Lincoln University Submission on Te Ara Paerangi Future Pathways Green Paper

Lincoln University welcomes the green paper on the research, science and technology system and is pleased that MBIE are embarking on such a wide-ranging review and proposing new approaches. While the current system has served Aotearoa New Zealand well in some aspects, such as demonstrating the actual cost of research and increasing research outputs, it has also developed many disincentives, such as excessive competition, too much time writing applications and a multiplication of governance and management structures with little strategic overview.

The aim of the green paper discussion, as stated, is developing a system that creates transformational change and supports grand challenges. This approach does run the risk of aiming at quick wins, rather than rebuilding the system from the foundations, which is what is required. We would like to see a more robust approach that builds a whole system, from early education to commercialisation.

Research Priorities

Operationalising Priorities – how should the strategy for each national research Priority be set and how do we operationalise them?

The current funding system has poor links to strategy or government and industry priorities. To better align strategic intent with what is funded, we support the proposal by UNZ that a Research Council be established. Currently, the funding priorities are poorly articulated and subject to 3-year political review and researchers, in a particular area, must look to multiple funding sources (with associated transaction costs) to keep any decent size lab group going. Each team must develop their own version of Māori engagement, often for an application that is unsuccessful, to the frustration of all. The environment in general can be characterised by lack of trust.

Priority-setting Process – what principles should guide a national research Priority-setting process? How can the process best give effect to Te Tiriti?

There is a risk that the proposed priorities seem more about measurement of spending and value of investment, than a developing stable research system.

There is always going to be a balance between stability, longer term funding and more competitive, short-term funding. Priorities "*could act as focal points for balancing research portfolios, ensuring an appropriate mix of leading-edge transformative research and experimental development in operational environments*". But the second would not be driven of priorities, but a broader investment in capability?

We are supportive of more mission-led research, which is a strong aspect of the Biological Heritage National Science Challenge submission. New models that emphasis collaboration between Universities and CRIs, for mission critical science should be explored. There is a need for stability in key research areas, which suggests a bulk funding approach for crucial research. We would like to see longer term funding (>5 years) as standard.

Priorities Design – what principles could be used to determine the scope and focus of national research Priorities?

A key principle is co-design with Māori and industry. Key stakeholders need to be at the table and have a role in the priorities, or there is no ownership. Aligned with this, the processes need to be open and transparent. In setting priorities, national issues are good priority areas, but should not be limited to this. More importantly, who sets these priorities and how often are they reviewed? We support the establishment of a Research Council to set priorities, with longer (>5 year) cycles.

Priorities do not need separate governance and management structures to be effectively managed. A priority is an intention, not a structure. Erecting structures has been the approach for the last 10 years, which then lacks flexibility as is focused on the survival of the institute/structure rather than the priority.

We agree that funding should be tied to the priorities, not separate. Research is now generally multidisciplinary and multi-institute, but do not "direct" this: teams form naturally around the problem if the priority setting is properly done.

Institutions

How do we design Tiriti-enabled institutions?

In our experience, designing better Tiriti-enabled institutions requires codesign at all stages and full participation. The models that many NSC and CoREs have now embraced, with co-governance and co-leadership has ensured Tiriti is given due consideration, without excessive external consultation.

Institution Design – how do we design collaborative, adaptive and agile research institutions that will serve current and future needs?

Colocation of research institutes (both government owned and independent) and Universities has a lot of advantages for a new science system. As well as having infrastructure benefits, it also provides more scope for workforce training, internships and better coordination of research. We believe colocation should be encouraged and supported where it already exists. Colocation is not just a benefit for research and infrastructure, but also allows for joint workforce training and favours joint appointments and staff mobility.

Open access and ownership of IP through government departments are not incentives for industry to commercialise research outputs. New Zealand is very small, often only one or two companies in a particular area. Companies cannot get an advantage when IP is publicly shared.

Pooling of resources for commercialisation has worked well, with KiwiNet as a model. Cross organisation collaboration for commercialisation has worked well, especially for small institutions.

Better Border Biosecurity (B3) is an example of multi-institute cooperation where each institute contributes funding for a mission-led programme of research. Involves industry and government for setting priorities and has low administration costs. B3 has made a submission outlining the nature of the collaboration and why it has been successful.

Knowledge Exchange – how do we better support knowledge exchange and impact generation? What should be the role of research institutions in transferring knowledge into operational environments and technologies?

Role of Institutions in Workforce Development – how can institutions be designed to better support capability, skills and workforce development?

Role of capability development in the pipeline of innovation is an important consideration, and currently is not linked to most funding decisions. A comprehensive research system includes education and training from early school through to PhD, with a strong focus on lifelong learning. There is a need to rethink what we are training graduates for, and training should involve more hands-on training and placements in industry and government.

Funding

Core Functions – how should we decide what constitutes a core function and how do we fund them?

Establishing a Base Grant and Base Grant Design – 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?

