

# Submission

## 2016 National Research Infrastructure Roadmap Capability Issues Paper

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### Questions

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

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

I have a concern that a focus on 'benefits and outcomes' might lead to a move away from supporting 'blue skies' and basic research. Governance of research infrastructure should also be concerned with the significant longer term picture, which will require basic investment in fundamental research, before we can fund more applied research. It should develop models for how such work will be invested, judged and prioritised.

Governance of research infrastructure should give some attention to academic freedoms and rights. The basic infrastructure is the people and without fundamental assurances and protections around their research practice, their ability to work is threatened. This may seem unnecessary in a modern democracy, but given both the number of high-profile infringements of academic freedom in recent years and the increasing demand to be funded by industry and the potential conflict of interests that may raise (remember when Big Tobacco funded medical research!), it seems that an interest in these political and ethical issues is vital to successful research and should be built into the infrastructure. It should also be a consideration in the push to internationalise research, especially when cooperating with countries where academic freedoms are less protected.

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

Yes. It should also consider investing in schemes like EU funding to enable Australian scholars to access these international pots of money.

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

This is a complex question and would depend on particular example. However, I would consider the significance of working with international scholars as an asset of using international infrastructure, that might be worth investing in. I would also be

concerned about how that would limit access by scholars who cannot travel (for whatever reason).

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

Yes. Research staff are the most vital part of research infrastructure. Considering them separately is short-sighted, but also leads to an emphasis on investing in technology, rather than people, and sometimes in instances when technology does not provide the most appropriate solution to the problem.

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

By considering people as part of infrastructure and developing models for a research system that takes people into account. If you need technical staff to work particular equipment, you plan for the investment in that research training as part of the investment. If you need specialists in digital archiving, then support partnerships between institutions that can provide that training and the institutions where such people would work. An example of this might be to provide PhD programmes that fund students based in heritage organisations. Linkage would be a good model here, except it wouldn't need to be tied to such significant sums of money as is expected in a Linkage grant and whose baseline funding (50k per annum) makes it difficult for many heritage orgs and charities to meet even in-kind.

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

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

Clearly this question will depend on the nature of the infrastructure. But, in some areas, notably heritage and culture and community more broadly, investment in infrastructure (Trove, archives, museums, arts organisations, etc) is also an investment in Australian society and in areas where there is significant research conducted by those beyond those formally employed in academia. These are resources that contribute to national benefit through providing research and information for television shows, popular books, tourism etc, but also often traditional academic publications by 'independent scholars'. When considering access, it would be a disservice to Australia and to research to reduce access to groups beyond academia or to attempt 'cost recovery'. It should also be noted that easy and free access to such resources enables many academic scholars to conduct relatively low-cost research, freeing funding for other projects. The loss of access to such material would be hugely problematic. At the same time, this should not put such services beyond the domain of research infrastructure. Much of our heritage organisations have had severe retraction in funding in recent times; this is of huge detriment to research in these field. The unwillingness to take responsibility for ownership of these organisation as 'research' is a basic failure in research infrastructure.

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

This is a topic where there should be more overt and frank discussion about the politics of government investment in research, and I would argue an expectation that such decisions are not based on the political imperatives of what government is in power but on independent, academic assessment of utility and value. This is another reason why infrastructure governance should take questions of academic freedom seriously as part of its remit.

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

I think the government should rethink how big business is taxed and look to redirect multinational profits more directly to national benefit (both in research and beyond). The desire for industry partnerships seems ultimately untenable. 1) Its virtually unworkable for any area of research that will not result in a product that is of financial benefit to the company. This excludes new research, blue skies work, investments in social inclusion or people, heritage organisations, human rights, health beyond pharmaceutical treatments etc. It is often expected that local government and charities can invest money in research, but not only have they seen a similar push to be 'entrepreneurial' and move away from central funding (which has been extremely difficult and left them very cash strapped) but the money they have is expected to be used in frontline services. This also raises ethical questions about whether their funds should be directed into research and so long-term benefit, over the immediate needs of the individuals they serve. 2) It does not sufficiently consider the ethical implications of having businesses invest in research and the ways that will shape outcomes. Does it really seem like a good idea to have mining companies pay for work on their impact on the environment? 3) If the government does want industry to treat all research seriously, then there needs to be an active engagement in changing the dialogue around the academy and research. Australia remains remarkably anti-intellectual and there needs to be a shift in public discourse around the value of research and higher education to business and society more broadly. It should not only be academics that are forced to be imaginative about how their research might be useful to industry, but industry should be taught how to see what all sorts of research could do for them. They should be given guidance on how to approach academics and what sort of academics – not least because if given those tools they probably have a lot more potential to understand their needs than we do. Whilst there may be some large businesses (typically those with R&D departments) that have sought out partnerships with academics, largely the burden has fallen on academics to make these connections and to pitch their work. This is hugely time-consuming and whilst we are doing that, we are not doing research. Changing the public discourse around education would also be important for increasing philanthropic giving to universities and research, although I expect that would require a more fundamental shift in how people think about public services – we'd need the public to see this not as a right, paid for through taxation, but a privilege

for individual investment. It's not clear to me that's necessarily what we want as a society, but it's untenable to live in a hybrid system, at least without creating significant public conversation on these issues.

