



Progressive Thinking:

Ten Possible Futures for Public & Community Services

Restoring research for the restoration of well-beings

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At first glance, our ability to do research isn't something most Kiwis would worry about in this crisis. After all, our epidemiologists, mathematical biologists and science communicators have blown our socks off with what they've achieved over the past three months, more visibly than the hard-working labs and practitioners who also performed admirably. Yet many may question whether they were well prepared and supported. Let's examine the health of our research system in achieving three main goals: building and delivering new knowledge, growing and maintaining expertise, and providing society with access to and engagement by experts.

It turns out there are plenty of reasons to worry. The path New Zealand's science system has taken since 1990 creates vulnerability. Our main research institutions – the Crown Research Institutes (CRIs), universities and smaller independents – tend to have fragile financial margins. Funding has mainly been directed toward outputs from large contestable applied research programmes aligned with our major sectors, with remarkably thin support for institutions and their people when compared internationallyⁱ. The biggest concern of all is a growing body of evidence for ongoing roadblocks in the career paths of Kiwi researchersⁱⁱ, and for problems with genderⁱⁱⁱ, Māori^{iv} and Pasifika^v diversity and inclusion in the research system. New analyses^{vi} suggest that these problems will worsen due to the pandemic-induced downturn.

These concerns are all amplified as we emerge from the Level 3 and 4 lockdowns expecting a recovery but realise the global economy may be entering freefall and reorganisation. To complicate matters, none of the slow-brewing problems we might previously have referred to as crises have gone away: think about climate change, freshwater, health inequality, and infrastructure. Each interacts strongly with the pandemic-induced downturn and potential responses. Worst of all, what if another crisis – such as a major earthquake or volcanic eruption – comes on top of this one?

An important marker on our path through this crisis, the Government's Budget, flashed across our screens last week. It passed muster for investing in useful employment, but those who expected COVID-19 to catalyse transformational change were deeply disappointed. A ray of hope was that stimulus funding did not drive backsliding in any key areas of the well-being agenda. But the challenge is clear: we're going to need an immense amount of research and analysis very quickly to assemble a roadmap and plot a course across a complex landscape toward transformational changes.

Let's take a moment to think about obvious benefits of research, science and technology to our well-being during this pandemic. One obvious example is how quickly we learned so much about the virus, and tested thousands of people each day. Or consider how different lockdown might have been a decade earlier, without ubiquitous smartphones, laptops, Zoom meetings and cloud



document services. Perhaps our new ways of working will help us be better connected while flying and driving less, making our lives better and helping us respond to climate change.

As Max Rashbrooke mentioned in the previous chapter, these steps forward have primarily been a long-term result of worldwide government-funded research and development (R&D). The technological and agricultural progress of the last century usually is a result of mixed ideas created elsewhere, transformed by local adaptation and innovation. Putting these ingredients together should raise labour productivity – how much value we create per hour worked – and lift our environmental and social well-being. The pandemic, or experience with Canterbury earthquakes, should also remind us of dangers of cutting research that massively protects our well-being during events that come decades apart.

For these reasons, the Government set a goal to raise R&D to 2% of GDP by 2027. The coronavirus crisis creates severe challenges for achieving this path as intended, through business-led R&D. The R&D tax incentive scheme won't work well when businesses aren't profitable, and a replacement loan scheme is unproven. We should also worry that aligning major public grants with business or government sectors, particularly through co-funding requirements, tends to favour the business-as-usual thinking of incumbents rather than the transformational thinking of emerging innovators.

Should government investment in R&D ramp up its contribution to the 2% target, putting transformational responses to the coronavirus downturn on a wartime footing? Doing so might at first be seen as a logical reversal of the transition to the post-WW2 boom of science and technology, achieved by returning to a wartime 'applied' science focus at the expense of 'basic' science.

Yet, two dangerous fallacies underlie the distinction between 'basic' and 'applied' science^{vii}, and could derail transformational R&D responses to our overlapping challenges. First, the fundamental quest for knowledge and its application are not separate categories, and the most effective science is achieved when the two overlap. Indeed, overlap and connectivity between knowledge and application provides a more effective strategy than designing pipelines that flow from basic to applied research, which have never been shown to work reliably when scrutinised. Second, the concept of 'basic' science implied a false independence or 'purity' that has been formally reversed in the health, environmental and social sciences required to address well-being issues, and also in the application of multi-disciplinary science advice.

