

Te Ara Paerangi

Future Pathways White Paper 2022



MINISTRY OF BUSINESS, INNOVATION AND EMPLOYMENT (MBIE) HĪKINA WHAKATUTUKI – LIFTING TO MAKE SUCCESSFUL

MBIE develops and delivers policy, services, advice and regulation to support economic growth and the prosperity and wellbeing of New Zealanders. MBIE combines the former Ministries of Economic Development, Science + Innovation, and the Departments of Labour, and Building and Housing.

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Kupu Whakataki a te Minita Minister's Foreword



Te Ara Paerangi – Future Pathways is an opportunity to build a new future for New Zealand.

Even as the threat posed by the COVID-19 pandemic abates, New Zealand and the world face a barrage of wicked problems: climate change, environmental degradation, low productivity and a slew of complex social issues that erode our health and wellbeing.

An impactful research, science and innovation system is critical to surviving these challenges and realising the opportunities for improved lives and livelihoods that lie beyond them.

Meeting these complex challenges will require researchers to work across disciplines and be supported to translate their ideas into the real world where they can have impact. While I have met many research groups and organisations taking steps down this path, our system is not set up for them to succeed. Designed in the 1990s, it is characterised by siloed institutions and unproductive competition. Now is time to consider how to best position the research science and innovation system for the future.

The Government has a goal to grow overall investment in RSI to harness the collective capabilities of New Zealand's talented researchers and innovators. We want to see a future-focused system that advances the wellbeing of New Zealanders by addressing complex challenges. Key among them is the need to transition to a high-wage, low-emissions economy.

Last year, the Government released a Green Paper to guide consultation on the future RSI system. During that process, the sector provided feedback on the changes needed to realise a better future for New Zealand. They expressed a strong desire for transformative change, to better enable researchers to collaborate instead of competing, and to honour Te Tiriti and its obligations. Submitters said they want a research system that enables New Zealand to address the pressing challenges facing this nation, and that building such a system will help ensure future generations thrive in industries that generate improved incomes and sustainable careers.

Another clear message from the Green Paper submissions was that current RSI policies fail to give sufficient expression to Te Tiriti, and struggle to attract and retain Māori and Pacific Peoples who face structural barriers in the workforce. Many submissions also highlighted the constrained opportunities for early to mid-career researchers and the challenging and precarious work environment in which they operate.

We must address these barriers if New Zealand is to activate the full potential of this country's distinctive talents.

The Te Ara Paerangi – Future Pathways White Paper sets out the Government's direction for reforming New Zealand's RSI system.

It is increasingly important that New Zealand is able to not only produce excellent research but also translate that into impact – into real improvements to the lives of New Zealanders. To create meaningful impact, we will need to focus on nationally significant priorities. The Government's investment needs to move from areas of traditional strength to the things that will really matter to New Zealand's future wellbeing and prosperity.

Setting National Research Priorities will provide the strategic direction needed to focus on New Zealand's most important economic, environmental, and social challenges and opportunities. In addition to National Research Priorities, we need to design all aspects of the RSI system to better enable connections between research organisations, end-users, health agencies, social enterprise and government to deliver impact.

The RSI system requires a clearer focus to accelerate the excellent work being carried out by researchers and innovators. This will help create better jobs and lead to improvements in ways of working.

The RSI system needs to embed Te Tiriti and be more responsive to Māori and Pacific Peoples to improve the wealth and resilience of those communities. This means appropriate representation at all levels, and creating opportunities for Māori to pursue their own priorities and aspirations.

People are the most important asset of the RSI system. The White Paper outlines the Government's plan to address poor diversity, equity and inclusion in the RSI workforce and to ensure the system works for its people. We need to address unproductive competition for grants and give people time to develop the skills and relationships that convert great ideas into impact. Building a system that truly supports an excellent and diverse workforce will require greater emphasis on fellowships as well as changing the incentives in the funding system to reduce contract 'churn' and promote capability development.

Finally, we must work to create a research system that is more sustainable and resilient. The Government will ensure our public research organisations have the scope and scale to adapt to emerging priorities. We will also establish long-term funding for public good science services that are required for government regulatory and monitoring functions.

The White Paper articulates the direction for the Te Ara Paerangi – Future Pathways programme. It sets out a high-level implementation plan and demonstrates how the Government will continue to work with the sector, stakeholders and partners along the way.

We have an opportunity to create an RSI system that will advance the economic, social, cultural and environmental wellbeing of New Zealanders, now and into the future. I look forward to working together throughout this journey.



Hon Dr Ayesha Verrall

Minister of Research, Science and Innovation



Whakarāpopototanga Matua Executive Summary

This Te Ara Paerangi – Future Pathways White Paper presents a high level vision for New Zealand’s public Research Science and Innovation (RSI) system, including key policy directions and actions, and provides a roadmap to implement the reform programme.

It will function as an enduring policy reference point for the reform programme as detailed proposals are developed to deliver on the Te Ara Paerangi vision.

The vision and key policy directions were developed after extensive consultation on the Te Ara Paerangi – Future Pathways Green Paper, released in 2021. We have taken into account feedback from 903 submissions and over 1,000 people attending workshops and seminars. Input from dedicated engagements with key stakeholders including Māori and Pacific researchers is included throughout.

Te Ara Paerangi – Future Pathways is focused on the design of the ‘public’ RSI system administered as part of the RSI ministerial portfolio. However, the changes proposed by this White Paper are pertinent to the entire RSI system including: the Crown Research Institutes, Callaghan Innovation, government departments, Crown Entities, tertiary education organisations, Independent Research Organisations, community and industry partners.

Matawhānui Vision

The Te Ara Paerangi – Future Pathways vision is for ‘An RSI system that supports wellbeing for all current and future New Zealanders, a high-wage low emissions economy, and a thriving, protected environment through excellent and impactful research, science and innovation’. The substantial reforms signalled in Te Ara Paerangi will create the uplifts required to grow health and social wellbeing, environmental sustainability, and economic productivity.

The key strategic shifts of the reform will support a high-wage, low-emissions economy, as called for under the Government’s economic plan:

- Greater investment in innovation and knowledge mobilisation will support a more productive and diversified economy that favours value over volume.
- The reforms will establish and grow connections between research, industry and other end-users to help take research through to impact.
- An increased focus on investment in, and delivering impact for, Māori and Pacific people through the RSI system will help grow the pipeline for building innovative Māori and Pacific economies, improving the wealth and resilience of Māori and Pacific communities.
- A strong, dynamic, and adaptable RSI system will attract international investment, promote collaboration with the global innovation ecosystem, and increase opportunities for innovative technologies in overseas markets.
- A more agile, better resourced system will enhance New Zealand’s ability to attract and retain a skilled workforce, key to greater productivity and improved living standards.

Te ara whakatinana Implementation approach

The Te Ara Paerangi – Future Pathways reforms signal large scale change that will have a significant impact for the RSI system and the people who work in it. Transformational change is required to enable the RSI system to deliver a better future for all New Zealanders.

Te Ara Paerangi – Future Pathways is a multi-year programme, with the key reforms implemented across three phases: immediate workforce and people support, strategic direction setting, and governance, funding, and institutional reforms where necessary to support the broader vision.

The phases of reform indicate periods where the *main* focus of our efforts will be. However, they do not imply exclusive focus. At any given time we may expect to be consulting, conducting analysis, releasing design documents, implementing changes, or evaluating results on all items in the programme. In reality, change processes on all aspects of the reform will take place over a number of months and years. We do not expect to wait until 2026 to start detailed conversations about the best structure for our public research organisations, or the best way to fund research.

Phase 1 of the reform will begin to make significant changes for the workforce and start embedding Te Tiriti o Waitangi in the RSI system in 2023. A workforce package, eventually including an expansion of research fellowships, applied training schemes, and an international talent attraction scheme will ensure our RSI workforce is supported through the reform, beginning in 2023. The Government's obligations, expectations and aspirations for the RSI system will be outlined in an RSI Te Tiriti o Waitangi statement. This will guide MBIE in its role as system steward and set expectations for research institutions across the sector.

Phase 2 of the reform, beginning in 2024, will provide strategic direction to the RSI system by establishing National Research Priorities. National Research Priorities will be government's tool to direct research, science and innovation resources to meet the most important challenges and opportunities for New Zealand's social, environmental and economic wellbeing. However, as noted above, we expect to begin a process to determine what those Priorities might be much sooner.

Phase 3 of the reform will implement any changes required to our public research organisations to achieve the vision of Te Ara Paerangi and will take place from 2026. This phase will also include changes to the governance and funding system to deliver stable, long-term funding for public good science services, and ensure we have fit-for-purpose investigator-led funding mechanisms that operate smoothly within the broader system changes.

Te take mō ēnei whakahoutanga, me ngā take me mahi ināianei Why these reforms, and why now

While our innovators and researchers have served New Zealand well over the past 30 years, our system is not set up for success. A well-functioning RSI system is essential to our economic, social, health, environmental and cultural wellbeing and is an important tool for government to support enduring improvements in living standards.

Our RSI system is too small, and resources are spread too thin. Our investment in research and development is well below the OECD average, with government expenditure stagnant over the last decade. Further, our investment is concentrated in traditional areas of strength, rather than being focused on all the things that will really matter to the country in the future. Achieving a resilient and low emissions economy will require us to diversify our industrial base and expand our investments into the innovations, including digital technologies, that can underpin future competitive advantage.

The current system is poorly placed to utilise increased funding to prepare us for this future. It lacks system-wide direction and can be slow to adapt to evolving national needs. Our researchers are not served well by a clutter of overlapping and confusing strategies that fail to effectively harness their often world-class capabilities towards the things that matter most to New Zealand.

Collaboration between researchers and with the wider economy and society is often hindered by institutional and funding structures. Competition between organisations can get in the way of collaboration, with negative outcomes for stakeholders. Links between New Zealand's firms and research organisations are much weaker than in comparable small-advanced economies.

A clear message from the Green Paper consultation was that the current policy settings fail to give sufficient expression to Te Tiriti o Waitangi. Our RSI system must play its part in meeting the Crown's obligations under Te Tiriti, and supporting Māori aspirations.

Māori and Pacific Peoples are under-represented at all levels in our research workforce, with women also being underrepresented in senior roles. A system that lacks diversity risks homogeneity, stifles creativity and has a tendency toward the status quo. Poor diversity, equity and inclusion outcomes are strongly linked to the instability of RSI careers. We need to develop new research career trajectories that enable more diverse pathways between academia and the industry, government and health and social sectors.

Ngā whāinga whakahou

Reform objectives

Four key objectives provide the framework for how we will organise our efforts to achieve our vision for the RSI system and respond to the case for change. These are:

- Creating New Futures
- Embedding Te Tiriti
- Valuing Our People
- Building System Agility.

The objectives of Te Ara Paerangi – Future Pathways emphasise a wellbeing approach to reform. As such, they reflect the four wellbeing principles of He Ara Waiora, a framework to understand a Māori perspective of wellbeing: Kotahitanga, Tikanga, Manaakitanga and Whanaungatanga.

By ‘**Creating New Futures**’ the RSI system will make an impact of national and global significance and continuously grow the adaptive capacity of society. A much greater focus on alignment and co-ordination (Kotahitanga) will be required to grow the impact we want and need from our RSI system. The key policy directions in this objective are to:

- Establish National Research Priorities that will enable government to strategically focus resources to our most important economic, environmental, and social challenges and opportunities while acting as hubs of coordination, collaboration, and capability building.
- Accelerate innovation and diversify and scale up the impact of our RSI system by supporting researchers to engage meaningfully and productively with industry, the health system, the environmental sector, and the wider community as well as establishing new ways to invest in high-potential innovation areas such as the Industry Transformation Plans.
- Grow the global connectivity of our RSI system by supporting our talented researchers and innovators to engage with the world’s best, and take advantage of international opportunities.

Te Ara Paerangi – Future Pathways acknowledges and responds to a strong call from across the sector by ‘**Embedding Te Tiriti**’ in the design of the RSI system. The key policy directions in this objective are to:

- Advance Māori aspirations in the RSI system by removing barriers to entry and promote Māori participation at all levels.
- Address the low proportion of funding that directly supports Māori researchers, including through Māori-led National Research Priorities.
- Invest in mātauranga Māori by partnering with Māori to explore development of a dedicated mātauranga Māori platform and through appropriate recognition of existing regional knowledge platforms such as marae and whare wānanga.
- Have the Crown lead by example as a partner to Te Tiriti o Waitangi, including through an RSI Te Tiriti o Waitangi statement. This will signal to the RSI sector how we can honour our Tiriti obligations and opportunities in the context of Te Ara Paerangi – Future Pathways.

The research workforce is central to the success of our RSI system, and ‘**Valuing Our People**’ is a key objective of the reforms. Our RSI system is, above all, an investment in people – those who seek to expand and apply our pool of knowledge to improve the wellbeing of all those in New Zealand. We must address issues raised in consultation, such as career precarity, limited diversity, and barriers to collaboration and mobility, that risk constraining both the wellbeing and performance of our workforce.

The key policy directions in this objective are:

- Attract, develop and retain talented people by expanding fellowship schemes, expand support for training our people and their access to development opportunities, address settings in the funding system that disincentivise secure employment, and co-ordinate international talent attraction schemes.
- Support diversity at all levels and grow representation of women, Māori, and Pacific Peoples through dedicated fellowship schemes, and revised assessment processes that better recognise the diversity of skills needed for research success.
- Provide sustainable career pathways for Pacific Peoples in the RSI system. This can be achieved by lifting the capability of Crown employees to engage with Pacific Peoples and, by applying a Pacific lens to RSI policy development.

The reforms set out an ambitious plan for 'Building System Agility' to deliver a sustainable, resilient and cohesive RSI system that adapts to new challenges and opportunities. To deliver its vision, Te Ara Paerangi – Future Pathways tackles pain points that hinder the effectiveness of New Zealand's RSI system. The reform will address governance, systems, and public research organisations so that the sector can deliver relevant, excellent, transformative research in the medium to long-term. The key policy directions in this objective are:

- Clarifying roles and responsibilities to deliver effective governance and ownership mechanisms that release greater value from government investment in RSI. This includes locating functions where they will be most effective and efficiently managed.
- Co-ordinating investment in future-oriented infrastructure by developing a system-wide infrastructure map, consolidating building investments where appropriate, and establishing long-term funding envelopes for public-good science services.
- Where necessary, undertake reform to design resilient and adaptable public research organisations so that our RSI institutions have the scope and scale to adapt to emerging challenges, support the delivery of the National Research Priorities, and support good workforce outcomes, and affirm and embed Te Tiriti in institutional practice.
- Design funding mechanisms that support system goals by continuing to support excellent and impactful research, reducing transaction costs in funding contests, and improving transparency of overhead funding, including options for integration into international funding competitions. We are particularly interested in considering approaches to assessment of research that really less heavily on bibliometrics, in line with international trends. We will consider the interaction of the Performance Based Research Fund and Te Ara Paerangi – Future Pathways.

This White Paper marks the beginning of the Te Ara Paerangi – Future Pathways reform process and lays out the key milestones for the programme. It is important that we get these changes right.

To ensure this we are committed to consulting with the sector and working in partnership with Māori and Pacific Peoples as we develop and implement policies to deliver the vision of this White Paper. Change will be transparent and signalled well in advance through decision documents, with sufficient time for the sector to prepare. There will be a focus on maintaining capability and delivery throughout the reform.



Wāhanga Tuatahi Part I

Kōrero Whakataki Introduction

Pūtake
Purpose

Tukanga
Process

Hanganga
Structure

Te Kaupapa mō te Panoni
Case for Change



Te Matawhānui

Vision

Ngā Mātāpono me ngā Whāinga Whakahou

Reform Principles and Objectives

Te Ara Paerangi – Future Pathways is a multi-year programme focused on the future of New Zealand’s RSI system.

Through Te Ara Paerangi – Future Pathways, we are building a modern, future focused research system for New Zealand to meet the challenges and make the most of the opportunities ahead of us. Te Ara Paerangi signals the pathway by which we will achieve the significant additional government investment needed to achieve the goal of overall R&D expenditure of two percent of GDP by 2030.

The focus for Te Ara Paerangi – Future Pathways is the design of the ‘public’ RSI system, that is aspects of funding administered as part of the RSI ministerial portfolio and public research organisations within that portfolio; principally the Crown Research Institutes (CRIs) and Callaghan Innovation. The research that takes place in other public institutions, such as universities, Te Pūkenga and wānanga, is also within scope, as is the publicly funded research that takes place in independent research organisations and other independent entities, to the extent to which it is funded from the RSI portfolio. All research conducted in public organisations, or funded by government, is of relevance to Te Ara Paerangi. We expect the effects of change to extend beyond the RSI portfolio and into government departments, Crown Entities, and tertiary education organisations; particularly with regards the changes we would like to see in the RSI workforce. Later in the programme, we will work with our tertiary education colleagues to consider changes to tertiary education settings, if they are needed, to align with the objectives of the programme.