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

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

Denmark has started investing in creating research jobs in its heritage organisations, archives and museums. Staff in those roles have some responsibilities towards heritage management but are also expected to produce research with the collections or in the field of heritage. It's a way of ensuring that the research infrastructure needs are met by archives and collections, because the staff that manage are not different people from those who use them.

I would also consider looking at the UK system for teaching relief during grants, and allow academics to replace themselves either with research assistants or teaching fellows during the life of a grant. It's more expensive but it creates meaningful employment and career paths for early career scholars; and it enables proper support for research activity and not the fractional amount of time currently allowed.

I would also think about (re)introducing small grants. Yes, these are more work to manage, but there is no longer money in the university system for small projects, exploratory work or pilot research. Moreover, there are some areas where significant findings could emerge for relatively small amounts of money used to support field research or teaching relief. It would make the money go further and spread it across more academics; a higher success rate would take the pressure of academics who need to bring in grant income as part of the requirements of academic jobs (i.e. most of us); and it would enable large grants to be founded on a more secure footing, reducing the risk of such investment.

Question 13: In considering whole of life investment including decommissioning or defunding for national research infrastructure are there examples domestic or international that should be examined?

Question 14: Are there alternative financing options, including international models that the Government could consider to support investment in national research infrastructure?

It's not an alternative funding model, but EU funding doesn't tie its results to 'Impact' as it believes that high-quality research produces benefit automatically; and its statistics lend credence to this. Trusting researchers does work.

## **Health and Medical Sciences**

Question 15: Are the identified emerging directions and research infrastructure capabilities for Health and Medical Sciences right? Are there any missing or additional needed?

Question 16: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 17: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Health and Medical Sciences capability area?

### **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?

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

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?

### **Advanced Physics, Chemistry, Mathematics and Materials**

Question 21: Are the identified emerging directions and research infrastructure capabilities for Advanced Physics, Chemistry, Mathematics and Materials right? Are there any missing or additional needed?

Question 22: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 23: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Advanced Physics, Chemistry, Mathematics and Materials capability area?

### **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?

I am concerned that research infrastructure in the humanities is so consistently imagined as digitising things. Material culture – whether books, archives, clothing, art, good etc – form a vital part of our heritage and their physicality is incredibly important to understanding them and to our research. If we look at countries like the UK, where research infrastructure in this area has been focused on digitising things, we have seen the loss of access to the original materials by scholars. In some cases, the digitised files are only available online at a financial cost that is targeted at private individuals who want to see one or two things and not thousands of documents. This means not only did we not get the benefit of easy access (or at least not cheap easy access) but we lost the very real critical edge that scholars get from working with physical goods. In some parts of Europe, there has even been threats to destroy our physical heritage once they have been digitised. Investment in digitisation cannot be at the cost of not looking after our archives and museum collections. It cannot be at

the cost of limiting access to those items. I absolutely agree that it can provide scholars with access to things without having to travel but it cannot be denied that certain types of research and knowledge are lost in the process. There is a growing scholarly literature on this.

I am also concerned that a lack of investment in archives and museums has led to them having to significantly curtail what they collect, whether that is new books or government records. This sort of strategic financial investment is vital if this area of research is to remain important in the future. And whilst digitising some modern records may help with storage space, it shouldn't be at the cost of not collecting anything physical at all. Moreover any activity of this nature needs to be supported by robust technology polices to ensure that data does not corrupt or be left on technologies that become obsolete. Well preserved physical records are often significantly more hardy than servers and hard-drives.

There needs to be a consideration of how publishing in the Humanities and Social Sciences will be sustainable in an open-access future. Much research, particularly in the humanities, is funded by scholarly societies, who also manage and publish journals. The income from journals sustain their activities, including conferences, book prizes, essay prizes, bursaries and even research activity (not least the editorial work of publishing journals). The push to open access is not only drying up that source of income, but as paying to publish is really untenable in these fields (due to the large number of non-grant funded research and independent scholars), there isn't currently a viable alternative to this model. Our scholarly communities and journals cannot exist without this income. This is a serious threat to our fields and it is time to start a national conversation on this and how best to protect our fields whilst enabling the democracy of knowledge.

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

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?

