

Science System Advisory Group submission from the Te Herenga Waka – Victoria University of Wellington University Research Committee

Introduction

We continue to support the need for the reform of the Aotearoa New Zealand science, innovation and technology system initially proposed as part of the Te Ara Paerangi Future Pathways Green Paper. This level of meaningful change requires substantial investment. As a country, our R&D investment of 1.4%, of GDP, continues to be well below the OECD average of 2.5%. The changes in the economic environment and an increasingly precarious and uncertain funding system puts publicly funded research organisations and its funders into a different context since Te Ara Paerangi was released. While the system itself is not broken, the environment we are currently operating in highlights some of the fragilities in the wider science, innovation and technology, and higher education systems. Universities, CRIs and independent research organisations produce highly cited research, and our research delivers direct benefit to Aotearoa New Zealand. We believe that the review needs to focus on the aspects that are not performing well and consider the future of our science and higher education systems holistically. Steps need to be taken to ensure that the changes result in a coherent, integrated system that is centred on people, establishes a new, sustainable way of operating, and most importantly continues to deliver positive outcomes for the country.

The Science, Innovation and Technology System

Our views regarding the envisaged future for a publicly supported science, innovation and technology system, the opportunities, challenges and barriers that need to be addressed, and principles to underpin the system are outlined in [our submission to the Te Ara Paerangi Future Pathways Green Paper](#).

In summary, we continue to support a system that is:

- underpinned by Te Tiriti o Waitangi, supports mātauranga and kaupapa Māori, and provides the funding and resources needed to grow
- deliberately designed to support and sustain long-term research that delivers public good
- develops the skills capability and capacity of, and career pathways for, the research workforce
- enables active collaboration with, and movement across, organisations
- creates equity across disciplinary areas
- supports the full spectrum of research disciplines and activities
- supports engagement and partnerships with end-users of research
- develops priorities in an open, inclusive and transparent way
- encourages and supports private sector investment, and
- provides a regulatory system that facilitates research mobilisation, engagement, uptake and leads to impact.¹

The research workforce must be one of the strategic priorities of the future research system. Our Te Ara Paerangi submission provides further detail on our views, however, the workforce issues equity, diversity and inclusion, precarity for early career researchers, the research-

¹ [Te Ara Paerangi Future Pathways Green Paper Te Herenga Waka – Victoria University of Wellington – submission to the Ministry of Business, Innovation and Employment](#), p.2-3.

education pipeline, movements within the research system, and international connections need to be considered and addressed.²

We continue to support the concept of a research commission/agency with a focus on supporting the long-term strategic outcomes for Aotearoa New Zealand.³ Consideration should be given to the benefits and opportunities in bringing together responsibility for research, science, innovation and technology with the responsibility for higher education. As Universities make up over half of research staff and students in Aotearoa New Zealand, with the specific role of training the researcher workforce, coherency across research/science and higher education is particularly important.

A single agency that provides the ‘caretaker’ role for the whole system has been lacking. This agency would be able to actively map, monitor, evaluate and plan for the future across the key areas including the workforce, research priorities, funding, and infrastructure, coherently bring together and align strategic research policies and outcomes, funding systems, and other resources from different parts of the public sector (e.g., education, health, primary sector), and maintain this across successive governments. We do believe that the common assertion that our system is complex is overstated. We caution against oversimplification which risks using a small number of instruments for multiple purposes and outcomes, causing lack of clarity and poor delivery.

We support adoption and/or evolution from the wealth of different models and the aspects of the current system that have worked well, including those from other jurisdictions, rather than trying to create a new model specific for our system. There are various examples across the globe that offer best practice that can be drawn on to deliver the outcomes we are looking for, including University-level block funding, the CSIRO model, the Canada Research Coordinating Committee, the Finnish Research and Innovation Council and the Swedish National Innovation Council, the Australian Research Data Commons, and the Fraunhofer model. These have all been pointed to in our previous submission. We have models that have worked to address barriers, for example the highly collaborative Centres of Research Excellence, and expand successful models. The PBRF and National Science Challenges have both been long-running programmes that are due to end. The positive effects and incentives from those programmes should be part of ‘what next’ in the design and development of the new system.

