By email: researchinfrastructure@education.gov.au

9 January 2025

Australian Academy of Science submission on the
Draft Final NDRI Investment Plan: Recommendations for Investment by the NDRI Working Group Feedback Survey

The Australian Academy of Science (the Academy) recommends the following be included in the Final National Digital Research Infrastructure (NDRI) Investment Plan:

- Greater investment to secure Australia's current high-performance computing and data (HPCD) infrastructure and to expand HPCD capabilities to meet increasing demand.
- The development of an "Integrated, National HPC Facility" should instead be referred to as a national *capability.* This national capability must be operated independently from an existing HPC facility, government body, or government science agency.
- Specific additional investment into a nationally coordinated digitalisation program for research collections be included under Outcome 3 of the Final NDRI Investment Plan.
- Provisions to develop and attract new talent outside of the existing NRI workforce, including school and tertiary education programs to embed critical digital and data skills.

Q1. Do the proposed levels of investment for the different outcomes and the outcome-specific investment areas seem appropriately balanced?

High-performance computing and data (HPCD) infrastructure is fundamental to Australia's national digital research ecosystem and future research capability.

The notional allocation of $100 million to the delivery of HPCD capability in the Draft Final NDRI Investment Plan is insufficient to maintain Australia's current HPCD capabilities, let alone prepare to meet the evolving needs of Australia's research sector. This limited funding envelope does not provide room for the much-needed expansion of HPC capabilities to meet continually increasing demand, such as developing a national exascale capability.

Governments have an opportunity to commit to a decadal program to secure, coordinate, and stack Australia's HPCD capabilities—across government, the private sector and the research sector. Such a decadal program would necessitate investments of up to $2 billion over ten years outside of the funding envelope of the NCRIS program.

The provision for skills development and a fellowship scheme for NDRI professionals is long overdue and welcome. Further details should be provided on what the $15 million for skills development and training for end users would target and enable.

Q2. Are there critical NDRI investments missing from the recommendations listed?

The recommendations listed lack a pathway to exascale high-performance computing and data infrastructure (HPCD), which is a critical gap.

To accelerate Australian research, the Academy recommends that Australia acquire and sustain next-generation supercomputers to develop Australia as a hub for exascale capability in the Asia-Pacific region. Initial actions to achieve this ambition include developing a national supercomputing strategy and committing to necessary scoping studies. Many of our international peers, such as China, the US, Japan, the UK, and Europe, are either already operating or planning for exascale capabilities and beyond. The NDRI Investment Plan is an opportunity to take the first steps towards this. The $15 million assigned to establish a coordinating model for HPCD should be tasked with implementing this national supercomputing strategy.

Another critical investment missing from the recommendations is a nationally coordinated digitalisation program for research collections, such as biological collections and those managed by the galleries, libraries, archives and museum (GLAM) sector. Research collections are a vital input to Australia's scientific research endeavour, yet the digitalisation of these nationally significant data sets is currently ad hoc, placing them at risk. While the broader data investments outlined in the recommendations may fill some needs, research collections and their associated metadata have unique requirements, such as persistent identifiers to link physical objects with their digital record. The Final NDRI Investment Plan should include specific additional investment into modernising, digitalising, and adapting historical data and research collections under Outcome 3.

Investment is required throughout the training pipeline to upskill Australia's workforce in the current and future capabilities required to operate, manage, and harness cutting-edge NDRI. The current recommendations do not address developing and attracting new talent outside of the existing NRI workforce. Other skills, such as expertise in data science should also be fostered. Additionally, school and tertiary education programs could be supported to embed critical digital and data skills, and training in the responsible and ethical use of AI tools.

Q3. Please provide any additional comments that you may have related to the Draft Final NDRI Investment Plan: Recommendations for Investment by the NDRI Working Group.

The intent of the recommendation for the development of an integrated, national facility is welcome, however the Academy recommends it is referred to as a national *capability* to recognise the dispersed nature of HPCD infrastructure. It should be coordinated and unified, but this does not necessitate it being entirely located at one facility.

This integrated capability will pave the way for greater coordination in the HPCD community, allowing for forward planning and investment in skilled workforce and infrastructure. To have the convening power required and to maintain authority, transparency and trust in evidence-based decision-making the proposed model must be operated independently and not be located within an existing HPCD facility, government body, or government science agency.

A coordinated national model for HPCD could also pave the way for flagship investment in a pathway to exascale computing and regional collaboration articulated in the NRI Roadmap, but we do not have until 2026 to reinforce existing HPCD infrastructure. Ensuring that investment adequately meets the lifecycle of the computing capabilities is critical for Australian science. As highlighted in Q1 above, the funding currently allocated is insufficient to secure our current Tier 1 facilities.

While significant opportunities exist to strengthen the plan, the Academy welcomes many of the investments currently recommended. In particular, the Academy welcomes the inclusion of funding to train Indigenous communities to govern their own data with autonomy over its use and access. The Academy also welcomes investment in services that support data discovery, access, and curation and ensure rich metadata for all research sectors, with appropriate data security.

To discuss or clarify any aspect of this submission, please contact Mr Chris Anderson, Director Policy and International at Chris.Anderson@science.org.au.