

National Research Infrastructure Roadmap - Response to Exposure Draft

21 December 2021

Note: Consultation on the National Research Infrastructure Roadmap Exposure Draft has been invited to a set of specific consultation questions, each with a 300 word limit. There is also an opportunity to provide an additional separate response of up to 1000 words.

Consultation questions:

300 words per question

1. Are the recommendations appropriate to the current NRI environment?

[The response to this question will be provided as the additional document of <1000 words]

Exposure Draft Recommendation 1: Adopt the NRI Principles

Covered in Question 2.

Exposure Draft Recommendation 2: Provide continuity and long-term funding to NRI

STA strongly supports this recommendation. Continuity and long-term funding are essential to maintain world-class research facilities. Short-term funding cycles prevent effective and efficient planning, and risk the loss of highly specialised staff.

Exposure Draft Recommendation 3: Adopt a challenge framework to support NRI planning and investment

STA urges caution. We note the proposed NRI 'challenge framework' areas align with the Modern Manufacturing Priorities and some Industry Growth Centre areas. While consistency and complementarity are broadly desirable, some crucial research areas and research infrastructure may not neatly fit into this framework. Sensible flexibility is needed to accommodate emerging critical research areas, and HASS research, which supports the success and uptake of STEM research. Fundamental, cross-cutting infrastructure that is not application-specific needs to be supported too.

Exposure Draft Recommendation 4: Establish an Expert NRI Advisory Group to drive a more effective NRI ecosystem. Immediate priorities would be:

- developing a NRI Workforce Strategy
- a review of current NRI facilities and services to identify opportunities for greater alignment of functions
- providing advice to Government on immediate and long term NRI planning and funding

In theory, an Expert NRI Advisory Group could enable greater consistency and coordination in the NRI ecosystem. The group's composition and expertise must be carefully considered, along with how it would interact with the NRI teams in DESE. If such a group is created, STA recommends including broad STEM and HASS, NRI facilities, industry and EMCR representation.

STA strongly agrees a workforce strategy is an urgent priority. Recruitment and retention of high-quality specialist expertise to run NRI facilities is an ongoing challenge in Australia. Maintaining global competitiveness requires retention of global talent.

While STA appreciates the value of efficiency, integration and alignment across the NRI system, it is not immediately clear how or why a further review of current facilities would achieve this. Such a review would likely be onerous and resource-heavy on facilities.

While Government decisions should always be guided by expert advice, it is unclear how the proposed Advisory Group's advice would interact with the consultative and iterative process of developing the Roadmap and Investment Plan. This should be clearly articulated. **Note: sector-wide consultation will be crucial to ensure the best investment decisions are made and to avoid mis-steps. STA is a key organisation to consult as that work progresses.**

Exposure Draft Recommendation 5: Drive a more integrated NRI ecosystem

The NRI system already has a very strong culture of collaboration across NCRIS and NRI facilities. Collaborative clusters draw together NRI facilities to work together both within and across disciplines.

If further integration and alignment is sought, the Roadmap needs to articulate exactly where and why it is necessary and how to achieve it. The concept of amalgamating NRI facilities or services implies a level of duplication and/or redundancy exists in the NRI system, yet there is no evidence of this. Seeking enhanced integration or amalgamation in pursuit of potential administrative efficiency would likely ultimately be a false economy.

It would also be useful to explain how perceiving the NRI system as a 'set of functions' interacts with recommendation 3 to 'adopt a 'challenge framework' approach to NRI planning and investment'. Will there be a mapping process to identify how the services and functions relate to the challenges? If so, this must be articulated with sufficient time for sector-wide consultation.

Observation and monitoring – STA strongly welcomes a focus on observation and monitoring. These key capacities underpin adaptive responses to climate change and environmental challenges.

Computing and modelling – High-performance computing to support all forms of modelling and data-intensive research is a crucial NRI capability. Funding should align with and match the diversity of research needs. The Roadmap survey confirms high-performance computing is a key NRI service. Rather than a need for 'greater alignment', there is a compelling argument for greater capacity.

