 34.) Scenario analysis, considering a range of possible futures with different skills biases and impacts on particular groups, could have helped find a way to say more about these issues despite the uncertainty. Scenario analysis could also have highlighted policies that might be worthwhile across a range of scenarios.

This would have both allowed a more in depth analysis of issues with high levels of uncertainty (such as effects of technological change on specific groups and changes to the skills in demand) and made the recommendations that came out of the analysis more robust. Finally, it may have made the recommendations more compelling to the surely substantial group of readers who do not share the Commission's view (despite the convincing case laid out) that dramatic technological progress and major changes to work are a distant prospect.

Fit between findings and recommendations

The recommendations the Commission provides are clear and well-substantiated. However, the focus of the recommendations seems less well-aligned with the findings of the inquiry. Eight of the 18 recommendations in the final report relate to tertiary education. These eight recommendations seem individually logical and are among the most specific recommendations provided. However, it is surprising that they account for such a large share of the suggested actions given the report notes that “New Zealand adults on average participate in education and training at internationally high rates and have high levels of measured skills.” Figure 3.9 also shows that New Zealand has the highest adult participation in job-related education of any OECD country.

There are clearly many areas for improvement in tertiary education. Yet the final report read as a whole suggests the larger problems for facing the future of work are to be found in primary and secondary education overall (and inequalities within it), low productivity growth, weak technology adoption, poor firm management quality, gaps in income support in the event of job losses, and rigidities and costs in the housing market. Some recommendations are also provided in these areas, though they are largely less specific than those in tertiary education. The report would have been strengthened considerably by more specific recommendations on areas where the findings identified stronger problems than in tertiary education.

In some cases the absence of a recommendation is particularly surprising. Compared to tertiary education, the report identifies larger problems in school level education including both declining PISA scores and a widening gap and persistently poor outcomes for some young people, notably Māori and Pasifika. The final report includes a section, 4.2, that is titled “Address school system performance” but no specific recommendations are provided. Recommendations for other parts of the education system would have fit easily within the terms of reference which ask “How can New Zealand's education and training systems be more effective in enabling adaptation to technological disruption?”

It may be that in some areas there is simply no clear recommendation that can be well-established but in those cases it would have been worthwhile to call for further analysis, as recommendation 4.12 does with regard to income support.

Value of the additional analysis completed

The Commission specifically requested an assessment of the quality analysis leading to recommendations. Clearly the analysis is of high quality. The reports provide a great service by gathering together in a clear narrative thread a wide range of analysis on technology and the future of work from both New Zealand and abroad.

Especially valuable is the original research commissioned and the replication of surveys overseas that did not include New Zealand. These enable an analysis of New Zealand’s situation in a comparative context. The study commissioned from David Maré on occupational churn in New Zealand is an important extension of research overseas that provides one of the strongest pieces of evidence for the limited impact of technology on labour markets in New Zealand so far. The survey of New Zealand’s attitudes to technology, using a subset of questions from the European Commission’s survey, is another excellent piece of analysis that significantly improves our understanding of the broad picture on the future of work in New Zealand.

Impact of regulatory changes on technology adoption

In section 4.9 the final report touches on other regulatory changes, beyond those in the labour market, which could help increase the adoption of technology in New Zealand. This is a welcome section as policy options in addressing the future of work are often thought of as restricted to the domains of education and labour market and welfare policy. As the report notes the labour market may not be the most prospective area to look for regulatory changes that would encourage technology and support technology adoption.

The policy areas the final report discusses are each worth consideration but it is not clear how these in particular were chosen over others. Some criteria for selecting which other regulatory issues to discuss would have been welcome. Other areas such as fixing market failures in carbon pricing or immigration policy can also have substantial implications for technology adoption but are not mentioned, nor is their absence explained.

Overall, the impact of wider regulatory issues beyond labour markets and education could have been emphasized more strongly in the reports. Even among OECD countries there are large differences in the extent of adoption of different technologies as well as differences in the social and economic impacts of adopting technology. The use of physical robots in cleaning, care, and manufacturing, for example, is more common in Japan and South Korea than it is in the United States or Europe. Similarly, the impact of industrial manufacturing robots on exit from the labour forces and wages seems to differ between the United States and Europe.¹ Even within the USA, regulatory settings vary on issues from facial recognition technology to driverless cars and have influenced the adoption of early versions of those technologies.

