THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

New Zealand Productivity Commission's Inquiry into Frontier Firms

Submission by the University of Auckland on the Draft Report: New Zealand firms: Reaching for the frontier – 5 February 2021

Thank you for the opportunity to comment on the Draft Report - New Zealand firms: Reaching for the frontier. This submission constitutes an institutional response from the University of Auckland. We have collected feedback from across the University and summarised key issues and concerns. Faculties, Schools and academics have also been encouraged to submit their own individual responses.

We congratulate the Productivity Commission on a comprehensive report which highlights many of the major issues in addressing New Zealand's long-standing productivity challenge. As a university, we are acutely aware of our responsibility to contribute to the transformation required in New Zealand. Our role is unique in that we supply two of the key ingredients for productive and competitive economies. We generate new knowledge and ideas that underpin ground-breaking innovations and educate highly skilled people who go on to become more innovative employees and business founders. That is, universities have a particularly important role to play in stimulating the creation of knowledge-rich and innovation-based firms; those more likely to be at the frontier.

The University welcomes the Commission's efforts to place its analysis and findings both within the international context and the challenges New Zealand faces in terms of transitioning to a sustainable, low-emissions economy. Critically the innovation and research capabilities of our universities will be pivotal in achieving New Zealand's goals for a low-emissions future.

The University submitted on the Commission's issues paper in August 2020. We are pleased to see that many of the points in that submission are addressed to some extent. Yet, it is our view that in line with the weight of international evidence, the role of universities in skills development and fostering innovation still deserves greater attention in the report. We offer the following comments.

Overall comments

Implementing the Research, Science and Innovation Strategy

Among the report's findings and recommendations is that Government must finalise the Research, Science and Innovation (RSI) Strategy and develop focused innovation policy akin to what has been the case in several of the cited small advanced economies. Further, the report also places strong emphasis on strong and sustained investment to support the effective implementation of national innovation strategy.

We are strongly supportive of this, particularly that effective execution necessitates strong and sustained levels of investments. Incremental increased investment will not enable New Zealand to catch up to leading small advanced economies, let alone become a "global innovation hub by 2027"; one of the ambitions goals of the draft RSI Strategy. It is our view that a major culture and investment shift is needed to match New Zealand's ambition.

The Critical Role of Universities

As noted in our introductory comments, universities occupy a unique role in the innovation eco-system because they supply two essential ingredients: new knowledge and ground-breaking innovations, and highly skilled people. There is ample evidence as highlighted in the report that strong and sustained investment in both have been critical in the success of other more successful advanced economies. More successful advanced economies are better at harnessing the potential of their universities to underpin the establishment of new innovative and productive industries. Often-cited examples of this include the establishment of the bio-tech industry around MIT and the "Eds and Meds" strategy leading the renaissance of the US Mid-West (Ehlenz et al, 2014).

Within the context of small advanced economies, the establishment of the wind power industry in Denmark is another telling example. Today Denmark is the hub of globally leading [frontier] companies (Vestas is the leading wind turbine manufacturer in a highly competitive global industry) and knowledge institutions within the field of wind energy. This is largely due to a comprehensive mix of policy initiatives that have been in place since the late 1970s/80s. In the early stages of the development of the industry, government funded university research in aerodynamics/aeroelasticity was fundamental to the development of large and efficient wind turbines, and as result, the successful establishment of the wind power industry (Megawind, 2015).

In its analysis of the innovation eco-system there is scope for further consideration of the pivotal role of universities in producing radical innovations. The Commission rightly acknowledges that the Crown Research Institutes (CRIs) are not geared towards the kind of research that produces the radical innovations needed to underpin the development of new, innovative and productive industries. Yet, there is little mention of universities' role in fostering more radical innovations.

It is our view that with the right government support models, there is large potential in our universities to further increase our contribution towards increased innovation in our economy, interact more effectively with the current base and catalyse the establishment of new knowledge-based industries. For example, research expertise at the University of Auckland, spans several fields that offer much potential for the future, including, food and beverage manufacturing, advanced manufacturing, health tech, agritech, digital technologies, and we are home to world leading researchers in these fields.

