

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

Innovation in medical products and health procedures is a high stakes affair. Introducing new products, comparing them to the status quo, and monitoring their safety and effectiveness post-deployment is quite literally a life and death decision. No change to currently approved products, medicines, or treatment guidelines can happen on the basis of a single trial, study, observation or experiment. Increasingly, in order to get through regulatory and approval gateways, multiple studies, observations, and trials must be brought together. Experimental and real-world evidence must be combined. The current obstacle to this kind of translational science is finding, securely accessing and harmonising data from multiple data sets from across the fractured and siloed health system. Digital research infrastructure needs: - Consistent and comprehensive visibility of key data sets across public, research and private sectors, and across modes (experimental, genomic, admin, imaging, trials, medical records). - Secure data access environments where innovators and scientists have the right combination of security, data, and tools. - Deployment of common data models leveraging national and international standards, allowing this data to be meaningfully aggregated with statistical integrity (including the skills uplift to enable researchers to adopt these new data-driven research methods and research infrastructure). - Tools, skills and compute for advanced analysis (modelling, machine learning, genAI). - Underpinning secure cloud with appropriate certification (e.g. ISO 27001). A very specific combination of these infrastructure elements is required to allow everyone in the regulatory approval process to see harmonised views of evidentiary datasets relevant to an approval. It is difficult now for innovators, scientists, or regulators to even characterise the current state of health care against which to compare any new proposal. An example of research-public-private cooperative infrastructure in this area can be seen in Europe through the DARWIN initiative (<https://www.darwin-eu.org/>). Australia would do well to develop its own medical approvals data commons.

Q24.

Defence

It is more and more critical for scientists inside and outside of defence to work collaboratively on the development of technology or insights to protect Australia's national interests. Also common is for defence to contract research from research institutions. Mobilising Australia's best minds—whether they be inside or outside defence—to address our strategic challenges is a critical piece of the defence futures puzzle. And yet because of national security considerations, collaborations between defence and research are limited, and when they do happen, the collaborative arrangements, access, approvals, datasets and tools need to be reconfigured in a custom and bespoke manner for each project. As part of NRI, an ongoing defence/research sector collaboration capability is desirable to streamline interactions. Trust mechanisms can be enabled through formal policies, standards, identity management, cybersecurity and fit for purpose tools and data access systems. Together these elements can create a 'safe data space' for trusted collaborators to work with defence scientists or defence sector related datasets. 'Data Spaces' is a formal technical architecture and governance framework for creating such safe and trusted data spaces. The framework is maintained by the International Data Spaces Association (IDSA) and is subject to the ISO/IEC AWI 20151. The IDSA originated in Germany in 2014 as the Industrial Data Space (IDS) initiative. IDSA provides a standards-based design framework for developing collaboration and safe data sharing. It should be stressed that such a capability would be a research capability and not a defence operational capability and would only aim to facilitate research collaborations and use only data and tools appropriate to the purpose. On both sides, there is already a great deal of open source data and tooling maintained independently. If the design pattern for such a safe data space were tested and deployed with the research sector, it would have other applications, such as in safe defence supply chain data spaces. Digital research infrastructure needs: - Safe, sovereign data sharing space that enables secure collaboration and managed data access across sectors. - Underpinning secure cloud with appropriate certification (e.g. ISO 27001).

Q25.

