From:	no-reply@mbie.govt.nz
To:	Research, Science and Innovation Strategy Secretariat
Subject:	Draft Research, Science and Innovation Strategy submission
Date:	Sunday, 10 November 2019 11:48:34 a.m.
Attachments:	Online-submission-form-uploadsdraft-research-science-and-innovation-strategy-submissionsCawthron-submission-form-research-science-and-innovation-strategy.pdf

Submission on Draft Research, Science and Innovation Strategy recevied:

Are you making your submission as an individual, or on behalf of an organisation?
Organisation

Name
Robert Matheson

Name of organisation or institutional affiliation
Cawthron Institute

Role within organisation
Investment & Contract Manager

Email address (in case we would like to follow up with you further about your submission)
robert.matheson@cawthron.org.nz

Which of the below areas do you feel represents your perspective as a submitter? (Please select all that apply)

If you selected other, please specify here:

Gender

Ethnicity

Name of organisation on whose behalf you are submitting, if different to the organisation named above

In which sector does your organisation operate: (Please select all that apply)
Research , Industry, Non-profit, Professional services, Interface of research and industry

If you selected other, please specify here:

How large is your organisation (in number of full-time-equivalent employees)?
280

Please indicate if you would like some or all of the information you provide in your submission kept in confidence, and if so which information.

Please upload your submission document here
Cawthron-submission-form-research-science-and-innovation-strategy.pdf - Download File

MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT
HĪKINA WHAKATUTUKI

Research, Science and Innovation Strategy

Submission form

The Government is developing a Research, Science and Innovation (RSI) Strategy to set out our vision for RSI in New Zealand and its role in delivering a productive, sustainable, and inclusive future.

We are keen to hear the views of New Zealanders on the draft Strategy so that we can get a better understanding of what our country needs from RSI. We also are looking for feedback on how we can take action to ensure New Zealand's RSI system is optimised for success. These views will inform the direction of Government investment in RSI and the research and innovation areas for us to focus on as a country, as well as help us understand the challenges we need to overcome.

We encourage anyone with an interest to make a written submission.

How to have a say

We have included a number of questions in the draft RSI Strategy document to highlight issues on which we would like further input. We encourage you to use these questions as a guide when submitting your feedback.

This document provides a template for you to provide your answers. Please upload the completed document using our online submission page.

You do not have to fill out every section – we welcome submissions on some or all of the questions.

The closing date for submissions is 10 November 2019.

After the consultation period finishes, we will analyse the submissions received and incorporate the feedback in the final version of the strategy.

Confidentiality

Please note: All information you provide to MBIE in your submission could be subject to release under the Official Information Act. This includes personal details such as your name or email address, as well as your responses to the questions. MBIE generally releases the information it holds from consultation when requested, and will sometimes publish it by making it available on the MBIE website.

If you do not want some or all the information you provide as part of this consultation to be made public, please let us know when you upload your submission. This does not guarantee that we will not release this information as we may be required to by law. It does mean that we will contact you if we are considering releasing information that you have asked that we keep in confidence, and we will take your reasons for seeking confidentiality into account when making a decision on whether to release it.

If you do not specify that you would prefer that information you provide is kept in confidence, your submission will be made public. While we will do our best to let you know that we plan to publish your submission before we do so, we cannot guarantee that we will be able to do this.

Contribution of Research, Science and Innovation

This strategy is about New Zealand's Research, Science and Innovation (RSI) at a high-level. Its aim is to identify challenges and opportunities that will have the broadest impact on our research and innovation activities. For this reason, it mentions few specific areas or sectors of research and innovation. For this draft version of the Strategy, we are keen to hear from researchers, innovators, businesses, and providers of public services on what the RSI system could be doing to accelerate progress on Government's priorities.

Question 1: Where can the RSI system make the greatest contribution towards the transition to a clean, green, carbon-neutral New Zealand?

Question 2: Where else do you see it making a major contribution?