Management of datasets and collections – A coordinated approach to data and collections management is imperative. Ensuring all data is managed according to the FAIR principles, as well as effective access to datasets, is a key consideration.

Fabrication and manufacturing – While NRI facilities will support modern manufacturing and cutting-edge research, it is more likely they will facilitate modelling and prototype development, or help to establish proof-of-concept for new technologies, rather than supporting large-scale manufacturing processes.

Measurement and characterisation – Measurement and characterisation cover all application areas outlined above, and should be considered foundational NRI capabilities. Supporting facilities to work closely with the National Measurement Institute to provide accredited support to industry will create more translation and commercialisation opportunities.

Exposure Draft Recommendation 6: Improve industry engagement with NRI

The Roadmap discusses this recommendation in conjunction with research translation. While there are clear connections and synergies, it is important not to conflate the two issues.

STA strongly recommends the Roadmap include clear definitions for both research translation and research commercialisation, and for engagement with industry and other users of research. The end-users of NRI-enabled research are not just industry, but include other researchers, clinicians, policy-makers and a range of government bodies including regulatory and national preparedness agencies. There are critical NRI capabilities that do not have a ‘commercial’ application, but underpin crucial community services such as bushfire and pandemic preparedness and responses.

While research commercialisation relies on partnerships with industry, stronger industry engagement with NRI facilities is not limited to research commercialisation. Some well established industries with their own research and development teams can benefit from accessing NRI facilities. The challenge is to boost industry awareness of the NRI and how to access it.

STA strongly supports extra funding to create ‘industry broker’ positions at more NRI facilities. Where these roles exist at some NRI facilities, they successfully deepen engagement with industry, government and other research end-users.

Exposure Draft Recommendation 7: Develop a National Digital Research Infrastructure Strategy

A comprehensive approach to data management and digital research is imperative. However, the timing of the development of a separate strategy must be carefully considered. Given that digital research and data management span the entire NRI sector, consultation is key to ensure the needs of facilities and those who use them are properly met. **STA recommends consultation with the sector to ensure crucial feedback is considered before the Investment Plan is finalised to avoid mis-steps.**

Exposure Draft Recommendation 8: Prepare Australia to tackle future challenges

Covered in Question 5.

2. Do the principles articulate the vision and key elements required of NRI, including investment?

The NRI Principles have a strong focus on NRI-enabled research applying to national priorities. While these goals have merit, the primary purpose of NRI is to support the research sector to do fundamental as well as applied research. The primacy of fundamental research capability, as the starting point of research commercialisation, must be acknowledged. A strong fundamental research capability is essential to Australia remaining globally competitive and being able to retain our best home-grown researchers and attract the best global talent to Australia.

STA commends the acknowledgement that the NRI includes ‘people, skills and knowledge, data, processes and equipment’. Supporting the NRI system to operate collaboratively advances Australia’s wealth, national security, social wellbeing, and environmental sustainability.

The investment principles clearly articulate a goal to drive co-investment and industry engagement, and international access. While noted in Recommendation 2, the investment principles should also acknowledge the importance of continuity of funding to provide certainty and enable facilities to

develop long-term strategic plans. Certainty and continuity of funding will ensure the best value return on investment for government funding.

3. The NRI Roadmap has a clear focus on identifying the NRI investments required to support Australian research over the next 5 to 10 years. Are there any national research infrastructure needs missing in the draft Roadmap?

The Roadmap identifies broad capabilities and challenges that the NRI system can address. It does not identify specific investments, so it is difficult at this stage to identify any specific omissions.

The Roadmap should look to ensure that all NRI facilities and services critical to Australia's global engagement and competitiveness are supported through NCRIS. This may transition some critical infrastructure currently reliant on short-term funding cycles to longer-term funding security.

4. A key priority for Australia is to enhance research translation. The 2021 NRI Roadmap identifies some reforms and investments to achieve this. What other reforms would help deliver this priority?

