#108

COMPLETE

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Page 2: Section 1: submitter contact information

Q1

Name

David Stevens

Q2

Email address

Privacy - 9(2)(a)

Q3 **Yes**

Can MBIE publish your name and contact information with your submission?Confidentiality notice: Responding “no” to this question does not guarantee that we will not release the name and contact information your provided, if any, as we may be required to do so by law. It does mean that we will contact you if we are considering releasing submitter contact information that you have asked that we keep in confidence, and we will take your request for confidentiality into account when making a decision on whether to release it.

Q4 **Yes**

Can MBIE contact you in relation to your submission?

Page 3: Section 2: Submitter information

Q5 **Individual**

Are you submitting as an individual or on behalf of an organisation?

Page 4: Section 2: Submitter information - individual

Q6 **Yes**

Are you a researcher or scientist?

Q7

Age

Privacy - 9(2)(a)

Q8

Gender

Q9

In which region do you primarily work?

Q10

Ethnicity

Page 5: Section 2: Submitter information - individual

Q11

What is your iwi affiliation?

Respondent skipped this question

Page 6: Section 2: Submitter information - individual

Q12

If you wish, please specify to which Pacific ethnicity you identify

Respondent skipped this question

Page 7: Section 2: Submitter information - individual

Q13

What type of organisation do you work for?

Crown Research Institute or Callaghan Innovation

Q14

Is it a Māori-led organisation?

No

Q15

Which disciplines are most relevant to your work?

Agricultural, veterinary and food sciences

Q16

What best describes the use of Mātauranga Māori (Māori knowledge) in your work?

There is some Mātauranga Māori, but it is not the main science knowledge

Page 8: Section 2: Submitter information - organisation

Q17

Organisation name

Respondent skipped this question

Q18

Organisation type

Respondent skipped this question

Q19

Is it a Māori-led organisation?

Respondent skipped this question

Q20

Where is the headquarters of the organisation?

Respondent skipped this question

Q21

What best describes the use of Mātauranga Māori (Māori knowledge) in your organisation?

Respondent skipped this question

Page 9: Section 3: Research Priorities

Q22

Priorities design: What principles could be used to determine the scope and focus of research Priorities?(See page 27 of the Green Paper for additional information related to this question)

Principles need to address

- Structure of the process
- Inclusion of a wide range of world-views
- Longevity of the issue
- Impacts of the issue
- Reviews of the process

Needs to have appropriate power -so needs to sit alongside a ministerial portfolio, under ministerial guidance. Current portfolio management structures such as MBIE and National Science Challenges, are inappropriate to deliver agile, innovative science. A new entity is required (the Department model would appear to be the most useful, potentially similar to the National Polytechnic structure) to both determine priorities and to govern science delivery.

Needs to be an open process that is available regularly, to enable discussion of emerging issues.

The process needs to be inclusive of a range of inputs from across age, knowledge, culture, as well as society, environment, business and science. A range of approaches could be used to generate input, from expert opinion to public forums and social media exploration. A combination of these would form a robust NZ-view. Some input from the international community may be warranted, especially when exported goods were involved.

Once priorities are decided they should have 25-100 year time horizons to maintain longevity.

Priorities need to be reviewed to ensure relevance (maybe every 3-5 years depending on the priority and its intended time horizon).

Impact assessment should include:

- complexity (of both the issue and potential solutions),
- severity (the impacts both instantaneously (acute) and protracted (chronic)),
- timeframes to impact (of the proposed science/solution),
- level of threat (and to whom),
- potential for good,
- risk and variability,
- ability to enable change.

Q23

Priority-setting process: What principles should guide a national research Priority-setting process, and how can the process best give effect to Te Tiriti?(See pages 28-29 of the Green Paper for additional information related to this question)

Principles to guide this process should include

- Equity
- o Recognising need
- o Ensuring transferability
- Impact
- o Social
- o Environmental
- o Economic
- o Cultural
- o Should include both harm and potential for good
- Uncertainty
- o Risk
- o Variability

There should be formal mechanisms in place to provide assessment of these factors

Discussion and negotiation processes should finalise a prioritised list, including comparative analysis of harm and benefit.