Strengthening University-Industry Collaboration

We are acutely aware that as universities our greatest impact will be achieved through partnerships with others: industry, government, community and iwi groups. The Commission presents evidence on the spectacularly low levels of university-industry collaboration in New Zealand. We agree that this is a major weakness in the New Zealand innovation eco-system and one that we are stepping up our efforts to address. In part this reflects the current industry mix in New Zealand and the limited number of knowledge rich firms and absorptive capacity the report highlights, however it highlights that significant intervention is required if New Zealand is to achieve the level of change required. As such, the University supports the Commission's recommendations in relation to strengthening collaboration in innovation across firms and public research institutions.

There are many instruments available to Government for fostering greater university-industry collaboration, and many that have been tried and tested internationally. In saying that, it is also the case that current disruption forces us to question what future university-industry collaborations will look like. To address the major challenges facing society, the nature of university-industry collaboration must become far deeper and boundaries will become increasingly blurred.

Innovation hubs in areas of strategic priority

In a number of jurisdictions the establishment of innovation hubs that connect universities, industry and public sector organisations have been transformational. There are local opportunities in areas of distinctive frontier capability - for example, scaling up a MedTech innovation hub would bring together the Ministry of Health, universities and DHBs, generating new high value industries and creating a joined up, revitalised healthcare system. Such an initiative would drive economic growth in an area where New Zealand has clear strengths, boost wellbeing, address inequities and strengthen world leading expertise in areas such as medical and health sciences, medical technology, data science and artificial intelligence. Within this context it is disappointing to see that the Med Tech CoRE – demonstrably the most successful in spinning out potential frontier firms and closely aligned with the MBIE identified sectors for potential transformation was not refunded.

Callaghan Innovation

The University would also like to reiterate the view that others have expressed through the Inquiry that Callaghan's operating model creates a possible conflict of interest. The current model puts Callaghan in direct competition with other innovation centres, which they are otherwise tasked with supporting and connecting. Among the many policy instruments suggested by the OECD (2019a) to strengthen university-industry collaboration is "intermediaries for collaboration"; organisations that help match supply and demand for new technologies, act as bridging institutions etc. This would appear to be a role that Callaghan could/should play, but the current model is not fit-for-purpose, and as such we encourage a review.

Investing in home grown talent

Evidence from the New Zealand Institute of Economic Research (NZIER) is cited by the Commission on New Zealand's attempts to fill the skills gap by attracting highly skilled migrants and entrepreneurs from overseas, but with little success. The recommendation follows that New Zealand should aim to reset its immigration policy to focus on attracting highly skilled migrants. While there are good reasons to attract global talent to New Zealand, it is also the case that there is enduring competition for global talent. Importantly, the implication is that we must, as a country, first and foremost, invest in our talent in New Zealand. The Commission should highlight the much larger investment in and role for advanced level tertiary education. Far from being a well educated nation, at the very top end of research informed degrees (masters plus PHDs) we are well below OECD averages. The comparative statistics on postgraduate study are revealing; only 5% of New Zealand adults have a Masters degree compared to the OECD average of 13% (OECD, 2019b). The figures suggest that we are heavily centre weighted (the 3 years degree) in our higher education system and significantly underperform at the top and bottom ends of the education spectrum.

Entrepreneurial and management education and training

The draft report only touches very briefly on the importance of entrepreneurial skills. We believe that instilling these skills in graduates and the role of universities in this, deserves further consideration as part of the Inquiry. As we pointed out in our submission to the earlier issues paper, New Zealand is playing catch-up when it comes to the promotion of entrepreneurial education. By contrast, entrepreneurial education has been part of the national policy landscape in many EU countries for almost two decades, and is seen as an integral component of national innovation strategies. It is our view that consideration must be given to this matter as part of the development of national innovation strategies.

The University is concerned that the draft report significantly underplays the role that formal management training plays in building managerial capabilities. Instead the report asserts that "*many of the skills needed for effective management and governance are built through commercial experience rather than formal training.*" We would counter this and suggest that both formal training and experience is necessarily for building effectively managerial capability. A substantial body of literature exists on the positive link between management training and firm performance (Broszeit, 2019; Bryson & Forth, 2018; CIPD, 2018; Hill, 2018). Indeed reliance on limited "commercial experience" has been a key weakness in many New Zealand firms.

