

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

Manufacturing Priorities – which guided the last roadmap are a very limited framework to prioritise investment – across either HASS or STEM. The NSRPs are a more constructive framing. We would also note that NCRIS's 'top down' approach to investing is not always the best fit for research-led innovation, maximising other R&D levers and programs, and cultivating talent across the system. What would an ARC Centres of Excellence EOI process look like in an NCRIS landscape – with government/NCRIS setting the priorities and the sector responding.

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

Australia's NSRPs call for a joined-up approach to tackling national and global problems. This means cultural and social research alongside science and technical. There is no way, for e.g. that energy transition can be achieved without the humanities and social sciences – which provide 'critical information on the causes of environment and climate change and societal responses to adaptation and mitigation policies' (The Brisbane Statement <https://icri2024.au/about-icri/brisbane-statement/> IRIC 2024). Yet, existing NCRIS facilities have developed over decades with a singular focus on STEM capabilities. There is no cross-cutting Indigenous research capability, and very limited capacity to marshal the talent of cultural and social research at scale to address the NSRPs much less the megatrends CSIRO identified in 2022 as guiding long-term investment, strategic and policy directions across government, industry, the not-for-profit sector and the broader Australian community. Trends of particular relevance to both NCRIS and delivering on the NSRPs include: 'Leaner, cleaner and greener', 'Diving into digital' and 'Unlocking the human dimension'. The 2026 Roadmap needs to support and build the HASS infrastructure being established through HASS & I RDC (subject to evaluation of the success of those projects). This work is also vital to the 'Integration and Coordination capability' needed over the roadmap horizon (see below, in new capabilities section), to leverage NRI partnerships and R&D opportunities nationally. Our view of key lessons from ARDC investments to date: • Co-location and collaboration of HASS and Indigenous projects has been valuable for incubating capability (i.e. in the HASS & I RDC). This has allowed for fit-for-purpose governance, conceptual work, engagement with communities, and building partnerships for collaboration and co-investment. • For a relatively small investment the impact of the HASS & I RDC has been 'game-changing'. The second phase investment (\$25M) was the largest ever investment in systemic HASS & I RDC capability through NCRIS. (The investment is still fractional compared to total NCRIS \$4 billion over 2017-18 to 2028–29 period.) • The ARDC is now at the stage where two of the original first-phase capabilities have reached maturity to warrant funding as stand-alone NCRIS capabilities – the Improving Indigenous Research Capabilities and Language Data Commons of Australia • Wide consultation has been a cornerstone of the program build, bringing the community along through consultations on project plans. • The projects share common needs which could be addressed in strategic ways going forward: the need for data collection/capture systems (sensors, born-digital, digitisation); decentralised data storage challenges; data discovery and interdisciplinary standards; cases for linked data; AI and machine learning for large-scale multi-modal data.

Q31.

Supporting healthy and thriving communities

Current areas of focus through the HASS&I RDC include: • Improved physical and mental wellbeing indicators – drawing information from free-text fields in health records using LLMs • Better understanding the diverse social and environmental determinants of physical and mental health in Australian communities – through the linkage of social science and health data What's needed over the next 5-10 years: • Collaborative opportunities for HASS and STEM and Indigenous research to contribute to better health outcomes • Tools and models for data linkage of social and health data • Data discovery protocols and workflows for government administrative data • AI and ML – models and compute environments appropriate to handling highly sensitive data

Q32.

Elevating Aboriginal and Torres Strait Islanders knowledge systems

It is critical to ensure Indigenous research infrastructure is realised holistically. Indigenous knowledges and ways of being do not readily fit siloed approaches to knowledge where the natural environment, language, history, culture and social wellbeing are treated as distinct objects of knowledge and stored in discrete repositories. Indigenous knowledge infrastructure requires the linking and interconnection of galleries, museums, collections, health services, land and water authorities and institutional archives. Current areas of focus through the Indigenous Data program (HASS&I RDC) include: • Incorporating ATSI knowledge into the development and application of critical and emerging technologies • Making Indigenous data discoverable • increasing Indigenous research capability • Practical implementation of Indigenous Data Governance principles, access models, protecting and managing ATSI cultural and intellectual property. • ATSI language preservation • Approaches to climate change adaptation to support regional and remote communities What's needed over the next 5-10 years: • Culturally appropriate AI and ML tools developed for automated cataloguing and indexing for audio, video and visual media. • Language processing tools for ATSI languages, including AI and NLP technologies • Scalable, high-quality remote sensing and geospatial infrastructure (e.g. GIS, satellite imagery, real-time monitoring tools) for environmental management. • Integrated, interoperable data systems and data sharing platforms that facilitate the collaborative integration of Indigenous and Western knowledges • High-capacity storage systems for audio, video and visual media; secure cloud storage and decentralised data centres to support the protection, ethical management, and responsible use of Indigenous data for research, policy and decision-making. See below for proposal for a proposed new Indigenous Capability.

