From:	no-reply@mbie.govt.nz
To:	Research, Science and Innovation Strategy Secretariat
Subject:	Draft Research, Science and Innovation Strategy submission
Date:	Saturday, 9 November 2019 6:57:15 p.m.
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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
Craig Stevens

Name of organisation or institutional affiliation
NZ Association of Scientists

Role within organisation
Past-president

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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)
Other

If you selected other, please specify here:
Independent advocacy organistation

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

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.

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

Climate Change/Emergency/Heating is severely under-represented. There's a one-page diagram trying to neatly summarise ANZ Climate Change work but it is as if it was produced independently of the rest of the document. Other than the table the word "climate" appears four times in the document and two of those are a negative as in "not just climate change". Is MBIE suggesting climate is not a priority? Or have they decided this is the only aspect with a revenue generating aspect. Drivers, Forecast, Mitigate, Adapt. None of these are in this document.

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

The Government says …. *"By 2027, New Zealand will be a global innovation hub, a world-class generator of new ideas for a productive, sustainable, and inclusive future."* So its going to have to do a lot of things.

- *Innovation hub* - what does this really mean? Is this a vision of hot-desking Nordic architecturally-designed offices producing apps?
- *New ideas* - OK so there will need to be more support for discovery science (Marsden) and then more willingness to take risks when converting science into outcomes.
- *Productive* - Of course. Arguably the National Science Challenges were a way to

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connect science with outcomes and their success is questionable - certainly in a per dollar view. A sign of a healthy science system would be if we really were answering some national science challenges. The document suggests MBIE thinks the National Science Challenges "are working well". What evidence is this based on? Is the compliance cost worth it? MBIE needs to explain, with metrics, how well this is doing because for 5 years they dominated the discussion and now they are almost invisible.

- *Sustainable* - there is little to no emphasis on environment in this document so how will we know we are sustainable? Or did you mean sustainable in a purely business sense? In which case we return to our opening argument that RS&I needs to be pulled out of MBIE.
- *Inclusive* - This is vital. Making it the platform for excellence will need to be examined closely to see if it can actually achieve what is says it will.

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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: 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)?

We don't have to pick one or the other - in fact we shouldn't. A healthy research ecosystem will have components operating at all points on the "frontier" compass. It is also not linear. There are many instances where a backwards look provides innovation. This monolithic view of advancement of knowledge is not helpful.

****The Parliamentary Commissioner for the Environment has just demonstrated how unhelpful....

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?

We appreciate the aspirational nature of this question but coupled with the low level of funding this is largely an unrealistic expectation except in niche areas.

- Problems of regional significance – we will certainly continue to excel on topics of local significance.
- Problems where collaboration is key – the scale of our science system means we can

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do some highly collaborative work relatively effectively.

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?

Here's a reality – we often work and collaborate in internationally connected/high profile projects where we have "unique opportunity to become a world leader". We do our best in international activity for a small country. The reality is our overseas colleagues go back to their team of five people working on the same task and the NZ scientist returns to their 4 other radically separate tasks.

On the other hand our scale means we are inherently well-connected internally. This is true both in terms of interdisciplinary work and crossing "the frontier". This is a really important point. It is true in terms of disciplines, getting science to policy, and getting ideas from Discovery to Proof of Concept.

In terms of unique problems to solve - South Pacific climate response and socio-political implications might be a good focus for the next century.

Question 9: What are the challenges of innovating in the public sector? How do they differ from those in the private sector?

Lets face it, the Aotearoa NZ public science sector is, for much of the time, indistinguishable from the private sector. Different stakeholders then think of the science sector as being public or private whichever way it suits them at the time. The scientists themselves do an amazing job continually walking this tightrope.

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

No, the Key Challenge is lack of funding. Certainly collaboration is important but MBIE seems to think the science community is not trying hard enough to collaborate internationally. There is plenty of evidence that ANZ scientists connect well internationally. The limit is we don't have the funds to properly contribute to international projects or support ECR to participate.

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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: Do you agree with the definition of excellence presented here as the best thing possible in its context? Why or why not?

There is nothing in the document that explains how excellence will be quantified/assessed. It's hard to agree as the document doesn't actually say how you identify excellence in any definitive way.

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?

Until we have a working NZRIS - and have it working for a number of years - do we even know what we have in terms of diversity? **A major barrier to diversity is inequality in wealth** - this leads to inequity in health, housing, opportunity, education and outlook. MBIE will be hard-pressed to solve this by making a few more positions for ECR from under-represented groups. Certainly ***do*** make these positions available but it is not a fix to a much wider problem. Lack of role models. Lack of funding. How do we build diversity in research areas unique to ANZ but that have little presence in the University sector? This will make us slow to respond to new challenges.

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?

