From:	no-reply@mbie.govt.nz
To:	Research, Science and Innovation Strategy Secretariat
Subject:	Draft Research, Science and Innovation Strategy submission
Date:	Friday, 8 November 2019 5:08:00 p.m.
Attachments:	Online-submission-form-uploadsdraft-research-science-and-innovation-strategy-submissionssubmission-form-research-science-and-innovation-strategy-VTT.docx

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
Nick Field

Name of organisation or institutional affiliation
Venture Taranaki Trust

Role within organisation
Business Advisor

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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)
Industry, Start-up, Professional services, Interface of research and industry, Other

If you selected other, please specify here:
Regional Economic Development

How large is your organisation (in number of full-time-equivalent employees)?
18

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
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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.

New Zealand, as a small nation needs significantly more assistance to bridge the 'valley of death' and to support existing enterprises with innovation including commercialisation. Consider not just funding of the innovations and core research and development but also commercialisation – which includes public stakeholding in the outcomes where there is a strong case for public good, such as climate change. This is particularly where innovations solve domestic as well as internationally relevant issues. This may require a significant public budget contribution.

Academic scientific research is important as an end in itself, however, more than 70% of OECD R&D stems from the private sector. To achieve the R&D target set of an R&D spend equivalent to 2% of GDP an emphasis on innovation will be arguably more important. Private sector R&D spend is required to nearly double (increase by 1.9%) to reach the stated goal. The government spending increase is led by this expansion of activity.

If this strategy is to focus on R&D at the frontier, the majority of the 4000 companies engaging in R&D in New Zealand may be disconnected. There may be a need for an equivalent strategy for commercially productive innovation that will be the engine of R&D growth beyond the *From the Knowledge Wave to the Digital Age report.* A more efficient route may be to not split R&D into separate frontiers and instead support its value creation.

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.

Questions 4-8

Focusing RSI strategy on *researching and innovating towards the frontier* is highly unlikely to achieve the stated goal to that by *2027, New Zealand will be a global innovation hub, a world-class generator of new ideas for a productive, sustainable, and inclusive future.*

It might also be problematic to split scientific research between two strategies – The RSI strategy and the Economic strategy increasing R&D as detailed in *From the Knowledge Wave to the Digital Age?* There could be potential for a single project to be subject to conflicting priorities and unnecessary complexity.

It is hard to argue that any distinction or exclusions should be made between innovation *at the frontier* rather than *behind the frontier*. There is no guarantee that exclusive novelty in R&D will generate any greater return on research capital. In fact, there is plenty of evidence to suggest that the reverse is the case. R&D at the frontier by its nature has a higher failure rate with fewer projects generating further development and no existing pathway to market for the results. The leading market position of many global companies is based on improvements to existing technologies that create value. It is the potential value of the results that, if anything at all, should be the focus of strategy. One measure can be financial, but also societal, environmental and productivity impacts can be a factor. It would seem to be perverse that an R&D *project at the frontier* could get favoured government support over one which is improving existing technology with a greater potential value and/or impact.

One reading of the summary statistics on our research, science, and innovation activity, (Figure 2, Page 21) would be that, as the number of our research publications as a proportion of gross expenditure on R&D is high, our research at the frontier is doing well. As our overall R&D is below target, this suggests that the research at the frontier is not providing follow-on R&D growth opportunities or sustainable, scalable returns. So attention and incentives need to shift to other areas – real connections that make a difference and change/accelerate the innovation fabric, especially for industry.

It is also worth pointing out that many R&D breakthroughs are made when working in an area that, at the outset, is not at the cutting edge, but seeds ideas that go on to break new ground. It is harder to create new ideas from a blank sheet of paper than from an environment of continuous improvement.

Alexander Fleming discovered penicillin in 1928 while researching something else (not at the frontier). It wasn't until a decade later that two chemists, Howard Florey and Ernst Boris Chain, picked up the problem and were able to synthesize penicillin. Even then, it took people with additional expertise in fermentation and manufacturing to turn it into the miracle cure we know today. (Forbes.com)

There is no specific area in which New Zealand has a totally unique opportunity to become a world leader. Equally, there are few unique opportunities or advantages available to the RSI system in New Zealand in comparison to elsewhere. Applying resources to these points suggests 'picking winners' which is fraught with risk. If these questions were asked at times in the past, it would have been unlikely that healthcare respiratory support, accounting software or private satellite launches would have been picked as areas for support. This does not mean that New Zealanders can't bring world-leading solutions to the world, however, government will not decide which ones succeed, global markets will.

On this theme, if government policy favours RSI challenges that are unique to New Zealand, that New Zealand is the only country likely to address then, by definition, they are unlikely to be successful beyond our shores. With New Zealand being a relatively small market with relatively high R&D costs, the logical emphasis should be on RSI challenges for global markets (that still have relevance domestically) if scalable R&D growth is to be achieved.

Splitting the RSI strategy with economic strategy appears to further distance academic R&D from its implementation in real world markets. If there is a good reason for splitting innovation strategy (not obviously described in the draft RSI strategy) then it should be secondary to economic strategy. Considering R&D as a whole is more likely to improve connectivity, cross pollination of ideas and access to investment.

