Te Ara Paerangi – Future Pathways Green Paper: University of Otago Submission

Overview

The University of Otago welcomes the opportunity to make a full institutional submission as part of the sector consultation process initiated through the *Te Ara Paerangi – Future Pathways Green Paper*. As a major contributor of research of relevance to important social, cultural, environmental and economic issues to New Zealand and globally, we are well placed to participate in this process.

The University of Otago, founded in 1869, has a strong research profile across all four academic divisions (Health Sciences, Science, Humanities, Business and Commerce) and is New Zealand's second largest research provider. It spends more than $350M pa on research and has more than 1,400 PhD students enrolled at any one time[1]. It is also an externally facing and connected organisation. Annually, staff interact with more than 400 private companies and external stakeholders to help service their research needs, and more than 75% of academic staff undertake public sector service activities.

We support the consultation and review process under way. We note that while the current New Zealand research system is imperfect, it is efficient – despite a relatively low proportion of Government Expenditure on Research and Development (GERD) as a proportion of GDP, we perform well on the ratio of publications to GERD relative to both the OECD generally and the set of Small Advanced Economies.[2] New Zealand punches well above its weight in terms of research efficiency, output and impact.

As New Zealand's research system is underfunded compared with those of our OECD and SMA peers, it cannot be expected to deliver more value without further investment. If the revisions to our research system are to achieve the desired transitional change, the Government will need to match funding to aspirations.

Hence, we strongly support the Government's goal of raising national research and development expenditure to at least 2 per cent of gross domestic product as a minimum action that should lead rather than follow the tranche of other reforms that will ensue from this consultation process.

1. Ngā Whakaarotau Rangahau: Research Priorities

Key questions:

- *What principles could be used to determine the scope and focus of national research Priorities?*
- *What principles should guide a national research Priority-setting process?*
- *How can the process best give effect to Te Tiriti?*
- *How should the strategy for each national research Priority be set and how do we operationalise them?*

- The setting of New Zealand's research priorities should not be subject to the vagaries of political cycles. Instead, a multipartisan commitment to priority setting should be adopted, involving funder, researcher, end user and community (including iwi) input and leadership. MBIE priorities tend to change on short timescales, often while a research project is under way. It would be good to have "decadal" plans or other long-term agreed objectives.
- The different parts of the system each have their own views on priorities. It is a massive challenge trying to get all the pieces aligned so a lot of time is spent trying to match industry

[1] University of Otago Annual Report, 2020 (https://www.otago.ac.nz/otago828400.pdf)
[2] Research, Science and Innovation Strategy: Draft for Consultation (2019), pp. 20-21.

needs, for example, with funding sources, and department interests. Joint priority setting and governance involving researchers, industry/end users, government and Māori would help align the various strategies and mechanisms.

- Prioritisation would need to incorporate (at least) four keys elements:
  - First, there should be a recognition of the need to preserve investigator-led, competitive priority setting *within and outside other identified priorities* to foster new thinking and innovation in research networks and teams, as well as to advance knowledge in areas that will be important in areas of future priority and need.
  - At the other end of the spectrum, identified high-level priorities, which would provide overall direction to national research investment, should be developed through a comprehensive process akin to that used ahead of the establishment of the National Science Challenges. An appropriate life cycle for these would likely be a decade.
  - Subsidiary level priorities, sitting underneath/embedded within the established high-level priorities, will also be important. These could usefully be refreshed on a rolling cycle (e.g. three years) and would provide the opportunity for new ideas, emerging areas and responsivity.
  - Capability development must be a priority across all research horizons, and universities are uniquely placed to take a leading role in training, nurturing and supporting our future research workforce.
- The narrow definition of research and priorities (focused towards Natural Sciences in this paper) misses the vital importance of Social Sciences, Humanities, Business and Economics research to advancing knowledge and understanding for the national good. This oversight risks inhibiting the development of researchers in this space and their ability to contribute to addressing key issues for New Zealand society e.g. educational and social disparities. The pandemic has exposed critical under-resourcing of social research.
- Moreover, not all research can be prioritised, nor should all research be prioritised. The process needs to allow for "non-prioritised research" or "not-yet prioritised research". Future needs are not always known – which is why novelty and innovation is needed. Priorities should not stifle innovation.
- Prioritisation creates a compete (win v lose/trade-off) landscape rather than a collaborate (win/win, and/and). Māori worldviews, for example, take an intergenerational approach, whether it's a 50-year plan, 100-year plan or 500-year plan. Our research prioritisation landscape favours a "need now or need tomorrow" approach, meaning the interconnections and potential for intergenerational gains over time may get lost or siloed.
- Research teams currently chase money, and for some funds there is a contest of ideas that is so oversubscribed that final decisions can resemble a lottery.[3] Mission-led opportunities need to be better funded, and funding needs to equally support discovery, translation, and implementation – these complementary steps are all research intensive.

