2016 National Research Infrastructure Roadmap Capability Issues Paper

Name	**Professor Susan Dodds**
Title/role	**President**
Organisation	**Australasian Council of Deans of Arts, Social Sciences and Humanities**

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.

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?

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?

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

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

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

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?

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?

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?

The current Understanding Cultures and Communities statement (pp. 32-33) emphasises three priority areas: translation of STEM knowledge through effective communication of innovation and its societal impact; digital humanities research; and the role played by national and state cultural collecting institutions, and their desire to digitise national cultural assets.

We see all of these as being important, but also point to the need to see the HASS disciplines as playing an increasingly important role in the innovation process itself. In doing so, we note the findings of the recent Australian Council of Learned Academies (ACoLA) report on *Skills and Capabilities for Australian Enterprise Innovation*,[1] which observes that innovation thinking and policy has been moving from a linear, STEM-led approach (first generation) to a systems approach (second generation), to the current networked ecologies models, which 'emphasises the importance of viewing people as bundles of skills, teams as bundles of diverse people, and organisations as resembling networked structures, that is bundles across organisational boundaries'.[2]

A critical implication of these findings, derived from a survey of Australia's most innovative companies across multiple sectors, as well as international comparative research, is that diverse teams that mix HASS and STEM-driven knowledge around responding to research 'grand challenges', has become critical to research innovation. The shift to an 'innovation ecologies' approach is summarised by Science Europe in the following terms:

> As priorities shift from curiosity-based to challenge-driven research, so the urgency increases to create innovation ecologies that integrate research domains across the sciences, technologies, arts and humanities. The formation of multi-disciplinary teams is, therefore, an essential element of future research if the skills needed to solve complex challenges are to be aligned. In seeking answers for major societal and environmental challenges we need radical innovation to help propel us beyond the narrow confines of a disciplinary field.[3]

Three examples may suffice. First, there is the possibility of a national network for social and behavioural science innovation (discussed on p. 34) connecting more strongly with projects that involve large scale social media analytics, such as the Tracking Infrastructure for Social Media Analytics (TrISMA) program funded through the ARC LIEF program, and led by Professor Axel Bruns from the Queensland University of Technology.

Such work is already taking place, as seen with the recent Australian government initiative to use big data analytics to identify young people at risk of long-term welfare dependency, drawing upon data provided by consultancy firm PriceWaterhouseCoopers.[4] Academic research that combines social

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[1] Cunningham, S., Theilacker, M., Gahan, P., Callan, V. & Rainnie, A. (2016). *Skills and Capabilities for Australian Enterprise Innovation*. Report for the Australian Council of Learned Academies, www.acola.gov.au.

[2] *Ibid.*, p. 41.

[3] Science Europe (2015) *Radical Innovation: Humanities Research Crossing Knowledge Boundaries and Fostering Deep Change*, p. 7.

[4] Doran, M. (2016). Federal Government aims to use data analysis to crack long-term welfare dependence. 25 July. http://www.abc.net.au/news/2016-07-25/welfare-system-overhaul-to-eliminate-long-term-dependency/7657270.

media analytics and relevant research methodologies, such as behavioural economics, could enable HASS researchers to have meaningful input into public policy innovation, in fields currently dominated by consultancy research.

Second, there is considerable scope to advance the National Science and Research Priority based around Cyber Security through articulation to the Understanding Cultures and Communities focus area. The Countering Online Violent Extremism Research (COVER) Program at Edith Cowan University, led until recently by Professor Anne Aly (who was elected a Federal MP in June 2016), and ARC and other funded projects related to addressing the role played by social media in both promoting and countering violent extremism, point to the vital importance of this connection. Countering violent extremism requires complex understanding of those cultures and communities through which such radicalisation may occur, as the issues are clearly social and cultural in nature, and are not resolved through purely technological solutions.