Recycling and Clean Energy

Recycling and clean energy operate within complex systems involving materials, energy inputs, waste management, consumer behaviours and evolving policies. We must map systems and develop innovations to enhance efficiency and sustainability. A key barrier to circular economy and decarbonisation goals is aggregating and analysing data from industry, consumers and researchers in secure, trusted environments. These must provide analytical tools while addressing privacy, enabling evidence-based decisions and systemic innovation. Collaboration is critical. This requires FAIR (Findable, Accessible, Interoperable, Reusable) data repositories, secure federated frameworks, and digital marketplaces connecting suppliers, recyclers and manufacturers. Five technology areas are focal points in transitioning to a circular, low-carbon economy—each requiring digital infrastructure for rapid development, integration and impact: 1. Waste-to-Resource: Recycling and waste-to-energy solutions transform waste into valuable resources. Infrastructure includes analytics for sorting, digital twins for simulating recycling and AI tools for analysing waste streams. 2. Battery Recycling: As EV demands grow, recycling lithium-ion batteries and recovering critical materials is essential. This requires data platforms to track battery lifecycles, AI to improve material recovery and forecasting tools to optimise material supply chains. 3. Renewable Energy and Smart Grids: AI-enabled decentralised grids and waste heat recovery improve efficiency and reduce emissions. Infrastructure includes simulation tools for smart grids, real-time energy analytics and IoT systems for monitoring. 4. Carbon Capture and Utilisation (CCU): Repurposing CO₂ into fuels and materials, along with Direct Air Capture, supports emissions reduction. Needs include AI for capture optimisation and ML tools for scalability. 5. Hydrogen Economy: Green hydrogen and fuel cells are advancing in scalability and efficiency. Infrastructure includes blockchain for traceability, AI for modelling storage and transport and simulation tools for cost-effectiveness. Digital research infrastructure needs: - FAIR data repositories for materials, emissions, and energy. - Secure, federated data systems for managing energy flow, grid stability and cross-sector data sharing. - Simulation tools for renewable integration, carbon capture and circular flows. - Scalable platforms for energy modelling, emissions forecasting and AI-driven optimisation. Progress in recycling and clean energy relies on digital foundations enabling visibility, analytics and collaboration. Purpose-built infrastructure—spanning secure data platforms, simulation environments and high-performance computing—is essential to unlock efficiencies, accelerate technologies and support evidence-based decisions. Investing in these capabilities, Australia can shape a resilient, low-carbon future and lead globally in circular economy innovation.

Q26.
Space

Q27.
Environment and Climate

Australia's environmental and climate adaptation challenges are complex, requiring multidisciplinary solutions. Researchers must analyse data from various ecosystems (e.g. terrestrial, freshwater, marine, atmospheric) while also considering social, economic, health, and cultural factors. Research that impacts Australia's well-being and prosperity must utilise data from various domains of science, public administration and industry. However, researchers face significant obstacles: difficulty accessing relevant data, inconsistent sharing arrangements between stakeholders, poor interoperability between datasets, and technical challenges in modeling complex systems. With improved access to diverse datasets (from satellites, sensors and citizen science) and computing infrastructure, researchers can build integrative models that simulate ecosystem interactions and test adaptation strategies in real-time, enabling analysis and informed decision-making. Advances in data, integration and compute are driving three research trends: 1. Environmental Monitoring and Forecasting: Satellite, sensor, and citizen science data are generating vast information on air, water, soil, and biodiversity. Infrastructure includes real-time data systems, scalable compute and tools for visualisation and decision support during events like floods and bushfires. 2. Digital Twins for Planning and Intervention: Digital replicas of ecosystems and landscapes support testing of restoration, land-use, and adaptation strategies. Infrastructure must enable dynamic modelling, data integration and tools for scenario analysis. 3. Environmental Performance Tracking: Tracking outcomes—such as emissions, ecosystem health, and resource use—is essential for assessing interventions. Infrastructure includes trusted data pipelines, standard formats and tools for validation and reporting. Digital research infrastructure needs: - National scale integrated environmental data assets and portals with standardised data access agreements. - Trusted environmental data supply chains that inspire confidence in the public, private and research stakeholders. - Environmental modelling and image processing capabilities. - Support for Indigenous data governance and knowledge integration. - Safe, sovereign data sharing spaces that enable secure collaboration and respect data ownership across sectors. - Skills programs related to this infrastructure to enable the early majority of researchers (rather than just the early adopters) to take full advantage of this new environmental data, modelling, processing and security infrastructure in their research.