[3] There is a role for using lottery-style processes to select projects in some parts of the system (once quality thresholds have been met through a deterministic assessment process), which was used to good effect for the *Whitinga Fellowship* round in 2021 for example. This has an advantage of being able to build specific equity and diversity objectives into the lottery process. However, whilst useful in some circumstances, we do not advocate for widespread use of lottery processes in contestable fund allocation.

- Prioritisation can lead to a scenario of "haves" and "have nots", whereby those working in an important field that may not be a priority have few options for support of their work (including blue skies research).
- It is therefore critical to have a balanced portfolio. Too much focus upon major priorities or missions risks losing critical innovative research that could have major impact, be the start of the next major priority, or become exceptionally valuable due to unforeseen developments.

2. Te Tiriti, Mātauranga Māori me Ngā Wawatao Te Māori: Te Tiriti, Mātauranga Māori and Māori Aspirations

Key questions:
- *How would you like to be engaged?*
- *What are your thoughts on how to enable and protect mātauranga Māori in the research system?*
- *What are your thoughts on regionally based Māori knowledge hubs?*
- *How do we design Tiriti-enabled institutions?*

- Leadership in this area (both Māori and non-Māori) will need to be strong to work through possible resistance and/or opposition. This might be achieved through a dedicated body that has oversight and governance of this area – from the priority setting phase to roll out and beyond.
- Progress in this area will take time and iwi need to be involved. Funding should be provided for communities to be involved in the establishment of new systems and structures. Ongoing funding will also be needed to ensure iwi are properly resourced to participate in meaningful co-design of research programmes and projects in our contestable funding system.
- Māori data sovereignty and the protection of Māori IP are crucial matters to be addressed.
- Te Tiriti is given little effect in national research priorities at present. Our research priorities are usually designed for "NZ Inc." and Māori voices are often not present in the research priority landscape – they're invisible. Using Vision Mātauranga Policy to attach Māori voices at the "delivery end" in a research proposal can be disingenuous, and significant Māori-led reform is needed.
- The current shortage of Māori researchers is a key issue the new process needs to address to enable and protect mātauranga Māori in the research system – and to promote the development of Māori research capacity across all areas of knowledge. New, additional funding needs to be specifically targeted at building the numbers of Māori researchers across the research system. Retaining as well as training Māori researchers is crucial, and the development of Māori research leaders is a particular priority.
- Māori researchers also need to be able to develop their careers without the double load of undertaking research while providing cultural leadership to their non-Māori peers. Resourcing of cultural advisory positions may be incumbent upon the individual institutions.
- To redress the shortage of Māori (and Pacific) researchers, our research system and institutions should commit to proportional Māori academic staff FTE targets over a number of years – something akin to Otago's Te Kauae Parāoa/Mirror on Society Policy for our Health Sciences Professional Programmes, which is already proving transformational in health professions such as medicine.
- To be truly Tiriti-led, our national research system needs to go beyond nurturing mātauranga Māori to redressing structural inequality – the legacy of our colonial past. This will involve

the sharing of power and resources with Māori. Māori must be involved (or have the right to be involved) in priority setting and co-design across the research system.

- We support the idea of regionally based Māori knowledge hubs – with mana whenua involved in priority setting, selection (of hubs), co-design and governance. There are likely to be myriad benefits from such hubs – intellectual, economic, social. Again, this will need to be underpinned by a focus on redressing the shortage of Māori researchers.
- Regional hubs will need to be appropriately resourced and they should have autonomy around strategic and operational decision making.
- For institutions to be genuinely Tiriti-led, Māori (mana whenua especially) must be involved in governance, priority setting and co-design across the full range of our work – including operational strategic planning, capital works decisions, human resources, etc. To be Tiriti-led will require partnership – power sharing.
- An effective response would also include increased Māori representation in senior decision-making capacity at MBIE and other public-sector research funding agencies. (The MBIE Science Board, for example, currently has only one Māori representative.)

