

MBIE Te Ara Paerangi/Future Pathways Response

Submission from the Maurice Wilkins Centre (MWC) Early to Mid-Career MBIE Future Pathways Response Working Committee:

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We applaud the MBIE's recognition of the problems entrenched in the current RSI system and the broad aims of Te Ara Paerangi. As our submission is from the perspective of early and mid-career researchers we feel our knowledge of the systems, structures and governance underpinning the RSI are too limited to be able to advance the 'Hows' that MBIE is requesting. However, we have detailed our experiences from the RSI frontline researcher perspectives. Our submission indicates what the solutions need to include and what they should be designed to avoid. Many of the issues we see in the current RSI sector are unintended consequences of the current settings and therefore any future changes need to be carefully considered to avoid further unintended consequences. Some of the 'gaps' in the current system are being addressed by the work of the MWC including facilities access, cross-institutional collaboration/connectivity and community outreach. However, the MWC has a large mandate spanning research and education, resources are spread very thin and the CoRE itself is a temporary organisation with fixed-term funding.

1. NGĀ WHAKAAROTAU RANGAHAU, RESEARCH PRIORITIES

KEY QUESTION 1: What principles could be used to determine the scope and focus of research Priorities?

KEY QUESTION 2:

A) What principles should guide a national research Priority-setting process?

B) How can this process best give effect to Te Tiriti?

KEY QUESTION 3: How should the strategy for each research Priority be set and how do we operationalise and implement them?

The potential risks of 'Research Prioritisation':

The current system supports both researcher-led and call-specific projects. Although call-specific rounds or 'new initiative' rounds are sometimes funded in addition to the existing generalised researcher-led funding streams, they will often eat into the existing budget (e.g., the health research budget) and even small reductions/fluctuations in these budgets may lead to loss of research personnel. This is because current levels of funding are insufficient and recent events have only made this more keenly felt. Research priorities may ensure issues that are important/unique to Aotearoa (e.g., environmental projects) are included in the RSI strategy, however, this may impact negatively by de-funding other research in an already stretched system.

- Set research priorities may limit blue sky/fundamental/basic science research, favouring translational and commercial research. Basic research is the foundation on which we build our understanding and essential to support home-grown research/innovation.

- Priorities may omit social sciences and humanities, but these are important for teaching within institutions and are currently funded from overheads.
- Funding track records are used as a proxy for a researcher's quality. Priorities may have the unintended consequence of overfunding some groups, while undervaluing other innovative research.

What a 'Research Priorities' decision-making forum should look like:

- Any system used to define research priorities must be decoupled from the three-yearly Government election cycles for time to build/develop.
- Careful consideration is needed selecting panels to choose research priorities to avoid a narrow focus that would restrict science capabilities and a lack of novel ideas. Panels need to be cross-discipline from various research coalfaces and RSI governance/policy to ensure the established system recognises multifactorial research (e.g., high-tech lab-based, clinical, *in-silico*, community, and multidisciplinary research) which need different approaches and resourcing for success and continuity.
- Funding needs to support the research pipeline and its highly skilled people, as well as better supporting diversity in science. Currently there is a lack of diversity in funding panels, and this would need to be addressed in priority decision making forums and in all funding assessment panels.

Potential solutions:

- Research priorities need to support capability growth, as we can't always predict which research area may underpin progress for future priorities. One solution could be using a grant proposal section to specify how the project specifically benefits Aotearoa (currently in HRC grants). This approach ensures a proportion of funding supports New Zealand-centric research, with another proportion for projects with wider relevance to participate in global research efforts.
- We recommend ring fenced/specific funding for basic science research as well as translational/applied science, accepting that some projects will not have short term impact but are necessary to build capability, the pipeline and understanding. Currently the Marsden fund is one of the few 'blue sky' funding options, but it is a small fund spread over the entire RSI sector and humanities, so opportunities for us to build a strong foundation for applied research is severely lacking.