Question 3: What else could else the RSI system be doing to accelerate the progress towards the Government's priorities*?

* see list of the Government's twelve priorities included in Part 1 of the draft Strategy.

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Researching and innovating towards the frontier

Question 4:	Do you agree that the RSI Strategy should be focused on innovation at the "frontier" (creating new knowledge) rather than behind the frontier (using existing knowledge to improve the ways we do things)?
Question 5:	In which research and innovation areas does New Zealand have an ability to solve problems that nobody else in the world has solved? Why?
Question 6:	In which areas does New Zealand have a unique opportunity to become a world leader? Why?
Question 7:	What do you consider to be the unique opportunities or advantages available to the RSI system in New Zealand?
Question 8:	What RSI challenges are unique to New Zealand, that New Zealand is the only country likely to address?
Question 9:	What are the challenges of innovating in the public sector? How do they differ from those in the private sector?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Q4:

The terms 'at', 'toward', and 'behind' the frontier research and innovation are introduced in both this strategy and the Growing Innovative Industries strategy. It takes some reading of the document to fully get to grips with the concept and then where the strategy sees the emphasis for research and innovation. It would be less confusing if this could be presented early in the document as a diagram and then the emphasised areas (e.g. at/toward the frontier for research, toward/behind the frontier for innovation) highlighted. It would be even more useful if this could be aligned with the current horizon model (which most researchers should be familiar with).

There is often a perception that research proposals must be at the frontier to be excellent (and funded). This can be a disincentive for research that will deliver significant 'low hanging fruit' benefit for NZ (e.g. application of behind the frontier engineering or breeding technologies to new industries, species etc) and that also requires excellent science and scientists. Conversely, we have seen concentration and duplication of research effort in at-frontier areas like AI or omics where some of the greatest opportunities for NZ are in the application and implementation of these technologies. In many fields, NZ has been a leader in figuring out how to apply existing technologies *in new ways* and we should not discourage this behaviour. Balance is important and ensuring the messaging in the strategy creates the appropriate incentives and behaviour.

The wording of some points in this section needs increased clarity. For example (p. 18) "solving problems that nobody else in the world has solved…" is rather self-evident. If a solution exists, the problem has gone. Is this point really trying to say that NZ should focus on problems that others are unlikely / unmotivated to solve? Agricultural emissions might

be an example because NZ's exposure to this challenge is so significant. This is already more clearly expressed in the 4th bullet on the same page.

Q6:

New Zealand is already a significant player on the world stage in a number of areas relating to the primary sector. A significant example is seafood safety, where our research, systems and methodologies are increasingly recognised and adopted globally. If we wish to continue to eat and export seafood this is a crucial capability to maintain. By being at the frontier in this space New Zealand can have a "rule maker" role on the world stage rather than a "rule taker" position. Such world leading research standing generally takes a long time to develop, with continuous support being a vital ingredient. There is now an SSIF platform supported in this area for example, but for many years this key capability for New Zealand was competing in the contestable funding arena, which seems a high-risk approach for capability that is so clearly crucial for this sector.

Note that it is important to recognise that world leading researchers should have a track record of global connectivity, be in demand, be co-authoring with other world leaders and achieving impact. New Zealand's leadership in seafood safety is an example of this.

Globally Aquaculture including Open Ocean Aquaculture are the fasted growing Primary Sectors, linked to productivity and sustainability. NZ Inc with its huge marine estate is poised to become a world leader in near-shore and off-shore aquaculture, subject to the right investments rewarding those with a track record of delivery.

Potential for world leadership was clearly demonstrated at Nelson's Open Ocean Aquaculture Conference in August 2019 with 300 attending. There is a double whammy here when seaweed aquaculture can mitigate greenhouse gas emissions and climate change.

The factors identified as guiding the selection of areas of RSI focus (e.g. problems that no-one else is likely to invest in, areas where New Zealand has a unique position) equally apply to identifying areas to target for the development of world leading standing.

