Please note: the substantive content of the 2026 NRI Roadmap Survey begins at Question 20 (with prior questions dealing with administrative and other information).

As such all submissions that are published include the responses submitted from Question 20 onwards only.

Q20.

Part 2: Research themes

2.1 NRI comprises the assets, facilities and associated expertise to support leading-edge research and innovation in Australia and is accessible to publicly and privately funded users across Australia and internationally. We are seeking your input on possible directions for future national-level investment - i.e., where the requirements are of such scale and importance that national-level collaboration and coordination are essential.

The 2021 Roadmap used a challenge framework to support NRI planning and investment. With this in mind, consider likely future research trends in the next 5 - 10 years, and with respect to one or more of the 8 challenge areas identified in the 2021 Roadmap as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or not at sufficient scale and
- describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities.

Q21.

Resources Technology and Critical Minerals Processing

Q22.

Food and Beverage

Q23.
Medical Products

Q24.
Defence

Q25.
Recycling and Clean Energy

Q26.
Space

Q27.
Environment and Climate

Q28.
Frontier Technologies and Modern Manufacturing

Q29.

2.2 The 2024 statement of National Science and Research Priorities (NSRPs) includes outcomes linked to each priority to assist in identifying critical research needed in the next 5 to 10 years.
Consider the priority statements and, with respect to one or more of the 5 priority areas as listed below:

- describe emerging research directions and the associated critical research infrastructure requirements that are either not currently available at all, or
- not at sufficient scale and describe current national infrastructure requirements that you anticipate will no longer fit the definition of NRI in 5-10 years.

Do not limit your commentary to NCRIS funded capabilities, and where relevant, refer to the underpinning outcomes and research identified in the NSRPs document.

Q30.

Transitioning to a net zero future

The science and research outcomes across all 5 science and research priorities are grand challenges - urgent, socially and technically complex societal problems whose resolution depends not only on new technologies but on socioeconomic and sociotechnical systems that foster the development of effective solutions, promote take-up and implementation, and minimize social harms and unintended consequences. The critical research needs for each priority illustrate this, for example: Transitioning to a net zero future: • mitigating the environmental impacts of efforts to decarbonise industries and infrastructure • perceptions, beliefs, barriers and incentives regarding adopting and applying new technologies • approaches to partnering with Aboriginal and Torres Strait Islander communities to share the economic benefits of emissions reduction projects that occur on Country • advancing critical technologies such as artificial intelligence (AI), quantum and robotics to allow us to transition to net zero in environmentally responsible ways • information, skills training and skills uptake of workers who support the transition to a net zero economy.

Q31.

Supporting healthy and thriving communities

Supporting healthy and thriving communities: • social, cultural, developmental, educational, and environmental drivers of individual and community health, particularly in infancy and childhood, and approaches to improve them at scale • anticipating and responding to future pandemics and infectious disease outbreaks • healthcare literacy and motivators for behavioural change and adoption of AI in healthcare • technological and social solutions to providing services and diagnostics for aged care, people with disability and people living in regional and remote communities • technologies and techniques that support an affordable, inclusive, culturally appropriate, and integrated preventive health system in Australia • Aboriginal and Torres Strait Islander-led, place-based and culturally appropriate approaches to build community capacity and achieve equity for Aboriginal and Torres Strait Islander peoples in health, wellbeing and life expectancy • maintaining and renewing connections to Indigenous and community languages, crucial for cultural well-being through creative arts and performance • likely impacts of climate change on communities' physical and mental health.

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

Elevating Aboriginal and Torres Strait Islander knowledge systems: • incorporating Aboriginal and Torres Strait Islander knowledge into the development and application of critical and emerging technologies, particularly digital and data technologies • securing vulnerable collections of Indigenous languages, and making them more accessible to the communities concerned in culturally appropriate ways • approaches for protecting and managing Aboriginal and Torres Strait Islander cultural and intellectual property • approaches to preserving language and promoting bilingual education • approaches to climate change adaptation to support regional and remote communities.

Q33.