Differences in technology adoption and its impact appear to be influenced by a wide range of policy settings in areas beyond education and labour market policy. The report effectively draws on overseas research but it would have been helpful to see a more explicit comparison of how different countries have regulated the adoption of new technologies and managed the implications and what lessons this provides for New Zealand. This is particularly relevant for New Zealand as technology adoption remains behind the frontier and so our initial experience may be of increasing adoption of technologies that are already more commonly used elsewhere.

Select other areas of analysis

In addition to the broad issues on the analysis discussed above there are some more specific points on the final report itself.

The discussion on how routine work has often been the most affected by technological innovation is interesting (pp. 9 & 10.) There are a range of analyses that argue that routine work is again likely to be among the most disrupted by future technological changes.² New Zealand is also behind the technology frontier and so will still feel the effects of technologies more widely used overseas that have already affected routine work elsewhere. Given both of these points, it would have been interesting to understand more why the Commission did not reach a similar tentative conclusion on routine work being the most at risk. That might have helped shed some light on the kinds of workers in New Zealand who may be at greatest risk of having their jobs impacted, which is a gap in the analysis noted elsewhere.

Relatedly, the discussion on page 10 then adds that a well-educated population is best placed to meet the challenge. I broadly agree with this, but partly because my reading of the evidence is that routine work remains at greater risk. Given the report does not make that case, I think it would have been helpful for the overall argument to detail more strongly why education remains

¹ For example see the contrast between Acemoglu and Restrepo's 2017 paper "Robots and Jobs: Evidence from US Labor Markets" <https://www.nber.org/papers/w23285> and Graetz and Michaels' 2018 paper "Robots at Work" on the impacts of the same robots in Europe

² For example this analysis from the UK Office of National Statistics <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/wichoccupationsareathighestriskofbeingautomated/2019-03-25> and this report from the OECD https://www.oecd.org/els/emp/wcms_556984.pdf

the best bet for the future of work. Especially given some analysts have suggested that a typical university degree may soon be redundant, or even that inherent human qualities such as caring and empathy (rather than the skill garnered after long years of study) may soon be more important.

The mention on page 12 of job polarisation not appearing in New Zealand is important and a fundamental difference with other countries. Among more sober commentators overseas such as David Autor of the Massachusetts Institute of Technology perhaps the biggest fear about the future of work is not mass unemployment but rather growing inequality and a hollowing out of the labour market with many people stuck in poor quality jobs. It would therefore have been helpful to understand more about how robust that finding is and why it is the case. Has New Zealand done something uniquely well in policy terms or have we been lucky somehow? What do we need to do to continue with to avoid the polarisation seen elsewhere?

The summary of existing studies on possible impacts of technological change in Figure 2.4 is particularly helpful and quickly orients the reader to the state of the debate. The subsequent discussion of why these predictions are problematic is also highly clarifying.

The discussion on the impact of housing prices is an important inclusion (pp. 46.) It would have been interesting to read more about this, particularly given it is such a major topic in New Zealand. It would also have been helpful to see more explanation of how economically significant the finding is. Figure 3.6 is interesting but worker mobility rate is difficult to get a sense of the economic importance of.

The recommendation stemming from this discussion for “less-restrictive” land-use regulation could also have been more specific. It would have been useful to understand what kind of less-restrictive land regulations might be appropriate. As this is a contentious area in New Zealand it would have been helpful to have a sense of how these restrictions might balance environmental concerns and whether the primary aim should be to free up more land for building or to change what is permitted in existing built areas. This would also have been an opportunity to provide some evidence from the perspective of technology adoption and productivity growth on debates about densification versus expansion of New Zealand cities

New Zealand’s barriers to Foreign Direct Investment are striking (pp.58.) The report identifies the major restriction in New Zealand as investments in land. This is clearly a politically charged issue in New Zealand. It would therefore have been interesting to know more about the relationship specifically between investments in land and technology uptake. It may be there is little information to this effect. But while it is clear from the analysis that New Zealand has much heavier restrictions on land investments particularly in non-urban areas, it is less clear how much this has a flow on effect into technology uptake. Given the sensitivity of the issue, the analysis would have been more compelling with a more explicit attempt to demonstrate, or provide a

clearer theoretical connection, between restrictions on investment in land in non-urban areas and technology uptake.