Q28.
Frontier Technologies and Modern Manufacturing

Modern manufacturing is undergoing rapid transformation, driven by evolving technologies, shifting global supply chains and increasing demand for customisation, efficiency and sustainability. Manufacturers must navigate complex workflows, integrate diverse processes and respond quickly to changing market conditions. A major challenge in modern manufacturing is harnessing the vast volumes of data generated across design, production, and distribution. Unlocking its value demands secure, scalable digital infrastructure for real-time monitoring, advanced analytics and seamless data exchange. This, in turn, requires interoperable systems, FAIR (Findable, Accessible, Interoperable, Reusable) data repositories and secure frameworks to enable collaboration across industry, research, and government. Four areas of innovation in modern manufacturing demand targeted digital and data infrastructure to accelerate adoption, improve efficiency, and maintain global competitiveness: 1. Advanced Materials and Additive Manufacturing: New materials and additive manufacturing technologies are reshaping design and production by enabling layer-by-layer fabrication with minimal waste. Infrastructure support includes simulation tools to model material behaviour, data platforms for managing and analysing material properties and performance, and AI systems for optimising print processes and reducing waste. 2. Automation and Robotics: Automation enhances precision and efficiency. Required infrastructure includes real-time data systems to coordinate machines, digital twins for process optimisation, and AI models for predictive maintenance and adaptive control. 3. Digital Supply Chains: Supply chains need to be resilient and responsive. This requires integrated data systems for end-to-end visibility, forecasting tools for demand and inventory management, and secure platforms for supplier collaboration and traceability. 4. Sustainable Manufacturing: Reducing emissions and waste is a key goal. Infrastructure must support data-driven resource tracking, simulation tools for process optimisation, and platforms to measure and report environmental performance. Digital research infrastructure needs: - High-quality, FAIR data repositories for materials, processes, and performance metrics. - Secure, federated data systems for real-time production monitoring and supply chain integration. - Advanced modelling and simulation tools for product development and manufacturing workflows. - Scalable computing platforms for design optimisation, process simulation and AI-driven automation. The future of manufacturing hinges on the ability to harness data and technology to drive smarter, faster and more flexible production. Digital infrastructure—spanning real-time data systems, advanced modelling, and AI-driven automation—will be the foundation of globally competitive, resilient 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

Researchers, innovators and policymakers are scaling clean technologies, decarbonising industry and creating a circular economy while ensuring social inclusion. Achieving this requires fast, evidence-based decisions and real-time collaboration. However, limited access to high-quality data, secure sharing frameworks, and clear governance hinders effective decision-making, innovation, and impact. Data is critical. It enables real-time monitoring, predictive modelling and system optimisation across energy, emissions and resource use. Robust digital infrastructure allows data sharing, interoperability and translation of research into solutions—supporting policy and investment. Net zero demands systemic change—cutting emissions, removing carbon, reducing impacts and supporting circular resource use. This must also enable Indigenous communities and a skilled, adaptive workforce. Four major research directions require targeted infrastructure to deliver solutions efficiently and at scale: 1. Emissions Reduction and Storage: Scalable renewable energy, grid integration and storage systems need real-time data for energy flow, demand forecasting and grid balancing. AI supports predictive load management and fault detection, while digital twins simulate grid operations for improved stability and emissions reduction. 2. Carbon Removal and Emissions-Intensive Sectors: Atmospheric CO₂ removal, including nature-based and engineered solutions, requires data for monitoring, verification, and optimisation. AI models can refine capture efficiency, assess land use and soil carbon, and evaluate impacts for sectors like agriculture and heavy industry. 3. Circular Economy and Critical Minerals: Tracking material flows and resource efficiency across supply chains relies on accurate, interoperable data. Digital platforms and AI tools enable waste sorting, recycling, and life cycle analysis, ensuring sustainable processing of materials and critical minerals for clean technologies. 4. Inclusive, Low-Impact Transition: Equitable decarbonisation requires data for environmental monitoring, support workforce development and benefit-sharing. Secure platforms support data sovereignty and enable Indigenous communities to participate in and benefit from projects, while training systems build workforce capability. Digital research infrastructure needs: - FAIR data repositories for emissions, materials and environment data. - Secure, federated data-sharing for collaboration and sovereignty, and safe exchange of sensitive data. - Advanced simulation and analytics for carbon removal and circularity and system optimisation, underpinned by harmonised data. - Scalable computing for modelling, real-time simulation, and AI applications across energy, emissions, and resource use. Digital and data infrastructure is central to delivering scalable, responsible solutions—accelerating emissions reduction, supporting inclusive growth, and building national resilience.

Q31.