A balanced portfolio should be an aim.

Q24

Operationalising Priorities: How should the strategy for each national research Priority be set and how do we operationalise them?(See pages 30-33 of the Green Paper for additional information related to this question)

A full strategy development process should be carried out. There are many frameworks available. Listed here is a potential process from those frameworks.

- Scenarios developed to identify common and divergent requirements/impacts
- Benefits of impact developed
- Critical steps of solution development identified
- Identification of current capacity and skills, and gaps of both identified
- Environmental scan to identify partners (both business and science, and national and international)
- Identify potential targets for research and extension
- Develop a framework to guide the implementation process
- Review and monitor progress through appropriately identified systems and metrics

This process would be done using a subset of the people who had input to the original Priority setting and would include extra specialists (both national and International if required) who bring appropriate knowledge to achieve each of the steps outlined above.

Page 10: Section 4: Te Tiriti, mātauranga Māori, and Māori aspirations

Q25

Engagement: How should we engage with Māori and Treaty Partners?(See page 38 of the Green Paper for additional information related to this question)

As equals, with appropriate resourcing for all parties coming from central government

Q26

Respondent skipped this question

Mātauranga Māori: What are your thoughts on how to enable and protect mātauranga Māori in the research system?(See pages 38-39 of the Green Paper for additional information related to this question)

Q27

Regionally based Māori knowledge hubs: What are your thoughts on regionally based Māori knowledge hubs?(See page 39 of the Green Paper for additional information related to this question)

Regionally based hubs are essential

Page 11: Section 5: Funding

Q28

Core Functions: How should we decide what constitutes a core function, and how do we fund them?(See pages 44-46 of the Green Paper for additional information related to this question)

Core functions of Public research institutes should include:

- Communication (to create links from science to the community of practice – this may be wider community-at-large)
- Uptake and adoption mechanisms (these are needed to facilitate impact)
- Data storage, including aspects of security and sovereignty
- Critical services (e.g. earthquake monitoring)
- Protection of Taonga (including plant and animal resources)
- Science delivery infrastructure (links to Question 17)

Funding for these core functions should be incorporated into a base funding grant. The size of these grants would depend on the final structure of the public-good science sector. This quantum of funding should recognise International models and the experience that shows us that investment in public-good science is the driver of outputs like patents, that then drive economic growth. Suggested targets in Government documents are still well short of an investment that would generate transformational change.

While CRI's have delivered to private and commercial businesses and industry, this income provides specific short-term solutions rather than long-term growth. Thus while encouraging industry to invest in its own solutions should continue, this funding should not be included in the funding required for change and progress, as it is too focused on short term problem solving.

Q29

Establishing a base grant and base grant design: Do you think a base grant funding model will improve stability and resilience for research organisations?(See pages 46-49 of the Green Paper for additional information related to this question)

Yes

Q30

Establishing a base grant and base grant design: How should we go about designing and implementing such a funding model?(See pages 46-49 of the Green Paper for additional information related to this question)

Funding instability and short term funding and science investment horizons has been the largest risk to, and disruption of, science. It has resulted in short term, low risk thinking which has resulted in incremental rather than transformational science. It has made the science community risk averse and tentative in its approach to innovation. Base grant funding has the potential to break this now entrenched model.

A new structure would be required. This would remove MBIE from control and develop a new structure, such as a Department, to provide Priority setting, governance, direct funding and some centralised services.

Core to delivering future science is the protection of the base capacity and resource set to deliver science. This includes

- Land-building assets
- Computing capacity, both processing and storage
- Intellectual capacity (covered later in Question 15)
- Equipment – fluid as technology develops, though funding needs to be fluid enough to enable the testing of a wide variety of new technologies.
- Adoption and practice change requirements

Designing this model of funding support should consider the following

- International requirements and current trends in delivering good science
- Analysis of recent trends
- Type of broader science restructuring
- Analysis of public-good science investment around the world and decide on a metric of investment suitable for NZ (this would need to include review dates into the future)
- Opportunities available through co-location with other research providers

The type of structure for public good funding needs to be decided on, as this will determine relative investment, and potential investment mechanisms.

