

1. What is your occupation?

- Researcher
- University Staff
- Business / Industry
- Government
- Higher Education Peak Body
- Industry Peak Body
- **None of the Above**

2. Are you responding as an individual or an organisation?

- Individual
- **Organisation**
- None of the above

3. What organisation do you work for?

The response has been jointly prepared by the members of the National Committee for Information and Communication Sciences at the Australian Academy of Science.

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

The roadmap adopts a challenge framework to support NRI planning and investment and identifies 8 focus areas (Recommendation 3). We acknowledge and support all the identified focus areas as areas of national importance and priority. At the same time, we identify digital technologies as a notable omission, and one that is not adequately supported by focusing only on effective use of digital resources (Recommendation 7). A recent report jointly published by the Australian Academy of Science and the Australian Academy of Technology and Engineering "[Australia's Digital Future – a nation of users or leaders?](#)" highlights the need to recognise digital technologies as an independent growth sector that forms the information and communications infrastructure for many other sectors (such as Health, Education, Transport etc. Without recognition and investment into research infrastructure to support fundamental computing science and engineering behind emerging digital technologies, Australia risks becoming a laggard among the world's top technologically driven nations.

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

6. 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 outlined the role that emerging research areas of artificial intelligence and machine learning (AI/ML) are expected to play in accelerating research outputs (Section 2.1). Graphical Processing Units (GPUs) are essential infrastructure for the development and implementation of AI/ML methods. Outcomes from various schemes such as the ARC LIEF as well as individual institutional level

investments indicate that while there are research groups that have good access to GPU servers and clusters, this capacity is not available at a national level. This lack of equity is especially detrimental to technological innovation that benefits small and medium size enterprises (SMEs). The roadmap recognises the need for high performance computing (HPC), but we request that GPU infrastructure be explicitly included alongside robust mechanisms for equitable access.

7. 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?

The roadmap presents detailed and welcome considerations for system-wide enhancements (Section 4) and building on a strong foundation (Section 5). Computing, data, software and digital translation skills underpin a number of these considerations. We propose that to fully harness cross-sectoral benefits of research translation, a specific framework of engaged research needs to be developed in collaboration with research and industry experts in digital technologies within the business, information, computing, social and communication science and engineering disciplines. We invite the NRI task force to contact the following groups to facilitate this engagement:

National Committee for Information and Communication Sciences at the Australian Academy of Science (<https://www.science.org.au/supporting-science/national-committees-science/information-communication-sciences>)

Digital Futures Forum at the Australian Academy of Technology and Engineering (<https://www.atse.org.au/research-and-policy/themes/digital-futures/>)

Computing Research and Education Association of Australasia (<https://www.core.edu.au/>)

Australasian Association of Information Systems (<https://aisnet.org>)

8. 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?

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

In order to ensure that opportunities for cross-sectoral benefits are not lost (see response to point 7 on framework for engaged research), the NRI should consider a national research expert and facility portal. The Australian Academy of Science has developed an ICS expert database on the back of the academy's COVID expert database last year <https://www.science.org.au/covid19/ics-experts>. In order to improve its adoption and use a national level approach is needed. There are examples of similar successes overseas, such as the navigator tool (<https://navigator.innovation.ca/en/about-navigator>) developed by the Canada Foundation for Innovation (<https://www.innovation.ca>). The developers highlighted the need for being well resourced with longitudinal support. Since its launch in 2013 it has grown from 100 to 800 facilities with high volumes of traffic and many success stories. This tool is also supported with ongoing engagement activities, user surveys, showcasing in conferences and industry facing member-based organisations, paid ads in trade journals, and ongoing monitoring through Google Analytics, LinkedIn etc. There are also similar initiatives in the UK such as the Science and Technology Facilities Council (<https://stfc.ukri.org>) and coremarketplace.org, a joint public-private service for collaborations in research facilities in the US (<https://coremarketplace.org>) and scientific equipment discovery tool run

out of Florida State University (<https://myweb.fsu.edu/aglerum/usedit/usedit-about.html>). There is also a computing specific portal in Canada (<https://www.computecanada.ca/research-portal/>).

10. If you have a PDF (.pdf) or Word document (.doc or .docx) to share as part of your feedback, you can upload your file here. Please keep documents brief.