PSA submission on the Science System Advisory Group Phase 1 Consultation

This submission is on behalf of the New Zealand Public Service Association Te Pūkenga Here Tikanga Mahi (the PSA). The PSA is New Zealand's largest trade union, representing over 95,000 workers from across public and community services – including people working in Crown Research Institutes, universities, and a range of agencies in the core public service and state sector that are closely linked with the science sector – either undertaking research or using it to inform policy.

This submission was developed by our National Science Committee, made up of working researchers from across the sector, representing the views of almost 3,000 people in the research workforce across the Crown Research Institutes (CRIs) and Callaghan Innovation. For more information please contact Andrew McCauley, Policy Advisor (andrew.mccauley@psa.org.nz).

1. ***What future should be envisaged for a publicly supported science, innovation and technology systems?***

   The public science system should have a strong focus on public good science: delivering science that has a positive impact for New Zealand as a whole, even if that impact is not easily monetised.

   As workers in science, we want to see a system where we can deliver science excellence – where our work is valued, we can grow our expertise, and we can build good careers. We want to see our science sector continuing to build local expertise that reflects the New Zealand context and is available over the long term. That requires science institutions to be exemplary employers. It also requires job and role security through good science strategy – knowing what we want to invest in, what expertise we have, and what the impact of our priorities will be on the workforce if they shift.

   We want a sector with strong connections. That includes with the industries that use our science domestically (i.e., through vertical integration and connection to the organisations that use our research outputs), with government, and with the international scientific community by having porous borders allowing for collaboration and movement of ideas – so we can build on the best science worldwide rather than reinventing what other countries have developed. New Zealand should be positioned as a science leader in the Pacific in general, with the frameworks for collaborations between institutions extended to include institutions in other Pacific countries and Australia.

2. ***What are the opportunities, challenges and barriers that need to be addressed to build a more thriving research, science, innovation, and technology system that delivers positive sustainable growth and prosperity for New Zealand?***

   The funding system is one of the biggest barriers to a thriving system: both in terms of the overall amount spent, and the way that funding distribution creates instability and unproductive administration and compliance. Capped funding over long periods limits investment in science infrastructure, make projects unnecessarily precarious, and force institutions to cut valuable work – and the jobs of those who do it – to meet bottom lines.

   However, simply putting more money in but continuing to do the same wouldn't be enough to address this barrier:

- Bidding for funding, and accountability requirements once funding is granted, divert effort away from science.
- The time-limited nature of many funding sources makes it difficult to provide career stability or certainty and limits us from retaining our best scientists.
- Overhead costs involved in putting up new work are significant which means we either have to do less science with the amount available and means a wide range of international funding is unavailable to us.
- The requirement for CRIs to maintain infrastructure and collections out of their budget means they sometimes can't compete with prices that smaller operations (e.g., consultancies) can offer.

3. What principles should underpin the design of a science, innovation, and technology system for New Zealand, given its demographic composition and distinctive cultural makeup, its geographical position, and its social, environmental and economic futures?

The following are a few principles we believe should underpin the public science system (among others):

- Coordinated sector wide workforce planning: being able to identify what we are willing to fund, what it will mean for workforce, and being able to move people into where they're needed. Maintain pipeline of careers and capability
- Maintaining expertise through stability and a pipeline of people: through competitive remuneration, equitable and transparent pay systems, and working conditions that attract people to the sector and enable them to stay and progress within the system
- Public good science: providing the foundational science that gives the rest of NZ the evidence to do their jobs (i.e., quantifying risk so others can decide where/how to invest)
- Public control of monopolies: where a monopoly is in the public good it should be delivered publicly, should avoid duplication with multiple organisations (public or private) trying to provide the same services, and have a clear line of sight of who is responsible (e.g., in relation to Geonet, earthquake/tsunami/volcanic risk preparedness and response).

4. What is the role of public research organisations such as Crown Research Institutes (CRIs) in the New Zealand context?

Public research organisations are the scientific memory of the country. They are:

- a source of advice to government – and to a range of actors making decisions within the economy – that is able to be independent from market influence
- a source of foundational public good research that others can build on, which has both private and public benefits. Doing the research that NZ needs
- able to take a strategic 'NZ Inc' perspective of our national interest that sets them apart from the more investigator-led work undertaken by universities or the commercial work of the private sector
- the organisations best placed to do the research that is unique to New Zealand's environment and circumstances, that won't be done anywhere else
- the holder of the state's scientific capacity and capability to carry out the highest priority research New Zealand needs to respond to serious threats and long-term challenges.

To carry out these roles effectively, CRIs need stable core funding that can enable them to retain their capacity and their flexibility to respond to new crises or changing priorities. They need to move towards a leadership model where capabilities sought for RSI institution leadership roles are less aligned with commercial expertise and more aligned with science excellence and public good research. And they need strong international relationships and networks of scientific practice.

