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Matapakinga IRANZ Te Ara Paerangi Pepa kākāriki

IRANZ Discussion on Future Pathways Green Paper

IRANZ Independent Research Association of New Zealand) represents New Zealand's Independent Research Organisations (IROs).

Hāpaitia te ara tika kia pūmau ai te rangatiratanga mō ngā uri whakatupu, Mā ngā hononga e whakarei i te mana o ngā rōpū te hunga Māori me IRANZ

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2. Introduction

Independent Research Organisations (IROs) are a vital part of New Zealand Aotearoa's research, science and innovation (RSI) ecosystem and increase its diversity.

IROs are not government owned and have a variety of community, philanthropic, and industry ownership models. We provide important targeted research and expertise in specific economic, environmental, and social areas not adequately covered by CRIs and universities and are frequently part of "the best teams" required for important research programmes.

IROs support all sectors in Aotearoa -Primary Processing, Food Safety, Environment *Taiao Ahuwhenua,* Housing. Infrastructure, the Economy *Kete Aronui,* Health, Medicine and Society *Hauora, Rongoā me te Rōpū Iwi.* IROs are located all over te whenua not just in the main centres and with our new Māori members we *whakauru ki te iwi*.

The government's RSI strategies, policies, and investment portfolios should take into consideration impact across the entire research, science and innovation ecosystem, including IROs.

IROs support changes to the science investment system which create a strong and evolving science infrastructure, increase the formation of best teams and avoid wasteful bidding processes. Policies should be agnostic to research organisation ownership whether it is by government, community or industry.

Base funding including Strategic Investment in RSI capability and infrastructure should be equally available to all research organisations. IROs have strategic capabilities that are unique in New Zealand, such as the fire testing facilities at BRANZ, the wind tunnel and road-testing capabilities at WSP Laboratories, Aotearoa's only licensed cell therapy manufacturing suite at the Malaghan Institute of Medical Research and Bragato Research Institute's research winery opened in February 2020, a world-class facility unmatched elsewhere in the southern hemisphere.

3. IRANZ Recommendations

1. It is important that the purpose of government investment in research, science and innovation is clearly set out and underpins Te Ara Paerangi. The shortcomings of the present system in meeting this purpose need to be understood. Any changes need to go hand in hand with a review of overall investment levels. Significant system change should be accompanied with a sustainable refresh and increase in funding levels.
2. Independent Research Organisations (IROs) are a vital part of New Zealand Aotearoa's research, science and innovation (RSI) ecosystem and increase its diversity. They have strong links with the community, industries and local, regional and national government. Te Ara Paerangi needs to recognise and develop IRO strengths and be aware of the potential consequences for IROs of investment and ownership decisions it makes.
3. The primary goal for Te Ara Paerangi should be building a world class research, science and innovation infrastructure for Aotearoa. The basis for setting the objectives should be the provision of research, science and innovation infrastructure for Aotearoa including its environment, society, industries, agriculture and economy. Greater sharing and managed access to infrastructure, including with industry, should be facilitated.
4. National Research Priorities should be broad based and inclusive, not exclusive. Covid 19 has demonstrated that Aotearoa's science infrastructure can rapidly adapt to take on new challenges. They should focus on requiring outcomes for Aotearoa rather than research

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outputs for organisations. If an Independent Research Council is established a Te Tiriti approach needs to underlie it and the Council needs to represent industry and the community.

5. Te Ara Paerangi should cover all Aotearoa's R,S&I investment not just that funded by MBIE programmes. It should cover TEC especially the PBRF, HRC programmes and research strategies and programmes for government departments, regional government, community and industry groups.
6. Te Ara Paerangi should be open-minded and inclusive, incorporating values beyond traditional science and upholding the value of mātauranga Māori. Engagement with Māori in the design and implementation of the system is critical to its success. The RSI system should truly honour Te Tiriti o Waitangi in form and function. Stronger statements and practices need to be introduced to ensure the prominence of mātauranga Māori. We demonstrate our commitment to mātauranga Māori through our Māori members and our Ngā Ara Mahi me Ngā Mahi Ngātahi (Career Paths and Partnerships) programme.
7. Government Science Policy has for a number of years targeted increased business expenditure on R&D. This is an area where IROs make a vital contribution, with their strong links to industry, businesses and the community. Te Ara Paerangi should build on this strength.
8. The current definitions of research excellence should be extended to cover the whole range of research dissemination opportunities. The current system distinguishes between excellence and impact and then subsequently focuses on narrow measure of excellence as research publications in the initial selection of proposals. This mitigates against applied research which will benefit Aotearoa in favour of research with reviewed publication metrics which are easily measurable.
9. Our workforce will be vital to the success of Aotearoa's R,S & I infrastructure. It is increasingly important that Aotearoa's Universities provide Early Career Researchers with skills and experience targeted at the needs of all of Aotearoa's research organisations. The current PBRF does not meet this need. Career movement and progression needs to be considered more broadly including researchers seamlessly transferring between academia and industry. Government investment in R,S& I should recognise the need for secure and challenging career paths for researchers.
10. Research investment funding must be equally available and agnostic to ownership. A suggested move from full cost funding to a mixture of base and marginal funding requires very careful consideration. It must not compromise collaborative research by the Best Teams and must be equally accessible across all R,S&I organisations. In the past IROs have been disadvantaged where schemes such as Non-Specific Output Funding and Core Funding have had the effect of channelling IRO funding towards large crown owned organisations.
11. Changes should have a focus on reducing the costs of engaging with the science system. There is well-established national and international research showing the significant cost of unsuccessful research processes such as unsupported proposals and unproductive engagement activities. Any changes to the system should have, as a core design principle, a reduction in the cost of doing business. This will enable a greater proportion of available time and money to be spent on developing and delivering research and outcomes.