Our key challenge – Connectivity

Question 10: Do you agree that a key challenge for the RSI system is enabling stronger connections? Why or why not?

Please type your submission below.

We agree that improving connectivity within the NZ research community is important but warn against incentivising "connections for the sake of connections". Where connections will yield the best team for research, this should be encouraged and there are currently disincentives in the system that should be addressed. These focus largely around competition for research funding and commercialisation (i.e. IP ownership and management). It should be noted that there is considerable variation in ease of collaboration with different universities and CRIs in NZ: some are easy to work with and some are challenging.

Measuring connectivity is challenging and while metrics such as co-authorship are relatively straightforward to measure, they provide a shallow picture. Many of our international collaboration networks involve frequent small 'knowledge transactions' rather than peer-reviewed publications. Many ideas come from overseas connections but aren't recognised formally. One option would be to take a more social science approach and collect user case stories or qualitative evidence to demonstrate international connectivity. This would recognise that in practice "connectivity" is about individuals interacting positively and working together, i.e. a social construct, as opposed to being entirely dependent on formalised, organisational agreements.

Recognition of meaningful connectivity should be part of proposal assessments.

Guiding Policy – Excellence

Question 11:	Do you agree with the definition of excellence presented here as the best thing possible in its context? Why or why not?
Question 12:	How can we achieve diversity within our research workforce? What are the current barriers preventing a diverse range of talent from thriving in the RSI system?
Question 13:	Do you agree that excellence must be seen in a global context, and draw from the best technology, people, and ideas internationally? Why or why not?
Question 14:	Do you agree that excellence is strengthened by stronger connections?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Agree in principle but beware of the concerns regarding misinterpretation of what 'extending the frontier' means.

Guiding Policy – Impact

Question 15: How can we improve the way we measure the impact of research?

Please type your submission below.

By citing and recognising exemplars with real world examples and rewarding those who think beyond research publications and shoring up their PBRF scores to attract TEC funding.

Simple metrics (e.g. patents) will only present part of the picture. Metrics such as increase in jobs, production or export revenue attributable to particular research and innovation probably provide a more meaningful measure but are more challenging to collect. Use of NZIER or similar analysis as part of track record should be recognised. User stories capture the richness of impact but are less objective and even harder to measure (e.g. 'breeding herpes resilient oysters saved our business'). Tangible examples include SPATnz and LAWA or enabling NZ to be a "rule-maker" in international regulations. e.g. seafood safety.

Often, we consider that the best way to maximise benefit to NZ industry is to retain trade secret IP and therefore no patent results from the research even though the technology is creating significant impact for NZ.

Incentivising / attracting RSI activities from those with a proven track record of delivering impact (through connectiveness) could be a useful boost to the assessment process.

It is not clear in the strategy where/how the sharpened focus on impact (ref. page 11) will be achieved.

Is the best possible use being made of, for example, the annual reports produced for all Endeavour funded work? Each of these reports include information on outcome benefits, i.e. impacts. It is likely that additional learnings can be extracted from these reports with no additional load on contract holders.

Guiding Policy – Connections

Question 16:	Where do you think weak connections currently exist, and what are the barriers to connections at present?
Question 17:	What actions will stimulate more connectivity between parts of the RSI system?
Question 18:	How could we improve connections between people within the RSI system and people outside it, including users of innovation, and international experts, business communities, and markets?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

We believe that SSIF platforms are a good mechanism for encouraging connectivity and providing mission focus, while also giving the flexibility for work across the range of horizons from at-the-frontier research through to behind-the-frontier innovation. When it is working well, impact drives SSIF platforms and prioritises benefit to NZ above the interests of individual research organisations. This incentivises appropriate connections.

Increasing SSIF and capability development in "young" areas with real headroom e.g. aquaculture, will enable world leadership and greater diversification in our primary sector.