Public Research Organisations

We continue to support a move away from the company model for Crown Research Institutes (CRIs), as well as a shift away from a sector-based model, as we believe this would have significant benefits for a future research system.⁴ CRIs currently focus on primary industries; while this is important, it is also limiting. There is a need to consider how we go beyond primary industries to support manufacturing industries and “zero-weight export” industries, such as digital technologies and entertainment.

We support greater collaboration between CRIs and Universities, and will continue to support CRI and University co-location and mergers. Our experience of the transfer of the Ferrier and Robinson Research Institutes from a CRI into the University has been largely successful and

² Te Ara Paerangi Future Pathways Green Paper Te Herenga Waka – Victoria University of Wellington – submission to the Ministry of Business, Innovation and Employment, p.7-8.

³ Te Ara Paerangi Future Pathways Green Paper Te Herenga Waka – Victoria University of Wellington – submission to the Ministry of Business, Innovation and Employment, p.4.

⁴ Te Ara Paerangi Future Pathways Green Paper Te Herenga Waka – Victoria University of Wellington – submission to the Ministry of Business, Innovation and Employment, p.7.

provides a good model for the future.⁵ The merger pathway helps address issues around the alignment of vision and purpose, research priorities, measures of success, and conflicting operating models including funding overheads and approaches to intellectual property ownership. Collation in and of itself, does not address these barriers, but physical connections can help foster the research culture, create efficiencies in terms of shared facilities, and support the development of capability and capacity of the research workforce.

Clarification of the role of an ‘advanced technology organisation’ is needed. We would support an organisation that provides research to underpin new industry sectors, or one that supports entrepreneurship, but not one that combined both these functions. It will be critical to ensure that the experiences of CRIs (which are so closely tied to sectors that are by their nature wedded to incremental, non-disruptive change), and that of Callaghan Innovation (which has struggled to address its multiple mandates), are not repeated with any new organisation.

We do believe the function of supporting future industry would support a shift to more zero weight exports and secondary industries, which would benefit the country. However, the diversity of advanced technology lends itself to a network of university or CRI based technology development institutes rather than try to achieve this with a single organisation trying to do everything. We have models for this, including the Ferrier and Robinson Research Institutes, and the Auckland Bioengineering Institute, which should be considered.

The Innovation System

There are mechanisms in place to develop the innovation pipeline, attract global partners and funding. However, the effectiveness of the existing mechanisms does need to be reviewed.

Innovation is found across the spectrum of research, particularly where outcomes are focused on the public good. The association of innovation with purely commercialisation outcomes creates an unhelpful and false distinction. Equally unhelpful is the view that innovation is a linear process from fundamental to applied research to commercialisation, and that each stage can be conducted by different organisations ‘staying in their own lane’.

We believe that there is a compelling case for Innovation Quarters centred around proven hubs of innovative research. The proposed Gracefield Innovation Quarter as a part of Wellington Science City initiative, had it been funded would have accelerated the innovative deep tech by building critical mass and fostering innovation around a core nucleus of excellent fundamental and applied research institutes - the Ferrier and Robinson Research Institutes. We need to support these kinds of models as they also facilitate shared capital expenditure, such as laboratories and equipment, and provide access to and exposure to investors. If the decision was made to establish an innovation-focused policy and promotional organisation it is vital its role and core functions are well defined and adhered to.

There are a range of bodies involved in industrial and commercial innovation: avoiding duplication and mapping out expectations and functions to enable a coherent system approach would help to effectively utilise the resources available. This includes the role that University commercialisation entities have in supporting these outcomes. Technology Transfer Offices possess the knowledge and expertise to identify market opportunities when researchers generate new Intellectual Property. However, in the deep-tech industry, the process of translating new knowledge into market outcomes is protracted. To reach a stage where the project is investible in the eyes of Venture Capitalists, funding of approximately \$1 million per

⁵ The submission from Professor Nicholas J. Long, Director, Paihau — Robinson Research Institute, provides details on this.

project is required. This can make tech transfer out of Universities more difficult than in other countries as a result of the structures, financial settings, and limited resources. Accessing further funding for these projects through a larger Pre-Seed Acceleration Fund would accelerate their development and access to the market and investors.

