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 4:09:06 p.m.
Attachments:	Online-submission-form-uploadsdraft-research-science-and-innovation-strategy-submissionssubmission-form-research-science-and-innovation-strategy_BodekerScientific.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
Greg Bodeker

Name of organisation or institutional affiliation
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Role within organisation
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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

If you selected other, please specify here:

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

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.

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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 prioritiesincluded in Part 1 of the draft Strategy.

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

Question 1: The technologies required to transition New Zealand to a clean and green, carbon-neutral state, in large part already exist. While there might be some focus on supporting research to reduce agriculture methane emissions, market forces beyond New Zealand's control (specifically the international demand for milk solids) will constantly provide opposing pressure. A better use of the RSI system is to support research that opens new markets whose activities and products are carbon neutral. For example, an existential threat to the New Zealand tourism sector is 'flight guilt'. Bio-energy with carbon capture and storage (BECCS) extracts bioenergy from biomass (such a trees) and captures the carbon by-product removing it from the atmosphere, i.e. it is a *carbon-negative* industry. Furthermore, as of 2019, most implementations of BECCS internationally store only some of the carbon, leaving the rest with the bioenergy in the form of a biofuel including aviation biofuel. Using the RSI system to build a viable BECCS industry in New Zealand would (i) re-invigorate the forestry sector, providing an economic alternative to intensive dairying, (ii) create a negative LULUCF entry in New Zealand's UNFCCC greenhouse gas emissions inventory, and (iii) would provide a financially viable source of aviation biofuel (so-called biojet fuel) for Air New Zealand. Another example, given New Zealand's abundant supply of hydropower, would be to support research that underpins a hydrogen economy. The RSI system needs to identify such opportunities and then provide targeted funding to develop industries that are financially viable in a global marketplace. As such, the RSI system needs, at times, to be much more targeted, identifying specific narrow avenues for required research that are a good 'fit' to New Zealand, specifying research needs (a research roadmap in that niche) and then calling for proposals to create a portfolio of research that targets that niche.

More broadly, New Zealand is different to many other countries in that we have no national research strategies. Years ago, when I was at a meeting of the Scientific Steering Committee of the World Climate Research Programme in Geneva, I was asked by the chair of the meeting whether I could get hold of the National Climate Research Strategy for New Zealand. He was very surprised when I told him there wasn't one. 'How do scientists then

know what research the government needs to have done?' he asked. I still don't know the answer. I believe that the government needs to create detailed roadmaps of required research, where those roadmaps are generated by officials with no vested interests in the contents of that roadmap (e.g. don't have research directors at CRIs decide what is going in those roadmaps), so that the research community can target specific government needs.

And of course, in a broader sense, the RSI system also needs to stimulate research that will lead to new sustainable industries that can provide employment to those who will likely become unemployed as carbon-intensive industries become unviable.

Question 2: In general, I see the RSI system making its biggest contribution by (i) supporting the creation of new IP that can form the basis for business models for sustainable industries that can provide alternative employment for those exiting carbon-intensive industries and thereby make the transition more politically palatable, (ii) sharpening the projections of coming changes in climate and their impacts so that the New Zealand population can lift is level of resilience to those impacts, and (iii) better supporting the start-up/innovation sector to make New Zealand a more attractive target for offshore investment in entirely new industries.

Question 3: In terms of supporting thriving and sustainable regions, the RSI system needs to do more to encourage research being undertaken in the regions, not research being done in the major centres to 'support' the regions. This includes interesting challenges such helping to find employment for spouses for researchers looking to establish themselves at regional research centre. It is good to see, for example, NIWA establishing a new presence in Twizel. On the other hand, the MBIE Regional Research Institute (RRI) initiative has, at least in my experience, been a flop – the $14.7 million secured to establish the Centre for Space Science Technology (now Xerra) resulted in 2 people being employed at its head office in Alexandra. MBIE, in managing the RSI system, needs to be more proactive in encouraging and supporting RSI activities in the regions.

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.