While Te Ara Paerangi – Future Pathways focuses on levers and shifts within the ‘public’ RSI system, the benefits of the reform will reach far wider. We acknowledge the important role of private industry and entities in New Zealand’s entire RSI system, and the change programme has been developed with this in mind.

Pūtake Purpose

The purpose of this White Paper is to provide a single, enduring policy reference point for the Te Ara Paerangi reform programme. This White Paper presents a high-level design and vision for New Zealand’s ‘public’ RSI system, including key policy directions and actions, and provides a roadmap to implement the reform programme.

Tukanga Process

On 28 October 2021, the Te Ara Paerangi – Future Pathways Green Paper consultation document was released to seek views on how to best position Aotearoa New Zealand’s future RSI system. During the consultation period to March 2022, a total of 903 submissions were received and over 1,000 people attended workshops and seminars to provide input.

Dedicated Māori engagement also took place, including conversations and online wānanga with over 100 Māori, representing Te Pūtahitanga (Māori research leaders collective), Māori innovators, Pūhoro STEM Academy (rangatahi), and Rauika Māngai. In addition to this, MBIE met Māori rōpū such as Te Kāhui Amokura, Te Ara Pūtaiao, Taumata Aronui, Wakatū Incorporation, and Māori business leaders.

MBIE also held talanoa with 27 Pacific researchers and research users in June 2022.

This White Paper communicates our position and commitments on how Te Ara Paerangi – Future Pathways will best position our RSI system for the future, informed by Green Paper submissions and consultations. Detailed policy proposals to deliver Te Ara Paerangi – Future Pathways will be developed, consulted on, and implemented in line with the Implementation Roadmap (Part III).

Hanganga Structure

To identify opportunities for change in the RSI system and seek input on possible solutions, the Green Paper for Te Ara Paerangi – Future Pathways was structured around six main aspects of the RSI system: research priorities; institutions; funding; Te Tiriti, mātauranga Māori and Māori aspirations; workforce and research infrastructure. This framing was helpful in identifying opportunities for change in the RSI system and seeking input on possible solutions. The aspects of the system do not work in isolation; therefore, this White Paper structures the reform programme of Te Ara Paerangi – Future Pathways around four system-wide strategic objectives, namely:

- Creating New Futures
- Embedding Te Tiriti
- Valuing Our People
- Building System Agility.



Te Kaupapa mō te Panoni

Case for Change

Our researchers and innovators have served New Zealand well over the past 30 years. Crown Research Institutes (CRIs), universities and other TEOs, independent research organisations, and other parts of the RSI system have contributed to New Zealand on multiple fronts.

Their contribution has spanned breakthrough research, supporting critical sectors of the economy and society, enhancing understanding of the natural world, solving environmental challenges, and responding to multiple emergencies, including underpinning our world-beating response to COVID-19. New Zealanders have all benefited environmentally, economically and socially from the work the research community has undertaken on their behalf.

But our system does not always set up our researchers and innovators for success. Too often their tremendous achievements occur despite the system in which they are operating, not because of it. In the face of tough economic conditions, social equity and inclusion challenges, and a climate emergency, it is essential that our RSI system is positioned to face the future and uplift the wellbeing of all New Zealanders.

A well-functioning RSI system is essential to our economic wellbeing. Technological innovation and digitalisation, supported by knowledge generated within and mobilised from the research sector, can help drive the productivity increases that are essential to a high-wage economy. While our RSI system provides excellent support to many of our existing industries, particularly in the primary sector, our economic security is enhanced by growing new and diverse industries, many of which will have their roots in discoveries made by our researchers. By providing strategic direction we can channel the ingenuity of our RSI system towards the greatest challenges we face, like transitioning to a high-wage, low-emissions economy. Through these mechanisms, a reformed RSI system will directly contribute to the key pillars of the Government's Economic Strategy.

A well-functioning RSI system is essential to our social and health wellbeing. An ageing and more ethnically diverse population; new, emerging and increasing threats to health, such as infectious diseases, anti-microbial resistance and mental health; and rapid technological change including increased digitalisation are demanding more from health research. The support the RSI system provided to the country during the COVID-19 pandemic is a prime example of this, and, while our system underpinned our world-beating response to the pandemic, we must ensure it is even better prepared to face future challenges.



A well-functioning RSI system is essential to our environmental wellbeing. In the midst of a climate emergency, and in the face of loss of biodiversity, and water and air quality degradation, our ability to tackle the pressing environmental problems and threats we face is heavily dependent on science and research over many years to monitor, understand and mitigate these changes. Research and innovation play a critical role in Aotearoa New Zealand's emissions reduction plan¹ to contribute to the global effort to limit global temperature rises.

A well-functioning RSI system is essential to our cultural wellbeing. Research and scientific endeavours play an important role in supporting communities to build, retain, interpret and express their arts, history, heritage and traditions. It develops our human capital and shapes our shared and contested understandings of the world. RSI plays a vital role in conserving and protecting our taonga and our unique heritage.

Our RSI system has many positive aspects and already delivers tangible improvements in the wellbeing of all New Zealanders across all the above areas. However, the system is not perfect and faces some significant challenges. In the following section we focus on those challenges as the areas to be targeted for improvement by Te Ara Paerangi, while continuing to preserve what is best about our current system.

¹ *Towards a productive, sustainable and inclusive economy: Aotearoa New Zealand's first emissions reduction plan*, Ministry for the Environment, 2022

He tino iti rawa tō mātou pūnaha Rangahau Pūtaiao me te Auahatanga (RSI), ā, e pēhia tonutia ana

Our RSI system is too small and under increasing pressure

Our RSI system is much smaller than it should be. Resources are spread too thin, and the system is under increasing pressure.

New Zealand invests a much smaller percentage of GDP in R&D than comparable Small Advanced Economy Initiative countries. Total (business, government and higher education) R&D expenditure in New Zealand was only 1.4 per cent of GDP in 2019, compared to the OECD average of 2.5 per cent.²

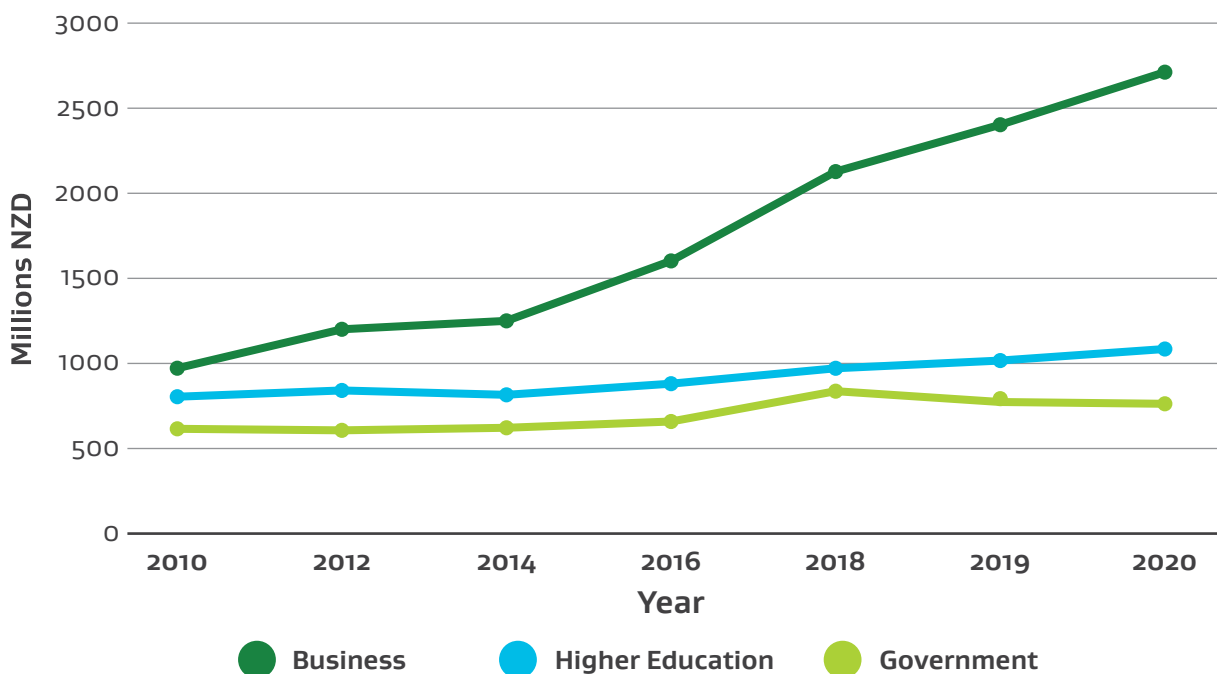
In recent years business expenditure on R&D has increased substantially from \$971M in 2010 to \$2,709M in 2020, with an 18 per cent increase relative to GDP between 2019 and 2021 alone.³

Government is contributing to this growth via the R&D Tax Incentive (RDTI), which is counted as business expenditure in these figures. The RDTI was established in 2019 as a globally recognised best-practice support

for business R&D, with a strong evidence base indicating additional business expenditure will exceed Government's investment by some margin.⁴ The first two years of the RDTI supported over a billion dollars of industry R&D, and we expect growth to continue, with forecasts suggesting future years will see government investment of over \$500m supporting business R&D of over \$3.5bn.

The trend of increased business expenditure, supported by Government where necessary, will need to continue for several years if we are to reach international norms of expenditure or meet our goal of two percent of GDP. In comparison, despite nominal increases, the remainder of government expenditure has remained unchanged relative to GDP, moving only marginally from 0.52% of GDP in 2010 to 0.56% of GDP in 2020.⁵

Figure 1 New Zealand R&D expenditure by sector per year in millions of dollars⁶



² Main Science and Technology Indicators database, OECD, 2022

³ R&D Survey, Stats NZ, 2021

⁴ OECD (2020), "The effects of R&D tax incentives and their role in the innovation policy mix: Findings from the OECD microBeRD project, 2016-19", OECD Science, Technology and Industry Policy Papers, No. 92, OECD Publishing, Paris, doi.org/10.1787/65234003-en

⁵ The Research, Science and Innovation Report, MBE, 2021

⁶ R&D Survey, Stats NZ, 2021

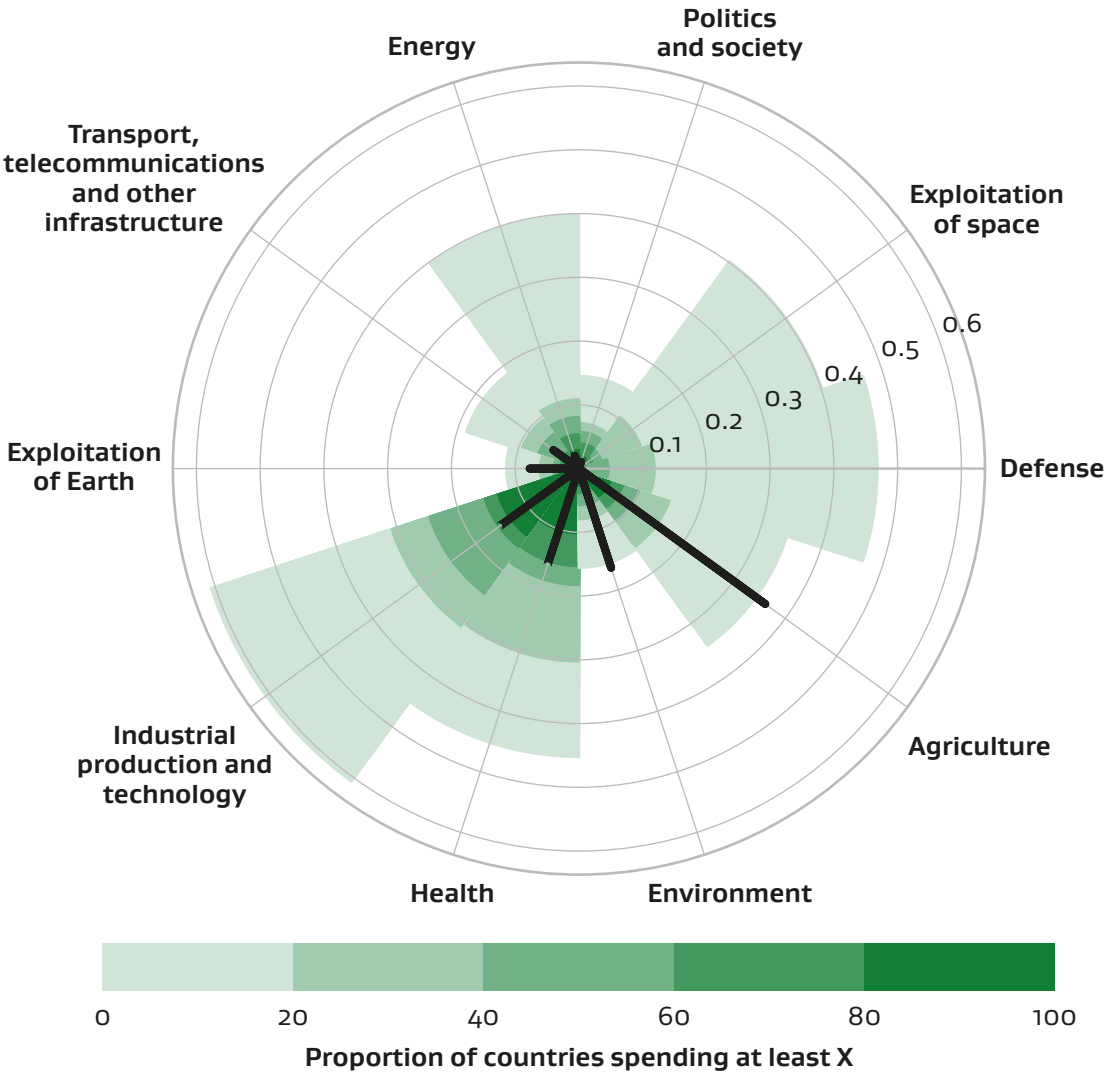
Me whakapiki, me whakaputa kē te Kāwanatanga i ana haumitanga

Government investment needs to increase and diversify

Government expenditure on R&D should complement business expenditure; by focusing on the public good in environmental, health and social research, by developing new and transformative technologies and economic sectors, and by investing in basic and fundamental research. But low levels of government expenditure have constrained the RSI sector’s ability to adapt to new opportunities and challenges, instead concentrating its efforts into traditional and “must do” areas of research.

As a result, and reflecting New Zealand’s economic history, New Zealand spends a higher proportion of government expenditure on agricultural science and environmental science than any other country in the OECD, while significantly under-spending in health, social research, industrial production and technology, and energy. Increased investment in these areas is required to rebalance the overall portfolio.

Figure 2 Fractional government budgeted appropriations on R&D by socio-economic objective 2012-2016 (OECD).⁷ Black lines represent New Zealand’s proportion of expenditure; green shading shows the proportion of other countries which reach particular proportions of expenditure



⁷ Main Science and Technology Indicators database, OECD, 2022

Our investments need to be re-tooled, grown, and focused directly on the things that matter. We can no longer afford to spread too little investment too thinly over areas critical to our collective future.

As the Productivity Commission notes⁸ –

If New Zealand is to achieve innovation-driven export success on the scale of comparator SAEs [Small Advanced Economies], it must be similarly bold in identifying the most promising areas for focus, establishing effective governance, institutions and processes and allocating substantial resources to chosen areas over a sustained period of time... A repeat of past “sub-therapeutic doses” will achieve little or nothing.

Achieving a resilient and genuinely low emissions economy requires us to consider radical changes to the way we produce existing products, as well as a shift to creating new products that have significantly lower emissions. This requires us to develop new sources of comparative and competitive advantage built on new sets of technological and digital capabilities that will predominantly come from investment in research and innovation. Diversifying our industrial base requires us to reorient our investment towards the technologies and industries that can underpin future competitive advantage, and thereby provide a wider range of high value jobs into the future.

Kāore i te pūnaha RSI ngā rawa hei waha i ngā pūtea nui ake ka hiahiatia kia noho takatū mātou mō āpōpō

The RSI system is not well-placed to absorb the increased funding that is necessary to prepare us for the future

Our RSI system is fragmented, with poor visibility of the effectiveness of current investments. It lacks specific system-wide direction, and siloed strategy-setting means the system is not well-configured for assembling multidisciplinary and transdisciplinary research teams integrating expertise across organisations, or building new capabilities in areas of emerging national research priorities.⁹ Fragmentation, lack of role clarity, and apparent overlaps between Crown Research Institutes (CRIs) ‘...mak[e] it difficult for stakeholders to access and harness relevant capabilities and creat[e] concerns about inefficient use of taxpayer funds... Incentives to compete... and the absence of suitable mechanism for addressing emerging overlaps has likely meant an increase in duplication and unproductive competition over time...’¹⁰ We heard similar comments about incentives to compete between other research organisations, such as Universities, during the consultation on the Green Paper. This comment is not intended as a criticism of those organisations, which were designed as part of a system which deliberately encourages competition. Rather it reminds us that a fundamental reconsideration of the basis on which the system was designed is necessary.