3. Te Tuku Pūtea: Funding

Key questions:

- *How should we decide what constitutes a core function and how do we fund them?*
- *Do you think a base grant funding model will improve stability and resilience for research organisations, and how should we go about designing and implementing such a funding model?*

- We support the Government's goal of raising national research and development expenditure to 2 per cent of gross domestic product as a bare minimum. Benefit would flow throughout New Zealand via knowledge transfer and the impact of research.
- Funding should be consistent with Tiriti partnership.
- Funding must strike a balance between investigator led and national priorities.
- In general, we support Universities New Zealand's (UNZ's) nuanced submission around funding. Whatever gains might come from a new approach to funding, the biggest gains will come from *more* funding being injected into the system within an institutional structure designed to promote collaboration and the achievement of outcomes, including funding provided separately to support key research infrastructure investments.
- We support UNZ's recommended principles:
  - Large capital infrastructure is funded by government (and not left to research institutions, or customised one-off collective solutions to fund) and is accessible to all relevant researchers.
  - Funding should promote, incentivise and support domestic and international collaboration as a norm, not just for some funding streams.
  - Funding should recognise and support the expense of the rising cost of salaries of domestic and international research talent.
  - Research funding to universities must support research workforce planning and development.
  - Funding should focus on strategic outcomes such as equitable health outcomes and research to benefit the Māori business sector, which in turn contribute to the economy.

- The current full-cost and fully funded model makes costs transparent and therefore auditable. There are, however, two consequences of this approach:
  - It creates a two-tier system, with institutions having some research supported by full cost external funding and other research (sometimes closely related) funded from teaching, commercial activities, charities and other sources.
  - Investment in research infrastructure that would serve national needs and international collaboration is not directly or easily funded unless a new and targeted infrastructure fund is established.
- We are open to the possibility that the funding system for research could be revised, but any revision needs to be comprehensive (and not just an arbitrary change to the approach to overhead funding), with due consideration of any potential unintended consequences. Furthermore, any change to the funding landscape also needs to preserve complete transparency of the cost of conducting research. Base grant funding, for example, would need to be calibrated to accommodate the greater relative costs of Sciences and Health research.
- Future research funding needs to be equitable, transparent and monitored – to ensure it is not used to cross-subsidize out-of-scope activity.
- Funding of investigator-led research needs to be increased and diversified to nurture a variety of capabilities. Humanities, Business and Social Sciences researchers, for example, are largely reliant upon the Marsden Fund – i.e. all eggs in one basket. In other funds, Social Sciences are often seen as (expendable) add-ons, so rebalancing Endeavour and other funds to support more research targeting important societal issues would be welcome.

4. Ngā Hinonga: Institutions

Key questions:

- *How do we design collaborative, adaptive and agile research institutions that will serve current and future needs?*
- *How can institutions be designed to better support capability, skills and workforce development?*
- *How should we make decisions on large property and capital investments under a more coordinated approach?*
- *How do we design Tiriti-enabled institutions?*

- We note respectfully that CRIs have achieved mixed results since 1992, which is no reflection on the skills and commitment of the research teams and of these institutions. As the UNZ submission points out, it is unusual among our international peers to have public institutions like CRIs focused on and limited to the dominant sectors in the economy of the recent past. This model – entailing circumscribed, static entities – means there has been little capacity to address emergent, knowledge-rich sectors. It is also impossible and risky for a single institution to have all the national capability in one area.
- The current company model of CRIs has also meant research infrastructure isn't used as effectively as it might be – a corporate entity housing research infrastructure in a competitive research system can act in ways that are incompatible with driving public research outcomes.

