



**Australian Government**  
**Department of Education**

# NDRI Investment Plan Consultation Survey Summary

NDRI Skills



**Q21 - How can NDRI training, education and professional development for all NDRI users and operators account for ongoing and rapid advancements in NDRI, including digital capabilities not yet realised?**

- Expert support and advice from data scientists and engineers with specialist knowledge in NDRI capabilities and the practical needs of research communities.
- Developing training and development schemes that provide foundational understanding of coding and data management but are designed to leverage that knowledge using AI tools.
  - Investing in a cohort of research software professionals would facilitate this, by developing people capable of bridging the gap between domain knowledge and advanced technical methods.
- Partnership with universities to enable certificate/diploma opportunities; organise webinars and design short courses.
- Collaborating with technology firms, startups and academia to access cutting-edge research and innovations to inform training content and expose users to cutting-edge tools early.
- Collaborative networks and mentorship programs are required to support knowledge sharing and professional growth. This can help build a community of practice that stays current with emerging trends and technologies.
- Providing accreditation in data research infrastructure focused skillsets is essential.
- Incorporating ethical, legal, and social implications of new technologies.
- Providing incentives for researchers to pursue advancements aligned with their field's priorities.
- Replicating successful overseas models that promote learning and knowledge exchange between bioimage analysis specialists through online events, workshops and repositories of training material.
- Establishing a program of Doctoral Summer Schools, hosted by academics and NCRIS staff.
  - They should be domain focused and targeted to uplift higher degree researchers across all disciplines and research domains.
- Strategic placement of technical specialists positions them in key roles within the NRI ecosystem, where they can design NCRIS products and services that benefit a wide range of projects and applications.
- A national e-research centre dedicated for research software engineering aspect and professional development can be very helpful for current NCRIS projects and the encouragement of rapid advancements in NDRI.
  - One international example is the Netherlands eScience Centre.
- Fostering global partnerships through face-to-face secondments, ensuring Australian NDRI operators remain at the forefront of international advancements.
- Collaboration with local and global technology development companies to stay informed about the latest advancements enabling integration of new technology into early adoption pilot programs for training purposes.
- Investing in the Tier-1 facility training teams to specifically address rapidly changing capabilities with a focus of producing broadly available resources and working with smaller facilities to tailor content to their needs.
- Investing in a National Training Program on Advanced Social Science Analytics that provides:



- Specialisation paths in contemporary streams (for example, natural language processing, social network analysis, geospatial analysis).
- Foundations in mathematical and statistical concepts underpinning data science, machine learning and AI applications, in the context of social science research challenges.
- Implementing a structured approach (one learning management system) that incorporates certification and credential pathways for data managers and data users leveraging existing resources and integrating AI tools for knowledge resource development.
- Libraries can lead in providing digital literacy programs and professional development opportunities that help researchers keep pace with technological advancements.

**Q22 - How can governments work with NDRI providers to address staff shortages and expand workforce training opportunities?**

**• How can Australia attract and retain its NDRI workforce in a competitive global hiring market?**

- Encouraging NDRI providers to develop clear career pathways and progression within NDRI roles that adjoin academia and industry, including opportunities for further education and professional development across both technical and leadership functions.
- Working with universities and other Tier-2 facilities to prioritise student enrolments and training in this space.
- Encouraging universities to develop a technicians' career pathway that is separate to current academic and administrative pathways.
- Leveraging public-private national and international partnerships to create internship and apprenticeship.
- Adopting models such as the Technician Commitment, which focuses on career development, recognition, and sustainability for technical staff.
- Enhancing Australia's research ecosystem with cross-capability exchange.
  - To encourage multi-skilling through cross-capability exchanges in health NDRI and with other NDRI sectors.
- Training the workforce from the bottom-up and provide clear career pathways fuelled by longer-term investments.
  - To provide PhD graduates with a workplace full of interesting challenges will drive them to learn, succeed and will take care of retention.
- Incentives for retention.
  - Providing salaries, competitive funding and career progression pathways, especially for fresh post docs or early- and mid-career researchers.
- Introducing work-integrated scholarships targeting students in relevant fields like data engineering.
  - These scholarships would include annual embedding within NDRI facilities during summer vacations, providing students with hands-on experience and fostering early engagement with critical national infrastructure.
  - This model can be adapted from successful industry-academia collaborations seen in countries like Germany, where dual-study programs bridge the gap between academic training and workforce needs
- Supporting university employment models like the University of Melbourne's Academic Specialist work category, providing flexibility, recognition, and career pathways associated with traditional academic roles tailored for NDRI workforce.
- Sustainable funding for open-source software:
  - a national program to support open-source development would attract international talent and retain researchers in Australia.