CRIs account for a significant proportion of government expenditure – just under half of public expenditure and 22% of New Zealand’s total expenditure on R&D,¹¹ meaning that their focus areas of research strongly influence our pattern of investment. Current settings that create a structural, institutional focus on agricultural and environmental research explain much of New Zealand’s revealed preference for high investment in those areas.

The current settings result in an RSI system that can be slow to adapt to evolving national needs and challenges. Our system must support our researchers to meet these evolving needs and challenges by leveraging their collective capability in new, more dynamic ways. Public research organisations with broader remits will be able to respond with agility to support New Zealand to prosper in the face of significant technological and geopolitical change, increasing global digitalisation and transforming economies. We need to make responsiveness and the deliberate, rapid development of new capabilities core attributes for our research system. And we need research organisations designed to deliver such change.

⁸ *New Zealand firms: Reaching for the frontier*, NZ Productivity Commission, 2021

⁹ *Te Pae Kahurangi – Positioning Crown Research Institutes to collectively and respectively meet New Zealand’s current and future needs*, MBIE, 2020

¹⁰ *Ibid*

¹¹ *R&D Survey*, Stats NZ, 2021

Nā te horapa haere o ngā rautaki me ngā whakaarotau whakaruruhau, whakataetae anō hoki kua hapa te aronga mārama

A proliferation of governance and competing strategies and priorities fail to provide clear direction

Our system's mechanisms for signalling direction to the system are diffuse and confusing, and so do not provide the system with the best support to change and adapt. Governance entities exist for seven CRIs, eleven National Science Challenges, numerous one-off platform investments, at least three Crown

Entities or companies, ten Centres of Research Excellence, amongst many others. Multiple overlapping strategies contribute to a cluttered governance environment, meaning that it is hard for researchers and research organisations to detect clear signals of research priorities.



Nā te kino o te kōmitimiti me te whakataetae korehua ka pāngia kinotia te whaihua me te pānga o te pūnaha

Poor integration and unproductive competition further reduce system effectiveness and impact

Submissions on the Te Ara Paerangi Green Paper¹² were clear that our system needs to be better connected and more collaborative.

Submitters and workshop participants agreed that institutions need to operate in a way that is more collaborative, adaptive, and agile. The current RSI system was described as lacking in collaboration with research institutions, who are largely disincentivised to work together due to competitive funding models, overlapping research priorities, and clunky layers of management and overheads.

Although on some measures our researchers appear to collaborate effectively, overwhelming feedback is that this is not as easy as it should be, and collaboration is often hindered by institutional and funding structures. The Te Pae Kahurangi¹³ report noted that competition between organisations gets in the way of collaboration, and reported –

The consequences of CRIs being standalone companies, the convergence of previously separate areas of research, the ‘sinking lid’ on funding and the imperative to ‘follow the money’ appear to include:

- *Ongoing competition among CRIs (and with other parts of the science system).*
- *Obstruction of otherwise net beneficial collaborations (including more systematic capability and infrastructure sharing).*
- *Confusion and sometimes frustration for some stakeholders.*

It is not just between research organisations that connections must be greatly improved. Our levels of business collaboration with the research system also remain poor. As the Productivity Commission¹⁴ reported –

The starkest comparison with SAEs [Small Advanced Economies] relates to collaboration between firms and researchers. Compared to other SAEs, links between New Zealand’s firms and researchers in universities and research institutes have been very weak (Figure 6.6) [reproduced below – Figure 3, . . . other SAEs appear to have longstanding and better developed institutions and processes, and more deliberate policies to forge links between businesses and researchers.

¹² Te Ara Paerangi Future Pathways Summary of Submissions – Part One, All Submissions and Engagements, MBIE, 2022

¹³ Te Pae Kahurangi – Positioning Crown Research Institutes to collectively and respectively meet New Zealand’s current and future needs, MBIE, 2020

¹⁴ New Zealand firms: Reaching for the frontier, New Zealand Productivity Commission, 2021

Figure 3 Percentage of innovating businesses collaborating with researchers 2012-14



The research system needs to better connect with itself, business, and society. The future will require greater flexibility, more cross-cutting and transdisciplinary research, much closer integration across organisations and research areas, and much deeper and more productive 'vertical' links with business, government, and other users of research. Competition can be healthy when it is bounded and focussed; competition of ideas and approaches is the lifeblood of a healthy research system.

A fight for resources between government-owned organisations focussed on preserving their own revenue is a waste of time and resources, encourages duplication, and discourages necessary cooperation. Instead, we need to create the conditions that support a higher level of connection and co-ordination of our investments to support knowledge mobilisation, greater impact and support for public good outcomes.

Ka noho pāhikahika te iti o tā mātou pūnaha haumi ki te rangahau nā te Māori, i te taha o te Māori, mā te Māori rānei Our system's investment in research by, with, or for Māori is disproportionately low

Surveys of the research workforce reveal the extent to which the RSI system fails to grow and retain Māori researchers in the workforce. Māori are significantly underrepresented in research careers; there are over 80% fewer Māori staff in research positions in research organisations than could be expected based on proportion of Māori in the general population (Figure 4).

Green Paper submissions overwhelmingly supported prior reports from the sector that the current RSI policy settings and research institutions fail to adequately uphold the commitments in, and the spirit of, Te Tiriti o Waitangi.¹⁵ This echoes MBIE's own analysis. MBIE's RSI policy settings refer to Te Tiriti o Waitangi via the Vision Mātauranga Policy but are unclear on how it is upheld. We are generally silent on Te Tiriti in almost all RSI funding policies, instead referencing the Vision Mātauranga Policy.

Several reports from across the RSI sector^{16 17 18 19} have also highlighted a lack of explicit Tiriti presence in RSI policy and legislation, despite existing Tiriti obligations. These reports have sought that Te Tiriti be explicitly addressed in RSI policy and across the RSI sector. Greater investment was firmly recommended for mātauranga Māori and its protection, for the development of the Māori STEM workforce pipeline, for research led by Māori, and for research outcomes that address the aspirations of Māori communities and end users. Furthermore, Te Pae Kahurangi²⁰ highlighted that CRIs' policy settings do not adequately align to Te Tiriti and Māori aspirations in RSI.

As noted in the Ko Aotearoa Tēnei Report,²¹ government policies were – “meant to provide an avenue for mātauranga Māori to be recorded and preserved, while championing the ‘distinctive’ opportunities that mātauranga Māori offered science in New Zealand. Both policies, however, have failed, as mātauranga Māori remains clearly at the [RSI] margins.”

These reports reinforce a consistent message that the RSI system does not uphold the Government's Tiriti commitments. Consequently, the benefits that arise from research, science and innovation are not equitably shared across Aotearoa New Zealand.

15 Cabinet Office Guidance (CO (19) 5) Te Tiriti o Waitangi Guidance simply refers to the three articles of Te Tiriti o Waitangi as: Article One – the Government gained the right to govern. Article Two – the Crown promises that Māori will have the right to make decisions over resources and taonga which they wish to retain. Article Three – the Crown promises that its obligations to New Zealand citizens are owed equally to Māori.

16 *Te Pūtahitanga A Tiriti-led Science-Policy Approach for Aotearoa New Zealand*, Kuktai, Tahu et al., 2021

17 *Ko Aotearoa tēnei: A Report into Claims Concerning New Zealand Law and Policy Affecting Māori Culture and Identity*, Waitangi Tribunal, 2011 (see 6.1.3 The research, science, and technology agencies)

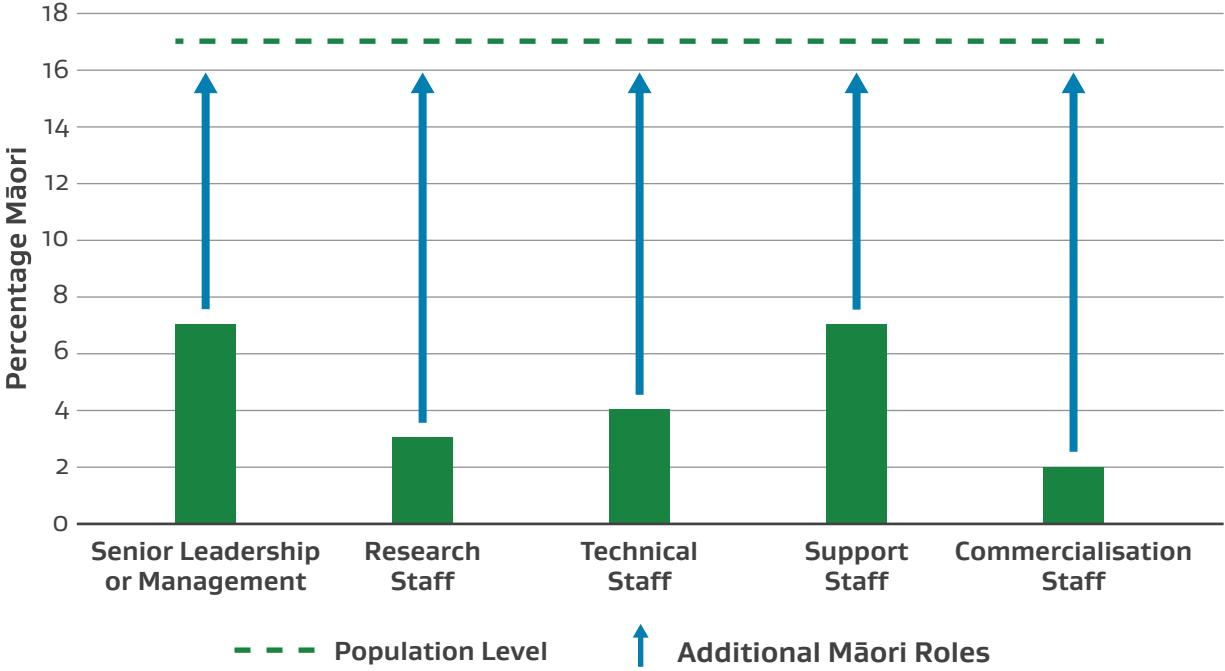
18 *A Wai 262 Best Practice Guide For Science Partnerships With Kaitiaki For Research Involving Taonga*, Rauika Māngai, 2022

19 *A Guide to Vision Mātauranga: Lessons from Māori Voices in the New Zealand Science Sector*, Rauika Māngai, 2020

20 *Te Pae Kahurangi – Positioning Crown Research Institutes to collectively and respectively meet New Zealand's current and future needs*, MBIE 2020

21 *Ko Aotearoa tēnei: A Report into Claims Concerning New Zealand Law and Policy Affecting Māori Culture and Identity*, Waitangi Tribunal, 2011 (see page 573)

Figure 4 Variation of proportion of Māori employed in research organisations compared to proportion of Māori in the general population²²



22 Tā te Rangahau, Pūtaiao me te Auahatanga Pūrongo Ohu Mahi o ngā Whakahaere: Research, Science and Innovation Workforce Survey of Organisations Report, MBIE, 2022

E pēhia nei tō mātou ohu mahi rangahau, he iti te kanorautanga, he pāhekeheke ngā huarahi aramahi

Our research workforce is under pressure, lacks diversity, and career paths are unstable

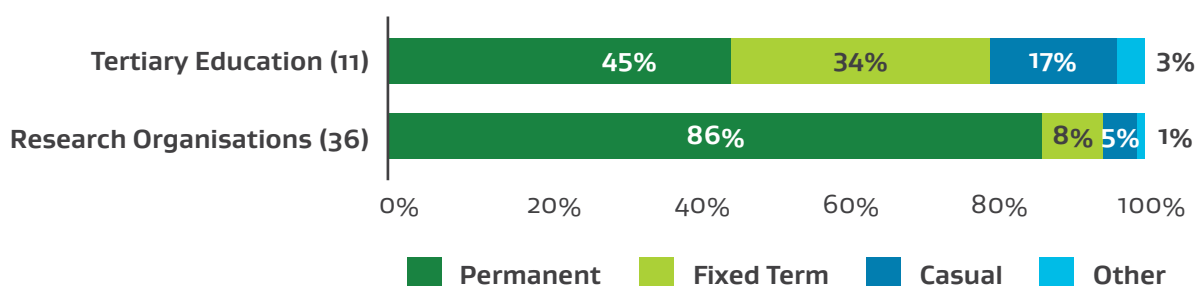
The OECD has noted a growing global mismatch between the things researchers will be required to deliver, and the career structures which support those researchers.²³

Academic career structures and the allocation processes for research funding largely reflect merit-based competition among individuals, which has proven its effectiveness over time in promoting excellence in fundamental research. However, concern is growing about how these structures and processes affect the precarity and attractiveness of research careers, and generate a lack of diversity in the scientific workforce. There is an expectation that science will not only produce highly-cited publications, but also rapidly translate into societal benefits and solutions to global challenges – such as the COVID-19 pandemic. The emphasis on individual disciplinary excellence and short-term outputs fits uneasily alongside the need for more transdisciplinary research, more novelty and risk-taking in research, and more data-intensive research.

As noted above, Māori and Pacific Peoples are under-represented in our research workforce. Furthermore, women make up the majority of the research workforce but the minority of those in senior leadership positions. These inequities present a disappointing picture of the career norms, expectations and decision-making structures that lead to such outcomes.

Poor diversity, equity and inclusion outcomes are strongly linked to the instability of RSI careers. A significant number of researchers are on fixed-term or casual contracts, particularly those employed in tertiary research organisations. The over-use of short-term employment contracts means that researchers whose circumstances mean they are less able to tolerate the uncertainties of these arrangements will exit the RSI system. As a result, researchers who are caring for children or relatives, needing, or choosing to work part-time, or entering research careers later in life, are less likely to experience successful research careers. Such a situation artificially limits the potential and productivity of the RSI system.

Figure 5 Researcher employment agreement types by organisation type²⁴



²³ OECD Science, Technology and Innovation Outlook 2021: Times of Crisis and Opportunity, OECD, 2021

²⁴ Tā te Rangahau, Pūtaiao me te Auahatanga Pūrongo Ohu Mahi o ngā Whakahaere: Research, Science and Innovation Workforce Survey of Organisations Report, MBIE, 2022



Me pai ake tā mātou tautoko i te tino whānuitanga o ngā huarahi aramahi ki te whakapiki i te uara o te pūnaha rangahau We must better support a diverse range of career pathways to enhance the value of the research system

We need to re-think what careers in research, science and innovation look like, to broaden our understanding of research success and how we support, recognise and value it, and how best to deploy the talents and skills of our workforce to meet the challenges of the future.

While the proportion of our population qualified to PhD level is around the OECD average²⁵, we are not making the best use of the valuable skills they can offer to our society and economy. Many submissions to the Green Paper supported the idea that a research career that offered greater opportunities for mobility of people and knowledge, thereby enabling broader range of experiences, would enhance the quality of our research, the value of the research system, and, through an extended range of opportunities, provide greater stability for research careers.²⁶

“A research system that provides both the skills and opportunities to undertake research in different ways and in different organisations would do more to support the long-term reduction of a precariat workforce. It would also be a significant step to ensure our homegrown talent is able and willing to stay in Aotearoa New Zealand, while providing an attractive option to bring overseas talent here. (Tertiary education organisation)”

We need to develop new workforce career trajectories that enable more diverse and multidisciplinary pathways within academia, but also enable people to move in and out of other sectors while maintaining their links to the traditional RSI system.

²⁵ OECD Science, Technology and Innovation Outlook 2021: Times of Crisis and Opportunity, OECD, 2021

²⁶ Te Ara Paerangi Future Pathways Summary of Submissions – Part One, All Submissions and Engagements, MBIE, 2022

Te Matawhānui Vision

An RSI system that supports wellbeing for all current and future New Zealanders, a high-wage low emissions economy, and a thriving, protected environment through excellent and impactful research, science and innovation.

The Government has clearly communicated its goal to advance the wellbeing of New Zealand for current and future generations. To ensure our next generations will thrive in New Zealand, in a range of future industries that will generate improved incomes and sustainable careers, with improved health and social wellbeing outcomes, and through sustainably managing our environment, we must harness the collective capability and impact of our research, science and innovation system. The substantial reforms signalled in Te Ara Paerangi will create the uplifts required to grow both individual and collective wellbeing, environmental sustainability, and economic productivity. This means building a future RSI system that gives effect to Te Tiriti o Waitangi, is adaptable by design and connected for impact, and reflects Aotearoa New Zealand's unique context and diverse population.