Things that need to be considered include

- Economies of scale
- Cross disciplinary interactions
- Transdisciplinary development
- Business vs Science transactions
- Science/private sector collaborations
- Public science/Tertiary learning institute interactions
- Campus size
- Regionality to spread risk and increase impact and insight
- Hubs of excellence

A principle to guide the development of institutes is that economies of scale should be applied at appropriate levels of an organisation.

An example structure would be

- Single national governance structure, potentially as a Department or something similar tot the National Polytechnic system, to set priorities, and liaise with Government and national industry and business bodies
- Single national operational structure which included asset management, overall financial management, National and International liaison roles and HR management
- Local/Regional science hubs including Science personnel, Business support, operational/administrative support and Adoption and Practice change support (including communication).
- Regional hubs would encompass all science specialties, to enable greater potential interaction and development of synergy to deal with wicked problems. This would also develop a culture of trans disciplinarity.

Synergies would also come from some co-location with Universities and/or business hubs. Security of funding (through a base grant) would remove barriers to interaction and collaboration. Consolidation of equipment would reduce potential duplication. Priority-setting would provide a shared vision, resulting in inclusion and inclusive behaviours.

Regional centres would ensure science/business/community interactions. This would ensure the development of more robust solutions, and faster uptake as solutions emerged.

The internal structure and performance of CRI’s was directly related to the regulatory framework, the competitive model and the need to generate operational surpluses to meet future infrastructure upgrades, and retain staff etc. The removal of CRI’s from the Commerce Act framework is a positive step. Other structural changes that would help

- Changes to reporting requirements regarding finances
- New frameworks to report success, especially related to outcomes.

Page 12: Section 6: Institutions

Q31

Institution design: How do we design collaborative, adaptive and agile research institutions that will serve current and future needs?(See pages 57-58 of the Green Paper for additional information related to this question)

Things that need to be considered include

- Economies of scale
- Cross disciplinary interactions
- Transdisciplinary development
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- Changes to reporting requirements regarding finances
- New frameworks to report success, especially related to outcomes

Q32

Role of institutions in workforce development: How can institutions be designed to better support capability, skill and workforce development?(See page 58 of the Green Paper for additional information related to this question)

The internal structuring of finances has linked the alignment of the workforce with the funding available. The problem with this is that only funded projects get resources. Some work has gone into developing funding for workforce development, but it has to be taken directly from funded research, as there have been few other opportunities. Thus the need for 'profit' to fund everything that is not direct science outputs. Even summer student scholarships and PhD funding must come from a funded project.
The answer is then to alter the structure of finances. If the workforce were considered part of the base funding model then there would be the freedom to direct and support capability development.
This needs to be done in conjunction with overall needs for capability and skill development identified in national Priorities. Long term base funding give staff the time needed to develop new skills and gives the Institution the opportunity to invest in the staff.
Development of skills and the workforce in general needs to be considered as a cross-pollination between science, Universities, business and the wider community. There are many initiatives available across the range of skill development – from summer students to International exchanges. Most of the problems with taking these up are either funding issues (as previously described) or a lack of potential capacity to enable the release of a person to commit to training. Thus funding and support models need to ensure that time allocations are able to be flexible, and that there is some spare capacity within the system, to ensure that capability development can be achieved.
Formal linkages to Universities, Business and Māori governance bodies need to be established and fostered to ensure that two-way relationships result in cross-pollination of ideas and ideologies. This would require specific structural processes be put in place at both National and regional management levels.