Q33.

Protecting and restoring Australia's environment

The 2026 Roadmap is the opportunity to address inherited divisions between HASS and STEM to build collaborative opportunities in areas such as climate change, and improved health outcomes. It is also the moment to consolidate and build on the existing HASS & I RDC focus areas, and to leverage the broader NRI ecosystem, which includes GLAM. NRI for HASS + Indigenous + GLAM can ultimately support continental-scale deep time observations not just geological but historical, Indigenous, and cultural. And help us to answer: how can we understand Australia's natural setting and processes, including in relation to Indigenous life pre-1788, and use that insight to understand what's sustainable now? Current areas of focus through the HASS&I RDC include: • The impacts and likely impacts of climate change on forms of social organisation What's needed over the next 5-10 years: • Internet of Things sensor data to better understand smart city governance, climate adaptation, and energy use patterns. • Joined up national research collections that bring cultural, biological and Indigenous data together -- subject to Indigenous data governance standards.

Q34.

Building a secure and resilient nation

The STEM focus of NCRIS facilities discourages the kinds of deep multidisciplinary work and collaboration in access to those facilities needed to meet the NSRPs – i.e. getting the social scientists, ethicists and lawyers in early to assess and contribute to the development of AI capability and advanced manufacturing capabilities, rather than adding them in at the end to assist in garnering social acceptance. New capabilities for HASS + I + GLAM (scaling from existing investments as well as new partnerships) will help answer questions at the heart of the building and maintaining a democratic and resilient nation: How do we tell our national story in a way that does justice to the country that so many people have good reason to love and to migrate to, while doing justice to Indigenous experience since 1788? Current areas of focus through the HASS&I RDC include: • Trust in democratic institutions and processes • Understanding the impact of digital platforms and disinformation on political and democracy discourse, and social cohesion What's needed over the next 5-10 years: • Data collection and donation from digital platforms • Custom generative models – specific to the Australian context • Secure AI systems • Multi-modal deep learning and time series analyses for heritage and other HASS data; automated research data processing; modelling, visualisation, and virtualisation; smart digitisation; and open research (subject to CARE protocols), and bench-marking • Audit and explainability tools • Digital capture of at-risk materials for communities • Emulation of complex digital platforms for research to develop sophisticated understandings of and the capacity to interrogate the dynamics of communication and flows of information in the digital, AI, social media age.

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.

What's missing from the current ecosystem and what do we need in next Roadmap? In summary: 1. Indigenous Research Capability: a ten-year vision, building on the successes of the Indigenous Data Capability program led by Professor Marcia Langton. This is a case for scaling an existing project (currently funded through the HASS & I RDC). 2. National research collections infrastructure capability: a new research-led agenda, bringing together Indigenous knowledge, sciences and humanities, taking full advantage of AI. This is a new capability, it does not yet exist. 3. Integration and coordination capability across HASS and for structured collaboration across NCRIS and wider system to leverage investment. This is a new capability, it does not yet exist. To focus on: a. National workforce capability strategy for HASS b. Multi-pronged AI capability for HASS c. Data capture (digitisation) capability. d. Repository infrastructure for high value collections - STEM also has this problem; a 'joined up' discussion about future proofing is needed. Australia's sovereign data in the humanities is at risk. 1. Indigenous Research Capability. [NSRP Priority 3] We support the proposal from the Improving Indigenous Research Capabilities (IIRC) project, led by Professor Marcia Langton AO FASSA through the HASS & I RDC for a stand-alone NCRIS capability as follows: "Aboriginal and Torres Strait Islander Research Data Commons: "A new National Research Infrastructure (NRI) capability focusing on scaling up the Improving Indigenous Research Capabilities (IIRC) project is critical for recognising, securely storing and effectively and appropriately utilising the wealth of Aboriginal and Torres Strait Islander data for research, policy-making, and cultural preservation. ... To support Indigenous data governance, protect cultural heritage, and integrate Indigenous knowledge into research, significant investment in long-term research infrastructure is required. This includes dedicated resources for managing, protecting, and sharing Indigenous data to facilitate large-scale research, policy development, and community-driven initiatives. Such investment is essential to meet growing demands for digital infrastructure, data security, cultural protocols, and supporting Aboriginal and Torres Strait Islander communities to maintain control over their knowledge." Leads: IIRC/Marcia Langton, with a 4-year establishment period. 2. National Research Collections Infrastructure Capability. [NSRP Priorities 3 and 5] Australia struggles with its national story and contested histories - an ongoing problem for government and communities. Existing science infrastructure will not solve this. We lack an authoritative, non-partisan, evidence base - the cultural and social research infrastructure that would equip HASS researchers (40% of the workforce) to construct the elements of our complex national identity in an evidentiary way. We need to connect the research data (locked away collecting institutions) so that it can be used by researchers to better understand and share the Australian story. This is imperative to matters of national identity and social cohesion. Leads: Profs Andrea Whitcomb, Gaye Sculthorpe, Alistair Paterson propose: An 'Australian Collections Commons' building to a 'A Cultural Atlas of Australia. Their model for a national research collections infrastructure (connecting up existing assets) brings together Indigenous Knowledges, science and cultural research, using purpose-built AI. It partners with GLAM and international exemplars. The program of work would harness existing infrastructure, relationships and expertise within the HASS & I RDC. 3. Integration and Coordination Capability across HASS. This is a vital, underpinning capability to capitalise on existing investments and leverage wider R&D landscape. There is value in convening for HASS writ large, and then developing targeted strategies for sub-sectors, themes and cohorts i.e. humanities, qualitative research, ECRs, etc. A national workforce strategy to build HASS capability: • Humanities face workforce challenges: lack of national succession planning; loss of ECR talent, as well as senior leadership; challenges 'mainstreaming' data enabled research. The opportunity cost we are currently experiencing, to build national capability, cannot be underestimated. • Better data management driven by disciplines is needed, including data standards and protocols, management frameworks, digital and data literacy capability, research training in digital methods. • There are very significant skills gap in EMCRs and MCRs' capacity to make full use of RDI already developed, also more generally in computational humanities. This reflects the piecemeal and fragmentary development of RI across HASS through ad hoc project funding without ongoing programmatic support or strategic framing. New AI infrastructure investment is needed • Proof of concept cases to significantly extend the use of AI in HASS NRI: o Building AI pipelines for projects working with textual data and sovereign LLMs. Leads: Profs James Smithies, Katherine Bode. Part of broader agenda for HASS to access high quality data and infrastructure for building sovereign LLMs. o Digital research platforms to interrogate flows of information in the AI age. Leads: Profs Julian Thomas, Jean Burgess. Underway through a second phase of ARDC HASS & I RDC investment - the Australian Internet Observatory (AIO). We refer the Department to the AIO's separate submission, which sets out an agenda 2028-2033 to meet the digital transformation challenge at scale o The AI enabled data analysis & aggregation proposed in the national collections model (above) can leapfrog the classification issues that silo our knowledge systems (science, museum, archive etc) by using AI to describe things, as they are, not by disciplinary or collection specific metadata standards. • For AI to truly deliver, data needs to be digitised.