Question 9

When considering public sector vs private sector R&D it is worth highlighting that in the OECD, business R&D continues to be the main global driver of R&D growth. In 2017, private sector enterprises accounted for more than 70% of all the R&D performed in OECD countries growing at 4.8%. In contrast, R&D carried out in the Higher Education sector grew by 1.6%, while R&D performed in government institutions increased by 1.3%. This suggests that the focus of strategy should be in facilitating private sector R&D growth or promoting the links and connections between advanced scientific research and enterprise.
https://www.oecd.org/sti/msti2019.pdf

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.

For NZ Inc as a whole, international connectivity is an obvious economic disadvantage. Domestically, it could be argued that RSI connectivity is relatively good though page 21 the draft strategy cites instances where this could be incentivised better.

The key challenge mentioned in the draft strategy is connecting internationally to users of RSI outputs and partners able to commercially implement results.

Another challenge not directly mentioned is connectivity between New Zealand regions and main centre institutions. There would be many positive outcomes in getting the CRI's and Universities in regions like Taranaki, building relationships on a regular basis, and engaged in projects (could be public good projects). This changes/accelerates the innovation/R&D ecosystem and often these types of relationships lead to other projects, and connections across a broader spectrum of actors, agencies, businesses and communities.

However, connectivity would sit behind investment, raising R&D productivity and improving commercialisation of results in ranking of key challenges for the RSI system. Splitting RSI strategy from economic strategy appears to widen the gaps in connectivity rather than reducing them.

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.

Guiding Policy – Impact

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

Please type your submission below.

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.

One area of weak connections is between the regions and main centre institutions. Using Taranaki as an example, notable exceptions are Callaghan Innovation and Massey University. However, beyond those organisations, links and connections to the RSI system could be improved.

The fragmented nature of RSI co-funding might also have an isolating effect on RSI activity. There are numerous co-funding opportunities made exclusive to individual sectors that may keep RSI knowledge siloed. Simplifying co-funding pathways (as separate from tax incentives) and sharing positive outcomes more widely may help to spark new connections. RDAs and the Regional Business Partner Network can play a vial role here as they are directly connected with enterprises with a deep understanding of their strategies and goals.

There are some recent programmes that have improved connections between New Zealand businesses engaged in R&D and international experts. The Callaghan Innovation International Connections Scheme co-funded international travel to technology events and visits to overseas experts. This worked well for the Taranaki businesses making use of the co-funding opportunity and accelerated R&D results were reported. However, that programme had limited funds that 'sold out' quickly and is no longer available.

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.

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.

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.

Questions 27-29

Startups able to commercialise and scale R&D require access to investment, business knowledge and talented staff. Alongside that is validation that the R&D output actually has a value in the market.

While the scope of this strategy is RSI, it is important that support for R&D is done so in context. For a new business startup, that context is commercial success. Alongside support for solving the technical challenge, support for business skills and innovation in other areas of the enterprise is important is achieving sales.

While support for technology incubators is welcomed, they are not available in all regions so do not serve all of New Zealand.

Making it easier for startups to make their own international connections using programmes such as the now-discontinued Callaghan Innovation International Connections Scheme and Global Expert searches would help them be successful going global from day one.

The Regional Business Partnership is a positive vehicle for combining access to a wide range of support options to help businesses reach their goals. It would be helpful to make use of the Regional Business Partner Network as a channel for startup business support initiatives to simplify combined access to R&D co-funding alongside other business support.

Is it the best outcome to have startups subject to two separate strategies – The RSI strategy and the Economic strategy increasing R&D as detailed in *From the Knowledge Wave to the Digital Age?*

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.

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.

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.

As mentioned in questions 4-8, the area of selecting areas of focus is hugely problematic and risky. If an R&D practitioner can demonstrate that their work has potential for either commercial returns or other beneficial impacts, should they have access to diminished support because their development is outside of a focus area?

If existing expertise and initiatives are greater in number in a particular sector, the RSI support in those clusters will be proportionally higher than others without further siloed exclusivity. Those areas would be likely able to demonstrate greater impact with support provided accordingly. This would be support led by R&D practitioners rather than pre-selection.

For example, the National New Energy Development Centre to be based in New Plymouth capitalises on the local energy industry expertise to help establish new low-carbon energy opportunities but does not pre-determine what sub-sector will be focused on.

In Taranaki alone, there are world leaders in formaldehyde testing, sports protection and aluminium building structures to give just three examples. None of these companies are likely to benefit from an RSI *focus area*, but, with R&D support, could grow their staffing and global reach.

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.

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.

To achieve the goal that by 2027, New Zealand will be a global innovation hub, a world-class generator of new ideas for a productive, sustainable, and inclusive future, the strategy should take care not to be counterproductive.

Looking at the definitions of the *productive, sustainable*, and *inclusive* future from pages 8-9 of the draft strategy:

'Productive means making the best of what we have, and providing opportunities and the means for our people to maximise their wellbeing and prosperity.'

This would suggest a focus on maximising the benefits and returns from scientific research and innovation and facilitating a growth in private R&D spend of 1.9%.

'Sustainable means our resources, environment, and people are brought together in ways that respects their value in the future, as well as today, and that we exercise kaitiakitanga responsibly over these resources.'

This points to an increased support for new, low-carbon energy development.

'Inclusive means the ability to participate in and benefit from RSI, which will be widely and equitably shared'.

To equitably share participation and benefit from RSI would be more effective by not concentrating on exclusive focus areas but at those projects that can demonstrate commercial value or positive societal impacts.