Regarding Part D of this question (how should public research organisations manage intellectual property?) in particular: we see value in public institutions capturing more value from their innovation, and we see problems with the idea of socialising the risk of investment while privatising the reward. Public institutions are in an excellent position to be the research arm of up-and-coming New Zealand businesses that lack their own research infrastructure. In addition to focusing on a CRIs own IP, they can help develop and partner with companies to develop IP.

However, our members in CRIs already find that in practice, too strong a focus on capturing IP can sometimes act as a barrier to getting the work done that would create innovation and value, as the focus tends to be on who owns what rather than how researchers can work together to create something that benefits a wide range of people. Making scientific outputs freely available in the public good makes it easier for those outputs to be built upon by others – this is a core part of what makes public good science valuable.

The appropriateness of capturing value from IP versus making outputs widely accessible will vary by circumstances. It may also differ between CRIs and Callaghan Innovation, given Callaghan Innovation's different role within the sector. Identifying the right mix and the right circumstances is an area where our institutions need to mature.

5. ***Does New Zealand need an advanced technology organisation doing applied and developmental research? If so, how would it be structured, governed, and organised? How would the private sector be engaged?***

New Zealand's existing advanced technology organisation, Callaghan Innovation, is a public good that's of benefit to New Zealand industry. We are concerned about Callaghan Innovation's strategic reset, which we believe is pushing the organisation in the wrong direction; Callaghan Innovation should be focusing on adding value to New Zealand as a whole rather than gutting science capability by focusing on commercial revenue rather than public good benefit. The timing of the strategic reset is unwise given that it is already beginning in the absence of any clear strategy from the Government about the role of the organisation and its appropriate place within the public science system.

Promoting the commercialisation of science outputs for the value of New Zealand industry should be the goal of Callaghan Innovation, and that is not the same as simply focusing on revenue generation from pay-for-service work. Long-term work that provides a foundation for industry may not be immediately commercialisable but is also good for New Zealand's long-term commercial prospects. Callaghan Innovation could be a testing ground for projects that have national significance. There also needs to be a home for applied physics and chemistry within the sector.

6. ***Does New Zealand have appropriate mechanisms to develop the innovation pipeline, attract global partners and funding?***

The pipeline of talent and expertise is a core part of the overall innovation pipeline. People drive innovation, and when they're free to focus on innovating and growing their understanding of the science – rather than having to focus on finding new income, protecting their patch or trying to

reduce risk to protect their jobs – they can achieve more. This is an area where the system needs to improve, and requires investment in careers including:

- access to liveable incomes and stable funding for early career researchers
- investment in education and training
- retaining expert capability through good career pathways and portability for workers between different parts of the system.

Fostering a pipeline of innovation requires institutions to be able to focus on impact and wider benefit (either to an industry or to society more generally) instead of being focused on generating revenue, and for institutional management and governance to be better at managing risk.

Long-term, stable funding should also be provided to institutions to engage with Māori – both to better enable mātauranga Māori to feed into innovation, and to ensure Māori aspirations and interests are reflected in the work that's carried out.

7. *What is an optimal structure for managing mission-led and contestable research?*

Contestable funding is too large a proportion of the overall mix of funding. The work involved in bidding for funding takes time and effort away from science work; uncertainty around ongoing funding and the need to include overheads in contestable bids inhibits people from maintaining secure work in the sector.

The system should include core funding, mission-led funding and contestable funding, with clear criteria for the types of science work that fall into each of those three categories. What's treated as contestable should be limited: mission led funding should be moving away from a contestable model towards a strategic priority model, while core functions, overheads, public good and non-chargeable work should have stable, long-term core funding.

Where funding is contestable there should be transparent decision-making processes, and incentives for collaboration. In the current system the most appropriate people to judge the merits of proposals (in terms of expertise) are usually competitors.

8. *How should the government's own research needs be identified and addressed? How should such research be quality assured?*

Identifying the government's research needs should be closely aligned with a mission-led funding approach. There is a need for strategic direction to guide science investment based on public priorities. In decision-making about priorities:

- science advice should feed into the national priority-setting process in a way that's transparent, to inform more values-based judgements at the political level – and science sector workers should be involved in this
- principles to guide the selection of priorities should include their impact on New Zealand, Treaty obligations, uniqueness of the research, whether it is likely to be done elsewhere in the world, and quadruple bottom line analysis
- the process of setting national priorities should involve Māori both at hapū and iwi level but also across the Māori science workforce.

To better align research with policy needs, there could also be stronger connections between science institutions and chief science advisors within the public service, as well as more alignment between MBIE and other government agencies that commission research work.