

Research Infrastructure Roadmap: IRU submission

High quality and accessible Research Infrastructure is the platform that underpins any nation's research system. Australia has had several rounds of major infrastructure investment through the National Collaborative Research Infrastructure Strategy (NCRIS). This investment has played a key role in Australia's global standing for excellent research as shown through ERA and the ARWU rankings.

Currently there is no Government commitment to further investment in new or substantially upgraded facilities and resources.

However, as part of the National Innovation and Science Agenda (NISA), a key pillar of its plan for Australia's changing economy, the Chief Scientist is leading development of a new ten-year Research Infrastructure Roadmap to provide the basis for Government to commit to long term investment in research infrastructure.

The IRU supports the directions proposed in the Panel's Issues Paper. In this submission, IRU makes the following key points:

- Ensuring sustainability of the broader Research Infrastructure system
- The importance of location – balancing spread, access and the national interest
- Australia within a global network of Research Infrastructure

We also identify priority resources to maintain and renew and new resources to be created. IRU members will provide more detailed submissions about the particular items.

IRU's responses to the Questions 1-11 included in the submission template follow at the end.

1. Ensuring sustainability of the broader Research Infrastructure system

Governments have the responsibility to adequately fund Research Infrastructure but they also have the responsibility of making sure that the system is sustainable in the long-term.

By raising the option of the decommissioning or defunding of research infrastructure, the Issues Paper rightly addresses the important issue of planning for the likely loss of value from a given item over time. Although such a process will cause moments of challenge, there is a collective responsibility among research users to make sure that the system is able to expand to new and different research infrastructures which might not have even been conceived and to plan for and acknowledge when existing research infrastructure loses usefulness.

Hence proposals for the funding of new research infrastructure and for the renewal of current infrastructure should clearly indicate an expected life span. When that point is reached, options for further use can be considered but against an assumption that further support will not be provided without a strong case.

Such a process is also needed for the previous NCRIS facilities receiving recurrent funding to support operations so we can be confident that they remain valuable and worthy of support.

2. The importance of location – achieving national access through strengthening the national research system

It is important that the host agency and the location of major nodes reflect a considered approach to:

- ensure the facility or service is accessible by all who could want to use it; and
- stimulate the whole Australian research system through a distributive intent, with resulting benefits for regions and potential reduction of pressure on major population centres.

To maximize its investment in Australia's research system, the government needs to make sure that publicly-funded research infrastructure is accessible to all researchers and potential end users. Currently this involves digital access, where the location of the researcher is largely irrelevant to the capacity to use the resource, and use of nodes and sub-nodes to widen options for access in person.

The requirement for national access is usually interpreted as ensuring that researchers outside the main cities can access resources, but equally it means that a resource could be located anywhere capable of supporting it, with those in major city areas as able as anyone else to access resources remotely.

Current

While there are universities across most parts of Australia, Australia's research infrastructure remains predominantly inner city-centric. [IRU mapping](#) shows that almost 80% of the currently-funded NCRIS infrastructure is located in cities and inner cities.

Since the large majority of resources are based in the major cities, particularly Melbourne, Sydney and Canberra, it means that researchers from many institutions (and in the majority of cases that means researchers from younger, outer-metropolitan and non-metropolitan universities) remain the 'outsiders'.

It means that the spillover value of hosting major resources is concentrated rather than distributed. The spillover is the incentive for strong research clusters such as the Parkville precinct. The challenge is to replicate this across Australia in areas such as the Gold Coast and northern Australia. Locating research infrastructure is one crucial part in underpinning the future research base across Australia.

Future

Some resources have a natural home. Bio-security capability ought to be present where the major challenges are likely to arise, which is northern Australia. Antarctic research capability is sensibly based along the southern ocean.

Most resources have no intrinsic locational logic. These can be used to stimulate the whole Australian research system through a distributive intent, with resulting benefits for regions and potential reduction of pressure on major population centres. As long as national access requirements can be met, and the resource suitable supported and operated, they can be broadly distributed.

Geographical spread should be a key factor in determining the hosting for resources the roadmap identifies as priority, with the selection criteria specifically citing this outcome. Hence, the selection cannot be solely by the individual merit of applications but should be geared towards achieving the final outcome of NCRIS resources being based across different parts of Australia.

The IRU will further explore this issue in its upcoming research policy statement *Building Regional Research Systems Across Australia*.

3. Linking up with global infrastructure

The Issues Paper rightly addresses the issue of how Australia should link with, and mutually share international research resources. In [Strengthening Research Across Asia](#), IRU recommended that Australia take the lead in the setting up of an Asian Research and Innovation zone which would include a research infrastructure strand.

In a global knowledge-based economy, mutual access to infrastructure in other countries will reduce costs, duplication and lead to economies of scale.

There might be instances where Australia does not need to replicate large-scale niche infrastructure which is readily accessible in another country for instance in South East Asia and vice versa.

By being able to concentrate on fewer but more internationally competitive Research Infrastructure, Australia will be able to attract world-leading researchers and other end users. For instance, unless Australia further invests and upgrades the Australian Synchrotron in the next ten years, it will no longer be internationally competitive.