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4. Te Ara Paerangi Questions

1 Research Priorities

1 *11*	1.2.2	**Ngā kōwhiringa hoahoa Whakaarotau Matua** **Priorities design** **What principles could be used to determine the scope and focusof national research Priorities?** **See page 27 of the Green Paper for additional information related to this question**

It is important that the purpose of government investment in research, science and innovation is clearly set out prior to the establishment of research priorities.

The focus of national research priorities should (where possible) be tied to work already carried out identifying key challenges across Aotearoa. Research priorities should dovetail with these plans and strategies in order to coordinate effort and focus.

It is also important that the government gives thought to societal buy-in to priorities as much as science sector buy-in. The sharing of national research priorities provides an opportunity to engage with New Zealanders around the role and importance of research, science and evidence in decision making and shaping the country's future. At a time when questioning of experts and science is evident in parts of society, this is a particularly important opportunity.

2 *12*	1.3.2	**Ngā kōwhiringa hoahoa mō te tukanga tautuhi Whakaarotau** **Priority-setting process** **What principles should guide a national research Priority-setting process?** **How can the process best give effect to Te Tiriti?** ***See pages 28-29 of the Green Paper for additional information related to this question***

The priority setting process should look at the benefit and impact the research investment for Aotearoa.

Te Ara Paerangi should be open-minded and inclusive, incorporating values beyond traditional science and upholding the value of mātauranga Māori. Engagement with Māori in the design and implementation of the system is critical to its success. The RSI system should truly honour Te Tiriti o Waitangi in form and function. Stronger statements and practices need to be introduced to ensure the prominence of mātauranga Māori. Work should be undertaken with the Māori research community and end-users to identify meaningful opportunities for improvement.

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3 ***13***	**1.4.2**	**Ngā kōwhiringa hoahoa whakahaere matua** **Operationalising Priorities** **How should the strategy for each national research Priority be set and how do we operationalise them?** ***See pages 30-33 of the Green Paper for additional information related to this question***

If the research prioritisation exercise is aligned successfully to national priorities and strategies, then this should also have a significant influence on how the research could be operationalised. It would enable the work to be initiated with a clear understanding of end users' targets and goals. This would then enable the research design process to be refined from this starting point. It would also provide a natural end-user/stakeholder community with which to engage during the design process and through implementation. End user engagement during the design and operationalisation phase should be a requirement. This will help ensure that impact is built into the design phase with clear lines for delivery and implementation.

To support this, MBIE needs to consider how it supports the (considerable) time and effort put into designing research. A shift is required away from thinking that sees this as "the cost of doing business". Investment is required up front to support thorough problem identification, refinement and design.

The design process also needs to look beyond traditional stakeholders and participants in the science system. Where system maps are available these should be utilised as they can provide insights around the key actors who need to be engaged for outcomes to be achieved.

2 Te Tiriti, mātauranga Māori and Māori aspirations Tiriti,

4 ***14***	**2.2**	**Te huarahi e marohitia ana** **Engagement** **How would you like to be engaged?** ***See page 38 of the Green Paper for additional information related to this question***

IRANZ will engage extensively on behalf of its members and through its Māori members on the Te Tiriti related issues around Te Ara Paerangi. IRANZ members will also engage individually

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5 ***15***	**2.3**	**Te whakamana me te whakahaumaru i te mātaurangaMāori** **Mātauranga Māori** **What are your thoughts on how to enable and protect mātaurangaMāori in the research system?** ***See pages 38-39 of the Green Paper for additional information related to this question***

IRANZ is fully supportive of a science system that capitalises on the significant strengths and contribution of mātauranga Māori. In order to protect, nurture and enhance this we feel that at the system design level there needs to be a partnership approach between MBIE and Māori. This could then establish some national level guidance, expectations, and resourcing. In turn this could cascade down through the system providing a set of core expectations that supports (not constrains) local variations.