Consideration also needs to be given to how the mechanisms for spinning out research can be streamlined and optimised. Consideration also needs to be given to how spinning out research takes vastly different forms in different disciplines: commercialising a new drug is a vastly different undertaking to commercialising a new software idea.

Contestable Research

We continue to support a funding system that supports the full spectrum of research, has a multi-disciplinary focus, and funds the collaboration and engagement activities critical to knowledge translation as outlined in our Te Ara Paerangi submission.⁶

The underinvestment in the research system is well documented, and Universities New Zealand has detailed the impacts on the university sector. There is a real need for more funding and resources for research so we can be competitive with our OECD peers. We support this opportunity to address the problems of the current funding mechanisms, while ensuring that the higher education and science funding systems for research are complementary. As there has been limited evaluation of the outcomes of our funding mechanisms, we strongly support this function being a key part of any future funding body.

We understand that there is a perception that the system is overly complicated. However, as noted previously we do need different instruments and mechanisms to deliver the different outcomes sought from mission-led research, researcher-led research, and end-user led research, and research capability building. While the administrative aspects of some funding mechanisms could be simplified, there is significant risk associated with simplifying the purpose and outcomes of funding. Expecting a fund to have multiple purposes risks the delivery on outcomes. Examples of this include the Endeavour Fund which is trying to be used to retain both capability and grow step change applied research. When we try to retain all of our existing capability in a single area, this comes at the expense of developing new capabilities in other areas, and these are the decisions we believe need to be closely examined.

We need a system that better recognises, values, and supports social sciences, humanities, creative arts, and community-based research, addresses the issues with capital funding that research organisations need to both maintain and grow critical infrastructure, and values and supports early career researchers through appropriate funding mechanisms that incentivise career support and employment mechanisms. We also continue to support undertaking work across all research organisations to determine internal costings as an evidence-base for a potential formula to address the issues associated with the funding of overheads. A system that addresses these areas would be a significant step forward.

Governments Research Needs

Aotearoa New Zealand is facing grand challenges where the human dimension is critical – tackling climate change, transitioning to a low carbon economy, dealing with threats to biodiversity, biosecurity and food safety, developing sustainable cities, improving health and wellbeing, and harnessing technology for cyber security and social good, among others. A

⁶ Te Ara Paerangi Future Pathways Green Paper Te Herenga Waka – Victoria University of Wellington – submission to the Ministry of Business, Innovation and Employment, p.4-6

research sector that provides multi-disciplinary approaches to find solutions and essential to supporting the needs and priorities of government.

Ensuring the government's own specific, targeted research needs are identified and addressed is through the retention of research capability and capacity within Department and Ministries, this includes science leadership through the Chief Science Advisors. This allows for Government's research needs to be appropriately identified and scoped, and also contributes significantly to Government having the capacity to understand, analyse and synthesise the research that they receive. Ensuring that Departments and Ministries retain funding for commissioning research, particularly during financial reprioritisation exercises, enables those organisations to address their particular research needs.

Universities have significant research capability, and as a sector we look for opportunities and challenges of engaging with the public and communities, and co-constructing and communicating the value of research. Initiatives like the Te Herenga Waka Policy Hub, in Wellington, is an example of growing the connections between researchers and end-users of research in Government. Initiatives like this can facilitate a better understanding between government and the research sector around what evidence or insights are needed to support policy, what research projects in related areas have been completed or are underway that could provide insights, and where the relevant expertise lies, which could enable more responsive partnerships to be developed.

We appreciate the opportunity be a part of the ongoing discussion on the future of the science, innovation and technology system in Aotearoa New Zealand. We hope the views from the Te Herenga Waka – Victoria University of Wellington Research Committee provides you useful insights into the areas of focus when considering the shape of our future research system. We look forward to continuing the engagement as you move into the next stages of the review process.

Sincerely

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