Supporting healthy and thriving communities

Australia's great health and wellbeing challenges are multifactorial. Therefore the direction of health research is 'multimodal'. For example, researchers addressing dementia try to combine information from diagnostics, therapeutics, epidemiological life course, genomics, demography, lifestyle, carer arrangements and more. Researchers addressing obesity must consider food and nutrition, physical activity, built environments, transportation, social media, social norms, education, socioeconomic status as well as genomic and phenomic factors amongst many other bio-chemical considerations. The global challenge of antimicrobial resistance requires a collaborative, multisectoral and transdisciplinary approach—working at the local, regional, and global levels—with the goal of achieving optimal health outcomes that recognise the interconnection between people, animals, and their shared environment. [Examples sourced from 'Australia's data enabled research future health and medical sciences' published by the Australian Academy of Health and Medical Science: <https://tinyurl.com/y6wkmk66>] To support such multimodal research, infrastructure must: 1. Make data findable and accessible from multiple sources across and beyond the health system. 2. Allow sensitive health data from multiple sources to be accessed securely. 3. Make it easier for data from multiple sources to be integrated. 4. Harness contemporary advanced analytics methodologies including AI. Digital research infrastructure needs: - Data Findability and Availability Infrastructure: Increase researcher access to strategic new datasets (such as My Health Record) and comprehensively expose health data and data on the social determinants of health from across governments, research institutes, national facilities and the private sector. - Secure Data Access Infrastructure: a) 'Trusted Research Environments' for researchers to work on sensitive health and wellbeing data; and b) Next generation infrastructure that allows sensitive data to stay where it is and for queries and aggregated data responses to be exchanged safely. - Data Integration Infrastructure: Fundamental semantic data harmonisation using common data models (including OMOP-CDM), international ontologies and standards (including skills uplift in relevant informatics, statistics, and data science to empower researchers with this infrastructure). - AI and Advanced Analytics Infrastructure: Synthetic data, NLP, ML, LLM and GenAI tooling deployed in these secure environments (including Skills programs to enable researchers to take full advantage of AI infrastructure in their research). - Underpinning secure cloud with appropriate certification (e.g. ISO 27001) to facilitate ethical human research.

Q32. Elevating Aboriginal and Torres Strait Islanders knowledge systems

Four key trends are driving emerging research directions in Aboriginal and Torres Strait Islander knowledge systems: 1. Indigenous Data Governance: Research increasingly focuses on developing appropriate governance frameworks that enable Indigenous communities to control how their knowledge is collected, stored, shared and used. This shift challenges conventional Western research paradigms and requires new approaches to intellectual and cultural property protection. As digital archives expand, questions of ownership, access and cultural safety become paramount. 2. Language and Cultural Revitalisation: Digital technologies are creating new possibilities for language preservation and cultural continuity. Research directions include AI-supported transcription, translation services and immersive learning environments that can help strengthen intergenerational knowledge transmission while respecting cultural protocols. 3. Combining Traditional Ecological Knowledge with Contemporary Environmental Science: Indigenous ecological knowledge offers sophisticated understanding of land management, biodiversity conservation and climate adaptation. Emerging research explores how this knowledge can be merged with Western scientific approaches to address pressing environmental challenges, particularly through Indigenous ranger programs and co-designed research initiatives. 4. Indigenous-Led Health and Wellbeing: Growing recognition of the importance of culturally informed health approaches is driving research into models that integrate traditional healing practices with contemporary healthcare. This work addresses significant gaps in health outcomes through holistic approaches that acknowledge connections between cultural identity, Country and wellbeing. Digital research infrastructure needs: - Indigenous-controlled data repositories and catalogues that implement both FAIR and CARE principles with appropriate metadata standards to support Indigenous data governance. - AI and natural language processing tools specifically designed for Indigenous languages. - AI-supported provenance and metadata creation to support the discoverability of Indigenous data at scale. - Traditional Knowledge and Ecological Modelling Platforms that merge Indigenous ecological knowledge with Western science, building on standards that enable effective information exchange between communities and other stakeholders. - Secure, community-owned on-Country digital infrastructure with technologies for Indigenous IP protection and cultural heritage tracking. - Comprehensive training and capacity building programs to upskill Indigenous communities, researchers and language workers in digital tools, data governance and AI applications.