Effective engagement: how well the Commission engaged with interested parties

The Commission team dedicated considerable time to engaging with interested parties. They completed almost 50 meetings with interested parties in New Zealand as well as six in the USA and two workshops and 17 conferences and forums. This was fewer than the recent *Low-emissions economy* inquiry and *Better urban planning* inquiry. But engagements spanned from government Ministries to private organisations and academics. Interviews by Kathy Spencer with a selection of people who had participated in the inquiry process found that all agreed the Commission had engaged with a good cross-section of people.

Rightly, the engagement focused largely on New Zealand stakeholders, though some Australian and American groups were consulted. One possible extension could have been to engage further with think-tanks, governments or the private sector in south-east Asia and east Asia. Japan and South Korea provide interesting examples of countries that are closer to the technology frontier in various sectors than New Zealand but, so far, appear to have managed the adoption of high levels of technology in some sectors with more limited negative labour market impacts than the USA (where consultations did happen and whose research tends to have greater reach.) The same is true of some European stakeholders, though these tend to be more thoroughly reflected in OECD research and so extra engagement may have been less pressing.

Engagements with groups in a selection of rich Asian countries, even via remote calls or videoconferences, could have enriched the report. A little more discussion of Asian approaches to technological change, and the variety of outcomes that different countries have achieved so far, may also have strengthened the case that the choices of New Zealand policy makers and businesses can significantly influence New Zealand's future of work. This in turn might have strengthened the case for strong engagement with the policy recommendations.

The Commission also received 85 submissions. This was more than the *State sector productivity*, which received 31 submissions. It is, however, considerably less than the recent inquiry on *Low-emissions economy*, which received 401, or, perhaps more surprisingly, *Local government funding and financing*, which received 269. Looking further back, of the 13 completed inquiries since April 2012 on a wide range of topics, 85 submissions is the second lowest total, with only the aforementioned *State sector productivity* inquiry receiving fewer submissions. In this context, it is difficult not to conclude that 85 submissions is low. Despite this, the Commission took them seriously including quoting and engaging with them directly in subsequent interim reports.

Overall public interest in the topic is likely to strongly influence the number of submissions received. The relatively low number may reflect a (somewhat surprising) lack of interest in the topic in New Zealand. The public debate on the future of work is significantly more advanced in

the USA, where it even formed a notable part of the Democratic Party primary election via the candidate Andrew Yang, and Europe, where discussions about automation are more common in the public press, than in New Zealand.

The Commission clearly did a lot to build engagement. The use of interim reports has been discussed in more detail above but it is worth reiterating that these created further opportunities for engagement with interested parties and that almost half of the submissions were on interim reports. The blog and social media outreach (discussed further low) were also a valuable effort to increase engagement. For all these reasons, the relatively low engagement seems unlikely to be driven by the Commission itself. Two speculative possibilities are nonetheless worth considering.

The first is that, as discussed earlier, the Commission's frame and the content of most of the reports is anchored around economics and public policy more than technology development, business, and engineering. It is possible that this focus slightly under-engaged a loose community of people, businesses and start-ups that are involved directly in commercial efforts at technology development and adoption in New Zealand. These groups may have had valuable contributions to make on the inquiry but were not as easily reached or did not see themselves as being directly relevant to the inquiry given the Wellington base of the commission, and the economics and policy frame of the work (and the Terms of Reference.)

The second, is that many of those who are, or might be, more concerned about the future of work are younger New Zealanders. It is their future that is at stake. An open question for topics such as these is whether the Commission can find more effective ways of engaging young New Zealanders to discuss, respond to findings, and even submit. This would require further thinking but closer engagement with, and events at, tertiary institutions and with their networks could be one way to reach younger New Zealanders as well as the innovation networks linked to universities, should that be relevant for future inquiries.

Nonetheless, the Commission did extend its channels of outreach to include the Futurework NZ blog. This was a welcome addition to the engagement and communication approach and provided an avenue for more specific and speculative ideas and another way to solicit public feedback. Engagement with the blog was good, receiving 18,153 unique views between May 2019 and June 2020, but could have been stronger still.

One question is how to drive traffic towards the blog. The Commission's Twitter following has grown to 2,572 (as of June 29th) while the Commission also has a solid presence on LinkedIn but both of these still remain relatively modest. In line with this, about 70% of unique views to the blog came from Google searches or direct entrance to the website. (For the Productivity Commission website as a whole direct and search arrivals account for 85% of new sessions.)