Protecting and restoring Australia's environment

Protecting and Restoring Australia's environment: • predicting ecosystem and biodiversity changes caused by climate change and human actions • new and innovative approaches to discovering, protecting and restoring biodiversity • effective partnerships and benefits sharing when using Caring for Country and Sea Country in environmental management regimes.

Q34.

Building a secure and resilient nation

Building a Secure and Resilient Nation: • secure and resilient supply chains that underpin Australia's prosperity • technologies that support Australian resilience to natural and human-induced challenges • technology design frameworks (including for AI) that increase democratic resilience and reduce risks to social cohesion, economic prosperity and national security • cognitive and social causes of engaging with misinformation and disinformation, and best practices for reducing their impact • technologies for managing water and producing food under likely future Australian climate conditions • predicting, detecting and responding to biosecurity threats and natural disasters • planning, design, materials and engineering of infrastructure and built environments for Australia and our region that account for likely future climate conditions. Some of these research topics are straightforward social scientific and humanities questions – how do we design policies and institutions to promote desired societal outcomes, how do we encourage and promote behaviour change and community acceptance for new approaches, how do we mitigate harms, especially for vulnerable communities, how do we protect against internal and external threats, how do we predict and plan for changed conditions. But achieving science and research outcomes associated with the priorities means developing new social, economic and technical solutions that will work effectively and be technically and socially viable. Grand challenge research has recognised that solving problems that straddle human, natural and physical systems requires interdisciplinary or transdisciplinary approaches that provide equal footing for physical sciences, social sciences, arts, humanities and communities. Research infrastructure required is typically digital – data assets, platforms, tools and services –that enable data generation, curation, discovery, analysis, modelling, across different data structures, data types and temporal and spatial scales. High performance computing is critical, but so too small-scale localised community projects and governance frameworks to empower local communities and support their self-determination in the design and conduct of research. Partnerships with government, industry and the not-for-profit sector are also critical for driving problem-focused research and supporting research translation. In the current ARDC-led HASS&I RDC and with the emerging initiatives such as the Australian Internet Observatory (AIO), we have much of the HASS&I content for this infrastructure with possibilities to connect to other NCRIS infrastructures especially PHRN and AURIN to address the research questions in the priorities. HASS is also developing the participatory governance frameworks and co-design methodologies to support not only Indigenous data governance but societally engaged responsible research that empowers communities and democratises research projects and research infrastructure.

Q35.

2.3 The case for a new NRI capability, or enhancements to existing capabilities, typically emerges through advocacy from research communities clustering around rigorously identified needs and goals. Such a concept could respond to a requirement for novel or expanded capacity within a domain, or across domains, and must be such that it could only be made available with national-level investment.

If you have identified such a requirement, briefly describe the need, the proposed infrastructure capability, the medium-term goals, impacted research communities, and the timeframe over which you advocate its establishment. Your response can include links to relevant existing reports.