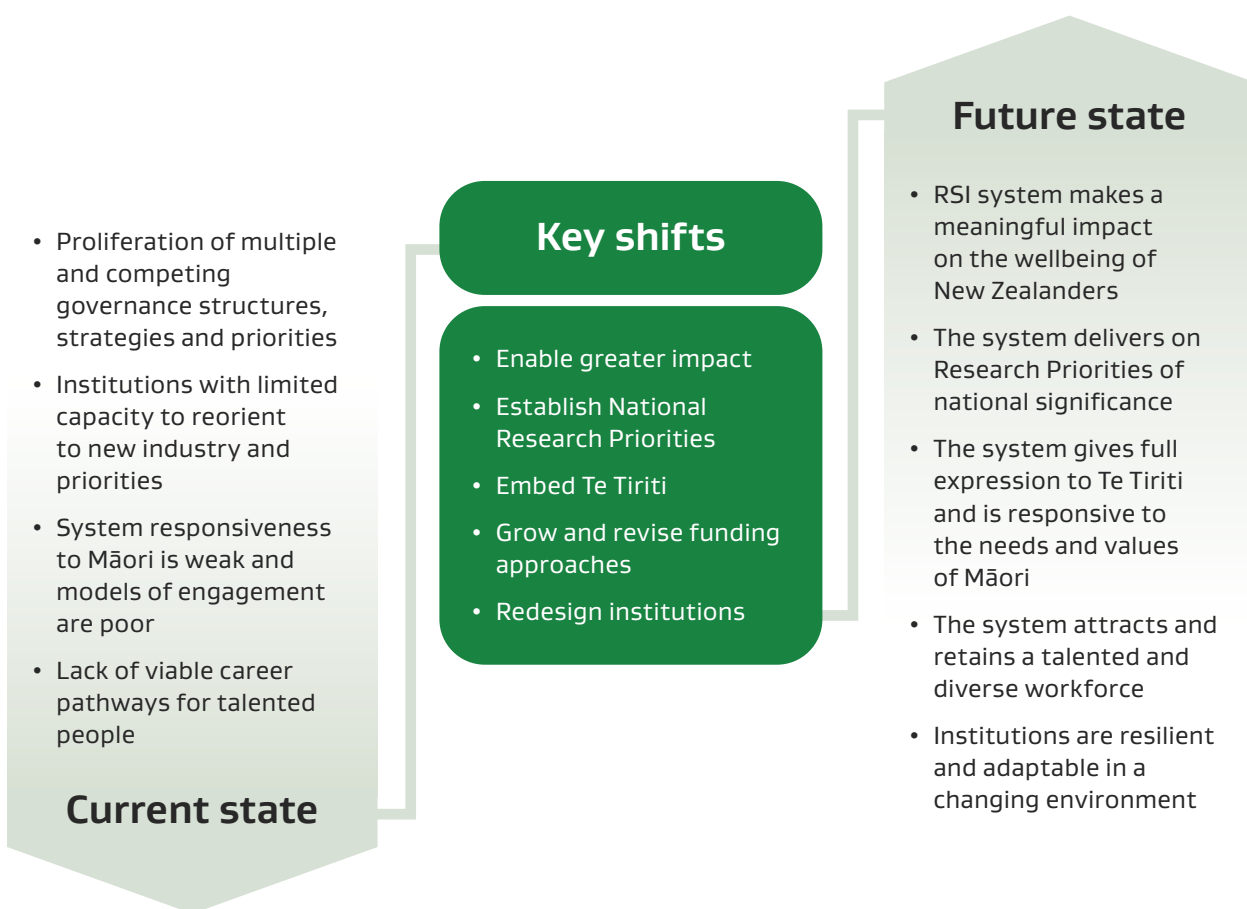
The RSI system of the future needs to:

- Create the knowledge and innovation that will drive improvements in individual and collective health and wellbeing, environmental sustainability and economic productivity.
- Affirm and embed Te Tiriti o Waitangi and provide appropriate opportunities for mātauranga Māori, Māori researchers and Māori-led research.
- Capture and enhance the full value of investment, nationally and internationally, from research and science.
- Improve system efficiency and effectiveness.

Te Ara Paerangi – Future Pathways will support the delivery of the Government's economic plan and wellbeing agenda. Our vision for the Te Ara Paerangi – Future Pathways reforms directly aligns to the Economic Plan to build a high-wage, low-emissions economy to improve the wellbeing and living standards of all New Zealanders. When implemented the plan will support key strategic shifts:

- Greater investment in innovation and knowledge mobilisation will support a more productive more diversified economy in line with initiatives to move the economy from volume to value and will result in improved multifactor productivity and product complexity measures.
- The reforms will grow existing connections between research, industry and other end-users to help take research through to impact. For example, we expect to see growth in commercialisation pathways and other indicators of impact in specific areas such as health and digital technologies.
- Key government priorities will be supported by comprehensive scientific monitoring data and prioritised research programmes. These will be fundamental to the delivery of initiatives to deliver greater value and improve environmental outcomes from the use of land and resources. Long-term investments are required to support the innovation for sustainable and affordable energy systems, and to monitor and mitigate climate change. The Te Ara Paerangi – Future Pathways reforms will stabilise and grow funding for the scientific services that underpin technical and scientific advice for policy makers.

- The reforms will ensure Māori and Pacific people are integral to the RSI system, as both participants and users. This will grow the innovative Māori and Pacific economies and support the aspirations and well-being of Māori and Pacific Peoples. These changes will improve the wealth and resilience of Māori and Pacific communities, and will be demonstrated through improved economic, social, and well-being indicators for Māori and Pacific people and communities.
- Strengthening the RSI system, as proposed by the reforms, is vital to growing international investment and collaboration with our innovative sectors. This will be seen through continued growth in investment and in new innovative businesses and growth of international markets for innovative technologies.
- Greater investment in RSI will enhance New Zealand's ability to attract and retain a skilled workforce, which is key to greater productivity and wealth. We expect to see better workforce outcomes, including greater representation of Māori, Pacific Peoples, and women, with more globally talented people choosing to work and contribute their skills within New Zealand.
- The reforms' focus on lifting wellbeing will ensure that the benefits from RSI activities and investments benefit all New Zealanders. By focusing on areas that matter we expect the reforms to lift well-being indicators in all areas of priority, including health and social indicators, environmental, cultural, and economic indicators. We will assess the impact of priorities through their impact on economic and well-being indicators.



Ngā Mātāpono me ngā Whāinga Whakahou

Reform Principles and Objectives

The reform objectives provide a framework for how we will achieve our vision for the RSI system and respond to the case for change. Each objective is supported by key policy directions that set the course for the reform programme.

The diagram below demonstrates that our people and the ability of our system to adapt to new challenges and opportunities, will enable the maximal output and impact of the RSI system. Underpinning this and encompassing all other objectives is the embedding of Te Tiriti o Waitangi in the design of the RSI system.

The objectives of Te Ara Paerangi – Future Pathways emphasise a wellbeing approach to reform. As such, they reflect the four wellbeing principles of He Ara Wāiora, a framework to understand a Māori perspective of wellbeing: Kotahitanga, Tikanga, Manaakitanga and Whanaungatanga.

Figure 6 Te Ara Paerangi – Future Pathways vision and objectives





Te Hanga Anamata Hou Creating New Futures

We want research and science to deliver value from new knowledge and ideas, and we look to the process of innovation to turn our best ideas into economic growth and improvements in our collective social, health, and environmental wellbeing by translating discoveries into new products, services and jobs. We want the sum of research, science and innovation activities to enhance the capacity of our society to take onboard RSI advances in knowledge, digitalisation and innovation, address what is most important, and create positive change in business, environment, health, public services, government, and for communities and wider society. As a Pacific nation we also want our Pacific communities and neighbours to be able to benefit from, and contribute to these advances.

Te Ara Paerangi aims to create a closer link between RSI investment and Government's social, environmental and economic policy objectives. It is important that RSI resources are more effectively directed towards the most significant challenges and opportunities for Aotearoa's wellbeing to result in impactful change, in addition to allowing space for investigator-led and 'blue skies' research.

A much greater emphasis on alignment and co-ordination (**Kotahitanga**) will be required to grow the value that we want and need from our RSI system. National Research Priorities will create a locus for connectivity, alignment, and coordination across the system. Supporting people and organisations to collaborate will harness the resources of the system, to provide greater traction from combined efforts across the system. Investment supporting priorities will drive new capability, enhance infrastructure planning, workforce initiatives, and incentivise connectivity between the RSI system and stakeholders.



Te Tāmau i Te Tiriti Embedding Te Tiriti

New Zealand is a multicultural society where the Crown and Māori are working towards partnership. Te Ara Paerangi acknowledges and responds to a strong call from across the sector to address marginalisation of Māori by the RSI system. We want the RSI system to reflect this partnership through affirming and embedding Te Tiriti o Waitangi in its design, to enable opportunities for mātauranga Māori, Māori researchers and Māori-led research to deliver on Māori aspirations (**Tikanga**).



Te Uara i Ō Mātou Tāngata Valuing Our People

We want to improve the wellbeing of all New Zealanders by respecting our workforce and reflecting our community in the RSI system (**Manaakitanga**). We support the wellbeing of our people by providing them with the resources and opportunities to have meaningful, inspiring and stable careers. We want to encourage smooth transitions and make pathways more visible between the RSI system, industry and the wider public sector; where people will take their knowledge and skills into new fields to deliver impact. Te Ara Paerangi recognises that a talented, diverse and well-connected workforce is critical to growing research and innovation in areas of high priority and value for New Zealand. Te Ara Paerangi is signalling greater investment to build and develop the people and capabilities needed for future opportunities and challenges.

A goal of the reform is to create viable career pathways for our people, and to support workforce requirements across the sector, spanning both research and research support staff. To ensure the benefits and opportunities from research and innovation accrue to a broad and diverse constituency the system must recognise, value and enable the contribution of diverse communities to research and innovation. A system that looks like this also enables researchers to engage in Manaakitanga in their work in relation to Aotearoa.



Te Hanga i te **Kakama o te Pūnaha** Building System Agility

A dynamic and high-performing system is a key determinant of impact. We want settings, institutions, governance arrangements, and our investment approach to allow for change while providing the necessary stability that enables our people to deliver high-quality research, science and innovation.

Its only by working together and harnessing our collective efforts (**Whanaungatanga**) that the system will be able to achieve our ambitious goals. The reforms seek to foster relationships and networks to promote collaboration where possible. We will harness the collective capacity of our RSI system by supporting relationships through collaboration networks centred on National Research Priorities, funding reform to reduce unproductive competition, and encouraging workforce mobility across the system. We will also need to coordinate access to, and investment in, key research infrastructures that drive research productivity, excellence, and impact.



Wāhanga Tuarua Part II

Ngā Whāinga Whakahou

Reform Objectives



Te Hanga Anamata Hou
Creating New Futures



Te Tāmau i Te Tiriti
Embedding Te Tiriti



Te Uara i Ō Mātou Tāngata
Valuing Our People



**Te Hanga i te Kakama
o te Pūnaha**
Building System Agility



Te Hanga Anamata Hou

Creating New Futures

The RSI system makes an impact of national and global significance and continuously grows the adaptive capacity of society.

The Government’s vision for New Zealand’s future RSI system is for it to make a greater impact on New Zealand’s productivity and wellbeing at a time when our country faces significant and growing challenges, such as adapting to a changing climate.

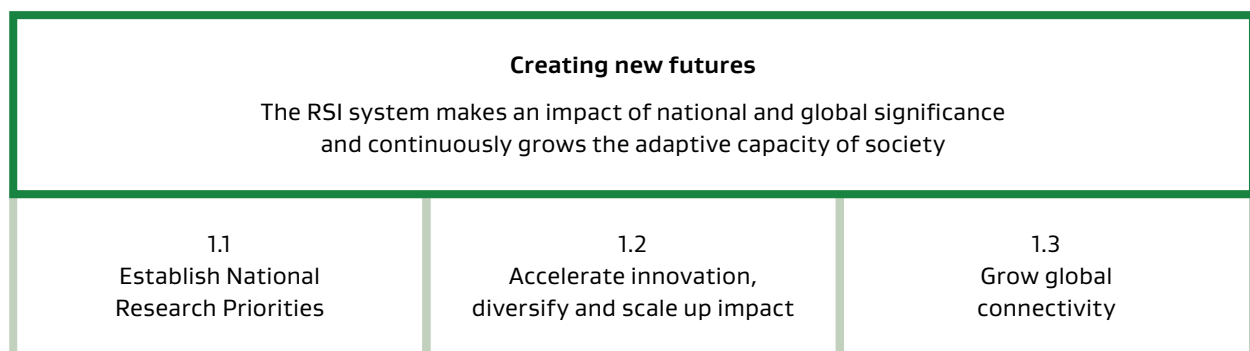
The Te Ara Paerangi – Future Pathways Green Paper identified that there is no clear government direction about the most important things for research to address. This has resulted in a cluttered landscape that lacks consistency and clarity. There is a proliferation of investment signals, ineffective resource allocation, unclear roles and responsibilities, and a lack of responsiveness and underinvestment in areas of transformational change and research that supports Māori aspirations.

To reach our full potential, we must address how difficult it is for the current system to focus on what matters, venture into new areas to help diversify the economy, enhance overall connectivity, translate excellent research into impact on health, social and environmental wellbeing, and fund the basics (see Policy Direction 4.1).

The future RSI system must focus on unlocking our innovative potential (including our capacity to apply and use innovations and digital technologies to make a greater impact) while retaining strong foundations in open, basic and investigator-led science to improve our ability as a society to successfully understand and apply knowledge.

To this end, we must shift the system to:

1. **Focus on what is most important** – align and prioritise resources (e.g., significant long-term public funding), and encourage collaboration and use of vehicles for collective action (collaboration and capability building platforms) to address major opportunities and societal challenges to make an impact on what matters most, at national or global scales; and
2. **Enhance our adaptive capacity as a society** – improve how we create, absorb, use and benefit from knowledge and technology, translate discoveries into new products, services, jobs and harness research to improve health and social wellbeing outcomes.





Strategic shift

- Difficulty aligning a critical mass of activity to succeed
- Lack of open and fluid connectivity across the system, domestically and internationally
- Settings that disincentivise knowledge mobilisation
- Low R&D investment rates alongside weak adoption and diffusion of technologies

Current state

- Establish participatory Priority setting process
- Significantly increase public investment in RSI
- Incentivise knowledge mobilisation & connectivity
- Utilise knowledge assets

Future state

- Clear and consistent statement of priorities for the RSI system
- Open system of knowledge mobilisation driving innovation and commercialisation and leveraging increasing digitalisation
- Significant and deliberate long-term investment focused in more diverse areas of high potential
- Individuals, programmes and institutions readily collaborate, also globally on NZ-inc basis



Aronga Kaupapahere 1.1: Te Whakapūmau Whakaarotau Rangahau ā-Motu Policy Direction 1.1: Establish National Research Priorities

Establish a national priority-setting framework to align resources and focus collective action on areas of critical importance.

Our RSI system needs to address what matters most to New Zealand. Te Ara Paerangi – Future Pathways will establish a mechanism for determining National Research Priorities (Priorities) in areas that will have the most impact for people’s lives and their wider environments.

Priorities will bring a far higher degree of future focus to our RSI system than is currently evident. Existing prioritisation mechanisms are patchy in their ability to connect with other researchers and users of research, including Māori, communities, government agencies and industry. This is critical for research to be relevant to next-user and end-user needs, to be taken up and have impact.

Having a larger proportion of research activities in the RSI system be directed by Priorities provides a strategic approach to investment. Priorities will reshape mission-focused research activity in the future RSI system by complementing investigator-led and applied research mechanisms (see Structural Change). Funding for Priorities will be significant enough to drive measurable activity in the RSI system. At the same time, investigation and knowledge generation outside of government-set Priorities will contribute to a balanced RSI system and investment portfolio.

Setting Priorities will provide opportunities for long-term career pathways in areas of priority that will bring new researchers through their early- and mid-career stages into established research careers.

Priorities will function as hubs of coordination, collaboration and capability for priority areas across the RSI system. This is intended to facilitate transdisciplinary connections and collaborations between researchers across all parts of the RSI system, and with users of research (industry, Māori, communities, central and local government agencies), in part by leveraging the increasing digitalisation of research. They will also form a locus for sufficient long-term funding to support research, capability building, critical infrastructure and technical services relevant to Priorities.

The Priority-setting mechanism will provide opportunities for researchers and research providers, end-users and industry to help shape and deliver Priorities, and will allow for Māori-focused and Māori-led Priorities.