The issues around more direct, bulk or the current highly contestable funding approach is appropriate area to discuss. Currently there is very large transaction cost in obtaining funding, which is completely divorced from capability maintenance or strategy. Limited direct funding to the CRIs has many (sometimes self-imposed) strings attached and often seems short term. The National Science Challenges (NSCs) and the many other funded initiatives, with significant governance, leadership and administrative structures, may not always have been as effective in research. Researchers often find themselves involved in multiple virtual institutes just to keep their research teams funded, leading to more reporting than should be required.

While we support the concept of increased bulk funding of institutes, we note that there could be unexpected outcomes depending how such an approach was instigated. As the intention is for more direct funding from MBIE Research and Development funding, this could have the outcome that the smaller amounts of contestable funding is available, which would still have competition between CRIs, Universities and independent research organisations. Inevitably, this would result in less research funded at universities and independent organisations, which would affect workforce and investigator led research (where much innovation comes from).

How would TEOs be incorporated into a base grant approach? If funding is not organisation specific, but area specific, could be very useful for stability, workforce development etc. But must avoid establishing more standalone entities with own governance and administrative structures. Also need to recognise that PBRF is not a research fund as such, it is about capability maintenance, so simply

direct funding the CRIs by reallocating the current contestable funds would cause a reduction in the quality and quantity of new and novel research which often comes from other organisations. A more nuanced approach to bulk grants could solve this issue, especially ones that favour multi-institute teams. History shows that even serendipitous discoveries come from a basis of good fundamental science. Get the base right, support capabilities, and breakthroughs happen.

One issue of bulk or block grants is how overheads for research will be covered. The current full cost model has its flaws, but at least institutes can maintain basic facilities. If contestable funding has no overhead component how will this be covered?

Te Tiriti, Mātauranga Māori and Māori Aspirations

Mātauranga Māori – what are your thoughts on how to enable and protect mātauranga Māori in the research system?

We support the UNZ submission on this area, where Te Tiriti o Waitangi is best pursued through a coordinated, systems-change approach.

The Research Workforce

Workforce and Research Priorities – how should we include workforce considerations in the design of national research Priorities?

In general, we support the position stated in the UNZ submission. "The future shape and size of the research workforce is inextricably linked to other aspects of the national system such as (but not limited to) strategic research priorities, infrastructure and total national investment in RSI". "Capability platforms within research organisations should align with national research priorities".

We also support other submissions that point out the importance of international linkages, for peer review, latest research directions and tools and workforce. Linking with international teams saves duplication of research.

Better Designed Funding Mechanisms – how do we design new funding mechanisms that strongly focus on workforce outcomes?

The new science system needs to take a workforce model that encompasses the future needs. This includes reshaping how graduates are trained for a modern research environment. Training graduates at university require more diverse approaches, working on transferable skills rather than a single academic model. The Lincoln-Canterbury Joint Postgraduate School is an excellent example of what can be achieved when multiple institutes (including CRIs) work together to shape the training. The school has provided a submission as an example of what can be achieved.

The flow of people, especially from graduate training to industry, is impactful. Industry would be more research engaged if they employed highly trained graduates, who were a fit for purpose. This needs to be encouraged.

One area that the current science system has consistently failed is maintaining capability. Without job security, how would any "best teams" approach work? Researchers are generally collaborative by nature, but competition means someone loses. Science is now always multidisciplinary/ transdisciplinary, requiring many skills to achieve success.

Base Grant and Workforce – what impact would a base grant have on the research workforce?

Full cost model of research funding has hampered the post-doctoral system, as postdocs cost almost as much as experienced staff members. There is an imbalance in costs which results in overtraining of PhDs and underfunding postdoc and early career researchers. This has made career progression very difficult at early stages and the loss of many talented researchers to overseas. A systematic review to determine strategically, what the pipeline of talent should look like would help, rather than the current system of counting PhDs in grant proposals as ticking the "capability development" box. Also, of relevance to this is that early career researchers are looking at the job of senior researchers and not seeing an attractive career. They generally see team leader engaged in almost constant bidding for funding (exacerbated by low success rates in contestable funding). This comes back to the funding model and transaction costs of the current system. It is worth noting that most other avenues of funding (NSCs, CoREs, etc) also run competitive funding schemes, requiring extensive applications.

National Research Infrastructure

How should we make decisions on large property and capital investments under a more coordinated approach?

We suggest that a National Research Infrastructure Council be established, potentially as a subcommittee of the UNZ proposed Research Council, priorities funding for key infrastructure. Such a body could determine the priorities for infrastructure, both in need and location, in coordination with the Research Council. The importance of good research infrastructure has been demonstrated during the Covid response. Infrastructure includes both hardware and software.

Funding Research Infrastructure – how do we support sustainable, efficient and enabling investment in research infrastructure?

Acquiring and maintaining large infrastructure is a major limitation for research in Aotearoa New Zealand, especially for smaller institutions. The issue is not only the cost of the hardware, but the inability to maintain a service, including employed skilled staff. External charging rates levied by organisations currently, as they try to justify large equipment purchases, are prohibitive for most research use. Colocation, co-ownership and recognition that these are not money-making ventures is needed.

It needs to be recognised that such issues include the establishment and maintenance of databases, which are often set up under grant-funded research programmes but impossible to maintain after programme finishes. As we are now in the age of big data, lack of such infrastructure will impede our research quality and impact.