Actions – Making New Zealand a Magnet for Talent

Question 19:	How can we better nurture and grow emerging researchers within New Zealand and offer stable career pathways to retain young talent in New Zealand?
Question 20:	How could we attract people with unique skills and experience from overseas to New Zealand?
Question 21:	What changes could be made to support career stability for researchers in New Zealand? What would be the advantages and disadvantages of these approaches?
Question 22:	Do you agree with the initiatives proposed in the Strategy to support and attract talented researchers and innovators? Are any changes needed for these initiatives to be successful? Are there any other initiatives needed to achieve these objectives?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Recruiting appropriate talent is a challenge currently, and our recruitment short-lists for important research roles are often exclusively overseas applicants.

Q19:

Smart Idea funds targeting emerging researchers with fresh ideas. Possibly through e.g. reserving a proportion of Smart Ideas funding for emerging researchers.

We note that in the same way there are multiple facets to assessing excellence there are multiple facets to identifying "our most promising researchers", and that not all of these are necessarily easily measured in an academic environment/context. Excellent researchers can arrive at that label via various routes in addition to the easily identified academic route.

Q.20

By better articulating the exciting and collegial work environment in NZ e.g. for Cawthron:-

- *"We have nearly 300 scientists and technical experts at Cawthron. 50% men and 50% women. > ½ have been with us < 10 years. > ½ are in the 20-to 35 year age bracket*
- *We have an emerging cohort of young men and women scientists who are vivacious researchers committed to a better future, value creation, environmental restoration, advances to protect environmental/human health*
- *Their research focuses on freshwater and marine ecosystems , aquaculture, including open ocean aquaculture, food safety, nutraceuticals, algae and biotechnology".*

Q21:

The alignment of research funding opportunities with stakeholder identified impact opportunities could be 1 aspect of lifting career stability. If e.g. companies are engaged

early in research careers, they will see the potential development and benefit and thus be prepared to support that career, either through co-funding or through direct employment. This could be an aspect of the "Connections" thrust proposed for the strategy.

Q.22:
Training and funding opportunities available through e.g. PSAF supported KiwiNet are an example of how emerging talent and ideas is already supported. It makes sense to leverage / enhance these existing examples in addition to / alongside any new initiatives.

Actions – Connecting Research and Innovation

Question 23:	What elements will initiatives to strengthen connections between participants in the RSI system need to be successful?
Question 24:	What elements will initiatives to strengthen connections between participants in the RSI system and users of innovation need to be successful?
Question 25:	What elements will initiatives to strengthen connections between participants in the RSI system and international experts, business communities, and markets need to be successful?
Question 26:	Are there any themes, in addition to those proposed in the Strategy (research commercialisation and international connections), that we need to take into consideration?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

It is crucial to ensure that any initiatives do not result in the addition of connections simply to increase the number of connections. Wording in assessment criteria, for example, that could be interpreted as meaning that simply adding (any) connections will increase chances of funding would be entirely wrong. Increasing the emphasis on the existing signals / assessment criteria about "best teams" will be useful in this respect.

Meaningful established connections with track record evidence e.g. joint publications and real-world impact

Q24:

We suggest ensuring that KiwiNet and Return on Science (in addition to research organisations and the investment community) be actively engaged in the development of these initiatives.

Actions – Start-up

Question 27:	How can we better support the growth of start-ups?
Question 28:	Do the initiatives proposed in the draft Strategy to support growth of start-ups need to be changed? Are there any other initiatives needed to support start-ups?
Question 29:	What additional barriers, including regulatory barriers, exist that prevent start-ups and other businesses from conducting research and innovation?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

It is important to ensure that start-ups are understood to be just one option for impact realisation.

Supporting the growth of existing and emerging SME and larger companies is also important, particularly when they can align $ and global market access pathways.

Q28:

Ensure that any new initiatives are well co-ordinated with existing programmes such as the Commercialisation Partner Network.

Actions – Innovating for the public good

Question 30:	How can we better support innovation for the public good?
Question 31:	What public-good opportunities should our initiatives in this area be focused on?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Q.30:

Looking for win-wins e.g. when growth in aquaculture including jobs can be aligned with climate change mitigation (seaweed aquaculture). Linking growth in a primary sector more explicitly with reversing trends in environmental decline.