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) interacted 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.

Q39.

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

- ☐ For expertise or advice
- ☐ Access to research resources or products
- ☐ Access to equipment for research
- ☐ Access to equipment for operational reasons
- ☐ Help in translating research
- ☐ 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.

The Australian Academy of the Humanities (AAH) submission focuses on key parts of the ecosystem for HASS and Indigenous NRI, not currently available, or not at sufficient scale. We address current NCRIS investments which need to be consolidated and sustained in the next Roadmap, unfinished business from the 2021 Roadmap (namely, 'step-change' NDRI, national research collections, and AI capabilities), and we propose new capabilities which position Australian research to respond to geopolitical, economic, social, technological and environmental challenges. HASS research infrastructure is central to Australia's self-understanding and sovereign capability in a fragmenting international order. Investments made since the 2021 Roadmap have started to meet these needs and fill a major gap in the NCRIS system. The 2026 Roadmap, needs to strengthen public research infrastructure for a thriving democracy. HASS ingenuity and leadership is vital to this agenda – including by ensuring well-governed AI capability for identifying potential strategic threats and opportunities, and building the bridges with public sector partners (including GLAM and governments) and communities. Brief history: after a period of NCRIS under-investment in HASS and Aboriginal and Torres Strait Islander (ATSI) capabilities, two scoping studies conducted for the Department of Education in 2019 identified the need for national-scale data infrastructure for HASS and Indigenous research: 1. ARDC (2020) Humanities, Arts and Social Sciences Research Data Commons - Final Report 2. Australian Academy of the Humanities (2020) Mapping International Research Infrastructures for the Humanities, Arts and Social Sciences. Guided by this work, the 2021 Roadmap and subsequent Investment Plans invested \$34M (plus partner contributions) in the HASS and Indigenous Research Data Commons (HASS & I RDC). This investment has been transformational, but there is more to do to unleash its full potential. HASS, Indigenous, and related GLAM NRI needs strategic coordination, better leveraging of existing investments, and new sovereign capabilities. The AAH urges the government to take a bold and systemic approach to its 2026 roadmapping process. Future NCRIS needs to amplify its collaborative remit in a more 'joined up' R&D ecosystem, which is also the subject of two major reviews currently underway: • the Strategic Examination of Research and Development (SERD), which calls for better coordination of National Research Infrastructure (NRI), and • the Australian Research Council's National Competitive Grant Program Review (NCGP), which positions the ARC as a funder of 'early stage' research across all disciplines; and signals its role in supporting institutional RI. The proposed Collaborate scheme promises to fill a gap between project based funding and 'Centres of Excellence' scale funding, which could help seed and build research-led infrastructure of national significance to be ultimately leveraged by NCRIS.