- We agree with UNZ's observation that successful collaboration has occurred within the New Zealand research system when it has been specifically incentivised through vehicles that require such collaboration for success – specifically Centres of Research Excellence (CoREs) and National Science Challenges (NSCs). Universities have, moreover, had success with hosting these collaborative models, which have been inclusive of CRIs, independent research organisations and end-user communities or entities.
- We note here the intimate connection between institutions and research supported through Vote Education (for CoREs, PBRF and funding to support researcher training) and the outcomes desired from Vote Research, Science and Innovation. Any redesign of CRIs should enhance their connection and integration with the tertiary education sector – universities and wānanga, in particular – who hold the principal national responsibilities for research training and workforce development.[4]
- We note also that the CoREs have become increasingly mission-led over time. Mission-led research sits naturally under national research priorities. Morphing CoREs and NSCs into mission-led, priority-driven entities might be useful.
- New Zealand doesn't need discrete institutions to separately drive its research priorities. If CRIs are to continue, there should be fewer of them with broader remit – and these carefully selected.
- Perhaps a nuanced approach can be taken, whereby something deemed necessary and permanent might exist through a CRI-like structure, and something shorter term and more responsive may proceed through a mission-led CoRE/NSC collaborative model.
- We have addressed Tiriti-enabled institutions under 2 above (Te Tiriti, Mātauranga Māori me Ngā Wawatao Te Māori: Te Tiriti, Mātauranga Māori and Māori Aspirations).

5. Te Hunga Mahi Rangahau: Research Workforce

Key questions:

- *How should we include workforce considerations in the design of national research Priorities?*
- *What impact would a base grant have on the research workforce?*
- *How do we design new funding mechanisms that strongly focus on workforce outcomes?*

- PhDs remain relevant and valuable, providing rich skillsets to support the knowledge economy. But research training needn't be all about PhDs – other qualification exit points are valuable.
- Generally, we need to strengthen our business linkages to create workforce outcomes - "on ramps" and "off ramps". "Pracademic" professional doctorates – DBA, EdD, etc. – are particularly valuable in this regard.
- Secondments and internments in industry and the public sector would provide benefits both ways. There is plenty more scope for collaboration with industry in Health Sciences.
- Additional funding is needed to help retain trained researchers and develop early career researchers into research leaders. As noted earlier, developing Māori and Pacific research leaders is a particular priority. Increasing and diversifying postdoctoral fellowships would

[4] Wageningen University in the Netherlands is a good example of CRI and university integration where institutes of national significance are managed under the university umbrella. This integration between CRIs and universities enhances efficiencies through removing duplication, the burden of subcontracting and resourcing.

help, and this might be achieved by bringing back something akin to the old FoRST scheme, by increasing the availability of Whitinga Fellowships beyond a "one-off", and/or by increasing the number of two-year Rutherford Foundation Postdoctoral Fellowships. At present, Marsden Fast-Start Grants have become de facto postdoctoral grants as there is nothing else available.

- Capacity building for Māori and Pacific research needs greater resourcing, starting at secondary school with a focus on widening participation. Māori and Pacific students should be encouraged more strongly than at present to see that research is for everyone and is "doable" as a career.
- Care needs to be taken around the design of future research funding processes (application and reporting processes, in particular) to promote efficiency and minimise workload for both researchers and research support staff. Competitive research funding is a high-stress, time-intensive environment where many put aside quality of life just to be able to maintain employment and hope to progress.
- The RSI ecosystem incentivises and rewards a traditional research pathway where one qualifies then goes from job to job to achieve a career-grade position (e.g. professorship) and without time out for life duties. The pressure to perform is immense and clearly disadvantages people who aspire to have a family and/or a decent work-life balance, or who have substantial community engagement. Some women, Māori and Pasifika are disadvantaged by the current paradigm. This an equity issue. Redesign of research funding processes should include more flexible or holistic assessment of excellence and opportunities for researchers who take parental leave or have significant family and community responsibilities.
- We support the following points from UNZ's submission on the Research Workforce:
  - It takes many years to train high-quality researchers, thus research priorities will need to be set with horizons that enable the training, recruitment and retention of talented international and domestic research staff. Depending on the timeline of those priorities, this might better enable New Zealand to grow our own talent and therefore also help address issues of diversity and inclusion (precarity is disproportionately borne by women, Māori and Pacific researchers).
  - Resourcing New Zealand's national research infrastructure is crucial for training, recruiting and retaining research talent – including technical support capability.
  - It is critical for New Zealand to invest in building career pathways and capability for pure research roles as well as for less traditional roles such as policy development, research IT, research data and digital preservation specialists, librarians and archivists. This will allow the infusion of research skills (such as analysis, data interpretation and application) into all relevant parts of the economy, which will further contribute to New Zealand's economic, social, environment and social outcomes.
  - Systemic change that will positively impact New Zealand's research workforce will only be effective if the government significantly increases its total investment in the RSI system and further incentivises the private sector to do likewise.
  - A base grant would have to be significantly greater than the quantum currently covered by overheads if it is to improve the stability of the research workforce. Base grants aligned to capability platforms would further enhance job security for researchers and would also provide high quality career pathways. A base grant approach would, however, need to be accompanied by systemic changes to prevent unintended consequences, such as underfunding of fundamental research.