We expect the future RSI system to:

- Provide a stable source of funding to Priorities, which will contribute to the reduction of unproductive competition and career precarity.
- Provide Māori, iwi and hapū with a forum in which to address their most important aspirations through science.
- Connect with industry, the health system, the environmental sector, research next-users and other end-users so that Priorities align with opportunities in new and existing sectors.
- Focus on areas where New Zealand has emerging strengths or opportunities, for example those highlighted by the Industry Transformation Plan programme.
- Enable researchers and research providers to bring their expertise and knowledge to bear on the opportunities where research can have the most impact.
- Enable government to exercise stronger leadership to align the RSI system with transformative opportunities and industries that do not yet exist.

We will:

- **Develop a system of National Research Priorities** that will provide clear direction from government, reduce fragmentation, and promote collaboration over unproductive competition.
- **Honour Te Tiriti o Waitangi and support Māori aspirations** through the inclusion of Māori-focused and Māori-led Priorities.
- **Enable government to direct a critical mass of RSI resources** towards the most important challenges and opportunities for Aotearoa’s social, environmental, and economic wellbeing (that research can address), and facilitate researchers to address the challenges within them.
- **Create impact** through mission focus and strengthened connection and engagement between government, researchers, industry, iwi and Māori leaders, end users and communities.
- **Establish a funding mechanism to proactively invest** in the determined priority research areas, which will also support networks of collaboration and capability for those areas across the system.



Aronga Kaupapahere 1.2: Te whakaterere ake i te auahatanga, te whakaputa kē me te whakarahi i te pāpānga

Policy Direction 1.2: Accelerate innovation, diversify and scale up impact

Design for and incentivise collaboration, connectivity and knowledge exchange between research organisations, end-users, health agencies, social enterprise and government to accelerate innovation and generate greater social, economic, community and environmental impact from research, including increased commercialisation and industry transformation.

Research-led and research-intensive innovation relies on ideas, data, people and technology circulating between universities, public research institutes and research users. Such exchanges are interactive, collaborative and not linear. The seamless mobilisation of knowledge between research organisations, research partners, next-users and end-users is key to ensuring our RSI system can innovate and enable outcomes and impact for New Zealand and internationally. Researchers undertake many activities to ensure that the knowledge they generate can be used for the benefit of the economy and society. Research next-users and end users may include policy makers, practitioners (public, private, NGOs), communities, and other researchers (working on other projects and at other institutions). The increasing use of digital systems within research and the wider economy has a significant role to play in dynamically bringing together these diverse stakeholders.

One route to research impact is through the private sector, which plays an important role in research and development (R&D) because it translates and mobilises new knowledge for end-users through the process of innovation and commercialisation.

Policies are already in place to accelerate innovation from research and to increase business expenditure on research and development. The effects of current policies can be seen in the growing involvement of industry and business in the RSI system. Business expenditure on R&D has increased substantially from \$971 Million in 2010 to \$2,709 Million in 2020, with an 18 per cent increase relative to GDP between 2019 and 2021 alone.²⁷ Business expenditure has also been the primary contribution to increases in overall investment in R&D in New Zealand.²⁸

However, more is needed to deliver transformative change. Public and private R&D expenditure rates remain among the lowest in the OECD. This low investment in R&D is a key contributor to New Zealand's poor productivity performance. It is estimated to account for up to 40 per-cent of our productivity gap.²⁹

More targeted support and incentives are needed to increase the free flow of ideas between the public RSI system and the private sector to maximise the impact that can be generated from research. At the same time, we expect the private sector to commensurably spend more on R&D as the benefits of commercialisation increasingly accrue to businesses and industry. This ensures government maintains an appropriate role as enabler and investor proportionate to the impact of research being publicly shared or captured by the private sector.

While there are pockets of excellence within the system where the generation of impact from research and collaboration with existing industries works well, we need this to be happening more broadly and consistently. We need system settings that incentivise and enable impact generation from research across the whole RSI system.

To achieve this, we must build on initiatives already underway and address incentives in a more systemic way. We will consider where the public sector can be more effective, especially in how it connects and collaborates with industry, to better support the change that is to be accelerated by the reforms.

²⁷ R&D Survey, Stats NZ, 2021

²⁸ Ibid

²⁹ An International Perspective on the New Zealand Productivity Paradox, New Zealand Productivity Commission, 2014



We expect transformative change will require:

- Support for new and leading innovation from research – meeting the cost of shifting to a more open system of knowledge exchange, mobilisation and uptake that would benefit New Zealand at a much greater order.
- Deliberate investment in focused innovation systems through National Research Priorities – to enable high-potential areas of the economy to transform and scale up and drive the diversification of our economy, including through the adoption and uptake of global innovation and increasing digitalisation.
- Support for future industries and revolutionary innovation – to embrace disruptive innovations of the future, which are driven by new technologies and increasing digitalisation, and support new entrants who promote the emergence of new areas of capability and novel technological capabilities that help us prepare for the future.

The reforms will need to speak to, and be supported by, wider government efforts, such as the Industry Transformation Plans (ITPs) and the Digital Strategy for Aotearoa. ITPs are a mechanism by which government and industry partner to drive transformation in key sectors of the economy. They may involve shifting an existing industry to higher value; shifting the performance of large and interconnected industries; or scaling up high potential industries to be a larger part of our future economy. The ITP Programme specifically recognises the importance of coordination between the RSI system and the individual ITPs. The National Research Priorities will be instrumental in enabling the intensity of research required in individual focus areas to support sustained growth.³⁰

We will:

- **Promote knowledge mobilisation to accelerate innovation**, by incentivising transdisciplinary research teams (drawing expertise from CRIs, Universities and research partners, like the health and environmental sectors, and leveraging new digital and data tools) to intentionally plan and deliberately resource the impact pathway from idea to impact. Collaborating beyond institutional boundaries drives the innovation needed to address large complex challenges, and planning to meet the needs of next-users and end-users from the outset maximises research impact.
- **Grow existing connections between research, industry and other end-users** to help take research through to impact for example, by better leveraging existing entities and networks (e.g., Product Accelerator, HealthTech Activator and KiwiNet), and designing for new ones, drawing from the RSI sector’s wide range of partners and stakeholders.
- **Increase the mobility of the RSI workforce** so that knowledge and skills more readily transfer between research institutions and end-users, enabled by support for a broader range of careers, including higher workforce mobility with industry more broadly. For example, careers in commercialisation could be enabled by supporting researchers to take sabbaticals from research for the purpose of working in industry, and then enable them to return to their research careers. This includes refreshing what is recognised and valued in research career pathways, including recognising the increasing digitalisation of research.
- **Establish new ways to develop and deliberately invest in focused innovation systems** around areas of the economy with rich potential for innovation and scale, and to address challenges for the benefit of New Zealand industry and society, for example, by leveraging National Research Priorities.
- **Better utilise our knowledge assets** by creating more open intellectual property and technology settings in RSI institutions that reduce barriers to impact generation.
- **Increase public expenditure on R&D beyond historic rates** to better match business-led R&D expenditure increases and improve our absorptive capacity of overseas-generated knowledge.

30 *New Zealand firms: Reaching for the frontier*, New Zealand Productivity Commission, 2021



Aronga Kaupapahere 1.3: Te whakapiki i te tūhonohonotanga ā-ao

Policy Direction 1.3: Grow global connectivity

Facilitate and foster global connectivity and purposeful international partnerships to enhance our ability to take onboard new innovations, attract overseas investment and establish routes to international markets.

Our RSI system is situated within the context of the wider, global science system. New Zealand is more often than not a knowledge follower, rather than a leader, and therefore reliant on adoption of knowledge from overseas and diffusion of global technology and digitalisation trends.

Importing knowledge critically depends on our ability to understand knowledge, adapt it, apply it and spread it. Mobilising knowledge to innovate in a global context also means collaborating internationally to create and utilise knowledge and transfer our own domestically generated technologies, products and services globally. As we move to a high-wage, low-emissions economy, digital ways of collaborating and connecting will have an increasing role to play.

While our RSI system is already well connected and respected globally, we need to build on this through more favourable funding and institutional settings that better support how knowledge is transferred and mobilised to innovate at an international scale. This will enable our researchers, innovators and institutions to engage with the world's best and take advantage of international opportunities. Growing our global connectivity will result in more global recognition of our research and researchers, enhanced access to international research infrastructure, and increased international funding.

A key step will be completing New Zealand's association with Horizon Europe. Pillar Two of Horizon focuses on Clusters and Missions that closely align with the National Research Priorities framework and Association will represent a meaningful investment in the international research cooperation necessary to optimise delivery and impact of the Priorities.

We will:

- **Better facilitate global cooperation and collaboration** through more favourable funding settings that make it easier for researchers to make use of overseas funding and resources.
- **Complete Association with Horizon Europe** Under the terms of Association, New Zealand research organisations (including businesses conducting research) will be able to bid for and receive Horizon Europe funding on essentially the same terms as their European counterparts. They will be able to lead research programmes and retain possession of the intellectual property they bring to, and create within, their collaborative projects.
- **Provide more proactive government leadership through National Research Priorities** in creating opportunities for global cooperation, accessing multi-national/global research infrastructures and participating in global research communities at more optimal scale.



Te Tāmau i Te Tiriti

Embedding Te Tiriti

The RSI system embeds Te Tiriti o Waitangi in its design.

Each objective of Te Ara Paerangi – Future Pathways, and therefore each chapter in Part II of this White Paper, contributes to our commitment to affirm and embed Te Tiriti in the design of the RSI system, support Māori aspirations and improve the lives of Māori and all New Zealanders through our investments in RSI and mātauranga Māori. This chapter focuses on the system-wide policy directions and actions we will take to deliver this transformative change.

Embedding Te Tiriti is vital to ensuring that the system is more responsive to the interests and values of Māori across the country. Te Ara Paerangi acknowledges and responds to a strong call from across the sector to better honour Te Tiriti obligations and opportunities, and address marginalisation of Māori by the RSI system.

Te Ara Paerangi – Future Pathways seeks to place Te Tiriti o Waitangi at the centre of the reform process to build an RSI system that provides equitable opportunities for Māori to pursue their values and interests. Through this reform, we will strengthen the role of Māori and increase Māori representation and capability across the RSI system; support kaitiaki to protect and develop mātauranga Māori; and improve outcomes for Māori achieved through the RSI system.

An RSI system that affirms and embeds Te Tiriti would mark a step change in honouring Te Tiriti obligations that would support Māori within the RSI system and be more responsive to the needs and values of Māori across the country.

| | | |
|--|---|---------------------------------|
| Embedding Te Tiriti The RSI system embeds Te Tiriti o Waitangi in its design | | |
| 2.1 Advancing Māori Aspirations in the RSI system | 2.2 Investing in mātauranga Māori, Māori knowledge | 2.3 Crown to lead by example |



Strategic shift

- Insufficient expression of Te Tiriti in RSI policy settings
- Low impact on and responsiveness to Māori needs
- Low representation and funding of Māori researchers
- Exploitation and lack of recognition of mātauranga Māori
- Māori perspectives and aspirations not reflected in priorities and decisions

Current state

- Increase representation of and support for Māori
- Elevate mātauranga Māori
- Increase funding for mātauranga Māori
- Increase capability of Māori and of non-Māori to engage with mātauranga Māori
- RSI priorities reflect Māori priorities

Future state

- An RSI system that reflects and responds to the needs of Māori communities
- Recognition and elevation of mātauranga Māori and Māori knowledge
- Increased representation of Māori in the RSI system
- Greater impact on Māori wellbeing



Aronga Kaupapahere 2.1: Te kōkiri i ngā Wawata Māori ki roto i te pūnaha RSI

Policy Direction 2.1: Advancing Māori Aspirations in the RSI system

Reflect partnership at all levels and invest in growing Māori researcher capacity.

Te Tiriti o Waitangi envisages equal rights will be afforded to all New Zealanders, yet reports convey that Māori are often marginalised or excluded from governance and decision-making in the public research system. Overwhelmingly, Māori respondents to the Green Paper advocated for greater Māori representation in governance of the RSI sector. In addition, the system must provide for Māori to exercise tino rangatiratanga over taonga Māori including mātauranga Māori.

Removing barriers to entry and advancement and reforming the funding system to address the low proportion of funds that directly support Māori researchers will increase Māori representation in the RSI system. These actions will have a long-term impact on the ability of system to meet the interests and aspirations of Māori communities.

We will:

- **Increase the proportion of research funding directly supporting Māori aspirations** by creating new funds or ring-fencing portions of existing funding.
- **Ensure appropriate Māori representation at all levels** so that the RSI system better reflects Māori values and tikanga.
- **Include Māori-led Priorities in National Research Priorities** to grow Māori-led RSI (see policy direction 1.2), and increase connection and value for Māori, iwi and hapū.

Aronga Kaupapahere 2.2: Te haumi ki te mātauranga Māori

Policy Direction 2.2: Investing in mātauranga Māori, Māori knowledge

Invest in mātauranga Māori as a key part of the RSI knowledge ecosystem.

Mātauranga Māori is a knowledge base that is distinctive to Aotearoa New Zealand's and of great importance to Māori and Māori wellbeing.

Te Tiriti underpins a commitment that Māori aspirations in research science and innovation be equitably accommodated.³¹ The knowledge and tools to enable those aspirations are a key to realising this commitment. Submissions on the Te Ara Paerangi – Future Pathways Green Paper have called for a Māori-led, government-enabled platform that will bring together mātauranga Māori expertise in RSI and deliver to matters of Māori RSI interests in mātauranga Māori. The design of such a platform would depend on its function. We propose to support Māori to consider the form, function and design of such a platform.

Further, Te Pūtahitanga³² and other reports have sought stronger investment of research system resources to meet the interests and RSI potential in the regions. This was reinforced in Green Paper submissions. Māori submissions overwhelmingly supported the establishment of research platforms that centre the regions and strengthen the research activities and outcomes in regions where mātauranga Māori is practiced and where mātauranga Māori experts and practitioners live and work. These regional platforms would allow Māori across the motu to draw on local knowledge, as well as link to national and international expertise, and ensure the benefits flow back to the communities from which that knowledge and research was sourced.

³¹ As outlined in Cabinet Office Guidance (CO (19) 5) Te Tiriti o Waitangi Guidance. This relates to Article three of Te Tiriti which simply refers that – the Crown promises that its obligations to New Zealand citizens are owed equally to Māori

³² Te Pūtahitanga A Tiriti-led Science-Policy Approach for Aotearoa New Zealand, Kuktai, Tahu et al., 2021



Mātauranga Māori is also a taonga Māori, which means that the Government has obligations of active protection under Te Tiriti.³³ Explicit tools are needed to ensure the right approaches are available for Māori to exercise the appropriate protections of mātauranga Māori in RSI, where these rights exist. These will be explored and developed as a part of Te Ara Paerangi Future Pathways.

We will:

- **Partner with Māori** to explore development of a dedicated platform for mātauranga Māori expertise in RSI.
- **Support the stronger deployment of RSI system resources to the regions**, potentially through supporting Māori to establish regional research platforms or through leveraging improvements in digital connectivity, with appropriate recognition and engagement with existing regional knowledge platforms, such as marae and whare wānanga.
- **Encourage and support RSI institutions to develop standards and guidelines** to ensure researchers have the competency to engage with Māori and te ao Māori, and vice versa.

Aronga Kaupapahere 2.3: Mā te Karauna e whakatauiria

Policy Direction 2.3: Crown to lead by example

MBIE and Crown-funded RSI institutions must lead by example in honouring Tiriti obligations and giving life to Tiriti opportunities.

In its role, as a partner to Te Tiriti o Waitangi, the Crown needs to take the lead in driving change across the RSI system, particularly in our RSI institutions. As part of this change, we must embed Tiriti obligations and opportunities throughout our institutions who are at the interface of RSI with our communities.

As a first step we want to develop a statement outlining our obligations, expectations and aspirations for Te Tiriti o Waitangi in the RSI system. Such a statement will provide a high-level indication and signal of intent to the RSI sector as to how we can honour our Tiriti obligations and opportunities in the context of Te Ara Paerangi – Future Pathways.

We expect such a statement will clearly set out how government intends to support and embed Te Tiriti in a future RSI system. The statement would guide for example, MBIE in its role as a steward, funder and administrator of RSI. This statement will guide and inform how Te Tiriti may be recognised in any new RSI legislation.

We will:

- **Publish a Tiriti Statement** that outlines how MBIE will honour Tiriti obligations and give life to Tiriti opportunities.
- **Lift the capability of Crown employees** to engage with and partner with Māori.

³³ As outlined in Cabinet Office Guidance (CO (19) 5) Te Tiriti o Waitangi Guidance. This relates to Article two of Te Tiriti which simply refers that – the Crown promises that Māori will have the right to make decisions over resources and taonga which they wish to retain.



Te Uara i Ō Mātou Tāngata

Valuing Our People

The RSI system attracts, retains and develops an excellent and diverse workforce at all levels.

Our people are our greatest asset. Our RSI system is, above all, an investment in people – those who seek to expand and apply our pool of knowledge to improve the wellbeing of all those in New Zealand.

