

# Submission

## 2016 National Research Infrastructure Roadmap Capability Issues Paper

<b>Name</b>	<b>Alec Coles</b>
<b>Title/role</b>	<b>Chair</b>
<b>Organisation</b>	<b>International Council of Museums (ICOM) Australia</b>

### **Introduction**

The International Council of Museums Australia (ICOM Australia) is a part of the global network of museum and heritage professionals committed to the world's natural and cultural heritage. As a branch of the International Council of Museums, it represents the international interests of its member museums and museum professionals across Australia and nearby regions.

### **Mission**

ICOM Australia is committed to promoting an Australian perspective on the conservation, continuity and communication to society of the world's diverse natural and cultural heritage, present and future, tangible and intangible.

### **Advocacy**

As a non-governmental, non-profit body, ICOM Australia advocates:

- professional cooperation and exchange
- dissemination of knowledge and raising public awareness of museums
- training of personnel
- advancement of professional standards
- elaboration and promotion of professional ethics
- preservation of heritage
- combating the illicit traffic in cultural property.

### **National Research Infrastructure Capability Issues Paper**

ICOM Australia welcomes the publication of the National Research Infrastructure Capability Issues Paper and the opportunity to comment. Comments are provided according to the template but where no answer is offered, the questions have been removed.

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

Whilst it would be tempting to adjust and test the taxonomy of these areas, however, the areas could be defined, separated or amalgamated in a number of different ways, each with its advantages and disadvantages; for the purposes of this exercise, therefore, ICOM Australia is content to work within these areas.

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

With respect to governance structures and characteristics, these must be appropriate to the infrastructure concerned. Given the wide diversity of infrastructure, both existing and proposed, it is hard to imagine a 'one-size fits all' solution. Important considerations will be the balance between representation, expertise and accountability e.g. it will be important that accountability is at the centre of any good governance structure; also, that the distinction between governance and management is preserved. Whilst oversight from a diversity of perspectives is often desirable, by the same token, it is important where there is clearly one, or a small number, of infrastructure provider(s) that activity and achievement is not constrained by unnecessary or tokenistic representation which adds to neither accountability, nor performance.

In terms of the characteristics listed in the paper, these are all valid. It is appropriate that a *focus on benefits and outcomes* heads the list as ultimately this is surely the true test of success: having acknowledged this, the definition of research outcomes that can be effectively evaluated is key.

*Access, IP and accountability* stand out amongst the others listed as those that must be at the forefront of good governance considerations, although all of those listed are relevant and desirable.

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

Most definitely: the global exchange of infrastructure, expertise, information and research outcomes are, probably, equally relevant to all the capability areas. It would be remiss not to explore and exploit the opportunities for the aggregation of expertise, human capital, infrastructure, equipment and financial resources that would be applied to the research into major areas of interest.

There is considerable potential benefit to be had by exploring infrastructure solutions developed elsewhere that may serve as models or even providers for Australian research infrastructure. Similarly, there are moral, practical and economic imperatives to explore and pursue the possibility of rolling-out or sharing Australian infrastructure solutions.

Many larger museums in Australia, for instance, contribute to, and utilise the Atlas of Living Australia (ALA) which is linked to international biodiversity informatics programmes such as Global Biodiversity Information Facility (GBIF), the Encyclopedia of Life (EOL), the Biodiversity Heritage Library (BHL), the Barcode of Life Database (BOLD) and Morphbank. The ALA is already being used by 10 countries around the world.

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

It should NOT be a question of prioritisation of one over the other: the defining criteria for investment should be the enhancement of research opportunities and outcomes. If international

facilities provide better solutions for research aspirations than they should be pursued: where they do not, then alternative national solutions should be favoured.

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

Research workforce skills are, most definitely a research infrastructure issue. It would be a grave mistake to imagine that investment should be restricted to hardware and software. The consideration of the expertise and human capital required will be a critical element when assessing future needs and, of course, this means addressing skills gaps, needs and requirements.

The research environment is constantly evolving and, most would argue, accelerating. New skills are required not only to develop and utilise research tools but, in particular, to manage, organise, interrogate and interpret an ever growing quantity and diversity of data.