Question 4: Yes, I agree that the RSI Strategy should be focused on innovation at the 'frontier' rather than behind the frontier. New Zealand will not be able to establish itself as a leader in global innovation by being nothing but a fast follower in the innovation race. The spoils of innovation go the victor, not to the person just behind the victor. This is captured nicely in the strategy document where it is stated that 'Concentrating on excellence will mean that New Zealand's RSI system is not duplicating what is being done elsewhere – that is, not 'reinventing the wheel'. Instead it is directed toward extending the frontier of what is possible'. Of course, this must not apply universally. Because of New Zealand's size, in most cases it will be a fast follower, but following fast needs little RSI investment. Investment should focus on 'frontier' innovation that leads to knowledge intensive and carbon-neutral industries, weightless exports, and a more equitable society.

Question 5: Quite frankly, I don't know. But perhaps there is an alternative way to look at this: first let's define a new measure 5 million people = 1NZ. The current global population comprises 1548 NZs. If we were an average country, we would be ranked 772. The fact that we produce around 1/500th of the world's research suggests that we do somewhat better than that 772 position. Just by chance, every one of those NZs is likely to generate globally unique innovations. The focus needs to be how to stack the odds in our favour so that those serendipitous innovations are more likely to happen in our NZ - better education, retention of students exiting university, strong support for a start-up sector, attractive targets for offshore investment etc.. The truly valuable innovations that lead to entirely new industries seldom result from targeted research investment because if you know to invest in that area, then the idea for what you are looking for must already exist and then, by definition, cannot be truly innovative. The focus must be on ploughing and fertilising the whole field, not deciding which seeds to plant and where. Let the innovators plant the seeds. Of course, there are already areas where New Zealand is world leading, but the opportunities for true

innovation in those areas is limited.

Question 6: As one of 1548 NZs in the world, we can expect few unique opportunities where New Zealand can become a world leader. Some that immediately spring to mind are: (i) agriculture methane emissions reductions technologies, (ii) earthquake hazards, and (iii) civil use of space.

Question 7: New Zealand is a wonderful place to live, and, without too much additional effort, can be made into a wonderful place for the most innovative and entrepreneurial people in the world to set up camp. Initiatives such and the Entrepreneurial Universities programme are capitalizing on these unique opportunities.

Question 8: Key RSI challenges that I am aware of include: (i) reducing agricultural methane emissions, (ii) preventing invasive species from entering New Zealand, (iii) protecting New Zealand's unique flora and fauna, (iv) maintaining New Zealand as a attractive long-haul tourist destination in the face of rising 'flight guilt', (v) achieving scale in commercializing any innovation given the small population of the country (ergo, all innovation must consider a global market), and (vi) selling the value proposition of New Zealand innovation to attract offshore investment.

The expected growth in 'business R&D funding' shown in green in Figure 1, i.e. a doubling over 8 years, is unrealistic.

Question 9: The public sector has little incentive to innovate since there is no profit motive and those who would need to drive the innovation have little (perhaps nothing) to gain by doing so. Coming up with something new and innovative is a sure-fire way to kill your weekends and prevent you from going home at 5 pm. In the private sector, if you innovate successfully, you retire at 50, buy a yacht, cruise around the Hauraki Gulf, and don't spend your Sundays making submissions on MBIE strategy documents.

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.

Question 10: I strongly agree with this. MBIE has, if anything, reduced incentives to improve connections – witness the demise of the Linking Science into International Policy (LSIP) Programme. There is simply no funding route to support scientists in international roles that would massively improve the connectivity of New Zealand research groups to offshore leaders in their field. The neglect of research, science and innovation connectivity is something that needs to be urgently reversed. My perception is that over the past decade or two, New Zealand research has become more insular, more domestically focussed, and less often benefitting from an influx of offshore skills and expertise that results from global connectivity. I couldn't agree more that a key challenge for the RSI system, is enabling stronger connections and, in particular, offshore connections.

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.