2. TE TIRITI, MĀTAURANGA MĀORI ME NGĀ WAWATA O TE MĀORI TE TIRITI, MĀTAURANGA MĀORI AND MĀORI ASPIRATIONS.

KEY QUESTION 4: How would you like to be engaged?

KEY QUESTION 5: What are your thoughts on how to enable and protect mātauranga Māori in the research system?

KEY QUESTION 6: What are your thoughts on regionally based Māori knowledge hubs?

How we feel we could better enable and protect mātauranga Māori in the research system:

- To properly embed mātauranga into science in Aotearoa we need to upskill tauwi and encourage more Māori into research through the following initiatives:

- Early engagement from regional kura kaupapa to encourage Māori to pursue a science career by demonstrating pathways and creating networks for long term success. Formal funding could support this initiative, with successful examples such as:
 - 'Sugar in Schools' programme run by the Moko Foundation in Te Tai Tokerau to raise health literacy and science engagement (<https://www.themokofoundation.com/research-unit/fiss/>)
 - Robinson Research Institute TECH Bootcamp run for Year 12 and 13 Māori and Pacific students to highlight potential careers in science and technology (<https://www.mikesnews.co.nz/wp-content/uploads/2020/09/Robinson-Research-Institute-TECH-Bootcamp-Application-Form-New-Dates-2.pdf>)
- Fully funded summer lab studentships/internships for Māori and Pacific students may attract more Māori and Pacific academics and set an example for rangatahi. The MWC has been developing such an initiative in recent years but with limited resources.
- There is a bottleneck for Māori students progressing from undergraduate degrees to postdoctoral research with many more attracted to medicine to be closer to their whānau and community, but also due to the European-centric system, lack of career stability, digital divide, lack of living support, workspaces, flexibility in schedule for whānau commitments; and targeted funding could alleviate some of these issues.
- While policies and specific roles may support mātauranga Māori, there needs to be a systemic upskilling, pride and understanding of Te Ao Māori including mātauranga Māori for all residents of Aotearoa.

How we feel about regional Māori knowledge hubs:

- Knowledge hubs could form a conduit between research institutions and Māori communities. Existing knowledge hubs such as Te Waharoa ki te Toi and the Moko Foundation can be a template for Māori leadership and a Māori-centric approach to connect cutting edge research with mātauranga Māori and Māori communities. These hubs could also be the interface between iwi and research groups, where they could pair interested Māori communities with research and commercialisation opportunities for true benefit for Māori.
- Māori knowledge hubs need to be decoupled from the election cycle and properly funded from a separate pool of funding from research to ensure this is truly empowering, can be properly established and maintained long-term.
- Regional hubs would ideally connect to local marae to ensure consistency in tikanga and for a deeper community-wide connection.

More formal support is needed to effectively implement Vision Mātauranga (VM) within our research:

We all agree we need to better honour the Te Tiriti responsibilities, implement VM and forge a place in the RSI landscape for more Māori leadership. To do this well, many researchers need guidance/upskilling:

- Our RSI workforce is multinational and requires cultural competency training as well as specific consultation to support non-Māori researchers to appropriately implement VM and honour Te Tiriti within their research. This requires formal systems and sufficient resourcing (separate from research funding which is already insufficient).
- The heavy VM weighting of funding rounds drives many non-Māori researchers to seek guidance from our few Māori researchers on how to implement VM in their project as there is no formal support system. Māori academics are overstretched advising colleagues, representing Māori on grants, in meetings and committees, with this free cultural labour detracting from their research on top of their other academic, whānau and community commitments. A considered and tailored approach is required for each project, but asking the only Māori researcher in the lab to help may

end up costing the Māori researcher's career and may not reflect the diverse views of all iwi. One short-term solution could be funding for Māori researchers that offer cultural consultation to have additional support to cover their consultation time (e.g., a technician), with a longer-term solution of formal VM consultants within organisations to properly guide research groups.