- The current funding system is not designed to fund capability but rather to fund individual projects or programmes for a finite period. This results in a degree of workforce precarity. A balance needs to be struck between funding capability and funding individual projects or programmes. This can be achieved through a base fund for capability and discretionary funding for projects or programmes. This approach would provide greater workforce stability than is currently the case while also ensuring we retain the current agility of the research workforce to pursue new lines of inquiry through basic, investigator-led and curiosity-driven research.
- Māori and Pacific researchers in the system are often overloaded, as funding settings increasingly emphasise mātauranga Māori and Pacific approaches to research. The doubling-up of responsibilities for Māori and Pacific researchers to include cultural leadership on top of their research leadership might be addressed through funding of supplementary, specialist cultural leadership.

6. Te Hangahanga Rangahau: Research Infrastructure

Key question:

- *How do we support sustainable, efficient and enabling investment in research infrastructure?*

- We support UNZ's position on this – that large capital infrastructure is funded by government, perhaps via competitive rounds, and is accessible to all relevant researchers.
- Models for running national competitive funding processes for research infrastructure are present in most advanced research-intensive economies. We have some familiarity with the *Canadian Foundation for Innovation*,[5] for example, that aims to help Canada remain at the forefront of exploration and knowledge generation while making meaningful contributions to generating social, health, environmental and economic benefits and addressing global challenges. This is achieved principally through its Innovation Fund[6] competition that runs at regular intervals of 24 to 30 months. We would be happy to share insights about this and other international models as Aotearoa's infrastructure funding is designed.
- New Zealand needs a national plan providing a better way to build research infrastructure that is in selected cases crown-owned and fully funded. This should include infrastructure for Māori.
- Research infrastructure needs to remain broadly defined and should include (in addition to capital equipment) nationally significant collections and databases (in some cases even if held at a regional or local level), long-term studies such as longitudinal studies, as well as the staff and other ancillary support services required to effective use such infrastructure.
- Infrastructure should be positioned around the country to support regional economic growth and engagement with communities, including iwi.
- Currently, the full-cost funding model does not support infrastructure being used fully, nor does it support purchasing large capital items. Researchers currently rely on serendipity for large infrastructure being available (e.g., the Primary Growth Partnership Fund from the Ministry for Primary Industries has recently funded a magnetic resonance imaging machine).

[5] https://www.innovation.ca/

[6] https://www.innovation.ca/apply-manage-awards/past-competitions/2020-innovation-fund

- The current system funds projects or programmes for a finite period (e.g., three to seven years), which leaves it to research institutions to make decisions about investing in and supporting infrastructure.
- National infrastructure investments should sit on the Crown balance sheet where this is appropriate, and in these cases operation costs (including depreciation) should not be the responsibility of the host institution. The host institution should be required to ensure open access and national use of the infrastructure.
- Setting national research priorities should encompass e-infrastructure requirements, such as datasets, archives and other forms of digital research infrastructure – including for the Social Sciences and Humanities. We note the vital role of collections (the Hocken Collection, for example) and longitudinal studies (the Dunedin Study) for supporting national Health, Social Sciences and Humanities research.
- Coordinated infrastructure for health priorities is a priority, including clinical trials and national biobanking services (with appropriate administrative, storage and kaitiakitanga protocols).
- Increasing New Zealand's national research infrastructure will have positive effects for the workforce, including technical support capability. Improved research infrastructure will also help in training, recruiting and retaining research talent.