### **National Security**

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

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

Question 29: Is there anything else that needs to be included or considered in the 2016 Roadmap for the National Security capability area?

### **Underpinning Research Infrastructure**

Question 30: Are the identified emerging directions and research infrastructure capabilities for Underpinning Research Infrastructure right? Are there any missing or additional needed?

People. Research infrastructure requires the right people to use it and make it work. They are as much a part of the infrastructure of research as anything else. Significant threats to people include the fact that grant income doesn't sufficiently cover the costs of people doing the work, so that university hiring practices in many areas are based almost exclusively around student numbers. The push to industry funding will make student numbers of even greater concern for fields that struggle to access industry partnerships. The emphasis on student numbers for income has meant that teaching workloads have exponentially increased, making it more difficult to carve out time to do research. It also means that the number of continuing positions in universities is reducing, stopping career paths for new scholars. This is made worse by the research time spent looking for industry partners and not doing research – which all has to come out of research time. It should be noted that a typical 0.2 contribution to a research grant over three years is only 31 days work. Yet in that 'month' we have to promise to change the world and publish innumerable outputs. Clearly scholars are going above and beyond to achieve these results, but 30 days is almost no time at all to do meaningful research, at least without significant use of research assistants, and lends itself to a culture of overwork and exhaustion – something that is a significant threat to the research infrastructure that is people.

Current funding models provide extremely limited contributions to teaching relief (especially on multiple people grants which most now are), so that you can often only get a few hours of casual teaching a week to take the edge off. This is a particular problem for people who need to do field research as they are expected to take research trips during university non-teaching weeks, at the same time as the school holidays and also major conferences.

The huge cuts to research budgets (perhaps particularly in the humanities and social sciences where we need TIME, not equipment) means that we can only afford to hire research assistants on fractional contracts, which means it is hard to recruit the best scholars and doesn't enable investment in early career scholars who have to do a few hours of research alongside five other jobs to survive. This is a very bad basis for creating quality research or research careers for new academics. Research funding should see that people do the research; they are the infrastructure and it should provide money or other resources to seriously enable them to carve out time to do it well.

There also needs to be a discussion about sustainability over time. Currently, universities in many areas are contracting their workforces and barely hiring in continuing positions, and fixed term contracts are not only increasingly limited but also for smaller and smaller fractional contracts. This is pushing many early career scholars out of research or overseas – unsurprisingly this can often be the best of the talent who are flexible and open to a wide range of opportunities. Yet, we also hear constant complaints about

a lack of the 'right skills' or gaps in particular areas. The lack of early and mid-career jobs and the need to wait until retirement of the previous generation will cause long-term problems when a generation of mid-career scholars disappear, and senior scholar retirements are replaced by new early career scholars but without a senior body of scholars to guide their work. Australia needs to think about the implications of such hiring practices or accept that a limited research capacity is all that can be expected, which does not bode well for their long-term social and economic success.

Question 31: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

Question 32: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Underpinning Research Infrastructure capability area?

### **Data for Research and Discoverability**

Question 33 Are the identified emerging directions and research infrastructure capabilities for Data for Research and Discoverability right? Are there any missing or additional needed?

Data is not just held digitally. Physical goods, archives, heritage collections, and also cells, samples, environments, landscapes, etc, are also data, and need to be discoverable to scholars, and one throw away sentence doesn't give much hope that this will be taken seriously. There is a lot of space given to discussing what IT investment means, but no space given to other forms of data.

Whilst the idea of big data online seems good, it also both ridiculously expensive and unmanageable without a much broader technological infrastructure (national broadband, IT skills to manage large scale databanks and servers etc). Uploading data at my university is still so slow that for large data it is quicker to physically put a hard-drive in the post. Does Australia have the underlying capacity to make such an investment work? And if not, is this the best use of limited resources?

Secondly, do we have researchers who have the ability to analyse large data across multiple datasets from different disciplines? And is this achievable in 31 days over three years? Doing large data research well can take a decade of meaningful investment. It requires much more labour intensive analysis, even if the data is already collected. Can current grant systems (which fund 3-5 years) enable the use of such data meaningfully? Do current questions on grant forms that insist on innovation enable reusing data to score well? And given the notorious issue with funding interdisciplinary work through the current systems, have we come up with serious solutions to that problem that would allow the interdisciplinary collaborations that such analysis would need?

If these issues are not resolved, then spending money on integrated systems seems like a waste of money. It might be better to be less ambitious, but fix more fundamental problems in the system.

Question 34: Are there any international research infrastructure collaborations or emerging projects that Australia should engage in over the next ten years and beyond?

National broadband network?

Question 35: Is there anything else that needs to be included or considered in the 2016 Roadmap for the Data for Research and Discoverability capability area?

**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.