- Recognising open data in grant assessments.
  - Funding bodies often prioritize publications over contributions like data sharing. Updating evaluations to recognise open data contributions would promote best practices and give proper credit to computational researchers.
- Restoring flexibility in grant eligibility.
  - Grant restrictions limit interdisciplinary collaboration. Allowing more flexible eligibility would enable computational biologists to drive innovative research and strengthen Australia's NDRI capacity.
- Granting access to training and professional development opportunities, including opportunities to collaborate with overseas counterparts.
- Developing the social licence within NDRIs, national research infrastructures (NRIs), Deputy Vice-chancellors of Research (DVCRs) and Vice-chancellors (VCs) for enablement careers.
- Helping organisations accelerate the enablement of careers through a national maturity model.
- Developing sectorial recognition of enabler leaders via awards, accreditations, promotions.
- Public-private partnerships between research institutions, universities, and industry.
  - It will provide collaborative learning opportunities and cross-sector experience, while targeted immigration policies, such as fast-track visas and permanent residency incentives, will attract global talent in bioinformatics and data science.
- Given the specialised nature of most work, specific effort is needed to propagate and nurture emotional intelligence, psychological safety and general good workplace culture.



**Q23 - What are the priority NDRI skills investments that would enhance Australia's research efforts?**

- Training programs to improve digital literacy and data management skills across all research disciplines.
- GPU and NPU/TPU software development.
  - Will build expertise in advanced computational methods will support vital national research areas.
- AI/ML model design and implementation.
- Numerical optimisation techniques.
  - Training in these methods will enable faster, more accurate research outcomes, directly supporting national priorities.
- Training in cybersecurity to protect sensitive research data and ensure data integrity.
- Merit based digital research infrastructure fellowships to attract and retain top talent in specialised fields, and to provide infrastructure staff with a pathway to career recognition and advancement.
- Providing internships to students.
  - Gaining working experience in the NDRI environment will help them see a clear pathway to employment in this evolving and vital field.
- Ethical, legal and social implications skills development.
- Global collaborations and cross-capability exchange especially for health digital infrastructure users and providers.
- Developing academic pathways and recognition frameworks for early/mid-career researchers and leaders specializing in NDRI, complemented by enhancing professional staff career pathways in this domain.
- Building NDRI capabilities within teams and institutions involved in creating new data assets, ensuring adoption of FAIR principles from the data creation stage.
- Establishing recognition metrics and career pathways for dataset creation and curation, equivalent to research publications, fostering growth of academic code specialists.
- Developing a national roadmap and investments towards exascale computing capabilities, preventing the loss of talent to international institutions leading in next-generation research domains.
- NCRIS-wide Learning Management System (LMS) for developing and delivering training amongst NCRIS. It would also make the transfer of training into the higher education curriculum much easier.
- Establishing a NDRI Academy, providing a wide range of training and learning pathways along with discipline specific resources for our researchers.
- Investment in bioinformatics and computational biology skills in areas such as genomics, personalized medicine, drug discovery, and precision agriculture.
- Structured training programs for higher degree researchers and PhD students.
- Investing in integrating data-driven research into humanities and social sciences.
- Partnerships between universities and data linkage teams to develop specialised training in probabilistic data linkage:

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|  | <ul style="list-style-type: none"><li>• Knowledge and skills related to Indigenous Data Sovereignty, ensuring researchers understand the societal value and importance of ethical data practice and integrity.</li><li>• Research software engineering and optimisation.<ul style="list-style-type: none"><li>○ To help researchers gain skills themselves and support central teams to provide advanced assistance to the research community.</li></ul></li><li>• Investing into community building at all levels to create an engaged network of technology leaders (emerging and senior).</li><li>• Fostering international collaborations and participation in international funding opportunities to put Australia on the map and contribute to the scoping and development of international projects.</li></ul> |
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