The generation and management of 'big data' is the tip of this particular iceberg and it is well recognised that there is inadequate capacity to either manage or interrogate that data: the predictions of the number of data scientists we will need in the near future outnumbering the size of the work force are apocryphal, but this does not mask the fact that in terms of data capture, management, discoverability and 'researchability', resources are woefully inadequate.

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

Providing opportunities for researchers to imagine new outcomes, learn new techniques and use novel equipment and facilities can all be aspects of research infrastructure provision. The opportunities for mentoring, and for the sharing and cascading of knowledge amongst researchers are considerable.

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

This should be a central requirement of publicly funded infrastructure and a key contribution to the sustainability and dissemination of research expertise. It is a potent method by which investment can be assured to deliver long-term and sustainable outcomes.

It is an obvious point, but the research-life of a human being is usually considerably longer than any piece of equipment, and ensuring that skills continue to be developed and honed, is undoubtedly one of the soundest investments delivering the best and longest term returns.

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

Rather like question 6, the range of possible scenarios is so great that it is almost impossible to provide a generic answer. Whilst there should always be a presumption of open access to publically funded data and research outcome, access will need to be assessed in each situation according to

potential costs and benefits: there are important considerations of other factors: these will include practicality, useability, cost-benefit, and the preservation of intellectual property and moral rights.

More seriously, there will be important ethical and cultural considerations in terms of ownership of and access to, infrastructure, data generated, and research outputs. The ownership and accessibility of cultural data, for instance, will often be determined by those groups involved, particularly in the case of Aboriginal and Torres Strait Islander peoples.

Restrictions to access will vary from one capability area to another, for instance one imagines that in the National Security Capability Area, there will be greater restrictions (!), however, there are instances and examples in each area where the principle of free access may need to be overridden in the interests of cultural, environmental, health or national security considerations.

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

This will depend on levels of use, research outputs and future potential. We are aware of existing infrastructure that has become indispensable in the research landscape, whilst there are other examples where funded programs seem little-utilised and almost invisible.

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

Models, again will depend on the nature of the investment, however, it is important that funding is provided over sufficient time to ensure the establishment of a facility. Once a commitment is made, Government should be prepared to bear a level of risk commensurate with an initiative to give it a fair chance to deliver the required outcomes.

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

It would seem appropriate that in almost all cases this would be necessary. Accreditation criteria are developed for good reason and usually with a high degree of care, consultation and sector buy-in. If research infrastructure does not acknowledge and respect such accreditation requirements, there would seem little point in having them.

Question 12: Are there international or global models that represent best practice for national research infrastructure that could be considered?

In the capability area of Culture and Communities, Europeana (<http://www.europeana.eu/portal/en>) is a widely recognised model with great potential, with over 53 million collection items currently discoverable on-line. Its mission goes well beyond pure research support, however, this is surely a strength - its mission is: *We transform the world with culture! We want to build on Europe's rich heritage and make it easier for people to use, whether for work, for learning or just for fun.*

There will be other examples and some are listed below under the respective capability areas.

## Environment and Natural Resource Management

Question 18: Are the identified emerging directions and research infrastructure capabilities for Environment and Natural Resource Management right? Are there any missing or additional needed?

This is an area where the collections sector, particularly museums, has an extremely important role to play. As is noted, below, Museums are key founding members of the Atlas of Living Australia (ALA) which is widely regarded as one of the stand-out infrastructure projects in terms of its success in providing an interface to make large amounts for disparate data discoverable and researchable.

It is also suggested that when considering the success of the ALA, it may be desirable to consider expanding the Atlas to incorporate more geological data, particularly of petrological and palaeontological collections that have so much resonance when understanding Earth processes and developing natural resource extraction proposals. Of course, the ALA would not necessarily be an accurate epithet any longer!

Question 19: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

The following are examples of existing collaborations in the Environment and Natural Resources Capability area. It is not suggested that all of these should be pursued, but they should be considered.