Question 11: I think that it is a rather weak definition that doesn't really help or provide guidance. Take, for example, the field of climate modelling. The best possible thing is a global, cloud-resolving model, run with 250 vertical levels, saving output data every 15 minutes of a thousand-year simulation. There is only one facility that could come close to achieving that and that is the Earth Simulator in Yokohama, Japan. Does that mean that no climate modeller in New Zealand can ever achieve 'excellence' in climate modelling? I sure hope not. I have always thought of excellence as that which reveals new territory in the knowledge landscape, pushing back ignorance of the unknown, revealing what has never been known before, resulting in a paper published in *Science* or *Nature*, or developing a previous unavailable product or service that has the potential to open a new industry.

Question 12: One barrier to a lack of diverse talent from thriving in the RSI system is the high cost of tertiary education. I have no specific suggestions on how to mitigate that other than to increase funding to universities so that they can reduce fees. The 'no fees for the first year' scheme is a good start.

In addition to seeking diversity in the RSI workforce, diversity in the institutions conducting research should also be encouraged. Incentivising a system where the majority of publicly funded research is conducted by CRIs and universities creates a system that is the perfect antithesis of agile. This is why many European countries strongly motivate and support the establishment and operation of small and medium-sized enterprises (SMEs) in their RSI systems. SMEs have lower overhead costs than larger organisations, are more agile to new opportunities, and are more incentivised to be innovative. I was (initially) encouraged to see the Regional Research Institute (RRI) initiative to establish more Cawthron-type institutes in New Zealand, but then later very disappointed to see the failure of the execution of the RRI model.

It was disappointing to see nothing in the strategy document about developing a richer mix of organisations conducting publicly funded research in New Zealand.

Question 13: Yes, excellence must most certainly be seen in a global context. One of my biggest criticisms of the RSI system is that it has been structured to encourage New Zealander scientist and innovators to compete over a fixed resource on two small islands in the bottom right-hard corner of the world map, rather than to make New Zealand a

competitive nation in the global market place.

Question 14: Yes, I strongly agree that excellence is strengthened by stronger connections and I have 30 years of evidence to prove that case. The effectiveness of the New Zealand RSI system has been massively eroded by a lack of support for (i) domestic collaboration (in fact the competitive model for research funding has strongly discouraged domestic collaboration), and (ii) international connectivity through a complete lack of support for scientists in international leadership roles. The *time* of scientists engaged in international leadership roles needs to be funded.

Guiding Policy – Impact

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

Please type your submission below.

Question 15: Measuring (rather than foreseeing) the impact of research cannot be left to the researchers or organisations conducting the research as it is often the case that in the years after the research has been completed (which is when impact maximizes) they have moved on to other things, have left the country (noting that this is a highly mobile workforce), and have no incentive to explore or quantify the impact of their research. Because we have no parallel universe in which the research was not undertaken such that we can quantitatively measure its impact, it can always only be done in a subjective way. It would be worth investing resources to establish a 'post research audit' body that would be tasked with assessing the impacts of case studies of selected research projects 2, 5, 10 and 20 years after the research has been completed. They would need to follow, detective-like, multiple lines of evidence to reveal the true impact of the research. But I believe that that process itself would add tremendous insights into what research investment strategies work (in terms of impact) and which don't.

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.

Question 16: Weak connections, both domestically and internationally, are pervasive in the New Zealand science system. Barriers at present are the highly competitive funding model - I have often received the message that some organisation doesn't want to collaborate with us because we are their competitor who they are working to crush. There is seldom, if ever, a focus on what is best for New Zealand.

Question 17: The following actions would stimulate better connectivity between parts of the RSI system:

i) **All** results and outputs (including all data, whether measurements or model output) from all publicly funded research **must** be made openly and freely available through a central database (managed by a government agency e.g. MBIE) to all researchers in New Zealand. It is simply ridiculous (as well as detrimental for New Zealand Inc.) for agencies to be using taxpayer funds to conduct research and to then withhold the results and outputs of that research (in particular data sets) for further financial gain. DOI-labelling of the entries in that database, and long-term curation of that database, will add significantly to the value of the research undertaken at little additional cost.

ii) A central database of all research contracts funded to date, as well as a database of scientists and their skills (this could be pointed to instead of constantly having to submit CVs when applying for funding), that could be searched to discover what has already been done, and to find potential collaborators for new research i.e. the New Zealand Research Information System (NZRIS), can't come soon enough.