Page views that come directly, and many of those who come via organic search, seem more likely to know of the blog already. This is because in the case of direct arrivals they need to

know the website address, and with search they need to be looking for the blog, or putting something very similar as search terms. Searches, of course may reflect growing awareness of the Commission's work from other outreach or media efforts. But user arrivals from other platforms such as social media or other news websites may be more likely to be genuinely new to the Commission's work as they can simply click through from a link that has popped up in their feed or from an article. Unlike direct arrivals and many search users, they do not have to know the Commission exists to search for it in the first place.

To drive up engagement, one possibility would be for Productivity Commission members to seek to publish substantially more articles on media websites such as Newsroom or Stuff.co.nz, ideally with links to the blog embedded or prominently noted. This would also serve to directly engage a wider audience with the Commission's work.

Secondly, I am not an expert on Twitter, but it is striking that the Commission's Twitter handle largely tweets the Commission's own content or commentaries and articles that directly refer to the Commission's (or affiliated parties) work. The number of tweets is also relatively low at 1,043 since joining in May 2011.

To increase the volume of content and engagement it may be worth sharing more content that is simply interesting and generally related to the topics of inquiries. The appropriate disclaimers can easily be added that these articles do not always reflect the Commission's views. In the case of the future of work there has been an extraordinary amount written overseas in particular and the Commission's Twitter handle could have been a way to bring more of this to New Zealander's attention. Doing so would likely also increase the number of followers and grow the audience for the Commission's own content.

Clear delivery of messages: how well the work is communicated and presented in the final report

The Commission's delivery of messages in the future of work inquiry was strong. As discussed, the approach taken admirably extended beyond normal communication channels to include a blog, social media engagement, and excellent graphic A3 format representations of key ideas from each interim report. This section will consider the reports themselves and the A3 graphics as the blog and social media were discussed above.

All the reports were well written and provided considerable detail. On the whole, the reports were long. The final report, shorter than usual thanks to interim reports, still reached 136 pages. Interim report 2 was 116 pages long, though interim reports 3-5 were about 50 pages each.

A lengthy final report is well justified. However, to make interim reports more digestible for readers and to encourage more widespread engagement I think interim reports of closer to 50 pages may be preferable. Combined with the above suggestion to reduce the number of interim reports slightly, this would free up more time for the team to research without needing to commit publicly to positions. To avoid sacrificing too much detail the Commission could also consider making greater use of Annexes for specialist readers rather than including everything in the core chapters.

The reports also make frequent use of boxes. On occasion these made it hard to follow the narrative flow of the argument, particularly as they were generally full page width boxes and were sometimes back to back with each other (such as boxes 2.4 and 2.5 in the final report) meaning a large break from the broader narrative thread. Smaller boxes that functioned more as side bars might interrupt the flow less.

In other places, substantial steps in the argument were placed in boxes for example the case that productivity growth is a useful indicator of technological change is placed in Box 2.2. Yet establishing that productivity growth is a reasonable proxy for technological change underpins much of the case that technological change is still modest as well as forming the basis for the relevance of the substantive discussion about New Zealand's poor productivity performance and what can be done about it through improving capital allocation, firm management, and the business environment. Putting such a key analytical step in a box can invite readers to skip over it as an interesting aside, which in this case would be problematic for the subsequent argument.

Given the extent of information provided, finding accessible ways of summarising key points is particularly important. The Commission was clearly cognizant of this and the reports attempt to address this in four ways. First, the report included clearly numbered short summary findings and recommendations throughout the text. Second, these were then repeated together at the end of the document. Third, each report began with an overview. Fourth, each sub-section had a highlighted

summary of key points for the section. (Chapter 3 of the final report also had a summary assessment at the end of the chapter.)

Yet having in effect at least four different forms of summaries in addition to the core text is possibly too complex and, in places, interrupts the flow of the argument. A simpler approach might have been to write a slightly longer overview at the beginning of each report that also included the key findings and recommendations, removing the need for them to be included at the end of the document. For the draft reports 'Key point' summaries in each sub-section also may not have been necessary if these points were well covered in the overview at the beginning of the report.

The Commission also produced other summary materials including A3 graphics for each draft report and an "At a glance" summary of the final reports. These were provided as separate documents and as a result did not interrupt the flow of the main reports. The provision of these, however, emphasizes further that fewer levels of summary in the main reports might have been justified.