4. Priority areas for future investment

This research infrastructure listed below is of critical importance to IRU members. They should be priorities for the roadmap.

Resources to maintain and renew:

- Terrestrial Ecosystem Research Network (TERN)
- Australian National Fabrication Facility (ANFF)
- Australian Synchrotron, additional beams
- Australian National Data Service (ADNS) and Research Data Storage Initiative (RDSI)
- Bioplatforms Australia
- National Computational Infrastructure
- National eResearch Collaboration Tools and Resources (NeCTAR)
- Australian Microscopy and Microanalysis Research Facility (AMMRF)
 - Flinders Microscopy Facility (not sure if covered through AMMRF)
- Integrated Marine Observing System (IMOS)
- AARNET

New resources to be created:

- Large-scale national data platforms (e.g. health bioinformatics)
- Compounds Australia

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5. Submission

2016 National Research Infrastructure Roadmap Capability Issues Paper

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Capability Areas

Question 1: Are there other capability areas that should be considered?

These areas are largely comprehensive covering relevant research areas with the following exceptions.

- Humanities and Social Sciences are only lightly present in one of the capability areas. It is important to ensure that the breadth of HASS needs can be covered.
- One possible strand that could be included in the 'Health and Medical Science' capability area is Sports Science research, which is relevant both for improving performances and for research into preventative measures for lifestyle-related diseases.
- The 'National Security' capability area appears to have a very narrow focus focusing on technical ways of safeguarding national security. There could be scope for soft measures of safeguarding security such as combatting radicalisation which might also require research infrastructure planning.

Governance

Question 2: Are these governance characteristics appropriate and are there other factors that should be considered for optimal governance for national research infrastructure?

The proposed governance model key characteristics appear to make sense although different research facilities will require different governance structures.

The proposal for an exit strategy for projects including possible defunding or decommissioning for a project following its anticipated lifecycle makes sense. Every new proposal for research infrastructure funding should include an exit strategy, with project extension possible provided it is justified.

International

Question 3: Should national research infrastructure investment assist with access to international facilities?

Question 4: What are the conditions or scenarios where access to international facilities should be prioritised over developing national facilities?

As outlined in the IRU's *Strengthening Research Across Asia*, Australia should take the lead in establishing an Asian Research and Innovation Zone similar to Europe's Research Area.

IRU strongly supports the use of national research infrastructure investment for access to international facilities. In a global knowledge-based economy, mutual access to infrastructure in other countries will reduce costs, duplication and lead to economies of scale. There might be instances where Australia does not need to replicate large-scale niche infrastructure which is readily accessible in another country for instance in South East Asia and vice versa.

Australia could partner with other countries in appropriately targeted areas of research and innovation.

Rather than being handled on a by researcher basis, there should be a specific system in place enabling researchers' access to international research infrastructure.

Skills and Training

Question 5: Should research workforce skills be considered a research infrastructure issue?

Question 6: How can national research infrastructure assist in training and skills development?

Question 7: What responsibility should research institutions have in supporting the development of infrastructure ready researchers and technical specialists?

Yes, research workforce skills should be part of a scope of the research infrastructure roadmap to ensure that all resources are able to be well used by all relevant researchers.

Access

Question 8: What principles should be applied for access to national research infrastructure, and are there situations when these should not apply?

An initial IRU analysis of the spread of NCRIS infrastructure across Australia highlights the tendency for RI to be centred around cities and inner-city areas with very limited spread across Australia.

Access and spread should be two key principles underpinning this research infrastructure roadmap. New research infrastructure should be devised in such a way that it can be located anywhere in Australia ensuring full access to all potential users. At the same time, there will be instances when it is in Australia's national interest for specific infrastructure to be located in a specific region in Australia.

Defunding and Decommissioning

Question 9: What should the criteria and funding arrangements for defunding or decommissioning look like?

IRU supports requirements for project plans to specify the expected points for defunding and decommissioning of the proposed research infrastructure.

Funding for Research Infrastructure

Question 10: What financing models should the Government consider to support investment in national research infrastructure?

The funding of research infrastructure should be structured to ensure regular investment in new and renewed resources, support for the operation of resources and preparation for ending resources that have reached the end of usefulness.

There should be a rolling average allocation of funds for research infrastructure that would cater for the building, maintaining, upgrading and operation of research infrastructure. One model to explore is whether this annual expenditure could be structured as a capital spend.

IRU supports the reported proposals in the 2015 Report on major research infrastructure. While not released, media reports state that the report recommended that the government contribute \$3.7 billion into an initial funding pool, which would return \$1.5 billion in earnings across a 10-year period and would be topped up from other sources such as state governments, universities and business.

Standards and Accreditation

Question 11: When should capabilities be expected to address standard and accreditation requirements?

IRU supports the approach outlined in the Issues Paper to push for relevant industry standards and accreditation to be attained.

Despite the obvious entailed costs, IRU supports the push for appropriate standards and accreditation in as many research capabilities as possible.

This is one way of driving industry-driven research, a key part of the government's NISA.