Question 18: A good start would be to support New Zealand-based researchers who have international leadership roles e.g. positions on international research councils, committees, steering groups etc.. This is a highly cost-effective means of ensuring international connectivity. And this needs to go beyond 'well we can cover your travel costs' (and even that support has now been dropped) to cover the *time* that people must invest in maintaining that international connectivity.

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.

Question 19: A good start would be to establish a programme for funding post-docs in New Zealand. Those that exist are ad hoc and pathetically small. The last time I had a PhD student ask a senior MBIE official what post-doc funding might be available to them they were told 'Well MBIE doesn't provide anything, but the National Science Challenges will'. She then approached the leader of a National Science Challenge to ask the same question and was told 'Well none. We have no obligation to.' - and then we're surprised when we find that our most valuable university graduates take up post-doc positions in international institutions and only occasionally come back? Looking for a post-doc position in New Zealand is colloquially known as 'transiting the valley of death' and for good reason. It is a funding desert. Post-docs are the right place to capture talent domestically, and perhaps even more importantly internationally – researchers who come to New Zealand for a post-doc often end up staying here. I came for a 2-year post-doc in 1994 – still here.

Question 20: I think that the Entrepreneurial Universities initiative is a good start. In general we should be looking to attract early career researchers. And what do they most want? They want to be able to establish their own research group. MBIE should implement something like the Emmy Noether Programme:
https://www.dfg.de/en/research_funding/programmes/individual/emmy_noether/

Question 21: More stable funding. As the director of an independent research organisation, I have frequently had to let excellent people go simply because the 2- or 3-year project that they were working on had finished and they were unable to secure additional funding. Being a researcher in New Zealand, and especially in a smaller organisation, means a complete lack of financial stability. 'Soft' funding is anathema to career stability. Looking at Figure 1 in the strategy document, one idea would be to use the 'additional spending needed by government' to provide a slowly increasing basic income to active scientists (where active would mean having had at least one success in obtaining funding from any of the funding pools shown on page 4 of the strategy document in the previous 5 years) purely on a pro-rata basis, and directly to those scientists (not to their employers). While this smacks of a

'universal basic income' for scientists, it would have the benefit of mitigating the panic and anguish that comes from losing one's employment whenever a funding proposal fails. Something needs to be done to provide better job security to scientists across all research organisations in New Zealand.

Researchers need to be seen as much a resource to be supported by SSIF funding as infrastructure. Any 'universal' researcher support, such as that suggested above, needs to be small enough that recipients are still strongly incentivized to remain active and innovative and to seek additional sources of funding, but large enough that scientists don't have to mortgage their houses to carry them through times when funding proposals have failed. This could be a PBRF-style system applied to *all* scientists in New Zealand but where the remuneration associated with the rating would accrue to the individual rather than to their institution (though obviously not at the magnitude of PBRF). This would allow researchers to use that discretionary funding to attend conferences, explore new avenues of research for which funding is not currently available etc.. Their employers would know that they are receiving this additional support and could be cognizant of that when setting salaries etc..

Too many of New Zealand's top researchers are too busy with the incessant treadmill of writing funding proposals, finding small niches of time to do the research in between answering emails, and then frantically trying to write reports on what was (supposedly) done, to have any time to think in an innovative way.

I fear that the importance of scientists (i.e. as individuals) is not well enough articulated in this strategy document. For example, on page 39 it states 'Part of our work will continue to focus on funding, institutions, and infrastructure…'. So if you're a post-doc in the New Zealand environment, or an independent scientist, where will the required support come from?

Question 22: On the whole, yes.

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.

Sorry, didn't have time to address these.

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.

Question 27: Better coaching through the entire process. Many start-ups have no idea how to navigate the various sources of funding made available through e.g. Callaghan Innovation and then how to develop and execute a progression of capital raising rounds. New Zealand needs more companies like Simmonds Stewart that actively hold the hand of start-ups through this process. Or, for example, any STEM courses taught at universities must have at least a couple of days in the year dedicated to teaching students about the innovation system, how to source funding, how to engage with VCs etc.. Those courses could be taught by the large incubators operating in New Zealand.