As noted in response to Recommendation 6, the Roadmap should acknowledge the distinction between research commercialisation and research that has other translational applications, such as providing data and forecasts essential for policy decisions or emergency response and preparedness.

STA has consistently called for a new Research Translation Fund – an investment at scale to truly 'shift the dial' on Australia's research translation and commercialisation capacity. This fund would support projects at Technology Readiness Levels of 5 and above, providing funding to push products and technologies through the 'valley of death' stage. NRI facilities certainly have a role to play in supporting the research projects that would be funded through a Research Translation Fund, but it would be inappropriate to single out specific facilities that may be more prominent, as this would run the risk of constraining the research that would be supported through such a fund.

It is not yet clear how the work of DESE's University Research Commercialisation taskforce will consider or integrate with the NRI system, and it is difficult for stakeholders to comment on this until the Government's full response is released. Government measures to support research translation and commercialisation and boost industry productivity need to be coordinated and complementary to ensure the best results and avoid a well-intended, but ultimately fragmented, approach.

Clearly determining where NRI facilities and services sit in the technology readiness level (TRL) scale could help identify opportunities for industry collaboration and research translation. However, NRI support is needed across all TRLs, and NRI services or facilities should not be limited to fulfilling a single niche along the TRL pathway.

Current funding is optimised to support research. The Roadmap should recognise that scaling up to meet industry needs may require additional resourcing.

5. The Roadmap proposes that Australia could make landmark investments to drive step changes in research and innovation over the next 10 to 15 years. Do you agree with the assessment of potential areas for investment in the report? What other areas do you consider might fit the definition of landmark investment?

Cutting edge national digital research infrastructure – STA welcomes acknowledgement of the importance of supporting digital research capability and capacity. However, it is unclear whether it is feasible to create one single NRI-wide digital research infrastructure. Consideration must be given to the unique digital capacities and capabilities across different research fields, and across different NRI facilities. STA reiterates caution in developing a National Digital Research Infrastructure Strategy under a potentially compressed timeline that does not allow time for meaningful engagement prior to the Investment Plan being finalised.

Synthetic biology research infrastructure to deliver new bioindustries – STA supports funding for a specialised synthetic biology facility, while maintaining funding for other crucial facilities and services. Regulatory considerations would need to be taken into account – early stages of synthetic biology research do not require regulatory accreditation, but this might be required at later stages of development and translation.

Research translation infrastructure to drive increased industry investment – the Roadmap provides some examples of NRI services that could fall under the classification of ‘research translation infrastructure’, however, it’s not entirely clear how this aids the Investment Plan decision making. It would not be practical to expect every NCRIS facility to have some sort of capacity to be a ‘research translation infrastructure’ facility. The Roadmap needs to understand the distinctions between research translation, commercialisation and industry engagement, and understand how NRI operates at various stages along the TRL scale, from critical fundamental research, through to translational and commercial outcomes.

World-leading environmental and climate infrastructure to underpin Australia’s national adaptation strategy – STA supports developing Australia’s environmental observation and monitoring research capacity, encompassing geological, freshwater, marine and atmospheric capabilities. These are all crucial to inform climate modelling and adaptation planning, as well as Australia’s resilience to climate extremes and national preparedness for other geohazards.

6. Please add any other comments you would like to provide to the Expert Working Group.

STA commends the acknowledgement of Indigenous knowledges and the need for deeper Indigenous engagement by NRI facilities. Collection and curation of Indigenous research and data carries additional considerations and responsibilities, and must be done in partnership with Indigenous researchers and communities.

Given the high-level, principles-oriented nature of the Roadmap, investment priorities and implications for funding are not clear. STA strongly advocates that decisions made in the Investment Plan are tested through meaningful consultation with the sector prior to the Investment Plan being finalised.

Given the constraints imposed by word limits in previous questions, we were not able to elaborate on our points with tangible examples and case studies. Please feel free to contact STA should any further information or practical examples be useful.