You tell us. This will be true up to a point. But at the same time we want to build diversity and locally relevant ideas- and our present ways of determining excellence don't support this.

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Question 14: Do you agree that excellence is strengthened by stronger connections? Why or why not?

The draft document has an unsophisticated view of excellence. Some aspects are strengthened. Certainly, excellence will rarely be harmed by stronger connections. There is much literature available on poor use of publication metrics. The Document says "Scientific papers that are co-authored tend to be cited more often than papers which are written by a single author". What does this even mean? Co-authored papers will typically be "bigger". Even simple self-citation will give this outcome. The literature is not a monolithic score card. It is where we archive ideas, data and discovery. The Document says "Papers co-authored by teams from across academia and industry tend to be cited more frequently than those that are written solely by academics." Really? Do you have evidence?

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Guiding Policy – Impact

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

Please type your submission below.

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

By reading the new Impact document released by MBIE last month?
https://www.mbie.govt.nz/dmsdocument/6983-the-impact-of-research-position-paper-october-2019-pdf

This correctly identifies the following difficulties in "quantifying impact".

- Long lags between research activities and impacts
- Convoluted impact pathways which may be distributed across several research organisations
- Missing or ambiguous data
- Contributions from multiple streams of research and factors beyond researchers' control
- Difficulties quantifying the magnitude and value of impacts.

However, nothing in the report provides any clarity on how these hurdles will be overcome.

It's not clear MBIE has an adequate definition of Impact. The impact of basic research is fundamentally mis-understood. The scale and cross-fertilisation of projects in NZ is not accounted for - you've ported ideas across from science ecosystems that fund very large initiatives and you coopt this to assess every scale of project.

We do not see how you evaluate impact for small or even medium scale projects unless they are effectively "engineering" with very narrow scope.

Furthermore, expecting to identify the impact of science as a way of evaluating its worth is fraught. You can lead a horse to water. Given that globally carbon emissions are not reducing would you suggest that climate science has failed?

How does MBIE expect any of this to work without at least a decade of the NZRIS operating?

Who will review narratives around Impact? Limited ability to judge veracity of impact statements means the system will slide further towards over-promising with little fear of come-back.

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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: 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, international experts, business communities and markets?

Funding is a major barrier to consolidating connections. Supply of quality students is limited as they find other systems more attractive. In addition, science is a small world and so people outside the system are aware that there are redundancies and struggles with the connection between vision and reality. Lack of pathway for students. Here we have a poor postdoctoral phase and limited industry opportunities. We note though that internationally short-term contracts are more common than in NZ.

Clarity around roles... Universities lead large research programmes, CRIs do consultancy work, Consultants apply for research funding. Having a meaningful review system for Endeavour Proposals would improve the ability of the system to gauge the likelihood of success of the proposed work. As it stands there is very little reason to not wildly over-promise.

Build home-grown leading scientists. Talk to a leading scientist from an international setting and ask them how they do all the things that they do and they say... postdocs. They have several fully functioning scientists who essentially run their lab while they do the big-picture work. These scientists have some turnover and fundamentally share their achievements. Again we recognise that internationally short-term contracts are more common than in NZ and so there is the possibility to take advantage of ECR.

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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.

Offer a lot more postdocs and work out a way to have some equity into terms of cost recovery for the Institutes that support them. Evolve the Rutherford Discovery to support presently unsupported people and target them for new areas of work rather than existing. Stop allowing entities to advertise scholarships/fellowships where they don't provide overhead as this makes the recipient less appealing from a business perspective. Build into the Tax Credit process the uptake and nurturing of industry ECR.

Make Aotearoa NZ the best place in the world to be a scientist. We do attract quality scientists, but more funding would retain them.

Need to be more diverse in how we think about the "high-flying researcher". Do these people ever fulfil the expectations? We will probably never attract the most expensive of big name rockstar researchers - the markets are simply too small. There would be plenty to suggest that someone focused on such large markets probably isn't appropriate for our scale anyway. We could also make sure our Universities and Research Institutes don't develop a reputation for making researchers redundant.

In addition, recognise that "science technicians" are increasingly unique and valuable and part of the international research job market. Our markets and talent pools are so small we need to think about tech skills as international also.

Compared to overseas in a lot of ways we have more stability - *for those with a job*. We also struggle with the small scale meaning dual career families make sacrifices to get even one career up and going.

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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.

Clarity and financial support for open data. Clearer lines around IP and roles within the research ecosystem. Trust and the sense that the work is underpinned by adequate funding. These connect with previous ideas around clarity of purpose for various research providers.

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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.

There will need to be an element whereby MBIE more clearly values public good research. It is probably time that we consider moving the RS&I out of MBIE as the "business is king" environment is clearly having a detrimental effect. Other than a few mentions in the preamble figures Discovery science seems to be ignored. It is not clear that MBIE understands how the science ecosystem actually works or that one of the major advantages of the NZ system is the interconnectivity between discovery and applied science.