- Global Biodiversity Information Facility (GBIF): ALA is the Australian node of this organisation.
- The Encyclopedia of Life (EOL) is a free, online collaborative encyclopaedia intended to document all of the 1.9 million living species known to science. It is compiled from existing databases and from contributions by experts and non-experts throughout the world.
- Biodiversity Heritage Library (BHL) - <http://www.biodiversitylibrary.org/> works collaboratively to make biodiversity literature openly available to the world as part of a global biodiversity community.
- Catalogue of Life – <http://www.catalogueoflife.org/> is the most comprehensive and authoritative global index of species currently available. It consists of a single integrated species checklist and taxonomic hierarchy.
- Integrated Digitized Biocollections (iDigBio) – <https://www.idigbio.org/> is the National Resource funded by the National Science Foundation for Advancing Digitization of Biodiversity Collections (ADBC). Through iDigBio, data and images for millions of biological specimens are being curated, connected and made available in electronic format for the biological research community, government agencies, students, educators, and the general public.

Question 20: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Environment and Natural Resource Management capability area?

As noted, above workforce skills should be considered as essential when planning research infrastructure and there is a real concern here about the demise in the number of skilled taxonomists in the biological and geological sciences. The development of genomics and phenomics, far from reducing, has actually increased the demand for skilled taxonomists who understand the organism as well as the molecular level of biology. It is an area that is decreasingly provided for by higher education institutions and will lead ultimately to a crisis in terms of limiting our understanding of the environment and our ability to address critical issues, such as food security. The network of major Australian natural science museums working, for instance, with CSIRO would be well placed to develop a distributed national facility to address these issues.

There are examples in Europe (e.g. the EU funded project European Distributed Institute of Taxonomy (2006 – 2011)) and the United States (e.g. the National Science Foundation’s Partnerships Enhancing Expertise in Taxonomy (PEET) program), which have been highly successful in establishing major national and international efforts that include taxonomic training.

#### **Understanding Cultures and Communities**

Question 24: Are the identified emerging directions and research infrastructure capabilities for Understanding Cultures and Communities right? Are there any missing or additional needed?

ICOM Australia has liaised closely with other peak bodies in respect of this capability area, notably the Australian Academy of the Humanities, the Council for Australasian Museum Directors, Museums and Galleries Australia, and the Australian Library and Information Association. In this respect, ICOM Australia is broadly supportive of, and indeed contributed to, several of these submissions.

It is our contention that the areas identified are correct, albeit described at a high level. Research infrastructure in this capability area has been conspicuously absent with the result that an enormous resource held in the collections of museums, libraries, archives and other collecting institutions, as well as in other public and private collections remains unknown, undiscoverable and unresearchable.

The development and provision of suitable research infrastructure to enable the discovery and research-ability of this immense resource, in all its many forms and media would provide a quantum shift in terms of research capability and outputs.

In line with other submissions, we believe the key elements of this national infrastructure would:

- identify the priority datasets to make discoverable to researchers;
- promote and adopt standards where possible, but remain flexible enough to act as an interface with different digital datasets;

- address the ethical and legal issues surrounding copyright, ownership and access, including with reference to Aboriginal and Torres Strait Islands communities;
- develop strategies and tools for mining and using 'big data';
- promote and enable cross-disciplinary research across STEM subject areas;
- mobilise citizen-researchers to assist with highly-targeted research projects.

Trove is quite rightly referenced in the Issues paper and its impact on humanities research as well as public access to data cannot be underestimated. Its continuation is critical but it needs to be supplemented by additional and interoperable infrastructure to maximise the discoverability of much wider resource.

We are aware of the Humanities Networked Infrastructure virtual laboratory (HuNI) funded through the National e-Research Collaboration Tools and Resources (NECTAR) initiative. This provides some indication of the possibilities for more comprehensive infrastructure development in this area.

An important consideration is the amount of digital resource that has been and is being created, either through the digitisation of a range of non-digital media (natural, cultural and art objects, documents, photographs, images, audio and cine recordings etc.), or through born-digital content.

Issue of ethical practice, data ownership and accessibility are critical in this Capability Area as in others. Along with the practical, commercial and IP issues noted above, there are serious cultural considerations regarding ownership and access to data and these must be taken into account. For this reason, we welcome the references to Digital Repatriation which is a relatively new consideration.