Q33

Better coordinated property and capital investment: How should we make decisions on large property and capital investments under a more coordinated approach?(See pages 58-59 of the Green Paper for additional information related to this question)

The structure of research institutions and their links with other providers and partners needs to be finalised before investment choices can be made.
The interactions with target communities need to be recognised and assigned significant importance. This will include the importance of regionalisation, as well as the need to maintain specific assets that may mirror the community that is being served (e.g. farms etc) or that support analytical needs (e.g. PC2 laboratories, computing power). This recognition of regionalisation also needs to acknowledge that the population in general benefits when significant science power is spread throughout the country, bringing security (from catastrophic events) and vibrancy to communities.
The siting of public-good science facilities alongside business, tertiary education and community is important. This provides investment into social value as well as deciding investment decisions on only a financial basis.
Investment in infrastructure needs to recognise that these assets are to produce science, not viewed as commercial assets. A case in point is the ownership of farms for agricultural research. These are outdoor laboratories and need to be considered as such, not as a traditional production/profitability asset.
A stock-take of current assets would be needed to assess fitness for purpose. Many facilities have been run down by austerity measures and need significant renewal.
If administration was centralised, as previously suggested, then on-going review of assets would also be streamlined and supported.
Future capacity requirements must be anticipated. A case in point is the growing demands for high demand computing and ever-growing demands of data storage. Investment must support this and address issues such as data sovereignty and security. This needs to be done from a central control/administrative point with full government ownership and commitment, matching priorities and strategy.

Q34

Institution design and Te Tiriti: How do we design Tiriti-enabled institutions? (See page 59 of the Green Paper for additional information related to this question)

Guiding principles which are to be developed (Question 2) need to be done so in a co-development framework. Delivering answers to Questions 7, 9 and 10 also require a co-development approach.
Critical resources need to be funded to support engagement. This would include the time required for all to participate, to ensure that Tiriti partners are not disadvantaged in the development process.
Cultural development and training must also be provided for those unfamiliar with tikanga, matauranga, rangatiratanga, and other pou related to appropriate engagement.

Q35

Knowledge exchange: How do we better support knowledge exchange and impact generation? What should be the role of research institutions in transferring knowledge into operational environments and technologies?(See pages 60-63 of the Green Paper for additional information related to this question)

The most effective delivery of science always involves direct engagement of scientists with their target consumers of that science – see the roles of the science advisors to the Covid 19 pandemic as an example. Target consumers included policy-makers, health providers and the general public, as well as police, business and many others.
Thus, communication, adoption and practice change and technology implementation must be a central core set of skills within a public-good science system. These skills need to be available to support scientists to deliver science to target consumers effectively. Delivery of science to that target consumer must be a core/essential function within public science.
Engagement with target consumers of that science must be done in a way that is fit for purpose. Dealings with the business community, the major conduit to delivery of economic outcomes, will have a different set of criteria and processes than delivering to community and Iwi. The use of secondments and other skill-building options will enhance this interaction. While the knowledge transfer capability should be a critical skill set within public-good science, it needs to be well connected to the target consumer of that science.
Regional and community-based hubs, with appropriate staff with specialist skills in communication and integration of science would ensure that connectivity with target consumers was maximised.

Page 13: Section 7: Research workforce

Q36

Workforce and research Priorities: How should we include workforce considerations in the design of national research Priorities?(See pages 69-70 of the Green Paper for additional information related to this question)

When developing any strategy, a guiding principle is to include an evaluation of the skill base and an assessment of the need for new skills.
Strategy development (Section 1.4.2) should consider this and provide an answer.
The capability development (with links to Universities, Business and Iwi, Question 10) should be done to meet that need. This creates a direct link between future needs and current development of skills.
Specific systems to improve international collaborations, management skill development and career development need to be a central aim of any public-good science system. Currently these aims are met by mostly voluntary training programmes and informal networks. Training into management positions, recruitment of Māori researchers etc would be best co-ordinated from a central administration point. Current initiatives such as Te Puawatanga Internships need to be continued and expanded to increase the rate of workforce development.
Development of, for example, MOU's with International partners are often restricted by lack of funding to support them, rather than by lack of willing of potential partners. Supporting early career attendance at International Conferences, and hosting of International Conferences in New Zealand are both ways of ensuring career progression and international collaboration opportunities.