We also note that an improved and genuine partnership approach will require greater efforts to support Māori across the research system as well as look at how engagement can be supported given likely increased demands on Māori participation and contribution.

We demonstrate our commitment to mātauranga Māori through our Māori members and our Ngā Ara Mahi me Ngā Mahi Ngātahi (Career Paths and Partnerships) programme.

6 ***16***	**2.4**	**Te whakapakari hononga ki te mātauranga Māori ā-rohe** **Regionally based Māori knowledge hubs** **What are your thoughts on regionally based Māori knowledge hubs?** ***See page 39 of the Green Paper for additional information related to this question***

We would expect that MBIE should pay particular attention to Māori researchers and iwi to identify if regional hubs are a positive move. Regional hubs, over time, have the potential to build core skills to support regional iwi interests. For this to work, organisations such as IRANZ with members spread throughout the whenua including the Regional Research Institutes are well positioned to foster research skills and developments outside of the main centres but this needs to be actively supported by MBIE. Our members have active programmes to encourage rangatahi from the regions into STEMM careers, including our EDI project Ngā Ara Mahi (Career paths) in partnership with the Pūhoro Charitable Trust.

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Funding

7 ***17***	**3.2.1**	**Ngā kōwhiringa matua mō ngā taumahi matua** **Core functions** **How should we decide what constitutes a core function and how do we fund them?** ***See pages 44-46 of the Green Paper for additional information related to this question***

If nationally important or significant infrastructure or capability is going to be supported, this should take place regardless of the institution type that holds that function. The nationally important or significant infrastructure or capability should be easily accessible beyond its host institution. Many IROs maintain such research and infrastructures, often without government support.

WSP Research is the only group in Aotearoa undertaking international quality research and development into road materials. At their Lower Hutt Laboratory their Wind Tunnels tests have been used to evaluate everything including buildings, cars, airplanes, and spaceships.

BRANZ fire testing laboratory offers a full range of fire resistance and reaction to fire tests for the building, construction, and marine industries.

Cawthron's Aquaculture Park is the national centre of excellence for shellfish aquaculture research, development, and production. This world-class facility is home to seafood companies, education and training programmes, and Aotearoa's largest mussel and oyster hatchery operations. The Seafood Safety Research Programme is led by the Cawthron Institute in partnership with CRIs, MPI, and industry.

The Bragato Research Institute opened its research winery in February 2020 in Blenheim, enabling them to trial world-first technologies, conduct commercial trials, and undertake research winemaking at a scale and degree of experimental control not possible before in Aotearoa.

The Malaghan Institute of Medical Research contains Aotearoa's only licensed cell therapy manufacturing suite.

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8 ***18*** ***19***	**3.3.2**	**Ngā kōwhiringa hoahoa mō tētahi tauira tuku pūtea hou** **Establishing a base grant and base grant design** **Do you think a base grant funding model will improve stability and resilience for research organisations,** **AND how should we go about designing and implementing such a funding model?** ***See pages 46-49 of the Green Paper for additional information related to this question***

We do not have a view about whether a base grant funding model is desirable or not at this stage. We do support funding that is more stable, consistent and transparent, reduces process costs and provides stability for investment in people and assets. Again, our view is that core funding of priority capability and infrastructure should be agnostic of organisation type. Our concern would be if a base funding model excluded Independent Research Organisations or discriminated on the basis of organisational structure. That approach would result in the loss of critical research skills and institutional knowledge of infrastructure, particularly in the engineering sector. It is important that base funding does not discourage collaboration and the formation of best teams. Consideration must be given to how it is distributed between contractors and sub-contractors.

We do however note that it is our view that if nationally important or significant infrastructure or capability is going to be supported, this should take place regardless of the institution type that holds that function.

4 Institutions

9 ***20***	**4.4.1**	**Te āhua, whakaruruhau me te hanganga o tewhakahaere** **Institution design** **How do we design collaborative, adaptive and agile research institutions that will serve current and future needs?** ***See pages 57-58 of the Green Paper for additional information related to this question***

IROs have been set up and have evolved to meet specific community, industry and iwi needs which are not being met by universities and crown owned institutes.

A key element across the consultation and in turn the design of a successful future focused system is to provide clarity about current and future needs. If this process is carried out successfully then it will provide certainty for organisations' governance to plan and respond to.

The broader review does provide an opportunity for the government to consider inter-institutional competition and replication of capability.