There would seem a good case to focus on some Public Good issues along with "innovation". Things like Environment, Climate, Health, Housing, Pacific, Inequity. Interestingly many of these align with NSC but these were largely captured by particular areas so significantly that the overarching challenges still remain.

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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.

Nowhere does the strategy take the time to analyse what our RS&I ecosystem *should* reasonably look like. We are probably the most physically isolated nation on earth and the last to be populated. Is there any reason we should be aiming for some SAE/OECD average setting? Funding is a major barrier to consolidating connections.

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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.

Innovation to survive climate impacts and enhance response in ANZ. Environment sector continues to be ignored. **When MBIE say renewable energy**, building on recent investments in the Advanced Energy Technology Platform – does MBIE mean more of what you've funded or support for areas that MBIE didn't fund in the initial tranche? A prudent focus area would be to develop some of the many points in the Climate Change figure not supported by on-going funding and to bridge historic disconnects in the science ecosystem around climate. Is MBIE reflecting on their lack of investment in renewable energy over the last decade and where that has left us in a global marketplace?

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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.

These foci are appropriate end-goals but they do nothing to foster a system that will get us there. We need to lift socio-economic equity indicators and we need to invest in science in early stage education across the board.

Where are Pasifika in all this? Vision Mātauranga continues to drive inequity.

There is not enough emphasis on fostering and supporting early engagement with potential Māori thinkers and researchers. As recognised by many, the lack of role models in any meaningful proportion means the supply and opportunities are not sufficiently developed.

The VM approach coupled with low success rates for funding is effective but can only develop slowly with inadequate support through Māori-focused education. A critical mass of Māori researchers are required so that their work can extend beyond traditional research areas otherwise the global aspect will not be achievable.

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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.

Against a backdrop of the 90s reforms, and the modest efforts to repair any negative impacts, these are big questions. Clearly the business focus of CRIs affects what science gets done. Does a "board-driven" model adequately support science? Is it time for a hybrid leadership model that better balances business and discovery/knowledge/application?

MBIE sends fundamentally conflicted messages. What, in the present Impact criterion, suggests CRIs **should** be doing globally leading research? Almost all of the CRI activity is based on applied science to support the nation, ministerial motivations etc. To expect this to be globally anything is only relevant in terms of supporting the scientist's CVs.

Most of the CRIs operate intensive capital programs – often at a scale beyond a University- so they have to fund this through their cost-recovery model. Funding capital equipment through surplus funding/profit biases support for certain areas.

You don't ask the same questions of the University sector. Are hybrid teaching/research/foreign student focused institutes appropriately designed to support dynamic, connected institutions and globally leading research? What changes might be made? Similarly the consultancy/SOE sector?

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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.

With funding success rates generally in the 10-15% range there is no room to fund work that only supports one dimension - excellence - impact - connections. Imagining a Venn diagram of impact, excellence and connections – what does something that sits in the intersection of all three? Is that what we want?

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General

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

Please type your submission below.

This strategy is focused on the innovation. The consultation talk implied that the Research and Science were to continue but this document provides little evidence of this. **It is time to move RS&I out of MBIE - the "Business" is clearly dominating the thinking to the detriment of science's ability to serve the nation.**

The document builds the case that the nation's science be assessed based on "excellence", "impact" and degree of "connectivity". In reality there is no evidence that MBIE can evaluate either "excellence" or "impact" and the focus for connectivity is incorrect.

The document gets hung up on "the frontier" as if there is some magic line in the sand out there that all our science should adhere too.

The document also has a strange disconnect between the nice flow chart diagrams and the text. Specifically, the lack of future climate impacts as a research driver in the bulk of the report is alarming.

The level of aspiration relative to the level of funding is out of balance and is an unhealthy attitude to have at the sector level. Telling people they have to be globally-leading then funding them well below average levels is essentially bullying.

MBIE also appear to be creating a paradox whereby they want to see "globally-leading" research but be locally relevant. The reality is that locally-relevant research will often struggle to have leading impact globally and any truly globally-leading research will move offshore at some point.

This submission is from the New Zealand Association of Scientists (NZAS) and this letter reflects the views of the Association. We are an independent association of scientists who work and lobby to promote science in New Zealand, increase public awareness of science and expose pseudo-science, debate and influence government science policy, improve working conditions for scientists, including gender and ethnic equality, promote free exchange of knowledge and international cooperation, and encourage excellence in science. The Association membership includes physical, natural, mathematical and social scientists and welcomes members with an interest in science education, policy, communication and the social impact of science and technology.

MBIE are to be commended for seeking to explore and clarify how the NZ RS&I system works - and for maintaining an open and accessible dialogue.

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