Actions – Scale up

Question 32: What is the best way to build scale in focused areas?

Question 33: Do the initiatives proposed in the Strategy to build scale in focused areas need to be changed? Are there any other initiatives needed to build scale?

Note: see following page to comment on possible areas of focus

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Q.32:

Build on existing capability and expertise, particularly when it is young and emerging e.g. SSIF.

Q.33:

Don't change the diversity of funding mechanisms across research horizons but increase support for emerging researchers working in "young" areas where NZ can show world leadership.

Scale up – Choosing our areas of focus

For this draft iteration of the strategy, **we seek input on the selection of possible areas of focus**. We will consider establishing around five focus areas, but, depending on the eventual selection, are likely to introduce them over time, rather than immediately. In addition to the criteria set out in the Strategy document, we invite stakeholders to consider the following factors in their suggestions –

- The ambition of this strategy to focus efforts in the RSI portfolio at the global frontier of knowledge and innovation.
- Ways in which the RSI system can accelerate progress on the government's goals.
- The focus areas already determined by *From the Knowledge Wave to the Digital Age*.
- Work already underway where we are already seeking to build depth and scale in the RSI system.

The following areas could be a useful start, and are highlighted in *From the Knowledge Wave to the Digital Age:*

- **Aerospace**, including both autonomous vehicles and our growing space industry.
- **Renewable energy**, building on recent investments in the Advanced Energy Technology Platform.
- **Health technologies** to improve delivery of health services and explore opportunities in digital data-driven social and health research.

We invite comment on these suggestions and welcome input on other possible focus areas.

Please type your submission below.

Areas of focus should be based on where research and innovation can have the greatest impact (economic, environment, social) for NZ. Government has identified priorities in these areas, but the research community should also inform where research and innovation impact will be significant.

Are these focus areas outside of existing research funding (e.g. continue the current investment in primary sector research)? Would they be implemented in a similar way to the current specific investment signals (e.g. for GHG emission reduction)?

Actions – Towards an Extended Vision Mātauranga

This section of the draft Strategy signals our intention to consult and collaborate further with Māori stakeholders to co-design our responses and initiatives. From that perspective, we consider the signals in the draft Strategy to be a start, rather than a set of final decisions. Nonetheless, we are keen on initial feedback in the following areas.

Question 34: Does our suggested approach to extending Vision Mātauranga focus in the right five areas? If not, where should it focus?

Question 35: How can we ensure the RSI system is open to the best Māori thinkers and researchers?

Question 36: How can we ensure that Māori knowledge, culture, and worldviews are integrated throughout our RSI system?

Question 37: How can we strengthen connections between the RSI system and Māori businesses and enterprises?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

There is an opportunity for Māori worldviews to become more of a driving force behind research and provide true transdisciplinary thinking. This is in contrast to the idea that Mātauranga is simply about knowledge transfer but can actually be about new ways of thinking that will enrich and build on traditional western science and thinking. VM is providing an opportunity for those that realise the potential and embrace it but is still treated as a tick box by many.

Actions – Building Firm Foundations

Question 38:	Do the current structures, funding, and policies encourage public research organisations to form a coordinated, dynamic network of research across the horizons of research and innovation? What changes might be made?
Question 39:	Is the CRI operating model appropriately designed to support dynamic, connected institutions and leading-edge research? What changes might be made?
Question 40:	What additional research and innovation infrastructure is necessary to achieve the goals of this Strategy? What opportunities are there to share infrastructure across institutions or with international partners?
Question 41:	What elements will initiatives in this area need to be successful?

Please type your submission below. If applicable, please indicate the question(s) to which you are responding.

Actions – General

Question 42: How should the Government prioritise the areas of action, and the initiatives proposed under each area?

Please type your submission below.

General

Question 43: Do you have any other comments on the Strategy which have not yet been addressed?

Please type your submission below.