We note that a key focus of this review should be to support Aotearoa's publicly funded science system to maximise its investment. The fostering of competition (notably in and amongst CRIs, universities and IROs) should be revisited. Aotearoa does not have the people or funding to support unnecessary duplication of skills and assets. Skills and assets should be recognised and supported irrespective of organisational structure or commercial drivers.

Government has an opportunity to provide clarity about the behaviours that it is looking for and can incentivise these through the design process. A useful starting point may be to develop an evidence base to identify any disincentives that have hindered collaboration and cooperation.

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10 ***21***	**4.4.2**	**Te whakawhanaketanga me te tautiaki pai ake o tehunga mahi me te raukaha** **Role of institutions in workforce development** **How can institutions be designed to better support capability, skills and workforce development?** *See page 58 of the Green Paper for additional information related to this question*

Training and human capital needs to be an explicit focus of all science and innovation investment programs. There needs to be consideration given to the attraction/retention of top researchers as part of the design of funding mechanisms. This also needs to be linked into wider education reform and immigration prioritisation and the need for cross-government planning is essential. Certainty of investment and stability of priorities over longer periods will also aid development of the research community.

Our members have active programmes to encourage rangatahi into STEMM careers, including our EDI project Ngā Ara Mahi (Career paths) in partnership with the Pūhoro Charitable Trust.

11 ***22***	**4.4.3**	**Te ruruku pakari ake me te arotautanga o ngā haupū rawa me ngā rawa nunui** **Better coordinated property and capital investment** **How should we make decisions on large property and capital investments under a more coordinated approach?** *See pages 58-59 of the Green Paper for additional information related to this question*

We note a general opportunity for improved procurement processes and better planning and coordination around investment and access to research infrastructure. It is important that national research infrastructures are made available to the wider research community and their use is not restricted to the host organisation.

12 ***23***	**4.5**	**Te tautoko i ngā wawata o te Māori** **Institution design and Te Tiriti** **How do we design Tiriti enabled institutions** *See page 59 of the Green Paper for additional information related to this question*

IRANZ is supportive of Tiriti enabled institutions and welcomes the opportunity to engage with this part of the consultation as it develops. We have three Māori organisations amongst our members and are actively seeking through our Ngā Ara Mahi me Ngā Mahi Ngātahi (Career Paths and Partnerships) programme to encourage rangatahi to follow STEMM careers in IROs which have adopted the best Equity Diversity and Inclusivity practices so that Ngā kaipūkaro Māori (Māori Researchers) feel culturally safe.

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5 Research workforce

13 ***24***	**4.6**	**Ngā pāpātanga pai ake – te whakawhiti mōhiohio mengā pāpātanga rangahau** **Knowledge exchange** **How do we better support knowledge exchange and impact generation? What should be the role of research institutions in transferring knowledge into operational environments and technologies?** ***See pages 60-63 of the Green Paper for additional information related to this question***

If the end goal is a science system that delivers on prioritised national outcomes, then thinking differently about the impact across the system from design through to implementation is required. Investment in the design and implementation stages should be seen as a core part of an end-to-end approach.

This may require research organisations developing new skill sets or establishing partnerships with groups skilled in implementation beyond core research. The accessibility and actionability of research should be given weighting in assessment processes as this will drive behaviour during the design and development of projects. We believe Independent Research Organisations have a critical role in implementing research outcomes for the betterment of the nation.

14 ***25***	**5.2**	**Ngā whakaarotau me te hunga mahi rangahau** **Workforce and research Priorities** **How should we include workforce considerations in the design of national research Priorities?** ***See pages 69-70 of the Green Paper for additional information related to this question***

Our workforce will be vital to the success of Aotearoa's R,S & I infrastructure. It is increasingly important that Aotearoa's Universities provide Early Career Researchers with skills and experience targeted at the full range of the needs of all Aotearoa's research organisations. The current PBRF does not meet this need. Career movement and progression needs to be considered more broadly including researchers seamlessly transferring between academia and industry. Government investment in R,S& I should recognise the need for secure and challenging career paths for researchers including in applied, industrial and commercial research.

Our members have active programmes to encourage rangatahi into STEMM careers, including our EDI project Ngā Ara Mahi (Career paths) in partnership with the Pūhoro Charitable Trust.

15 ***26***	**5.3.1**	**Ngā pūtea me te hunga mahi rangahau** **Base grant and workforce** **What impact would a base grant have on the research workforce?** ***See pages 70-71 of the Green Paper for additional information related to this question***

The suggested move from full cost funding to a mixture of base and marginal funding requires very careful consideration. It must not compromise collaborative research by the Best Teams and must be equally accessible across all R,S&I organisations. In the past IROs and their workforce have been disadvantaged where schemes such as Non-Specific Output Funding and Core Funding have had the effect of channelling IRO funding towards large crown owned organisations.