Q37

Base grant and workforce: What impact would a base grant have on the research workforce?(See pages 70-71 of the Green Paper for additional information related to this question)

When developing any strategy, a guiding principle is to include an evaluation of the skill base and an assessment of the need for new skills.
Strategy development (Section 1.4.2) should consider this and provide an answer.
The capability development (with links to Universities, Business and Iwi, Question 10) should be done to meet that need. This creates a direct link between future needs and current development of skills.
Specific systems to improve international collaborations, management skill development and career development need to be a central aim of any public-good science system. Currently these aims are met by mostly voluntary training programmes and informal networks. Training into management positions, recruitment of Māori researchers etc would be best co-ordinated from a central administration point. Current initiatives such as Te Puawatanga Internships need to be continued and expanded to increase the rate of workforce development.
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Q38

Better designed funding mechanisms: How do we design new funding mechanisms that strongly focus on workforce outcomes? (See page 72 of the Green Paper for additional information related to this question)

Current MBIE funding processes restrict career development significantly. A focus on ‘expert’ ratings to determine science excellence, and a focus on novelty in that process, instead of the production of good science, regardless of methodology has seriously skewed that funding programme, and restricted access to young scientists. The study by Shaun Hendy regarding the Marsden Fund bias and lack of ability to ‘pick’ good science programmes would apply equally to the MBIE Endeavour Fund process.

Shifting to a base grant for staff immediately removes some of those barriers to science implementation. Shifting to a national Priority system, with overarching goals across many institutes should be accompanied by a move away from current project-by-project funding that is current prevalent, towards a core funding model for most of the science spend.

This then provides a significant shift in trust, as the current system has been one of distrust in science.

Funding mechanisms need to be designed with the overall strategy in mind

- Alignment with gaps and future needs
- Assess current mechanisms to see if they are fit for purpose
- Identify the problems with current mechanisms and fix those
- Ensure that the mechanisms are business-as-usual, rather than ad hoc opportunities

A new administrative (potentially central) structure would need to:

- Support upskilling of the current workforce
- Support capability development through new entrant recruitment
- Support the transdisciplinary skill development needed for solving wicked problems
- Support cultural/ideological development regarding Te Tiriti obligations (becoming a better New Zealander)
- Be associated with the Priority sets to recognise the gaps and under-resourced areas, and identify emerging gaps

Many current structures are available and need to be assessed and often bolstered to meet future needs. Some specific areas which need work include:

- Secondments across sectors – these are not well represented but could increase science impact if done well
- Post-doctorate positions – these are used for interim labour and the current system does not provide a good stepping-stone system into full time employment. The science community often, instead, uses these as a trial period for the young researcher, or just as cheap labour.
- The secondary education level is a relatively under-resourced area of engagement.
- OECD funding appears to be relatively under-utilised.
- Research institute training for higher education, such as PhD’s is piecemeal at best and is not recognising and developing internal capability effectively.

Page 14: Section 8: Research infrastructure

Q39

Funding research infrastructure: How do we support sustainable, efficient and enabling investment in research infrastructure?(See pages 77-78 of the Green Paper for additional information related to this question)

The government needs to recognise that it owns most of the research providers and facilities. Just as it has finally realised that it owns the schools. Thus, while Research Institutes may know what to invest in, it is the Governments responsibility, as the owner, to provide the investment. A structure such as a Department would acknowledge and oversee investment.
Most of the key research assets are central to, and critical to, the delivery of public-good science. Thus, as a critical asset it needs to remain in Government ownership. Currently trends towards outsourcing functions such as data storage (cloud-based) is introducing serious issues around data sovereignty (data stored in Microsoft servers off-shore are no longer under NZ law for example) and meeting Te Tiriti obligations of protection of taonga (as data derived from natural resources is often considered taonga).
If Institutes remain as separate entities then central ownership of science infrastructure is reinforced, to ensure access and use by all, especially when assets, such as computing and data storage, may need to be pooled.
This would then require national collaborative decision-making to match governance models that are developed. Decisions on upgrading and replacement would then need be co-developed with input from Government representation.
Perhaps a fund, such as the Cullen Fund for superannuation, could be set up to support future infrastructure spending.
Alternatively, Government bonds could be issued on the strength of the future value that science brings to the economy. This would put infrastructure decisions at arm’s length from policy of the day.