For the last 8 years, The University of Queensland (UQ) Humanities, Arts and Social Sciences (HASS) Faculty has been actively engaged in the HASS and Indigenous Research Data Commons (HASS&I RDC), as a result of ongoing NCRIS investment, strong partnerships, and university co-contributions. Investment across key focus areas has accelerated the impact of HASS and Indigenous research to deliver long-term, enduring national digital research infrastructure and improve its overall national coordination of, access to, and analysis of, large data corpus and physical and digital collections using tools such as digitisation, computational, aggregation and interpretation platforms. UQ HASS has engaged in all activity areas of the HASS&I RDC, contributing key leadership roles in the Language Data Commons of Australia, the Social Science Research Infrastructure Network, and the Australian Internet Observatory. There is also strong commitment of UQ researchers concerning the Improving Indigenous Research Capability, the Community Data Lab and the Australian Creative Histories and Futures Project. UQ social research science researchers in the Science Faculty are also shaping research infrastructure development with the NCRIS AURIN Facility with the intent to establish a UQ node of AURIN. National HASS research infrastructure through ARDC, AURIN and government, community and industry partners is approaching a standalone capability. Australia's Learned Academies for Social Sciences and Humanities are critical players, mobilising research communities and coordinated research infrastructure planning, with UQ researchers being integrally involved in these large national initiatives. UQ researchers have also led the development of the Academy of Social Sciences Decadal Plan for Research Infrastructure, which establishes the 10 year roadmap for the development of national social science research infrastructure. HASS leadership of research infrastructure supporting Indigenous research capability provides a model for sector wide leadership across the "NCRIS family" as a recommendation in the 2026 Roadmap. Our maturity as a sector extends to the establishment of an integrated standalone HASS NCRIS capability. This would work strategically across the HASS&I RDC and establish collaborations and promote interoperability to other NCRIS capabilities (e.g. AURIN, TERN, PHRN). It would also contribute to the establishment of the Indigenous NCRIS capability, and leverage government and non-government partnerships, international research infrastructure, private industry organisations, GLAM, and community associations. A new HASS NCRIS capability would support research and researchers addressing national science and research priorities, but, this will require new investment to: - enhance current focus areas of the HASS&I RDC; - build capability including further linkage between Government (e.g. ABS) and non-government research infrastructure with relevant NCRIS capabilities (e.g. ARDC, PHRN); and - develop new infrastructures through Improving Indigenous Research Capabilities (IIRC), the Australian Creative and Historical Futures (ACHF), the Social Sciences Research Infrastructure Network (SSRIN), and Language Data Commons of Australia (LDaCA). In generative AI, the Australian Internet Observatory, SSRIN, and LDACA are already shaping tools and technologies to build sovereign capability and shape national sovereign capability, by testing offline capabilities to work in controlled environments and pressure test generative AI tools and AI-augmented research workflows. This work expands demand for high performance computing (HPC), training and support, and workforce development. Digital infrastructure plus AI technologies, generative AI and large language models (LLMs) will move us from statistical and computational analytics and empirics towards models, synthetic populations, and simulation. As well as analysing existing cultures, societies, social systems, structures, institutions and behaviours, we will be able to simulate and model these entities. The critical capabilities for this are local and national sovereign AI models built and trained on appropriate data for Australia. We also need secure offsite test environments to ensure cybersecurity, and support social licence, public and community acceptance, especially as we build models and synthetic data from increasingly rich digital traces of real human populations in time and space. In the future, understanding underlying social, cultural, and economic structures and how they shape policy, institutional design, behaviour change, and adoption will require different types of data – in terms of human behaviour, diverse languages, social interactions, cultural collections, community outreach, institutional and government assets – at different scales. Australian HASS researchers need to work at scale to stay internationally competitive but Australia also has the research infrastructure foundations for global leadership in HASS, with the right investment and planning. All fields and disciplines will need to consider social licence, community and social engagement and community involvement. HASS can lead this. ATSI governance models and ATSI knowledge systems are also pivotal across fields and priority areas. HASS can lead this too.

Q36.

Part 3: Industry perspectives

This section is seeking input specifically from industry-based respondents. Other respondents can skip this section.

Recommendation 6 of the 2021 Roadmap related to improvements in industry engagement with NRI. To complement work on this topic that has occurred since then, we are seeking additional advice on NRI requirements as perceived by current or potential industry-based users.

Q37.

3.1 Have you (or your organisation) interreacted with or used Australia's NRI?

- (●) Yes
- ( ) No

Q38.

3.2 If so, please briefly outline the NRI capabilities you (or your organisation) have interacted with or used. Do not limit your response to NCRIS capabilities.