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16 ***27***	**5.3.2**	**Ngā tikanga tuku pūtea hou** **Better designed funding mechanisms** **How do we design new funding mechanisms that strongly focus on workforce outcomes?** ***See page 72 of the Green Paper for additional information related to this question***

Changes should have a focus on reducing the costs of engaging with the science system. There is well-established national and international research showing the significant cost of unsuccessful research processes such as unsupported proposals and unproductive engagement activities. Any changes to the system should have, as a core design principle, a reduction in the cost of doing business. This will enable a greater proportion of available time and money to be spent on developing and delivering research and outcomes

6 Research infrastructure

17 ***28***	**6.2.2**	**Ngā kōwhiringa hoahoa matua mō te tuku pūtea ki tehanganga rangahau** **Funding research infrastructure** **How do we support sustainable, efficient and enabling investment in research infrastructure?** ***See pages 77-78 of the Green Paper for additional information related to this question***

The primary goal for Te Ara Paerangi should be building a world class research, science and innovation infrastructure for Aotearoa. The basis for setting the objectives should be the provision of research, science and innovation infrastructure for Aotearoa including its environment, society, industries agriculture and economy. Greater sharing and managed access to infrastructure, including with industry should be facilitated. Government investment in such infrastructure should be ownership agnostic but could be in partnership with industry groups.

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Appendix

IRANZ and Independent Research Organisations

The Independent Research Association of New Zealand (IRANZ) represents the collective interests of these Independent Research Organisations in New Zealand.

IROs are a vital and unique part of the New Zealand Science ecosystem, IROs include the oldest (Cawthron) and newest (Te Tira Whakamātaki) research institutes in Aotearoa.

While IROs are all different, they are each structured in a way that enables Aotearoa to benefit from high-impact research across business, the economy, the environment, and the community. IROs consistently provide quality science outputs that provide high-impact results for their stakeholders and Aotearoa.

Independent Research Organisations

- Independent Research Organisations (IROs) are a vital part of Aotearoa's research, science and innovation (RSI) ecosystem and increase its diversity.
- IROs have a variety of community, philanthropic, and industry ownership models, they are not government owned. They provide important targeted research and expertise in specific economic, environmental, and social areas not adequately covered by CRIs and universities and provide translational expertise moving research from lab to field. IROs are frequently part of "the best teams" required for important research programmes.

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- Strategic Investment in RSI capability and infrastructure should be available where appropriate to all research organisations. IROs have strategic capabilities that are unique in Aotearoa, such as the fire testing facilities at BRANZ, the wind tunnel and road-testing capabilities at WSP Laboratories, Aotearoa's only licensed cell therapy manufacturing suite at the Malaghan Institute of Medical Research and Bragato's Research Institute's research winery opened in February 2020, a world facility unmatched elsewhere in the southern hemisphere.
- The government's RSI strategies, policies, and investment portfolios should take into consideration impact across the entire research, science and innovation ecosystem, including IROs. This will be particularly important with initiatives and changes arising from Te Pae Kahurangi (CRI Review), and a new Research, Science and Innovation Strategy.
- The Endeavour Fund has highlighted valuable research opportunities for Aotearoa that are being missed due to insufficient investment being available. A wide, rather than academic, assessment of "Research Excellence", alongside increased funding, will reduce the waste of high impact RSI opportunities.
- Health IROs are playing a vital role in Aotearoa's fight against COVID-19. Malaghan Institute as a lead player in the Vaccine Alliance Aotearoa New Zealand, MRINZ with clinical trials and public health initiatives and by providing a regular report on the latest therapeutics for MBIE.
- IROs with good industry connections play a key role in increasing business expenditure on research and development (BERD).

Independent Research Organisations are research organisations that have internal intellectual and material capability for carrying out research, science, technology, or related activities at all horizon levels with ownership and governance independent of Government. IROs are not CRIs or universities, they have a variety of ownership structures including public, community, industry, and researcher, and have been set up to address specific challenges in targeted areas of the economy, society, and/or environment.