The graphics and "At a glance" documents were very well done and gave an excellent and more accessible summary of the key points of each report for non-specialist readers. The strongest of the A3 graphics in my view was the first, which accompanied interim report 1 and was more graphic driven than subsequent A3 pages and more spacious, but nonetheless got across a critical set of core messages. This is an excellent template for future efforts to engage non-specialist audiences and a valuable approach for both social media and blogs.

Overall quality: the overall quality of the inquiry taking into account all factors

The overall quality of the inquiry, taking into account all the aspects discussed above, is very high. This review, with the aim of being useful, has highlighted various areas where the inquiry could have been strengthened. But taken as a whole, the inquiry is a highly valuable contribution to the debate on the future of work in New Zealand.

The Commission's reports do an excellent job of covering a large amount of research, both internationally and domestically, about the future of work. The international research covered is generally interpreted with a view to New Zealand's distinct economic and social situation – a commendable approach that is sometimes lacking in other analyses of these issues in New Zealand. The inquiry also provides an important contribution by pulling together existing data on a range of economic and social outcomes in New Zealand into usable and revealing graphs and analyses. Moreover, as noted above, it adds important new research that significantly deepens our understanding of technological change and its labour market implications in New Zealand. Unsurprisingly given the evidence base marshalled, the broad conclusions of the inquiry are convincing.

The main areas where the overall quality could have been improved include building more strongly the 'burning platform' that should compel action on the issues identified, going further in the analysis of the distributional impacts of technological change, and ensuring a better balance between the findings and the specific recommendations which skew slightly towards tertiary education. In terms of engagement, given the relatively low number of submissions, more thought may need to be given to how generate public interest and involvement in subsequent inquiries. This is particularly relevant for groups that may be interested in a given topic, but are less clearly embedded in the typical professional networks of the Commission.

Relevance to a post covid-19 era

It is difficult to assess how much covid-19 has affected the salience of the Commission's findings and recommendations as the full effects of the pandemic in New Zealand's economy (and the world's) are still unknown. It is clear in New Zealand that there will be a major medium term impact on the tourism and international education sectors. However, the Commission's findings focus on underlying long-term issues in New Zealand's economy, such as low productivity growth and unequal education achievement. It is therefore likely the recommendations will remain relevant despite recent events. In addition, at least two areas of recommendations have already grown in salience.

First, the report was written during a period of low unemployment in New Zealand and in much of the Western world. Now, covid-19 has caused dramatic increases in unemployment. This has

underlined in New Zealand the importance of developing more robust forms of income smoothing in the event of unemployment.

The wage subsidy to keep people connected to their jobs and incomes in the face of covid-19 and the lockdown was an acknowledgment of the importance of keeping people in work and the huge difficulties that sudden unemployment creates. Moreover, the 12 weeks of payments at \$490 a week for those who lose their job due to covid-19 is substantially above the job seekers allowance provided to those eligible and unemployed in New Zealand. This seems an implicit acknowledgement of the point that both the Productivity Commission has made: that New Zealand needs to explore better income support in the event of unemployment. Covid-19 has strongly underlined the salience of that recommendation.

Second, the overall recommendation that New Zealand adopt more technology may also be more relevant in a post covid-19 era, at least in some sectors. There are already numerous good reasons, outlined in the reports, for adopting more technology not less. Now, the restrictions at New Zealand's borders, which seem set to remain in place quite possibly until a vaccine is found, have greatly diminished the ability of businesses to rely on lower wage temporary migrant workers. These workers have played an important role in horticulture, dairy, and hospitality among other sectors. While various work arounds are likely to be found to bring in some workers, an overall ongoing restriction on the entry of lower wage workers may heighten the need for business in affected sectors to adopt labour-saving technology in order to stay competitive.

Annex 1: Terms of Reference for the Expert Review

Background

This independent review of the Technological change and the future of work inquiry is a valuable opportunity for the Commission to learn about what could have been done better. A key motivation for review (apart from accountability purposes) is to make improvements, and the Commission is seeking to improve our accessibility and reach new audiences, while maintaining the quality of our outputs and processes.

Deliverables

The deliverable is a report of your review of the Commission's Technological change and the future of work inquiry. The deliverable would be a relatively short report summarising the evaluation that we could publish on our website, quote in reporting our performance (e.g. on our website and for use in the Annual Report) and use in improving our performance.