- Relationship building with Māori communities takes a long time, which is impossible when you only have funding for 6-12 months then have to abandon it if your project is not funded again, and those valuable connections are lost.
- Support is needed for both Māori and tauwiwi for relationship building and the development of ideas in consultation and collaboration together before potential research is developed to the point of a funding application. The current system assumes researchers are already equipped to do this effectively, but many tauwiwi are not. Additionally, support should be provided to continue or strengthen these relationships in a manner that isn't contingent on success of a specific project grant. The nature of 'support' mentioned here needs to encompass funding, time and access to development of capability and capacity to facilitate building and maintaining relationships that support the principles of Te Tiriti.
- For some research areas (i.e., subcellular pathways), there is no obvious direct link to current mātauranga Māori which will need to constantly evolve to encompass areas of novel knowledge. In these cases, funding could equally value Māori community outreach, funded student internships and health literacy education. Alternatively, community outreach to Māori could be a grant condition rather than an assessment criterion, with support provided by an external body to facilitate connections to ensure that meaningful and appropriate efforts are made to engage.

3. TE TUKU PŪTEA FUNDING

KEY QUESTION 7: How should we determine what constitutes a core function and how should core functions be funded?

KEY QUESTION 8: 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?

A core function of the RSI system should be the support of the workforce:

We all agree that there is currently not enough funding in RSI to support stable careers for highly educated scientists in Aotearoa. This leads to (and/or is caused by) the following major issues:

- Grant success rates of less than 10% mean that we spend a large proportion of research time trying to secure funding to survive another year, which is time and cost-inefficient and leads to researchers feeling unsupported and undervalued. Ultimately, many brilliant researchers are lost from the system because of this.
- Short, fixed-term contracts (often 1 year or less) lead to a significant lack of job security and difficulty publishing due to a lack of continuity. This causes an inability to maintain a research direction, and subsequent inability to secure more funding due to the current emphasis on track record as a scoring metric on grant applications. This also makes long or medium-term projects all but impossible and causes an inability to build partnerships with Māori.
- Exorbitant overheads ($\geq 110\%$ of salary) make postdocs and technicians unaffordable, so more PhD students are recruited as cheap labour, who then cannot secure a job in

research upon graduation. Overheads also stifle collaboration, as it is too expensive to include senior or CRI researchers on grants. Additionally, overheads are included in the total amount applied for in a given grant, leaving insufficient funding for staff salaries and project costs.

- Non-teaching institutions are entirely reliant on grant funding for salaries, resulting in significant career precarity and a loss of funding (and therefore employment) for almost every researcher at some point in their career.
- Lack of paid parental leave or support for researchers with additional family/carer/community responsibilities, brought about by short-term contracts.

Priority areas for a base grant:

- Continuity for the research workforce to avoid the current reality of job losses if they cannot secure external funding. The major goal of a base grant should be to ensure more job security for researchers.
- Significant reduction in overheads.
- Maintenance or extension of research infrastructure.
- A base grant should have a contractual definition of what the base grant can/can't be used for and importantly should be suitably resourced to realistically cover costs and match inflation.

Additional suggestions regarding funding:

- Funding for overheads allocated in addition to the monetary value of the grant should be based on transparent processes for setting overhead rates and/or overhead caps should be imposed to prevent cross-subsidisation of activities that are not directly related to the funded research.
- The current tying of overheads to researcher salaries needs to be discontinued because this promotes discriminatory and exploitative hiring practices, such as appointing PhD graduates at below-postdoc levels in roles where they are essentially performing as postdocs. The current system also disincentivises externally funded researchers from applying for promotions because they become too expensive or cannot fund enough FTEs on grants.
- A lottery model for grants that meet a quality-specific threshold would remove the track record as a key determinant of success, as track records can be negatively impacted by life factors e.g., family leave or illness etc.
- A funding structure that allocates some funds for early-career, some for mid-career, and some for late-career researchers to avoid competition of earlier-career researchers with established senior scientists.
- A streamlined grant application process to reduce the number of applications an individual has to write, thus improving efficiency (e.g., combination of multiple funds into one pool with one deadline).
- Standardised application forms between grants to avoid time wasted reformatting.
- Flexibility and provisions embedded within funder's budgets to enable funded extensions of projects to complete objectives whilst facilitating researchers to take parental leave or to focus on family/carer/community responsibilities. To provide budget certainty for non-

governmental research funders, a government funding pool could be available to co-fund these project extensions.