Primary Processing, Food Safety, and the Environment - Taiao Ahuwhenua

1. Aqualinc Research Limited
2. Bragato Research Institute
3. Cawthron Institute
4. Land & Water Science Ltd
5. LASRA - The New Zealand Leather & Shoe Research Association
6. Lincoln Agritech Ltd
7. PlantTech Research Institute
8. Te Tira Whakamātaki

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Infrastructure and the Economy - Kete Aronui[1]

9. BRANZ - Building Research Association of New Zealand
10. Dragonfly Data science
11. HERA - Heavy Engineering Research Association
12. New Zealand Institute for Minerals to Materials Research
13. Mackie Research
14. ME Research
15. Motu Economic and Public Policy Research
16. Verum Group
17. WSP Research
18. Xerra Earth Observation

Health, Medicine and Society - Hauora, Rongoā me te Rōpū Iwi

19. New Zealand Brain Research Institute
20. Malaghan Institute of Medical Research
21. Mātai Medical Research Institute
22. MRINZ - Medical Research Institute of New Zealand
23. Takarangi Research Group

Economic impact

IRANZ members and our associates employ over 850 staff and have a combined turnover of $160 million p.a., which includes $30 million of research investment from Government and $30 million of stakeholder investment.

Place in the research sector

IROs are a key part of a thriving independent research sector that is a major pillar of the Aotearoa science system, and a key to Aotearoa achieving the goal of increasing business expenditure on research and development.

Many, but not all, IROs started with government support, normally backed by an industry group. This includes BRANZ and HERA, who both administer industry research levies, as well as the recently established Regional Research Institutes.

Other IROs have been established completely independently of Government support by researchers who have identified specific needs for high impact research, these include the environmental IROs Motu, Aqualinc, Land & Water Science, and our newest IRO Te Tira Whakamātaki - dedicated to

[1] Kete Aronui - basket of knowledge of aroha, peace and the arts and crafts which benefit the Earth and all living things - one of the three baskets of knowledge. This basket relates to knowledge acquired through careful observation of the environment. It is also the basket of ritual, of literature, philosophy and is sometimes regarded as the basket of the humanities.

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identifying where mātauranga Māori principles may be beneficially applied in tandem with a modern scientific approach for the protection of our native species and natural environment.

IROs often have excellent links to philanthropic funding, including Cawthron[2], the Malaghan[3] Institute of Medical Research, the Medical Research Institute of New Zealand, and Motu Economic and Public Policy Research.

IROs play an important role in collaborative research programmes with universities and CRIs, where we provide important industry and sector linkages to the programme. Some 25% of the research undertaken at IROs is as subcontracts to CRIs or university programmes, with around 10% of the research led by IROs being contracted to other organisations.

The role of IRANZ

IRANZ represents the collective interests of its members by undertaking activities to create a positive operating environment for the Independent Research Organisations in New Zealand. These activities include:

- Providing a forum for IROs to discuss matters of common interest;
- Providing an IRO point-of-contact for Ministers, MBIE, and other governmental science investment agencies;
- Raising the profile of IRANZ and its members with the Government (and their advisors) and the research community (partners);
- Developing IRANZ policy positions on key issues, and advocating to Government on issues that are important and where there is a clear collective requirement;
- Sponsoring the Royal Society Speaker's Science Forum and other activities to promote science in the community; and
- Disseminating news and success stories from IROs that demonstrate the wide impact of our members' work by means of our quarterly email newsletter *Connections* and our website.

[2] Cawthron Institute was established in 1919 by the last will and testament of Nelson philanthropist Thomas Cawthron who had a vision – that science could contribute to the growth of a young New Zealand. Following his death in 1915, Cawthron bequeathed the equivalent of $127 million* in today's New Zealand dollars - the largest single bequest in New Zealand at the time – to establish and maintain a technical school, institute and museum; the forerunners of today's Cawthron Institute

[3] Using funds from a trust established by the Wellington Medical Research Foundation and the Wellington Division of the Cancer Society, the Wellington Cancer and Medical Research Institute was opened on 26 July 1979, in rented premises in the Wellington School of Medicine. In 1986, the name of the Institute was changed to the Malaghan Institute of Medical Research in recognition of the generous support by Len and Ann Malaghan.

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Ngā Ara me, Ngā Mahi Ngātahi

Hāpaitia te ara tika kia pūmau ai te rangatiratanga mō ngā uri whakatupu, Mā ngā hononga e whakarei i te mana o ngā rōpū te hunga Māori me IRANZ

Foster the pathway of knowledge to strength, independence, and growth for future generations through partnerships that enhance the mana of Māori and IRANZ.

IRANZ is committed to lift Māori communities' (whānau, hapū, marae) and Māori organisations engagement in the IRANZ workforce by following kaupapa Māori principles, including manaakitanga and whānaungatanga, to develop inclusive STEMM-based professions.

IRANZ will engage with rangatahi to assist them map their core values in a te ao Māori context to potential STEMM careers, and to choose subject options which will support that choice. We want to assist rangatahi better understand IRANZ partners as future employers.

IRANZ memebers will adopt world-leading EDI policies, practices, and organisational cultures that partner with Māori, break down barriers, embrace Māori cultures and traditions and build strong reciprocal relationships with Māori communities and organisations.