Third, there is the relationship of cultures and communities to the emerging digital economy agenda. The digital economy has been defined as 'the global network of economic and social activities that are enabled by information and communications technologies, such as the internet, mobile and sensor networks'.[5] It has been noted that Australia has been historically weak in the 'intangible innovation capabilities' that are central to the digital economy, and include the legal, cultural and institutional frameworks that promote innovation ecologies, and the uptake of digital content and services.[6]

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

Australian HASS researchers can benefit from drawing upon links with overseas research institutions and projects pursuing comparable projects. The CREATe (Creativity, Regulation, Enterprise, and Technology) initiative in the UK, which is Centre for New Business Models in the Creative Economy, based at the University of Glasgow, provides one such example. CREATe draws together an interdisciplinary team of academics from law, economics, management, computer science, sociology, psychology, ethnography and critical studies within a consortium of seven UK universities (Glasgow, East Anglia, Edinburgh, Goldsmiths University of London, Nottingham, St Andrews, and Strathclyde), and over 80 industry, public sector and civil society partners, to investigate the future of creative production in the digital age.

CREATe is funded jointly by the Arts and Humanities Research Council (AHRC), Engineering and Physical Sciences Research Council (EPSRC) and the Economic and Social Research Council (ESRC). Identifying a key stumbling block to effective research on innovation and the creative industries as being the lack of legal, business, technology and creative researchers trained to 'speak each others' languages', a central aim of the Centre is a new generation of trained interdisciplinary researchers in the creative economy.

There is also the scope to develop dedicated sites for public innovation, or equivalents to the role played by Stanford in the ICT domain for social innovation. A recent report by the National Endowment for Science, Technology and the Arts (NESTA) identifies the possibilities for *social science research parks*, or 'policy labs' such as MindLab in the Copenhagen Business School, SPARK at Cardiff University, and the Social Innovation Lab in Bilbao, Spain.[7] All point to the need for societal problems and 'grand challenges' to act as a catalyst for transdisciplinary research infrastructures

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[5] Australian Law Reform Commission (2015) *Copyright and the Digital Economy: Final Report*. Sydney: ALRC, p. 57.

[6] *Ibid.*, p. 58.

[7] Price, A. & Delbridge, R. (2015) *Social Science Parks: Society's New Super-Labs* London: NESTA.

that go beyond traditional structures and promote HASS-STEM collaboration with industry and government partners.

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?

It was noted above (Q. 24) that three major opportunities for better engaging the HASS disciplines in the National Research Infrastructure Agenda arise around:

- the relationship between social media analytics and behavioural research around predictive data analytics as a guide to public policy;
- the relationship between cyber security and a better understanding of cultures and communities, particularly those where individuals may be at particular risk of engaging in violent extremism;
- the contribution that legal, cultural and social science researchers can make to advancing Australia's 'intangible innovation capabilities' in the digital economy context, where networked ecologies of innovation are increasingly central.

It is also the case that cultural institutions in the GLAM sector (Galleries, Libraries, Archives and Museums) will play a critical role in the provision of digital documents, data, archives and collections, where access can be distributed more widely though networked research infrastructure.

There is also the need for greater consideration of the relationship between the gathering of social media data and related data analytics, and the Digital Humanities agenda. To take one example, reception of contemporary cultural works (exhibitions, performances, festivals etc.) is increasingly registered in real time by participants making use of social media platforms, such as Facebook, Twitter, Instagram etc. It will be vitally important to current and future cultural researchers to have access to appropriately archived and curated records of the reception of these works among the public as well as the critics of the time.

The Issues Paper discusses indigenous research perspectives within the Understanding Cultures and Communities Focus Area. The commitment to deposit, manage and curate culturally sensitive data is welcomed, as is the aim of harmonising policies and procedures between ATSIDA and AIATSIS. It would be noted that indigenous research perspectives extend beyond the HASS disciplines, and are vitally important to focus areas such as Health and Medical Science and Environment and Natural Resource Management.

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?

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?

A key issue in an increasingly data-driven digital economy is that of public trust in social institutions, and in how personal data is to be used. The problems of the 2016 Australian Bureau of Statistics Census were illustrative of a challenge that should in principle have enhanced the quality of the Census, by allowing the form to be completed online (as most forms now are), but in practice failed because it did not understand the social dimensions of the question. It is now apparent that a trade-off could have been undertaken between the need to gather data at a broadly comparable time and the load capacity of online servers, but it would appear that this had not been considered from the perspective of household users. Engaging with the socio-cultural dimensions of digital engagement is critical to building public trust in social institutions in a digital age, as data becomes more central to decision-making around the allocation of public resources.

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

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.