From the long-embraced 'Diffusion of Innovation' model^{viii}, we know that many small steps of unpredictable investigator-led and user-led innovation is critical in successful transformations. In short, leaving top-down transformation out of the Government's Budget was a smart choice when bottom-up innovation will require design and support to enable successful transformation.

By and large, our research institutions are small and diverse, with the connectivity to deliver what is required. A decade ago, during the recovery from the last financial crisis, a strong case was made for giving CRIs greater control of their own direction because they knew their area better than government funders. Despite initial success, this performed poorly due to fixed funding that became a 'sinking lid' after accounting for inflation, perhaps hindered further by the largess of emerging National Science Challenges.



Now is the time to consider what we want the research system to look like as we respond to and emerge from this crisis. If we are to enable transformation, funding must flow to and strengthen institutions. If we do not yet trust them, the solution is to include reporting that can build trust and reforms to stabilise governance where required. The alternative is tangled thickets of output-based accountability, requiring excruciatingly slow preparation and evaluation of proposals, and tending toward the ‘think big’ scale that favours incumbents over innovation. In short, there is an opportunity to restore stable funding that looks after people and their knowledge, as an alternative to unstable over-reliance on output-based funding.

Success will ultimately depend on people. Long-term government strategy has consistently supported raising well-being and economic participation to acceptable and equitable levels – looking after basic human development^{ix} extends to the ability to access experts and participate in research. It follows that our research system will be unlikely to deliver successfully if the people in it are not representative of our diverse society. Yet, data from recent months already shows a global collapse of hard-won gains in the most easily measured form of diversity – gender equity^x. New Zealand’s poor support for Māori and Pasifika research careers is almost certainly at risk of sliding backwards as institutional budgets continue to tighten^{xi}, hitting casual and fixed-term contracts first.

Given these issues, and the impending collapse of our dependence on international migration at the post-doctoral career stage, restoration of the once-successful early career research fellowship scheme has to become a top priority. This is particularly true because the limited Rutherford fellowships scheme only supports a few of our top researchers, and does little to train or support a workforce likely to enter business or government science or otherwise target transformations toward well-being in a post-coronavirus New Zealand. Ultimately, the heart of what we need is diverse, young Kiwis at the heart of dynamic teams leading bottom-up innovation across the research, government and business sectors.

Read more from the Progressive Thinking series at
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ⁱ <http://www.stuff.co.nz/dominion-post/comment/3421554/Review-of-Crown-research-institutes-finds-just-the-right-balance>

ⁱⁱ <https://www.noted.co.nz/currently/currently-science/where-have-all-the-postdocs-gone-the-blockage-in-our-science-talent-pipe>

ⁱⁱⁱ Brower A, James A 2020. Research performance and age explain less than half of the gender pay gap in New Zealand universities. PLoS One 15(1): e0226392.

^{iv} McAllister TG, Kidman J, Rowley O, Theodore RF 2019. Why isn’t my professor Māori: a snapshot of the academic workforce in New Zealand universities. MAI Journal: A New Zealand Journal of Indigenous Scholarship 8(2): <http://doi.org/10.20507/MAIJournal.2019.8.2.10>.

^v Naepi S 2019. Why isn’t my professor Pasifika? A snapshot of the academic workforce in New Zealand universities. MAI Journal: A New Zealand Journal of Indigenous Scholarship 8(2).

^{vi} <https://www.science.org.au/covid19/women-stem-workforce>



vii Stokes DE 1997. Pasteur's quadrant: basic science and technological innovation. Washington, D.C., Brookings Institution Press.

viii Rogers EM 2010. Diffusion of innovations, 6th ed., Simon and Schuster.

ix Raworth K 2017. Doughnut economics: seven ways to think like a 21st-century economist, Chelsea Green Publishing.

x <https://www.nature.com/articles/d41586-020-01294-9>

xi <https://thespinoff.co.nz/atea/21-05-2020/as-universities-restructure-maori-and-pacific-researchers-are-being-put-at-risk/>