Question 29: A lack of domestic sources of capital at the scale that is required to make New Zealand-based start-ups globally competitive.

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.

Question 30: They will need to discourage practices that agencies employ to entrench research monopolies in the marketplace and practices whose sole purpose is to generate additional revenue even if it is detrimental to the success of New Zealand as a competitor on the global RSI stage.

Question 31: As stated in the strategy document, social and environmental problems.

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.

Sorry, didn't have time to address these questions.

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.

Under renewable energy, I think that Bio-energy with carbon capture and storage (BECCS) would be an excellent fit for New Zealand.

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.

Question 36: There is clearly a need for better teaching of STEM subjects in Māori schools. We have repeatedly sought to include and engage Māori researchers in our research projects. Some are so busy just answering calls for them to be included in dozens of research projects that they don't have time to respond to every request. Increasing requirements for Māori engagement on research projects where there simply isn't the capacity to fill the need, is a huge source of frustration (on both sides).

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.

Question 38: Using the politest possible language – hell no. The competitive model for funding research in New Zealand, and the imperative for CRIs to provide the government with a strong return on investment (and to support e.g. the construction of expensive new buildings), has created a highly non-collaborative environment, replete with back-room deals, last minute withdrawals of support to scuttle funding proposals, and situations where even to get people in the same room to talk has required rounds of signing NDAs – and these are people at publicly funded agencies – leading to a lot of lawyers becoming very wealthy. What changes need to be made to reverse this situation? That needs a whole submission on its own. Maybe start with the Commerce Commissions investigation into NIWA and MetService.

Question 39: Hell no × 2. What changes might be made?

i) Incentivize cooperation and actions that benefit New Zealand ahead of behaviours designed to maximize profits to ensure that CEO bonuses are paid.
ii) The use of SSIF funding to create an unassailable inside track against competitors unable to access SSIF funding, needs to be discontinued.
iii) Excessive charge-out rates to support unnecessarily top-heavy research organisations needs to be discontinued. Charge out rates for researchers should be standardized based on a PBRF-type rating of *all* researchers across New Zealand.

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.

Sorry, didn't have time to address this.

General

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

Please type your submission below.

Overall, I was both pleased by and impressed by the strategy document. It shows a lot of promise for the future of New Zealand's RSI system. However, it also appears to be somewhat blind to much of the 'truth on the ground'. Perhaps the document was being careful to be 'safe' and to expose as little as possible of the current failings in the RSI system. That's OK – let's aim for the brighter future.

In many places the difference between what was being proposed and what is currently happening, was vast. For example, the plan to 'ensure our … public research organisations to form a coordinated, dynamic network of research across the horizons of research and innovation' will need to reverse decades of often acrimonious highly competitive behaviour that has strongly disincentivized collaboration between public research organisations. I recall being told by the Director of Research of a CRI that was the host for one of the National Science Challenges (NSCs) that an idea that I had proposed as part of the research plans for that NSC, that while highly beneficial for New Zealand, would never be supported since 'there is no way we are going to be pushing any of *our* funding to one of our main competitors'. As long as such attitudes prevail in the CRIs, I have little hope of MBIE achieving this panacea of 'public research organisations forming a coordinated, dynamic network of research across the horizons of research and innovation'. I see some light at the end of that tunnel in the form of the 'review the CRI operating model to ensure it supports dynamic, connected institutions and globally leading research' statement in the strategy document. If that is done properly, I believe this could be a massive improvement to the RSI system in New Zealand.

The goal of making New Zealand a 'global innovation hub' by 2027 is unrealistic. To be a global innovation hub I would argue that a country needs to be in the top 20, if not the top 10, of all innovation hubs. As highlighted above, there are 1548 NZs in the world. Even if we made it into the top quarter of NZs, we would still only come 387th. To make it into the top 20, we need to make it into the top 1.3% of all NZs. I don't think that we can achieve that while we are spending well below the OECD average on R&D. I would like to see a more realistic goal that is less likely to make researchers in New Zealand feel cynical about the goal.

A huge challenge I see for New Zealand (in comparison to other countries), is the lack of incentives for New Zealand academics to engage with industry.