We must therefore ensure that we have the systems, structures and culture in place to attract, retain and develop great people. In an internationally competitive market for research talent, we need to be more intentional in how we develop the strengths and capabilities of our people to ensure that our RSI system is at the global frontier, now and into the future.

We must value the essential professional skills of our researchers, recognise the capabilities that are transferrable across disciplines and expand our view of excellence to recognise the diversity and impact of Aotearoa's knowledge systems. This includes initiatives to support our Māori and Pacific researchers and Māori and Pacific knowledge systems (see policy directions 2.1. 2.2), consideration of a broader recognition of skills and excellence (policy direction 4.4), and good workforce outcomes (policy direction 4.3).

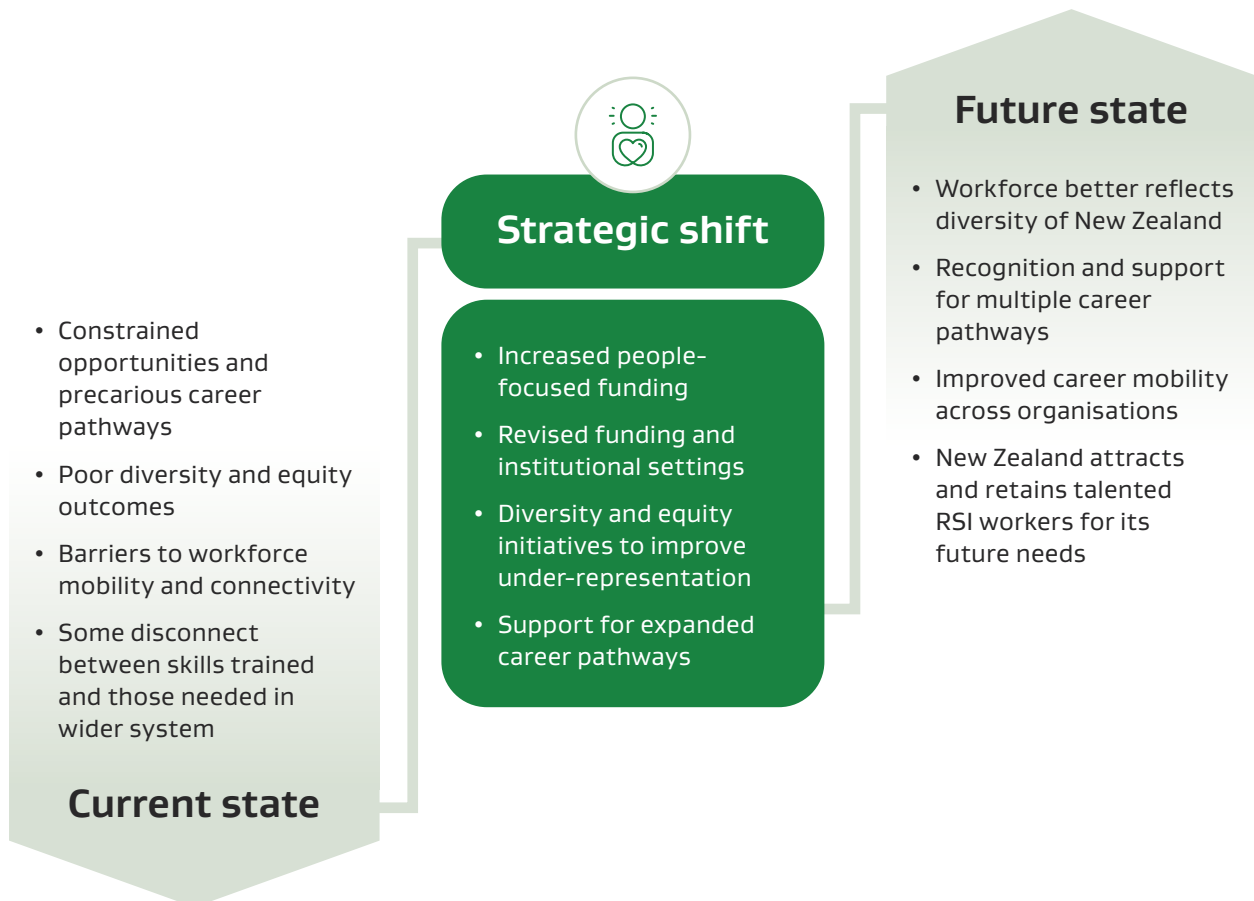
Achieving these objectives will require partnerships between government, RSI employers, the RSI workforce and our communities.

Through Te Ara Paerangi we will empower and support our RSI workforce to make the greatest possible contribution to the economic, social and environmental wellbeing of New Zealand and all New Zealanders.





| Valuing Our People The RSI system attracts, retains and develops an excellent and diverse workforce at all levels | | |
|---|--|--|
| 3.1 Attract, develop, and retain talented people | 3.2 Supporting diversity at all levels | 3.3 Empowering Pacific Peoples |





Aronga Kaupapahere 3.1: Te whakapoapoa, whakawhanake me te pupuri i ngā tāngata whai pūmanawa

Policy Direction 3.1: Attract, develop, and retain talented people

The New Zealand RSI system provides diverse, fulfilling and stable career pathways.

The success of New Zealand's RSI system depends on its people and its ability to develop, attract and retain the best talent. Our ability to do so is critical to the performance and sustainability of our RSI system.

We must therefore act to increase opportunities for diverse and fulfilling career pathways, improve workforce wellbeing, and address presenting issues such as career precarity. We will begin by expanding people-focused initiatives such as fellowships and schemes to attract and build connections with international researchers.

However, we recognise that these initiatives will have an important but limited reach and we also need to address systemic causes of precarity. The wider initiatives in the reform, which will invest in National Research Priorities, grow connections with users such as industry and communities, and create long term funding for public good service functions and national infrastructure, will provide better incentives for long-term employment in many areas. Reducing workforce precarity and creating opportunities for researchers to move between institutions will also be a key consideration for the design of funding and institutional settings, including the National Research Priorities.

Our future research workforce needs improved opportunities to be prepared for a broad range of possible careers in addition to academia, including technical, private sector, community-led and entrepreneurial occupations. Doing so will expand career opportunities, support our organisations in accessing the skills they need, and reduce the risk of staff becoming trapped in precarious positions. This will include development and retraining in response to new opportunities and skill requirements, particularly those necessary to operate in our increasingly digital world.

We will:

- **Expand fellowship schemes** to support leading talent, to reduce precarity, improve equity and diversity and strengthen pathways through the public research system.
- **Address settings in the funding system** that disincentivise permanent or longer-term employment contracts to reduce contract 'churn' and so improve workforce productivity.
- **Establish clear capability development expectations** within the design of the upcoming National Research Priorities. The Priorities will also serve as connection hubs, both physical and digital, to better enable partnerships between people from different parts of the RSI system.
- **Expand support for training our people and access to development opportunities** for a broader range of research careers through programmes such as applied training schemes (e.g. applied or industry PhDs) and support for cross-sector partnerships (such as co-location).
- **Co-ordinate international talent attraction schemes** to strengthen links between New Zealand and world leading knowledge and incentivise returning New Zealanders.



Aronga Kaupapahere 3.2: Te hāpai i te kanorautanga i ngā taumata katoa

Policy Direction 3.2: Supporting diversity at all levels

The workforce is representative of and embraces Aotearoa New Zealand's diversity.

The RSI workforce must reflect and respect the diversity of New Zealand. The diversity, equity and inclusiveness of our workforce is vital to a thriving RSI system that contributes to the wellbeing of all New Zealanders. A lack of these characteristics risks homogeneity, stifles creativity and has a tendency toward the status quo.

We must therefore recognise and support the breadth of skills needed for the RSI system to succeed. We rely not only on our researchers, but also the technicians, project managers, administrators and people in many other skilled roles, who all work together to create new knowledge, understanding, and applications.

We must also be ambitious in our efforts to eliminate barriers to entry or advancement for women, Māori, Pacific Peoples, ethnic communities, disabled people, and members of LGBTQI+ communities.

We will:

- **Grow representation of women, Māori and Pacific Peoples**, particularly for senior staff and management roles in public research organisations and tertiary education organisations.
- **Introduce dedicated fellowships for Māori and Pacific Peoples** to reduce underrepresentation in the RSI system.
- **Review funding assessment processes to better recognise the diversity of skills** needed for research success, through measures such as narrative CVs.







Aronga Kaupapahere 3.3: Te Whakamana i Ngā Iwi o Te Moananui-a-Kiwa

Policy Direction 3.3: Empowering Pacific Peoples

Invest in research, science and innovation by and for Pacific Peoples in New Zealand and across the Pacific.

There are many different Pacific Peoples in Aotearoa and across Te Moana Nui a Kiwa (the Pacific Ocean), who all have varied relationships with New Zealand and our RSI system. Our special relationship with Pacific Peoples in New Zealand and across the Pacific region is underpinned by policy and legislative commitments, particularly with Realm Entities and Samoa. Furthermore, Pacific Peoples also have whanaunga relationships to Māori.

New Zealand supports research, science and innovation from Pacific Peoples in New Zealand and further across the Pacific region. We have a considerable RSI footprint in the region (our CRIs have participated in over 100 projects across Pacific nations since 2018) and should be more intentional in how we promote the development of people and skills in the Pacific, including mobility between New Zealand and other Pacific nations for training or collaboration.

Pacific researchers are well positioned to lead and extend research into our Pacific communities in New Zealand and across the Pacific region. There are many different knowledges held by and within these Pacific communities, which can enrich Pacific communities and the knowledge base and innovative potential of the RSI system. While Pacific Peoples will benefit from wider access to the RSI system, the RSI system will also benefit from Pacific Peoples' increased involvement, through respectful access to Pacific knowledges of the moana that may be more regionally relevant and specific than other knowledges that are more embedded in the RSI system.

This potential is limited by the severe underrepresentation of Pacific Peoples in the RSI sector. According to the Workforce Survey of Individuals there are only 40 Pacific Peoples across all the CRIs. We have also heard through consultation that Pacific Peoples are also underrepresented as system- and end-users of research and do not have equitable access to the system.

Our talanoa with Pacific researchers and research users identified key shifts for Te Ara Paerangi – Future Pathways to ensure the RSI system lifts the wellbeing of our Pacific communities:

- **Increase the visibility** of, and the integration of Pacific researchers and research-users into the RSI system.
- **Rethink how Pacific research excellence is defined** and celebrated.
- **Apply a Pacific lens** to how research impact is acknowledged and celebrated.
- **Genuinely integrate Pacific methodologies**, research practices and cultural protocols in the RSI system.
- **Grow the Pacific research pipeline** and support Pacific researchers within the RSI system.
- **Recognise the value and contribution of Pacific communities** to the RSI system.
- **Design research funding models** to grow, enable and advance the Pacific research workforce.
- **Explore new opportunities** for a Pacific-led function of the RSI system.
- **Commit resource** to ongoing and regular engagement with Pacific researchers and research users.

We will:

- **Work across government and with Pacific researchers to design a definition and framework for 'Pacific research' and 'Pacific research excellence'.**
- **Grow sustainable pathways for Pacific People across the RSI workforce** through funding of Pacific Research fellowships and supporting access to workforce development opportunities.
- **Lift the capability to Crown employees** to engage with Pacific Peoples and apply a Pacific lens to policy development, including through regular engagement with Pacific researchers and communities. Enhancing this capacity will enable more intentional and mutually beneficial engagement with Pacific communities and build links for collaboration, domestically and across the Pacific region.

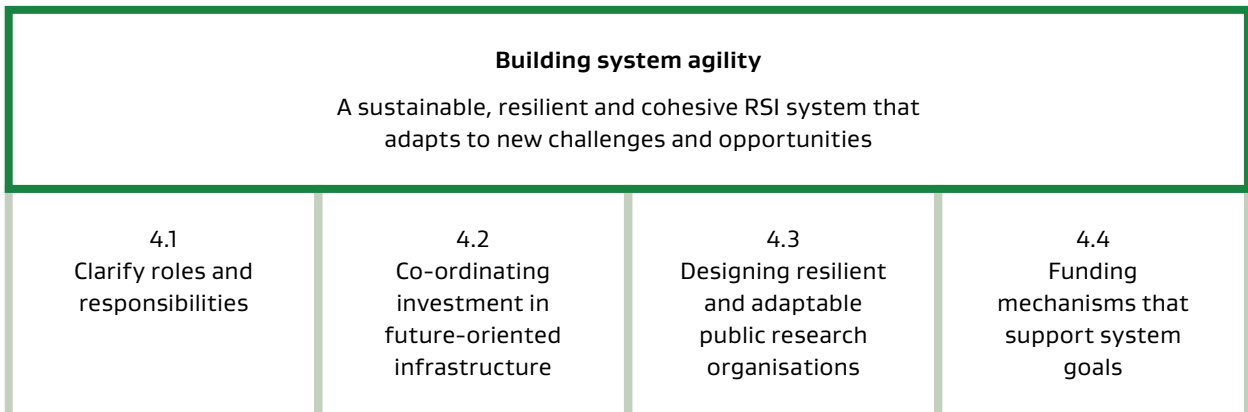


Te Hanga i te Kakama o te Pūnaha Building System Agility

A sustainable, resilient and cohesive RSI system that adapts to new challenges and opportunities.

The Government has indicated its intention to grow Research and Development to two per cent of GDP. Increased funding, especially to priority areas, will enable more effective delivery across the RSI system, enabling it to compete globally in areas of strength, improving career opportunities for researchers, and ensuring delivery of essential functions and research infrastructure. However, increased funding alone is inadequate to ensure that the institutions and funding mechanisms will meet future requirements. We also need to invest in new capabilities and public research organisations that will accelerate emerging knowledge and technology-driven sectors.

To deliver its vision, Te Ara Paerangi – Future Pathways will tackle pain points in the system that hinder the effectiveness of New Zealand’s RSI system. The reform will address governance, systems and institutions so that the sector can deliver relevant, excellent, transformative research in the medium to long-term.





- Lack of clarity about roles across the RSI system, and accountability about value
- Institutions with limited capability to respond to emergent priorities outside their sector focus
- Financial drivers incentivise short-term planning
- Counterproductive wasteful competition

Current state



Strategic shift

- Devolve governance and funding where appropriate
- Agile and resilient institutions capable of shifting focus over time
- Strategically aligned infrastructure investment
- Changed funding approaches

Future state

- Governance and funding decisions are made where they are most effective
- Institutional design and funding support responsiveness to government, sector and community needs
- Co-ordinated planning and funding of national infrastructure better reflects user requirements
- Long-term funding secures stable delivery of public good science services and infrastructure
- Efficient and effective funding approaches enhance value



Aronga Kaupapahere 4.1: Te whakamārama i ngā tūnga me ngā haepapa

Policy Direction 4.1: Clarify roles and responsibilities

Effective governance and ownership mechanisms release greater value from government investment in research, science and innovation.

The RSI system is characterised by a plethora of governance mechanisms and priorities that are at times contradictory and confusing. This complexity means that the system struggles to gain traction to respond to new and emerging needs and priorities. At the same time, some public good science functions are not sustainably funded, because responsibilities for funding and ongoing development are dispersed or unclear.

Research and public good science services such as environmental and natural hazard monitoring, biosecurity capability and forensic services are key enablers of the functions of government through the generation of knowledge and innovation to inform policy and through contributions to regulatory systems. Ensuring that the system continues to deliver public good science services that support the regulatory and monitoring functions of government is therefore vital.

To deliver the vision we must enhance government levers to steward and set direction for the system while enabling expert input at the points where this can most benefit the quality and impact of RSI investment and funding. The reform will clarify roles and responsibilities and streamline governance and funding arrangements across the system. The National Research Priorities will provide a single co-ordinating mechanism for mission-oriented research, while investigator-led research will continue to be funded through Endeavour, Marsden and Health Research Council funding (See Overview of Changes to the System). Together these changes will provide more coherent signals to support institutions to make medium to long-term investments in staff and capability.

We want responsibility for public good science services, applied research and end-user-initiated research to sit with the entity best placed to commission it and support its uptake, and to make decisions about resource trade-offs – in some cases this will be sector-oriented government agencies.

These changes will ensure that ongoing investment in research programmes, infrastructure and institutions is clearly linked to cross-government goals and priorities for the RSI system.

We will:

- **Clarify the roles of government agencies** in owning and funding some public good RSI functions and applied research. Some sectors and agencies require public good research and science related services to meet their enduring regulatory and strategic policy requirements. Ensuring the ongoing provision of such services will be best served through expert engagement in the commissioning and funding of these important services.
- **Locate functions that currently sit in government entities where they will be most effective and most efficiently managed.**

We expect to see:

- An expanded role for a range of government agencies in funding science services and applied research, especially where there is strong alignment to agency goals and expertise. This will mean closer links between policy agencies and research institutions.
- Long-term stable funding for public good science services and related infrastructures. This will mean:
 - › An ongoing role for central co-ordination of public good functions that have multiple users and beneficiaries. This will ensure that science functions that are used widely are co-ordinated and deliver the best value and outcomes for everyone needing them.
 - › Clarity of ownership and clearer signals from government agencies about requirements for critical research functions, high priority scientific services and national databases and collections, and measurement and monitoring services. This will support the ongoing capability building connected to these functions, including workforce planning and basic science research investments.
- More effective and nuanced expressions of Te Tiriti partnership in the oversight and prioritisation of research, science and innovation resources and services.