Securing the talent pipeline

The Commission reports that "*New Zealand universities are not supplying the numbers or types of post-graduates they need (including via postdoc support mechanisms)*" and that the tertiary system is not sufficiently responsive to the needs of industry. The Commission acknowledges some of the initiatives already in place to ensure greater industry relevance of qualifications and research.

We would also point out that a funding model centred overwhelming on the 3 year undergraduate degree, tends to propagate this limited industry connection. Therefore we strongly support the Commission's finding that there is scope for a more systematic approach to building the pipeline of post-graduate talent needed to support innovation, and to increase retention of post-graduates in New Zealand by developing career pathways. We would point out that the Auckland Bioengineering Institute (ABI) has consistently generated more jobs than graduates, largely in the frontier firms it spins out. As such, we consistently advocate for greater support for post-graduate study, and for enhanced funding to develop new postgraduate programmes that both meet the needs of industry and provide career pathways for students (e.g. new postdoc programmes, industry-focused PhD pathways, commercialisation internships).

Rethinking the PhD

We recommend further exploration and elucidation on how expansion of and changes to doctoral programmes, can help address skills gaps that have traditionally been met by attracting highly skilled migrants and entrepreneurs from overseas. While the report identifies some of the challenges New Zealand faces, it is short on recommendations on the nature of funding or programmes needed to resolve these issues.

At the post-graduate level, providing an additional 12 months funding to PhD students (the ABI model) would enable certain disciplines to build in an experiential and broader skills component, encouraging industry ready graduates and greater knowledge exchange. Similarly, a commercialisation post doctorate or internship scheme could incentivise industry to co-fund a PhD graduate to spend 6 months working on the commercialisation of an idea in collaboration with an industry partner. The Government could also address the challenge associated with getting start-ups to scale by reviewing the "valley of death" support it provides start-ups and industry.

A recent workshop on early career researchers hosted by the Royal Society Te Aparangi discussed the significant mismatch between the fields of study and aspirations of PhD graduates. One idea that was floated was a "pre-doc" programme where the prospective PhD student spends time with a potential project sponsor and supervisor (like an internship) during which time there is relationship development and refining of the research project concept.

The recent MBIE announcement of $10 million over two years in a one-off fellowship to support 30 of New Zealand's early career researchers impacted by COVID-19 is welcomed. However, again this is

time limited opportunity and does not address the significant structural issues identified in the Productivity Commission report. We believe there is significant scope to better align the research workforce with the needs of industry.

Return on Science and Momentum

We recommend that alongside *Kiwinet*, the report address two other highly relevant University of Auckland led initiatives with substantial national reach – *Return on Science* and *Momentum*.

Return on Science is a national research commercialisation programme that leads the establishment of best practise to deliver new research to market from universities, research institutions, and private companies. Services include connecting science, technology and project teams with strategic management, top-tier advice and guidance, world leading best practice process, and efficient access to capital.

Momentum is a national student-led investment committee program which provides access to world class advice, connections, and investment opportunities to students and start-ups across New Zealand.

Conclusion

Overall, we felt there needs to be a much stronger emphasis on the role of an innovation based, knowledge rich industry ecosystem in lifting productivity. This defines the critical part that universities can play including generating radical innovations, addressing a significant gap in advanced level, research based, tertiary education and fostering the entrepreneurial and management skills that drive the generation of new firms and sectors. The target is more engaged researchers and a pipeline of students, particularly postgraduate, with entrepreneurship/ commercialisation education and experiences, increased management capabilities, etc.

The release of the Climate Change Commission draft report highlights the urgency for New Zealand to accelerate the deployment of existing technologies, business models and services, and swiftly move the next generation of climate solutions from the lab to the market (Climate Change Commission, 2021). New technologies and innovation will be needed to reach the more ambitious targets identified. There is currently both the opportunity and much needed momentum for New Zealand to make critical changes needed to set it on a pathway to a more knowledge rich, low-emissions economy.

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