Strategy for Research Science and Innovation

As is pointed out in the draft *Strategy for Research, Science and Innovation*, Aotearoa's research, science, and innovation system consists of a combination of people, institutions (including research organisations and businesses), and infrastructure. Independent Research Organisations are a vital and significant part of that system. IROs have been established to support areas in the system that are not adequately served by Universities and CRIs.

It is important that the Government's research investment portfolio recognises this, and the impact of science policies on IROs is assessed during their development. Although IROs are not Crown owned, many are community owned and are just as vital to the Aotearoa research infrastructure. New RSI strategies, initiatives, and policies should take into consideration impact across the entire research, science, and innovation ecosystem including IROs. This will be particularly important with initiatives and changes arising from Te Pae Kahurangi (CRI Review), and a new Research, Science and Innovation Strategy

Endeavour Fund

Contestable research is a fundamental part of the Aotearoa research, science and technology environment, but over the years this investment has been eroded by new initiatives (e.g. Strategic Science Investment Fund and National Science Challenges). The renaming of contestable funding to the Endeavour Fund, the focus on impact as well as research excellence, and the broader strategic direction are all welcomed initiatives for contestable funding. The focus on impact is increasingly important, and the fund also needs to take a broad, rather than an academic, view of Research Excellence.

As the Endeavour Fund is eroded by mapping monies to Strategic Research and Science Challenges, competition for this investment has increased. This year the available funding through the

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Endeavour Fund has been further eroded by the COVID-19 crisis. The impact on IROs, particularly those that do not receive Strategic Funding, has been severe.

In the UK, an AIRTO report *The impact of the innovation, research and technology sector in the UK economy*, by Oxford Economics, assessed the total impact of the UK innovation, research, and technology sector at between £32Bn and £36Bn, equal to 2.3-2.6% of total UK GVA (gross value added), achieved with just 0.3% of government spending. This takes into account both the innovation, research, and technology sector's induced and catalytic effects on the economy. AIRTO (the Association for Innovation, Research and Technology Organisations) membership is roughly equivalent to the IROs, CRIs, and university science commercialisation groups, in Aotearoa.

On the basis that a similar proportional impact would occur, Aotearoa can only gain from increasing its investment in the Endeavour Fund for high-impact and excellent research. Aotearoa must do this if it wants to achieve a high-performing economy, world-leading social well-being, protection for the environment, and an efficient 21st century infrastructure.

Strategic Science Infrastructures

The Strategic Science Investment Fund (SSIF) supports longer-term programmes of mission-led science and science infrastructure of enduring importance to Aotearoa. Many IROs maintain such research and infrastructures, often without government support.

- WSP Research is the only group in Aotearoa undertaking international quality research and development into road materials[4]. At their Lower Hutt Laboratory their Wind Tunnels tests have been used to evaluate everything including buildings, cars, airplanes, and spaceships.
- BRANZ fire testing laboratory offers a full range of fire resistance and reaction to fire tests for the building, construction, and marine industries.
- Cawthron's Aquaculture Park is the national centre of excellence for shellfish aquaculture research, development, and production. This world-class facility is home to seafood companies, education and training programmes, and Aotearoa's largest mussel and oyster hatchery operations. The Seafood Safety Research Programme is led by the Cawthron Institute in partnership with CRIs, MPI, and industry.
- The Bragato Research Institute opened its research winery in February 2020 in Blenheim, enabling them to trial world-first technologies, conduct commercial trials, and undertake

[4] The team at WSP Research are the only group in New Zealand undertaking international quality research and development into road materials, surfacings, and road pavement behaviour. They have a dedicated research facility based in Lower Hutt, including a chemistry laboratory, rheology and mechanical testing equipment, and specialised road surfacing and pavement testing instrumentation. The latter includes the CAST machine which is unique in the Southern Hemisphere and was constructed by the team to study road surfacing behaviour under realistic traffic speeds and stresses in the laboratory. WSP Research works closely with Waka Kotahi NZ Transport Agency in the development of world leading innovations such as epoxy OGPA road surfacing, but also in undertaking the fundamental materials and engineering research needed to underpin the development of specifications needed for day-to-day maintenance and construction of the road network.

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research winemaking at a scale and degree of experimental control not possible before in Aotearoa.