Aronga Kaupapahere 4.2: Te ruruku i te haumitanga ki ngā tūāhanga aro ki anamata

Policy Direction 4.2: Co-ordinating investment in future-oriented infrastructure

Supporting future capabilities with national investment in cross-cutting infrastructure.

A more consistent and coherent approach to priority setting and strategic planning will be supported by a coordinated approach to investment in long-term and cross-connecting infrastructure, both physical and digital, that will support capacity and connectivity across the system. This includes making sure that researchers have access to the digital technologies and capabilities that underpin a modern data-rich research sector. Coordinated research infrastructure investment also offers the opportunity for greater connectivity across the system, creating natural hubs of activity and knowledge exchange and capability building.

A portfolio of complementary funding mechanisms offers the opportunity to shift incentives in the funding system to ensure that medium to long-term horizons and system benefits inform institutional research strategies without compromising organisational autonomy. Having a sufficiently stable funding horizon can also de-risk investments in high-risk high-potential research and encourage strategic workforce planning.

We will:

- **Develop a system-wide infrastructure roadmap** to coordinate investment and, where appropriate, consolidate infrastructure ownership, to better reflect user requirements and enhance visibility and access for the entire sector. The roadmap will complement the existing *Kitmap* initiative that will provide information to the sector about significant pieces of kit located within research institutions.
- **Consider opportunities for consolidation of building investments** to support co-location of functions where this offers synergies that will enhance collaboration and the quality and effectiveness of public investment.
- **Shift the mix and scale of funding mechanisms** towards more long-term funding approaches aimed at growing capability and addressing long-term challenges.
- **Establish long-term funding envelopes for public good science services** to ensure ongoing planning and resourcing for services that are required for government regulatory and monitoring functions.





Aronga Kaupapahere 4.3: Te hoahoa whakahaere rangahau tūmatanui e aumangea ana, e urutau ana

Policy Direction 4.3: Designing resilient and adaptable public research organisations

Our public research organisations have the scope and scale to respond and adapt to new and emerging challenges.

To be responsive to evolving priorities and opportunities, while remaining financial sustainable, our research organisations require the scale and scope to redirect their resources, adapt and invest in new areas of scientific endeavour and pursue new opportunities while maintaining core capabilities and public good service functions. Within these parameters we want our public research organisations to provide viable and exciting opportunities for a diverse workforce.

The Government will consider what institutional reform may be required to deliver greater impact and enhance capabilities across the system. Our public research organisations will continue to have an important role to play in the research landscape, distinct from that of universities.

Our public research organisations need to:

- Be more responsive to government priorities and funding signals.
- Deliver enhanced knowledge mobilisation and impact from RSI activities, that reaches beyond the current areas of strength to new and emerging sectors.
- Undertake stable, high quality and transparent delivery of core government public good functions and services.
- Create greater exchange of ideas and workforce to help cross-seed innovative thinking and technical expertise.
- Strengthen international connections beyond current areas of strength.
- Increase capability to engage with emerging sectors, industry, and communities.
- Be financially resilient and able to plan for medium to long term horizons.
- Support movement of the workforce between institutions and between research institutions and industry to strengthen knowledge mobilisation.
- Attract, develop, and support a diverse and skilled workforce.
- Confidently engage and partner with Māori and Pacific communities and researchers.

We will:

- **Consider institutional reforms** to ensure that our public research organisations have the scope and scale to adapt to emerging priorities and better contribute to the wellbeing of diverse communities for current and future generations. In particular we want to look at how to encourage collaborative and multidisciplinary research within and across institutional boundaries, and how different operating models (including the removal of the Company model of operations) might support delivery of public good research and services.
- **Grow the capacity of our public research organisations through increased funding** aligned closely to National Research Priorities and the delivery of public good science services.
- **Strengthen the requirements on our institutions** to support good workforce outcomes and affirm and embed Te Tiriti into institutional practice.
- **Ensure that our public research organisations are resourced to deliver the public good services** that we require from them. This will mean ensuring a clear distinction between activity taking place towards the public good, which should not attract commercial revenue, and private or industry good activity, which should be supported with appropriate funding from the private sector.
- **Work closely with the sector** through any changes to ensure our workforce are supported and to carefully manage the continuity of our important research and science activities.



Aronga Kaupapahere 4.4: Ngā taputapu tuku pūtea e tautoko ana i ngā whāinga pūnaha

Policy Direction 4.4: Funding mechanisms that support system goals

A balanced portfolio of complementary funding mechanisms enhances system performance.

Funding is a major source of concern for both institutions and researchers.

Widespread dissatisfaction with the funding system, including how funding decisions are made, was expressed through the Green Paper submissions. These identified concerns with the overall level of funding and the impact of the current system of funding for career precarity, as a source of reduced productivity and unnecessary stress due to uncertainties created by the ongoing requirement to compete for small buckets of relatively short-term money. Addressing concerns about the funding system cannot be done in isolation from reforms to address institutional agility and initiatives to attract, develop and grow a diverse workforce.

We also need to respond to international trends, such as the Declaration on Research Assessment, that are moving away from funding settings that incentivise bibliometric measures of research excellence at the expense of other vital activities such as knowledge exchange, patenting and commercialisation, and community engagement.

We have indicated already that the reforms will direct funding to:

- Support the Government's goal to increase overall investment in research and development to 2% of GDP by 2030.
- Increase research funding directly supporting Māori aspirations.
- Direct investment in mission-led research using National Research Priorities.
- Co-ordinate investment in national research infrastructure.
- Increase emphasis on people-focused funding and support career transitions and mobility.
- Grow international connectivity and attract international talent.
- Fund the public good science services and critical infrastructure permanently whilst retaining the contestability of great ideas.

The programme of change will also address settings in funding mechanisms to:

- **Enhance the operation of funding contests** to reduce transaction costs and unhelpful competition whilst retaining the ability to invest in the best novel, high risk or investigator-led research.
- **Consider options to fund participation in international funding competitions** to improve access to these for New Zealand researchers.
- **Continue to support excellent research**, ensuring that the settings provide opportunities for our new and mid-career researchers to successfully compete for research funding.
- **Encourage investment in workforce development** and reduce career precarity.
- **Introduce, where appropriate new funding approaches** to support the wider goals of the reform, such as stable long-term funding for public good science services.
- **Improve transparency of overhead funding and expenses** to address information asymmetry between researchers, institutions, and funders about the cost of research and the use of government funds.
- **Consider modes of assessment and funding that place less weight on bibliometric measures of research excellence.**
- **Consider the implications of Te Ara Paerangi for the Performance Based Research Fund (PBRF).**

We expect to see:

- Increased investment in areas that are vital to New Zealand's economic, social, and environmental wellbeing.
- Settings within our funding mechanisms that give greater weight to workforce development, employment conditions and diversity.
- Changes to the way funding contests operate to reduce unhelpful competition and administrative burden, which may include novel approaches to funding allocations.
- New approaches to support New Zealand's competitiveness in international research funding contests.



Wāhanga Tuatoru Part III

Te Whakatinana Implementation

Te whakawhitinga me te toiora
Transition and wellbeing

**Te Tirowhānui ki ngā Panoni
ki te Pūnaha**
Overview of Changes to the System

**Te Hātepe Whakatinana
i te Whakahounga**
Phasing of the Reform





This White Paper marks only the beginning of the change programme of Te Ara Paerangi – Future Pathways.

It is important that we get these changes right, so we are committed to engaging with the sector as we develop policy proposals to implement the actions in this White Paper.

We are also committed to working with the sector and in partnership with Māori and with Pacific Peoples in the implementation of the reforms.

Te whakawhitinga me te toiora

Transition and wellbeing

The Government has signalled that it wants to embed a wellbeing approach across the public sector. The vision we have articulated for the RSI sector is a vision for improving the wellbeing of New Zealanders through research science and innovation.

As we move forward, the wellbeing principles of He Ara Waiora (see Reform Principles and Objectives) will continue to inform not only what we do but how we go about implementing the change.

We acknowledge that the Te Ara Paerangi – Future Pathways reforms signal large scale change that will have a significant impact for the system and the people who work in it. However, although difficult, transformational change is required for a better future for Research Science and Innovation in New Zealand.

These changes are being undertaken with the goal to grow the RSI system; we want to ensure that this growth is aligned to the new National Research Priorities.

We are committed to undertaking the necessary transitions with the sector so that we retain, support and grow our workforce, and ensure the ongoing delivery of research and science services through the transitions that will be needed.

The changes will be phased to enable a careful approach that is appropriately attuned to the complexities and inter-relationships within the system. This will include transitional funding arrangements to bridge gaps created by institutional changes and reprioritisation of funding.

Change will be transparent and signalled well in advance, with sufficient time for the sector to prepare.

Te Tirowhānui ki ngā Panoni ki te Pūnaha Overview of Changes to the System

To illustrate the changes we will make, we compare the types of activities and funds in the existing and future systems.

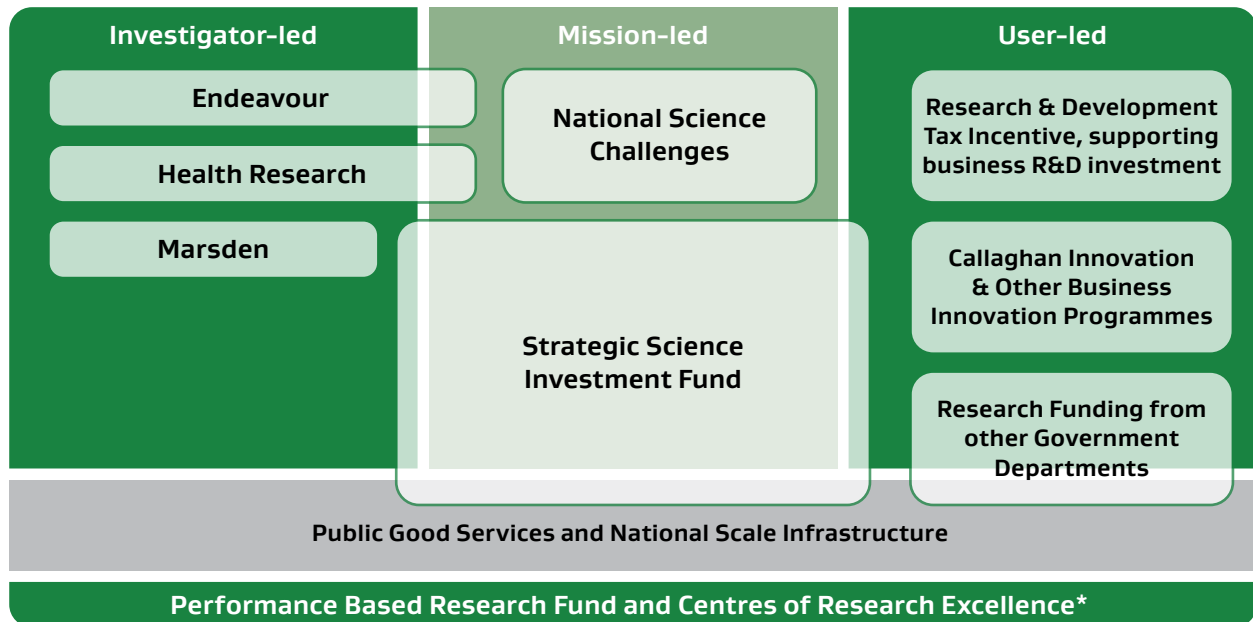
This model, of necessity, uses broadly characterised modes of activity or funding and does not reflect nuanced complexities. It relies on the following key concepts:

1. **Investigator-led research:** This is a mode of research where the researcher instigates the research and defines the scope based on their own expertise. Investigator led research can include a range of research types from basic or fundamental research to applied research. Endeavour, Marsden, and the Health Research Council are the main funders of investigator led research in New Zealand.
2. **Mission-led research:** This is a mode of research where the goals and direction are generally set by actors other than researchers or the research community. Direction, goals, or subject area are most usually set by government in consultation with researchers, Māori, businesses, and communities – as was the case with National Research Challenges.
3. **Applied research:** This is a mode of research undertaken in response to a well-defined problem, usually with a specific type of solution in mind. It is best characterised by the type of research one might expect to find taking place in businesses, but could also be in response to social or environmental problems (e.g. clinical trials for a new surgical device or how to increase the effectiveness of a particular pest species trap).
4. **End-User-initiated research** refers to research that is initiated and funded by end-users to meet their specific needs. This will include business funded R&D programmes but also applied research funded by government agencies or other entities.
5. **Public good services and related infrastructure:** These are activities adjacent to the research system, but which are not 'research' in and of themselves. These activities usually serve to support not only the research system, but also support New Zealand in general to be an advanced, resilient nation with high standards of living. Examples could be our seismic monitoring network, GeoNet, our forensic laboratories, or our weather monitoring and forecasting systems.



We characterise our current system in the following way according to this schema (Figure 7).

Figure 7 Schematic Representation of current public RSI system funding and activities.

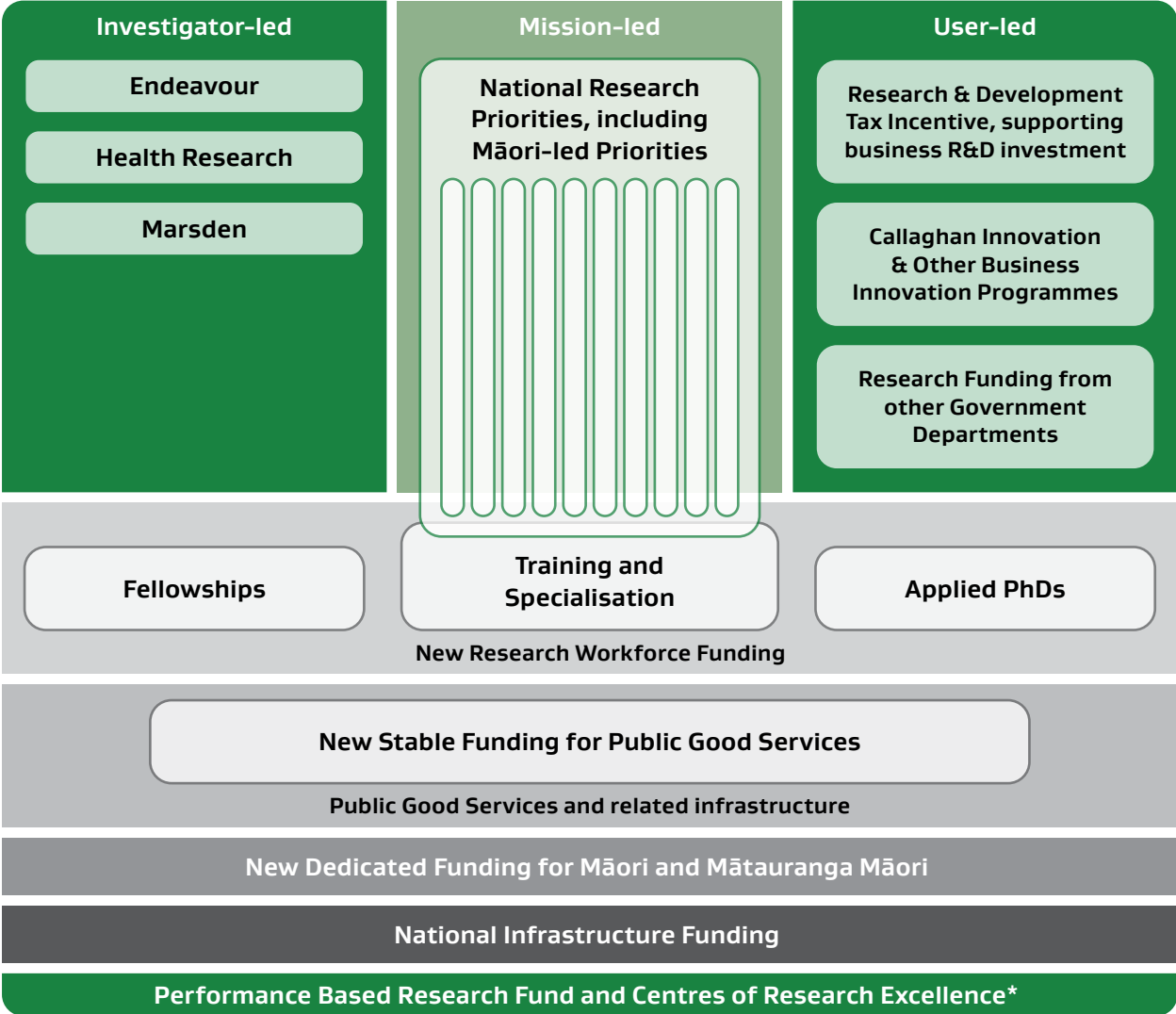


*Funding administered by the TEC to eligible education organisations to support research activity and research-led teaching.