Q33. Protecting and restoring Australia's environment

Protecting and restoring Australia's environment is a national priority, tied to climate resilience, sustainable resource use and biodiversity. Researchers and policymakers aim to integrate environmental data into tools that support evidence-based decisions for climate adaptation, restoration, and land and water management. The goal is to shift from isolated monitoring to predictive insights. Technology advancements are reshaping environmental research. Science is increasingly intertwined with economic and social factors, driving demand for integrated, cross-disciplinary data to support complex decisions. Observational data from drones, lidar, satellites, and in-situ sources like ocean floats, camera traps, audio, and genomics is growing rapidly. Researchers must combine diverse datasets from multiple domains but face challenges accessing unfamiliar data types and integrating incompatible datasets. Digital infrastructure can replace bespoke, project-level data wrangling with dependable national services. Trusted data supply chains—underpinned by robust systems and governance—are essential for secure data flow across public, private, and research sectors. Meanwhile, advanced analytics, including modelling and AI, are moving from the frontier into mainstream use. Tools once limited to specialists are now essential. Infrastructure lowers barriers, enabling more researchers to process, model, and extract insights from data. Leveraging these advances, five research directions will shape Australia's environmental response beyond 2028: 1. Digital Twins of Ecosystems: Real-time digital replicas to simulate change and guide interventions, enabled by integrated data and modelling. 2. AI Forecasting: Predictive models for hazards and climate impacts, requiring scalable compute and trusted data pipelines. 3. Real-Time Monitoring: Sensor networks delivering continuous data; infrastructure must manage large flows and ensure quality. 4. Socio-Ecological Integration: Linking ecological, social, and cultural data through interoperable systems and ethical governance. 5. Carbon and Services Accounting: Accurate tracking to support markets and policy, built on standardised, verifiable data. Digital research infrastructure needs: - National-scale integrated environmental data assets and accessible portals to improve data findability and reuse across sectors. - Trusted data supply chains with secure platforms and governance frameworks for safe access and exchange of sensitive or proprietary data. - Scalable modelling, simulation, and image processing capabilities, supported by advanced computing and AI tools (e.g. machine learning, digital twins). - Consideration of Indigenous perspectives and data sovereignty, supporting ethical stewardship and culturally appropriate governance. Purpose-built digital infrastructure accelerates research, enables innovation, and turns data into action—driving progress in sustainability, resilience, and climate adaptation.

Q34.

Building a secure and resilient nation

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.

The Need for Engineering Research Support in NCRIS: Despite the critical role heavy engineering research plays in driving innovation and industrial growth, NCRIS currently lacks dedicated support for engineering researchers. This gap affects a broad spectrum of fields, including manufacturing (FoR 4014), energy (FoR 4008), recycling (FoR 4019) and materials science (FoR 4016). Notably, 21% of Australia's R&D expenditure goes to manufacturing, which lacks supporting digital research infrastructure (<https://tinyurl.com/3rfa7tt7>). Engineering research underpins efforts to reach net-zero and build a secure, resilient nation—two of the 2024 National Science and Research Priorities. Furthermore, the 2021 National Research Infrastructure Roadmap identified several challenges still unsupported: Resources Technology and Critical Minerals Processing (FoR 4019), Recycling and Clean Energy (FoR 4016, 4019), and Frontier Technologies and Modern Manufacturing (FoR 4008, 4009, 4014). Without dedicated digital infrastructure, Australia will fall behind in sustainability, economic competitiveness and innovation. ARDC proposes to establish an Engineering Research Data Commons (Engineering RDC) to support national engineering research through secure access, sharing and use of engineering data. This capability will integrate existing datasets, enable secure and efficient data sharing, and support advanced modelling and simulation. By facilitating data interoperability across universities, research institutions, SMEs and heavy industries, the RDC will accelerate research translation, foster collaboration and drive innovation. Secure data sharing and interoperability are essential to translate research into real-world applications. A key function will be developing data standards and governance frameworks, ensuring research outputs can be effectively used by industry. Case Study—The Role of Data Standardisation in Carbon Capture Reporting: Data standardisation is critical to ensuring trust, transparency and credibility in industrial reporting and regulatory compliance. For example, in the concrete industry, carbon capture and storage within concrete products is an emerging decarbonisation strategy. Producers are increasingly required to report on the amount of CO₂ captured and stored during production. Without standardised data formats and verification frameworks, inconsistencies in reporting arise, creating loopholes that can be exploited. Some companies, including international operators working under different regulatory regimes, may satisfy Australian compliance requirements without demonstrating equivalent environmental outcomes. Robust data standards address this risk by ensuring that emissions data is consistent, verifiable and comparable. These standards can be embedded in companies' data capture and reporting processes, while also enabling regulators to independently verify claims and uphold the integrity of emissions reduction efforts. This supports fair competition, builds confidence in industry reporting, and reinforces Australia's climate commitments. About the Engineering RDC: This initiative will establish a federated and secure data infrastructure connecting diverse engineering research domains. The immediate priority will be to map and integrate existing datasets, addressing critical gaps in research areas such as sustainable manufacturing, energy transition technologies and resource efficiency. The capability will focus on developing AI-driven tools and digital twin technologies to enhance modelling, simulation and predictive analytics in engineering applications. A major milestone will be demonstrating the practical benefits of data sharing and interoperability, showcasing how enhanced access to engineering data can accelerate industrial innovation, optimise resource utilisation and support national sustainability goals. Given the breadth of engineering research, it is important to recognise its pervasiveness across sectors, the rapid pace of technological progress and the evolving nature of national priorities. Accordingly, initial efforts must be focused, and priorities refined as the initiative develops, guided by ongoing consultation with stakeholders. ARDC has used its Translational Research Data Challenges (TRDC) program for short (2–3 year) mission-driven initiatives to build digital infrastructure and foster collaboration across sectors to tackle specific problems, e.g. Bushfires TRDC. In alignment with current national priorities and ARDC research, this construct will be applied to the energy sector before 2028. This pilot will serve as a model for scaling to an Engineering RDC. The Engineering RDC will benefit a wide range of research communities and industry sectors, particularly those engaged in advanced manufacturing, clean energy technologies and circular economy solutions. Researchers working in materials engineering, robotics, AI-driven industrial automation and sustainable resource processing will gain access to a robust data ecosystem that enhances their ability to develop and test innovative solutions. Additionally, industries focused on battery development, hydrogen production, waste recycling and smart infrastructure will benefit from improved data accessibility, enabling them to collaborate more effectively with researchers to address pressing technological challenges. Given the urgency of addressing Australia's engineering research data needs, it is recommended that this capability be established within the next five years. The Engineering RDC will be the backbone of engineering research and the transition to net zero in Australia, ensuring that researchers and industry partners have the tools they need to drive sustainable, technology-led growth for the nation. By investing in a dedicated Engineering Research Data Commons, Australia can position itself as a global leader in engineering-driven innovation, supporting economic resilience and national priorities.