- The Malaghan Institute of Medical Research contains Aotearoa's only licensed cell therapy manufacturing suite. This unit is Medsafe approved to manufacture cutting edge cell and gene therapies to support clinical trials. The Institute is also home to a world-class cytometry and imaging facility and biomedical research unit with more than 100 biological disease models to support their immunology and immune therapy research activities.
- TiDA's initiatives in Selective Laser Melting (SLM) 3D printing have been key to directly 3D printing metal components in Aotearoa, vital to the future of local manufacturing. Their latest robotic Wire Arc Additive Manufacturing (WAAM) developments offer potential for Aotearoa to establish a leading role in the expanding global market for systems to 3D print large metal parts.
- HERA is undertaking world leading research on Industry 4.0 applications to fabrication in terms of real-time quality analysis during welding. It is also in the process of developing a Fabrication 4.0 research and training facility.
- Lincoln Agritech established a "New Uses for Crossbred Wool" pilot processing facility. This facility is the only one of its kind in Aotearoa and transforms course wool into new physical formats, including powders, high surface area particles, and fibres, using wet spinning capability. This facility enables scale-up from lab-scale experiments to quantities that can be sent to customers for product evaluation and is being used by the wool industry as a proof-of-concept plant before investing in manufacturing capability of their own.

These nationally unique resources only exist because the IROs that maintain them are strong and financially viable. It is important to check that new policy initiatives will not undermine this viability.

The Strategic Science Investment Fund (SSIF) programmes are structured around science platforms. A science platform is a combination of people, facilities, information, and knowledge that provide a particular, ongoing science and innovation capability for Aotearoa. While Cawthron, LASRA, the Malaghan Institute, and the Medical Research Institute receive SSIF investment, all IRANZ members are keen to be part of contributing to a larger-scale research infrastructure that supports enduring priorities and a high-performing science system. The SSIF platforms should be provider agnostic and focus on best teams' capabilities.

New Research Institutes

The new Research Institutes (RRIs): Xerra (Alexandra), the Bragato Research Institute (Blenheim), PlantTech (Tauranga), and the New Zealand Institute for Minerals to Materials Research (Greymouth), Mātai (Gisborne) Takarangi Research, and Te Tira Whakamātaki are all IROs and contribute to the IRANZ community.

A report by NZIER, *Impact of the Cawthron Institute: Economic contribution to Nelson and New Zealand*, showed that the Cawthron Institute has created a unique business model, adding value to the Tasman/Nelson region and national economies. It represents 25% of the Nelson business service sector's exports, contributes $14m in added value to the local economy, and indirectly creates an additional 91 jobs. It has national and global reach, and its future successes could further boost Aotearoa's GDP by $200 million and create over 500 jobs.

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A similar NZIER study commissioned by the Bragato Research Institute has shown that R&D has contributed to 20%-25% growth, worth over $60 million a year, in the wine industry.

National Science Challenges

The eleven National Science Challenges provide an opportunity to align and focus Aotearoa's research on large and complex issues by drawing scientists together from different institutions and across disciplines to achieve a common goal through collaboration.

The Building Better Homes, Towns and Cities National Science Challenge is being led by an IRANZ member, BRANZ, with Motu and WSP Research playing key roles. IRANZ members are also involved in several other National Science Challenges, including Cawthron Institute researchers playing an active part in Sustainable Seas, Land & Water, Biological Heritage, Science for Technological Innovation, and High Value Nutrition challenges, Lincoln Agritech is involved in the Deep South National Science Challenge, and Land & Water Science is part of the Our Land and Water challenge

Climate Change and Big Data are subjects that could warrant new National Science Challenges. There are IROs well placed to take an active role in these areas.

Health Research

IROs in the health sector - Malaghan Institute of Medical Research, the Medical Research Institute of New Zealand, Mātai Medical Research Institute and the NZ Brain Research Institute, supported by other IROs including BRANZ and Cawthron are dedicated to investigating the causes of important public health problems in Aotearoa and internationally. The problems include infectious diseases, cancer, asthma, and mental health and brain disorders . They have led the way in Aotearoa research for COVID-19 vaccines and treatments. They use their knowledge to support the prevention and treatment of a number of diseases and provide a base for specialist training in medical research. This research is normally supported by the Health Research Council. Research into new drugs or medical appliances that could be developed by Aotearoa firms and provide economic and other health benefits could be supported by the Endeavour Fund.

Business and Enterprise Research and Development

The National Science Investment Strategy seeks to grow business and enterprise expenditure on research and development (BERD) to well above 1% of GDP. It sees this as driving a "thriving independent research sector that is a major pillar of the Aotearoa science system". IRANZ members are excited to be part at this new growth area for Aotearoa's research.

A number of IROs are built around Industry Levies: collective investment by business and enterprise in R&D and other collaborative activities. IRANZ sees IROs as being ideally placed to help increase BERD, whether they are structured as businesses or trusts, and whether or not they are supported by industry levies. It is important that policies are structure and funding neutral.

Further information

For further information about IRANZ or the IROs please feel free to contact the IRANZ Executive Officer, Dr Rob Whitney, on 027 292 1050 or information@iranz.org.nz.

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