UQ HASS are users of capability, infrastructure providers, and strongly engaged in HASS & I RDC. Brief details of UQ engagement in the HASS & I RDC are presented below: Language Data Commons of Australia (LDACA; led by Prof Michael Haugh) LDACA will ensure long-term access to language data collections for analysis and reuse. Significant collections of this intangible cultural heritage have been accumulated, including of Aboriginal and Torres Strait Islander languages. LDaCA integrates this existing work into a national research infrastructure while securing at-risk collections and improving researcher access. Social Science Research Infrastructure Network (SSRIN; led by Prof Wojtek Tomaszewski) SSRIN aims to improve discoverability, accessibility and usability of social science data; enhance existing data infrastructure with a focus on integrated administrative data assets; build capacity, improve engagement and build collaborations between key stakeholders. It is a key plank in the Australian Research Infrastructure Ecosystem for the Social Sciences in the Decadal Plan for Social Science research infrastructure. Australian Internet Observatory (AIO; UQ lead - Prof Nic Carah) AIO is a new, national research infrastructure initiative that will create an interconnected ecosystem of people, data, tools and capabilities to support innovative approaches to the collection and analysis of digital social data, internet platforms, online user experience data, algorithms, and interactions. Australian Creative Histories & Futures (ACHF; UQ lead - Prof Anna Johnston) ACHF augments Australia's cultural data capabilities by strengthening the technical, financial and social architectures of Australia's cultural collections. UQ is not involved in the first phase, but there are ongoing dialogue about the importance of AustLit as national research infrastructure. Improving Indigenous Research Capability – Partnered Activity (Prof Sandra Phillips [2022-2023]; Dr Michael Aird [2025]) Through a partnered activity on research data capability building for Aboriginal and Torres Strait Islander communities, Professor Sandra Phillips led the Sandpit in the Sandstone Project (2022-2023). In 2025, a new project led by Dr Michael Aird will develop an Indigenous-led knowledge base on key information about collecting institutions, in Australia and overseas. Community Data Lab – Proposal for Reusable and Accessible Public Interest Documents (Dr Sam Hames, Prof Michael Haugh, & Prof Nic Carah) This project aims to make Public Interest (PI) documents (beginning with Federal Hansard and Submissions to Public Inquiries) easily accessible to a much wider audience of researchers; enable new research workflows and make existing research more interesting and impactful via a GLAM Workbench style Data Guides that explain how to use, understand, read and analyse PI documents within a variety of different research contexts.

Q39.

3.3 Please indicate your (one or more) primary reasons for interacting with NRI:

- [x] For expertise or advice
- [x] Access to research resources or products
- [x] Access to equipment for research
- [x] Access to equipment for operational reasons
- [x] Help in translating research
- [x] Access to data
- [ ] Support for clinical trials
- [ ] Other (please specify)

Q40.

3.4 If you answered no, please indicate your (one or more) primary reasons:

This question was not displayed to the respondent.

Q41.

Part 4: Other comments

4.1 Please elaborate on any of your above responses or add any other comments relevant to the development of the 2026 Roadmap. Your response can include reference or links to existing reports that you recommend be considered during the 2026 Roadmap development process.

Further to our discussion on research priorities and by way of illustration of transdisciplinary grand challenge infrastructure supporting research across HaSS and STEM, The University of Texas at Austin's Planet Texas 2050 (PT2050) research infrastructure provides one model: PT2050 has incorporated high-performance computing, developing a data portal and model integration platform to serve as foundations for understanding interactions between human and environmental systems. But this cyber-ecosystem is also supporting community-led design projects with the Museum of South Texas History in the Rio Grande Valley and community organizing efforts in flood-prone Latinx neighborhoods in Austin (Lieberknecht forthcoming). PT2050 research programs combine quantitative and qualitative methods: projects combine genetic and isotopic analysis with archaeological and historical approaches to study the interaction between environmental change and human mobility across long timescales; use both models and stakeholder conversations to correlate metropolitan growth and unequal exposure to climate change harms; and deploy participatory and creative research tools such as PhotoVoice to integrate local knowledge and lived experience into policy proposals. It has also consistently involved stakeholders outside academia in this research. Specifically, advanced computing connects people through information, establishing digital portals that provide access to data, community-based projects that collect data in new ways, and narratives and visualizations that reflect a changing Texas and support marginalized communities. Source: Lieberknecht K, Houser H, Rabinowitz A, et al. Creating meeting grounds for transdisciplinary climate research: The role of humanities and social sciences in grand challenges. Interdisciplinary Science Reviews. 2023;48(4):585-607. doi:10.1080/03080188.2022.2148889

Q49.

4.2 Optional Document Attachment.

Note: Our strong preference is that answers are provided against the relevant questions in the survey. However, this file upload option is available for submissions in file format, where needed. Please ensure the document includes your name or organisation.