Not to scale.

Our future system can be characterised in the following way (Figure 8):

Figure 8 Schematic Representation of our future public RSI system funding and activities.



*Funding administered by the TEC to eligible education organisations to support research activity and research-led teaching.
Not to scale.

- The key shifts in this system include:
- a central process and funding mechanism for National Research Priorities.
 - a more clearly defined role for our investigator led funds.
 - dedicated funding for workforce initiatives.
 - stable funding for public good services.
 - dedicated funding for mātauranga Māori.
 - strategic investment in critical Infrastructure.

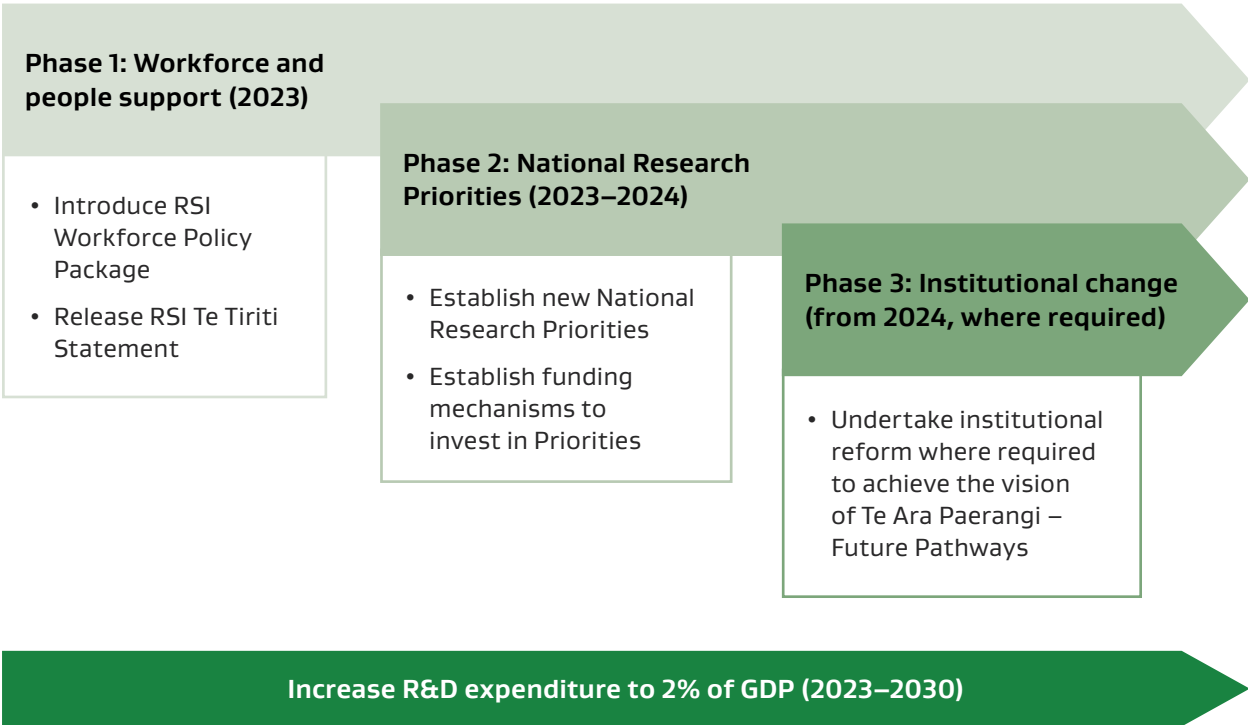
In addition to the actions set out above, Policy Direction 4.4 notes the need to enhance the operation of funding contests to reduce transaction costs and wasteful competition. This is a more fundamental set of changes to *how* we fund, rather than *what* we fund, and will have implications across the funding system, including to the new funds we describe above. We also note our intention to consider the implications of Te Ara Paerangi for the Performance Based Research Fund (PBRF).

Te Hātepe Whakatinana i te Whakahounga Phasing of the Reform

Te Ara Paerangi – Future Pathways is a multi-year reform programme, which will see ongoing implementation throughout. But there are key milestones around which the broader reform programme will take place.

The reform programme has been phased in such a way that it addresses immediate matters first (workforce issues and the first steps to affirm and embed Te Tiriti in the design of the RSI system), sets the strategic direction of the RSI system (National Research Priorities), and then makes the necessary adjustments to the system to ensure that it can best deliver on this direction for the benefit of all New Zealanders. These are the three central implementation phases of Te Ara Paerangi – Future Pathways.

Figure 9 Te Ara Paerangi – Future Pathways high-level implementation phases



The phases of reform indicate periods where the main focus of our efforts will be on particular aspect of system transformation. However, they do not imply exclusive focus. At any given time we may expect to be consulting, conducting analysis, releasing design documents, implementing changes, or evaluating results on all items in the programme. In reality, change processes on all aspects of the reform will take place over a number of months and years. We do not expect to wait until 2026 to start detailed conversations about the best structure for our public research organisations, or the best way to fund research.

Phase 1 of the reform will begin to deliver two key changes in 2023 that begin to alleviate pain points for the workforce and start embedding Te Tiriti o Waitangi in the RSI system.

An RSI workforce policy package, including but not limited to an expansion of research fellowships, an applied training schemes and an international talent attraction scheme will be an early initiative of the reform, which we will begin to implement in 2023. These initiatives demonstrate ways we can support our RSI workforce and their wellbeing in the short-term while we undertake the wider systemic reforms that will improve their wellbeing in the longer-term.

An RSI Te Tiriti o Waitangi statement that outlines the Government's obligations, expectations and aspirations for the RSI system to reflect true partnership at all levels and support Māori researchers will be released in 2023. The Statement will guide MBIE in its role as a steward, funder and administrator of RSI and set expectations for agencies with whom we work, and mark the first step toward embedding Te Tiriti in the design of the future RSI system.

Phase 2 of the reform will centre on establishing National Research Priorities. National Research Priorities will be government's tool to direct research, science and innovation resources to the most important challenges and opportunities for New Zealand's social, environmental and economic wellbeing. National Research Priorities will be a mechanism to proactively invest in those areas and act as locus of collaboration, coordination and capability across the RSI system.

High-level National Research Priorities will be agreed in 2024, organisational and operational structures to oversee the investments to support each Priority will be in place from 2025 onwards, and Priorities will start to operate as soon as they are ready.

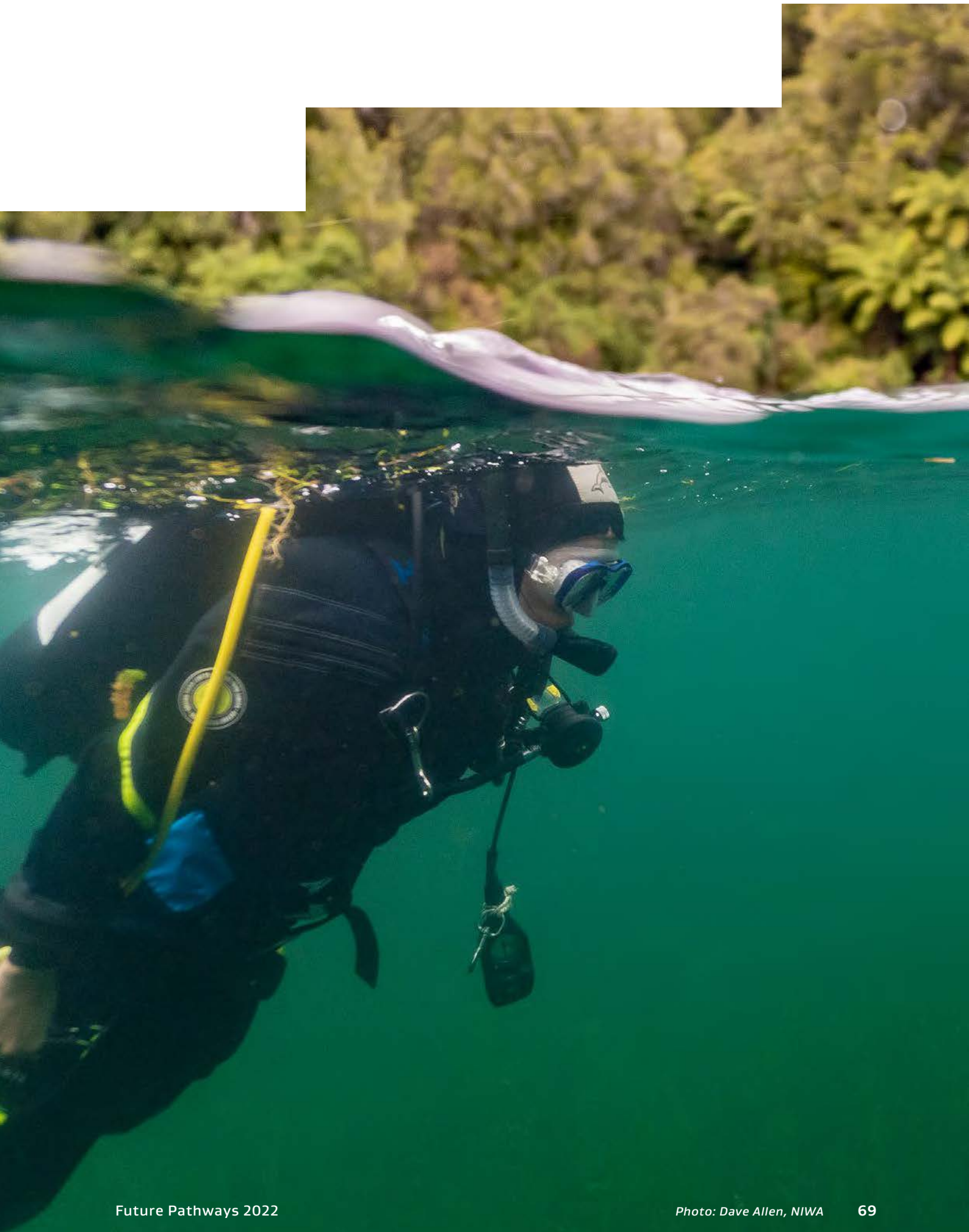
During this phase, we will commence consultation with the sector on the scope and scale of institutional and other system reform required to achieve the vision of Te Ara Paerangi – Future Pathways, in preparation of implementation in Phase 3.

Phase 3 of the reform will implement any institutional reforms required to achieve the vision of Te Ara Paerangi. During this period, we will also be implementing changes to the governance and funding system to deliver stable long-term funding for core public good services and reviewing the operation of investigator led funding to ensure these operate in a way that adds value for the system as a whole.

We expect to see continued growth across the RSI system, enabled by new funding and institutional structures. We expect that the changes we have implemented will be reflected in a shift in science outputs, growth of the RSI workforce and improvements in diversity and inclusion outcomes. Building capacity and growing diversity will take time to achieve but we expect to see solid evidence that the shifts we are seeking are being realised.

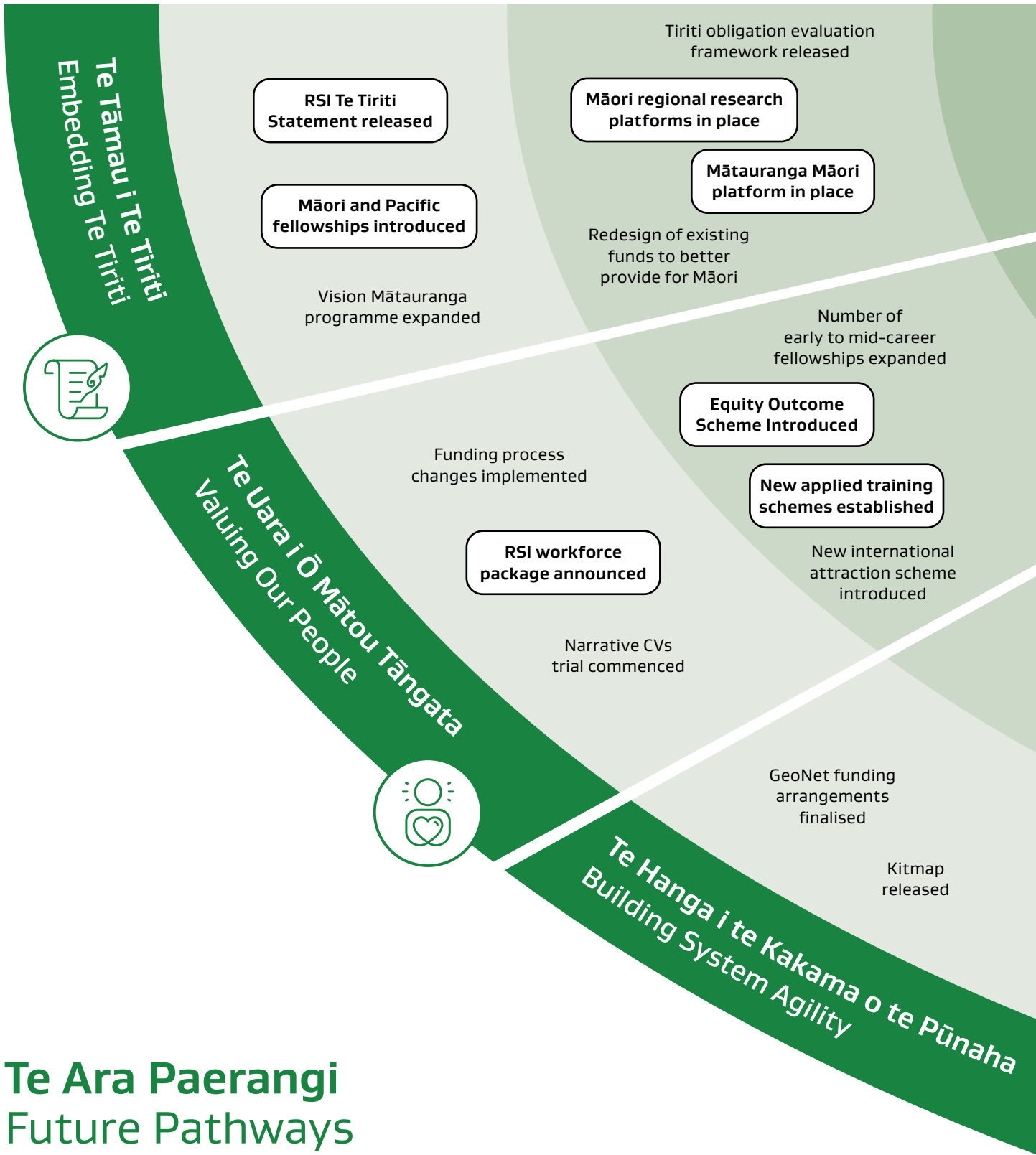
Te mahere whakatinana Implementation roadmap

To support the transition, and in line with calls made through the Green Paper submissions process, we are presenting an implementation roadmap that provides indicative timings for key milestones along the Te Ara Paerangi – Future Pathways change journey.



2023

2024



Te Ara Paerangi Future Pathways

Te mahere whakatinana Implementation Roadmap

All content and placement is indicative and may change as policy positions develop

2026

Onwards

Te Ara Paerangi – Vision

An RSI system that supports wellbeing for all current and future New Zealanders, a high-wage low emission economy, and a thriving, protected environment through excellent and impactful research, science and innovation.

Te Tiriti recognised in RSI legislation

Changes embedded

Changes embedded

RSI institutional workforce requirements (e.g. equity) embedded in new entities

R&D investment rate at 2% of GDP goal reached

Embedding institutional reform

Priorities reviewed

Funding envelope and mechanisms for infrastructure

Infrastructure roadmap released

New entity[ies] established, if required (institutional reform legislative change enacted)

IP change proposals implemented

Policy statement on roles and responsibilities for the RSI system, including MBIE

New funding arrangements for public research institutions established

Priorities process fully implemented

Contestable funding review published

Institutional change programme announced

eResearch: new organisation and cross-system arrangements

Industry research incentives in place

Commercialisation support mechanisms implemented

New infrastructure policy framework and roadmap process

Revised policy on funding of overheads released

Top level Priorities determined

Governance, coordination and collaboration arrangements established for Priorities

Policy on government support for international funding opportunities released

IP policy consideration released for consultation

Embed Te Tiriti-led governance of collection and databases

Priority-setting process confirmed

Priority-setting process proposal released

Priority-setting process commenced

Funding policy for Priorities decided

Horizon Europe

Te Hanga Anamata Hou Creating New Futures