- More frequent funding opportunities (e.g., twice yearly) with faster turnaround times are required to increase efficiency and competitiveness of research and to retain skilled ECRs in Aotearoa.
- While we still need to support innovative/ambitious research to contribute globally, funding could be better tailored to support a project's scope and growth along the science spectrum, i.e., funding calls for less costly and/or pilot data administered alongside larger funds to cover more ambitious/expensive research.
- Funding initiatives should encourage cross-institutional collaboration and reward groups that work together to get the best people doing the best research and not further ingrain competition.
- International connection is important to avoid stagnation. Initiatives such as funded short-term exchanges with a return to New Zealand are likely to suit many researchers with family connections better than the current overseas postdoc/PhD model.

4. NGĀ HINONGA INSTITUTIONS

KEY QUESTION 9: How do we design collaborative, adaptive and agile research institutions that will serve our current and future needs?

KEY QUESTION 10: How can institutions be designed to better support capability, skills and workforce development?

KEY QUESTION 11: How should we make decisions on large property and capital investments under a more coordinated approach?

KEY QUESTION 12: How do we design Te Tiriti enabled institutions?

KEY QUESTION 13: 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?

- For questions 9, 10 and 11, more funding support is needed, and with a base grant and access to equipment to keep our research going. Currently the intense competition for insufficient funding means that collaboration is difficult/impossible.
- The MWC was created in part to cut across institutions, allowing collaboration, networking, national-level access to knowledge and facilities as well as encouraging cross-disciplinary research. Over time it has also provided national-level researcher support with its Early Career Steering Group providing technical training, mobility, mentoring and career development opportunities and ultimately improving national connectivity for early-career researchers. One of the outcomes of this was the improved ability of our researchers to pivot to face COVID in 2020. This functionality within the current RSI sector is not provided elsewhere and can be used as an example of how to facilitate a collaborative, adaptive and agile research workforce.
- Te Tiriti needs to be embedded within the institutions and should be properly funded to support capability (see detailed responses to questions 5 and 6).
- Joint PhD funding split between industry and universities could build networks and collaboration, with appropriate prior consideration of intellectual property and publications.
- Science parks could be Government-funded infrastructure for equipment/facilities such as the synchrotron in Australia, with technical support to run/maintain it, allowing researchers to access

these at lower costs. Current equipment such as NMR and mass spectrometers in major centres (Auckland, Wellington, Otago) could be centralised.

- Wider accessibility to eScience infrastructure at all levels would be beneficial. For example, NeSI is a fantastic resource for the member institutions/partners, but wider access could be facilitated with centralised funding.

5. TE HUNGA MAHI RANGAHAU RESEARCH WORKFORCE

KEY QUESTION 14: How should we include workforce considerations in the design of research Priorities?

KEY QUESTION 15: What impact would a base grant have on the research workforce?

KEY QUESTION 16: How do we design new funding mechanisms that strongly focus on workforce outcomes?