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.

This question was not displayed to the respondent.

Q39.

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

This question was not displayed to the respondent.

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 alignment between the National Research Priorities and the 2021 Roadmap Challenges reflects the nature of key societal problems. The desire for long and healthy lives is captured both by the 'Healthy and thriving communities' Priority and also by the Challenge 'Medical products'. Similarly, 'Transitioning to a net zero future' maps to the Challenge of 'Recycling and clean energy', and both the priority and challenge reflect the need of ensuring Australia's long-term energy sustainability while minimising climate change. It's natural to see common infrastructure requirements between priorities and corresponding challenges. However, for DRI common patterns exist across all the challenges and priorities. Complex, disparate data sources must be brought together in a secure environment with analysis tools (increasingly AI-driven) and researchers need skills and expertise to use the infrastructure. Access to data, whether an individual's health records or commercially sensitive manufacturing outputs, requires appropriate data sharing agreements and a secure environment for analysis. Specific solutions to these problems will vary according to context. European industry uptake of data spaces in manufacturing is growing, while in hospitals leaving data securely where it is and executing federated queries is driving the adoption of common data models such as OMOP. Given these common needs, NDRI must address cross-sectoral issues while dovetailing into discipline norms and standards. ARDC's Thematic Research Data Commons address this need sector-by-sector. Consistent underlying digital "commons" approaches, if applied across challenge and priority areas, will result in a more efficient and interoperable NRI, better able to seamlessly combine to address society's cross-cutting challenges. While the focus on priorities and research trends is critical, it is also necessary to have robust underpinning infrastructure, particularly for DRI that requires continuity of service such as persistent identifiers (PIDs) and cloud computing. PIDs is a core component of a national infrastructure and key to world-class research. Using PIDs, cross-cutting infrastructure, including Research Link Australia, supports the translation of research for evolving priorities. While PIDs potential for significant cost savings is clear, the imperative to use PIDs increases with AI. Provenance tracking is essential for ensuring research integrity and distinguishing AI outputs. By linking scientific concepts across systems, PIDs enable knowledge integration across fields with traditionally different practices. (National PID Strategy <https://zenodo.org/records/10656276>) Similarly, the Nectar Research Cloud is a critical component of NDRI. It hosts over 200 services optimised for Australian research, including NCRIS capabilities. Nectar is undergoing ISO certification (27001) to meet the cybersecurity requirements for cross-institutional collaboration with sensitive data.

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.