Our inquiries are formally evaluated on the following performance measures:

- Right focus – the relevance and materiality of the final inquiry report in meeting the Terms of Reference;
- Good process management – the timeliness and quality of the inquiry process;
- High quality work – the quality of the analysis, guidance and recommendations in the final report;
- Effective engagement – how well the Commission engaged with interested parties;
- Clear delivery of messages – how well the work is communicated and presented in the final report;
- Overall quality – the overall quality of the inquiry taking into account all factors.

While these criteria are all important (and required as part of our formal reporting) the Commission is particularly keen to get your assessment of

- the quality of the analysis leading to the recommendations;
- the quality and effectiveness of the Futureworknz blog in seeding ideas and reaching new audiences;
- the effectiveness of having shorter thematic or subject matter reports throughout the course of the inquiry, and a shorter (by our normal standards) final report.

The Commission's performance framework also contains another dimension:

- Having intended impacts – what happens as the result of the Commission's work.

While it is likely too early to judge this aspect, you should make any observations that you feel you can make. In particular, we would appreciate any comment you might have on the salience of the inquiry's findings and recommendations for the post-COVID-19 economic recovery:

- the need for New Zealand to adopt more tech not less;
- the recommendations to facilitate easier access to retraining, short courses and student loans;
- that employment law should target harms rather than seek to regulate work in particular settings eg, on digital platforms;
- the recommendation to explore better income smoothing in the event of unemployment.

The review should note any lessons that can be taken and make recommendations for any future improvements to the Commission's inquiry processes and reports.

The report should contain a 'summary assessment' (or alternate name) that summarises your perspective on each of the performance dimensions (a short paragraph on each) – this is useful for the Commission's Annual Report.

The approach in undertaking the evaluation is up to you but we can assist by making available all relevant papers/documentation, blog stats and communications material. All published outputs are on our website here: <https://www.productivity.govt.nz/inquiries/technology-and-the-future-of-work/>

We can also assist in identifying and coordinating discussions/interviews with key people (Commissioners, NZPC staff and external stakeholders) if you wish.

Annex 2: Terms of Reference for the Technological change and the future of work inquiry

New Zealand Productivity Commission Inquiry into Technological Change, Disruption and the Future of Work Issued by the Minister of Finance, the Minister of Education, the Minister for Economic Development, the Minister for Workplace Relations and Safety and the Minister for Government Digital Services (the "referring Ministers"). Pursuant to sections 9 and 11 of the New Zealand Productivity Commission Act 2010, we hereby request that the New Zealand Productivity Commission ("the Commission") undertake an inquiry into how New Zealand can maximise the opportunities and manage the risks of disruptive technological change and its impact on the future of work and the workforce.

Context

Technology, and its rapid development and adoption, is one of the critical dynamics in the changing world of work. The transition to a low-emissions economy has begun and will accelerate, providing scope for New Zealand to increase its focus on technology and changing economic opportunities. While technological innovation and disruption is nothing new, the increasingly pervasive nature of disruptive technologies and the pace of change will create significant opportunities for New Zealand to achieve a productive, sustainable, and inclusive economy. However, systemic, rapid change can be daunting and it is important for government to understand and respond to this prospective change so that these opportunities are realised and the risks managed. The opportunities and risks also need to be communicated in a clear and accessible way to New Zealanders. Technology is changing how government interfaces with the public and business, so government needs to be ready to respond to change in an agile and adaptive manner.

It is difficult to predict exactly what technological change will mean for New Zealand and how widespread disruption will be, but impacts are being felt already in the form of changing business models and some jobs being replaced or transformed by automation. While non-government parties (businesses, consumers and communities) will to a large extent drive change, government also has an important role to play by actively managing the impacts on different groups (positive and negative), and using policy and regulation to promote the innovative and beneficial use of technology across the public, business and not-for-profit sector.

New Zealand has had much success in labour market participation and employment on the whole but some groups are under-represented in labour market participation and employment. While technological disruption may pose fresh challenges in terms of policy and regulatory changes needed to help workers and firms adjust, it also provides opportunities to reduce barriers for participation. The government must actively manage a just transition, such as through its range of initiatives that support workplace productivity, regional labour markets and filling skills gaps.

Finally, the government has a vital role in how it chooses to promote the innovative use of technology in the public sector and business community and to ensure a level playing field for different technologies.