- Many of the current major workforce issues are caused by insufficient funding and consequent career instability and are outlined in the 'Funding' section of this response.
- However, additional issues include:
 - Becoming a PI is the only career path promoted for post-doctoral researchers; however, the number of PhD graduates and post-docs far outweighs the number of PI positions available. Additionally, not all post-doctoral scientists *want* to be a PI but are still valuable and highly skilled technical specialists.
 - Not every PhD graduate wants a career in academia, but there is a lack of transparency about and training for alternative options.
 - There is a push for 'individual research careers', when in reality no (good) research can be done in isolation.
 - Very few Fellowships are available or coordinated in a way that supports career progression. Those that are available (e.g., Marsden fast start, Rutherford) don't support a full salary if research costs and technical support (postdoc or RA) is included.
 - A lack of funding opportunities for international researchers/non-residents. This is a significant issue, as it devalues people who have come here to study and have developed skills/knowledge aimed at benefiting Aotearoa. Research is an international pursuit, and our research workforce benefits from the diverse perspectives of international scientists.
 - Many tenured lecturer positions and prestigious grants are preferentially awarded to New Zealanders with significant overseas experience, disadvantaging those that cannot live overseas due to whānau, carer or other responsibilities.
 - A lack of time/money allocation for service, which is expected within an academic's role, but is on top of 1.0 FTE research time.
 - Moving between industry and academia is difficult, as the primary metrics of success in academia are publications and grants awarded, so time outside academia does not contribute to these metrics, making it difficult to return.
 - Many early-career postdoctoral fellowships are only open to those who have been awarded their PhD. The delay between thesis submission and graduation can easily be 6-12 months or longer, and grant rounds are usually on a 12-month cycle, which means that these researchers often have to seek alternative employment.

- The early and mid-career period often overlaps with having a family and parents/carers are disadvantaged in many RSI facets. Most grants, awards and metrics of excellence are tied to years since PhD with no room for 'merit relative to opportunity' to be considered.
- Suggestions for improvement:
 - Generation of alternative career paths for postdoctoral scientists who do not wish to become a PI, such as: predominantly hands-on laboratory or other technical research-based roles, with a small FTE allocation for student supervision/service/admin; facility managers; technical or knowledge specialists who provide services for several research projects. These roles could retain skill sets for lab techniques that take many years to master.
 - More capacity for researchers to apply for funding as a team to support collaborative projects, reduce the pressure to come up with a separate research niche for each individual researcher, and reduce competition.
 - Greater transparency/support for NZ residency pathways, and/or greater funding support for international researchers.
 - Support for short-term overseas placements for researchers to bring back valuable skills to Aotearoa, without having to uproot their family for years.
 - Paid support for those wishing to take family or carers' leave, and support upon their return to work.
 - Protected time and salary support for service (serving on university committees, community outreach etc.).
 - Overhaul of the metrics for success in academia. Focussing on the number of publications as the primary metric of success causes a multitude of issues including poor-quality science/lack of scientific rigour due to time-pressure/overwork and failure to recognise skills/experience in researchers from non-traditional career pathways.
 - Opening up early-career grant eligibility criteria to include those who have submitted their PhD thesis but may not have graduated yet (award of fellowship contingent on the recipient passing their oral exam).
 - Improved postgraduate training for careers outside of academia, such as conjoint courses, industry-recognised qualifications/experience, and internships.
 - Each lab could be guaranteed basic functional capacity by provision of funds for one technician and one postdoc, with additional capacity gained through grant funding and postgraduate education.

6. TE HANGANGA RANGAHAU RESEARCH INFRASTRUCTURE

KEY QUESTION 17: How do we support sustainable, efficient and enabling investment in research infrastructure?

- A huge amount of effort is lost in needless administration and could be better spent on research rather than research management.
- Flexibility in grant budgets is required to allow for changes during unplanned events such as COVID. As long as general objectives are met then budgets should be flexible and less tied to specific outputs.
- Biomedical science often relies on expensive equipment that cannot be supported by one organisation alone. Centralised facilities are one solution, or a 'virtual' equipment/facility hub

with a database of equipment and contacts with funding for researchers to access it. This system would need consistent funding to support experienced staffing to maintain/run the machine to full capacity and help researchers to add value to their research. The activities of the MWC currently go some way to plug this gap for its members by providing a database of facilities and equipment across multiple institutions nationally, as well as some funding to access these. There is no other resource fulfilling this role in the RSI sector at present.