Along with colleagues across the museums and collections sector, we welcome the recognition of the need for further identification of the gaps in materials conservation and the need for a capability to ensure that information, techniques and instruments leading to best practice materials conservation are shared with a view to ensuring, both the appropriate care of this distributed natural resource and the development of sustainable practice for both preventative and remedial conservation techniques.

Collecting institutions have a responsibility to care for the collections they hold in the most responsible way: in such a way that will guarantee their longevity and, in effect, their preservation in perpetuity – or as near as is possible!

This can lead to prohibitively expensive treatments and restrictions on the movement and use of those collections.

By contrast, collections can still suffer deterioration, despite the best intentions.

The guidelines for the preservation of different kinds of material have been the subject of many decades of research, but it seems that some of the treatments and, more importantly, the environmental requirements to ensure 'passive conservation' lie uncomfortably between science and myth.

For the welfare of our distributed national collections, but also for the sustainable operation of our collecting institutions, a distributed facility that could provide scientifically robust data on the

optimum conservation requirements of collections, but also on the acceptable, would provide a global lead in this vexed area between science, art and technology.

Question 25: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

It will be important to investigate research collaborations in this area and there are examples across the world that can be referenced. One of the most obvious in this context, both in terms of providing a model to inform development, but also a linkage in terms of Australian migration history is Europeana (<http://www.europeana.eu/portal/en>) (see answer to question 12, above).

Question 26: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Understanding Cultures and Communities capability area?

In recognising the need to develop research infrastructure in this capability area, there is reference to the Atlas of Living Australia (ALA) as a possible model for an equivalent cultural infrastructure development. We would support and approach along these lines through the creation of some kind of 'Cultural Atlas of Australia' or 'Digital Index of Cultural Resources', or similar. The unquestionable success of the ALA provides a strong indication of the potential of such an endeavour.

We would draw attention to the 2015 National Arts and Culture Accord: Digital Technology survey, commissioned by the [Meeting of Cultural Ministers](#), which concluded there was a need for national, cross-domain collaboration in the collection sector to implement national digital strategies and standardise technical and skills areas in relation to online access.

Partly in response to this recommendation – and partly in response to a long identified need - in 2016, peak organisations from the Galleries, Libraries, Archives and Museums (**GLAM peak**), including Council of Australasian Museum Directors (CAMD), and a representative from the Academy of Humanities, were successful in obtaining Catalyst funding enhancing digital access to collections.

The project will:

- prepare a draft national framework for digital access to collections;
- endorse principles and common standards to assist small to medium institutions to prioritise digitisation and adopt best practice approaches to digital access; and
- produce an accompanying case study-based prototype toolkit to support capacity building in the collecting sector.

## National Security

Question 27: Are the identified emerging directions and research infrastructure capabilities for National Security right? Are there any missing or additional needed?

Major Australian Museums play an important role in the front line of addressing issues of biosecurity and identifying threats. Many museums run quarantine facilities to deal with potential threats that may arrive by air, sea or land via vectors such as weather, biological carriers or international transport.

The expertise that exists within the Museums as well as the collections of invasive pest organisms that is gradually building represents a potent research resource.

We would concur with the conclusion in the paper that current research infrastructure is inadequate to provide the level of resilience required. Investment in this area is recommended, not least to take advantage of the knowledge and material that already exists.

Question 28: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Biosecurity is, almost by definition, an international issue. Research and ultimately controls can only be facilitated and implemented through extensive international cooperation.

## Other comments

If you believe that there are issues not addressed in this Issues Paper or the associated questions, please provide your comments under this heading noting the overall 20 page limit of submissions.

The 'Mapping' table provided in Attachment C is extremely misleading in terms of the contribution of at least two capability areas with which museums are particularly concerned: Culture and Communities is mapped only against transport: this is an issue that was raised by the author of this response as part of a Capability Expert panel. Understanding Culture and Communities could justifiably be mapped against every single Focus area in the table! Environment and Natural Resources could be mapped against Focus Areas Energy and Health (and possibly transport) in addition to those against which it is already mapped.

Thank you, once again, for the opportunity to comment.

ALEC COLES OBE  
Chair  
ICOM Australia