Well-designed and coordinated government responses could allow New Zealand to:

- fully realise the potential of disruptive technologies for economic productivity and social prosperity;
- improve the services provided by government and increase the efficiency and effectiveness with which government functions; and
- provide an enabling environment without unnecessary barriers to desirable change, while effectively managing risks.

Together, these would also help to prepare New Zealand for any rapid labour displacement and distributional impacts.

Scope and Aims

The purpose of this inquiry is to provide an independent assessment of the scale and potential impacts of rapid technological change and its disruptive impact on the future of work and the workforce in New Zealand. The overriding aim is to harness changes to maximise the wellbeing of New Zealanders. The assessment should provide material for future government policy development and other initiatives to prepare the country for a productive, sustainable, and socially-inclusive future, despite uncertainties around the impact of technology.

For this inquiry, 'disruption' is primarily about the impacts of technological change. The inquiry should acknowledge the potential for disruption to have both positive and negative impacts.

Two broad questions should guide the inquiry:

- What are the current and likely future impacts of technological change and disruption on the future of work, the workforce, labour markets, productivity and wellbeing?
- How can the Government better position New Zealand and New Zealanders to take advantage of innovation and technological change in terms of productivity, labour-market participation and the nature of work?

We encourage the Commission to break the inquiry down into a series of shorter, related reports, published throughout the term of the inquiry, with a final report summarising findings and providing recommendations.

For example, the topics could be as follows:

1. A scene setter:

- A definition of disruption;
 - An analysis of the status quo in New Zealand, including the government's institutional and regulatory ability to flexibly adapt to a rapidly changing environment, and to support the diffusion of innovation;
 - The likely nature and scale of the impact of technology change on labour market participation, under-employment, productivity, wages, education and skill requirements, and the nature of jobs (e.g. the gig economy);
 - The likely scale and pace of technology change, including across regions and industries, and the distributional impacts within the population; and
 - New Zealand's distinctive features in this space, and its comparative advantages and disadvantages (e.g. relatively flexible labour market and high employment, significant incidence of low skills).
2. How can active labour market policies, including their interaction with the welfare system, assist (or hinder) displaced workers to transition to different types of work and work places?
 3. How can New Zealand's education and training systems be more effective in enabling adaptation to technological disruption?
 4. How can we address the digital divide in New Zealand?
 5. Identifying how technological change will affect different groups of workers, and therefore what are the appropriate types and levels of support required.
 6. How can the regulatory environment enable adaptation to change, provide opportunities for new technologies to be tested and understood in New Zealand, and become more responsive to disruptive change?
 7. How can government best encourage technology innovation and uptake, with a focus on wage growth and the development of appropriate high-engagement, high-performance actions and behaviours in New Zealand workplaces and industries?
 8. How can New Zealand firms improve their employees' management capability in terms of adapting to technological change?

Report and Recommendations

The inquiry should explore New Zealand and international research and experience related to the questions above. However, the focus should be on practical applications relevant to New Zealand's circumstances. Given the uncertainty around future technology and its impact, the

inquiry is not expected to make detailed, quantified predictions of impacts. Rather, it should give a sense of the nature and relative scale of impacts in different scenarios.

The inquiry should have a long-term focus, with recommendations that can be implemented in the short- to medium-term. It should provide a resource for government to develop policies and programmes that make the most of the technological opportunities on offer and allow New Zealanders to face an uncertain future with confidence.

The report should build on previous relevant inquiries undertaken by the Productivity Commission.

The final report should provide recommendations for how New Zealand should manage a transition to a more technically advanced economy in relation to both technology's upside and downside risks, while still maintaining or improving incomes and wellbeing across all groups in the population, through recommendations on appropriate policy settings.

Consultation

Given that technological change is an issue of national significance, the Commission should consult with a broad range of stakeholders including: central and local government; the Future of Work Tripartite Forum, Future of Work Ministerial Group, the Just Transitions Unit in MBIE, and any new Future of Work groups established in Government agencies; relevant industry and NGO groups, including the NZCTU and Business NZ; academic bodies, businesses, Iwi, and the general public.

This inquiry is intended to complement and take account of existing policy work and other current work by evidence-gathering groups on the future of work and the impacts of technological change. The groups include the Law Commission, the AI Forum, and the OECD.

Timeframes

The Commission should present a final report to referring Ministers by 31 March 2020