AAH Policy

AUSTRALIAN RESEARCH COUNCIL IMPLEMENTATION OF THE NATIONAL SCIENCE AND RESEARCH PRIORITIES

1. **The ARC does not target a specific proportion of funding to research in the National Science and Research Priorities—the ARC leaves it to individual applicants to determine whether to undertake research in the areas outlined in the National Science and Research Priority areas. The ARC also does not allocate a dedicated score for alignment with the National Science and Research Priority areas—it is one of the components of the selection criterion Project Quality and Innovation.**

    a. **Is this approach appropriate in the context of the ARC's role in Australia's research system (as detailed in Section 2)?**

Yes, it is an appropriate approach and in line with the Australian Research Council's (ARC) principal role in supporting "the highest quality research and research training through national competition in all fields of science, social sciences and the humanities" (Australian Research Council Corporate Plan 2018-19). The ARC's programs maintain Australia's research quality and integrity, build capacity in Australia's research workforce and contribute to social, economic, environmental and cultural benefits to the nation.

The Science and Research Priorities (SRPs) are not designed to direct the full spectrum of research. They are system-level priorities which should allow for a balance of fundamental and applied research across science, technology, engineering and mathematics (STEM) and humanities, arts and social sciences (HASS), and importantly enable other areas of priority to emerge as the need arises. The Paper indicates that the priorities are not meant to be exhaustive and the Academy supports that approach.

The ARC has a unique function in Australia's research ecosystem as one of the only sources of funding to support fundamental merit-based research. Fundamental research gives the research and innovation system its core capacity. It provides the platform for multidisciplinary approaches to problem-based research, and ultimately enables Australia to identify emerging opportunities in its global engagements and to prepare for and respond to unforeseen societal challenges.

It is the Academy's position that a situation where the scales are tipped heavily towards short-term applied research at the expense of fundamental research would ultimately limit our system's responsiveness to change and threaten our long-term economic success. Passing the quality threshold must remain the key principle in competitive grants programs administered by the ARC (and its counterpart – the National Health and Medical Research Council (NHMRC)).

To that end, it is appropriate that applicants determine the fit of a project application within SRP areas and that the assessment with regards its alignment or not with the SRPs is then appraised in the context of a broader assessment of the quality and innovation of the project.

b. Are there other methods of funding research in the National Science and Research Priorities that the ARC should consider?

It is clear from the evidence in the Discussion Paper that the ARC's current National Competitive Grant Program (NCGP) schemes provide strong support for the SRPs. The ARC also has at its discretion other ways of providing more targeted or direct support to drive research to meet short-term policy agendas, such as is currently in play with the Industrial Transformation scheme (aligned to the Government's Industry Growth Centres) or through mechanisms such as Special Research Initiatives to respond to emerging research areas. It is not clear from the evidence in the Discussion Paper that there is a need to provide additional support for the SRPs.

It is important to view the ARC's remit in a wider context. The Academy notes that the ARC's total budget only accounts for 8 per cent of the entire Government commitment to R&D (Discussion Paper, p.7). As part of its R&D investment strategy, the Government maintains an array of programs and mechanisms which are at its disposal to support areas of identified priority (Science, Research and Innovation Budget Tables).

In terms of ensuring a robust system and the ARC's fit within it, the Academy strongly supports a balance between strategic and merit-based investment across the system. A recent study in the UK has found that structural diversity in the system is important for risk mitigation and achieving a sustainable research base. The report found that the UK's "capacity to support excellence and respond to opportunity" arises from a diversity of research fields; diversity and flexibility in research support mechanisms (allowing both long- and short-term responses and 'strategic and responsive awards'); and a diversity of research organisations, "where mission-led units complement large and small universities with regional as well as international engagement" (Digital Science, The Value of Structural Diversity).

2. Under current arrangements, approximately 70 per cent of total funding allocated each year is allocated to research which applicants identify as being linked to the National Science and Research Priorities, with the proportion varying by year and by scheme.

Is the current level of alignment of ARC funding with the National Science and Research Priorities appropriate, and in line with the Government's objective of increasing Australia's capacity for research in these areas?

Yes, it is broadly appropriate and in line with the aim of increasing Australia's capacity for research in the SRP areas. The SRPs are not intended to be exhaustive, so we would expect other areas of priority and hence other areas of allocation across the ARC's schemes.

Given the current SRPs are closely allied with select industry sectors, it is not surprising to see the Linkage scheme with the highest proportion (100 per cent) of funded projects aligned with the SRPs and Discovery in the 60-70 per cent range. As regards the Linkage scheme's 100 percent compliance, this does raise the question whether the SRPs are the sum of areas we should be focused on and whether emerging industries or areas of growth not represented in the current SRPs and/or Industry Growth Centre regime should be in view. We might look to the UK's Industrial Challenge Fund as a model – which, among its priorities, includes creative industry clusters, audience of the future, and next-generation services.

The data presented in the Discussion Paper reveals that the Future Fellowships are less aligned than the other schemes (54 per cent of the successful applications). Given the scheme's explicit focus on "increasing Australia's research and innovation capacity [to] generate new knowledge

and results in the development of new technologies, products and ideas, the creation of jobs, economic growth and an enhanced quality of life in Australia" we would suggest that this indicates a range of priorities of national significance that the scheme is catering for which fall outside the current SRP rubric. The very nature of the Future Fellowships scheme is to support cutting-edge, emerging research areas – in effect, the next set of research priorities, that researchers themselves are identifying. So it is important that these Fellowships and other grants are not constrained by the now, but looking to the future.

Another indicator of the importance and potential of other priority areas of national significance and impact is the impact case studies which scored highly in the ARC's Engagement and Impact exercise. Examining the humanities and arts codes (from FoR 19 to 22) reveals that of the 35 case studies ranked 'high' (with humanities and arts as a primary assessment code) over 74 per cent (25) fall outside the SRPs. This raises the question of whether the SRPs as applied to the ARC's programs are equal to the task of incentivising research, building capacity or responding to challenges and opportunities in areas such as:

- Investigating and supporting creative industries as an entrepreneurial system
- Transforming research, policy and practice to maximise the benefits of digital technologies for young people
- Reconnecting Indigenous Australian communities with heritage objects held in museums and galleries
- Challenging and countering Islamophobia.

The four examples listed above are highly ranked impact case studies which did not indicate an alignment with any of the current SRPs.

What would the potential benefits and costs for the Australian R&D system be if allocation of ARC funding against the National Science and Research Priorities was aligned differently?

The ARC's funding represents only 8 per cent of the total R&D ecosystem so quarantining this spend for SRP-related research would be far from an effective or efficient way of steering a research agenda or changing the overall system balance. However, there would be a long-term impact on certain fields across STEM and HASS that would ultimately jeopardise the quality of the system. This is particularly the case for fields that undertake proportionally more fundamental research and fields that derive a higher proportion of funding from HERDC Category 1 streams.

The Discussion Paper makes the point that "HASS projects are much less likely to be identified as falling within a National Science and Research Priority than are STEM projects" (p8). This does not come as a surprise given the way the SRPs have been framed as issues to be solved by STEM. Nevertheless, in quantitative terms, the volume of STEM applications not addressing the current SRPs exceeds HASS. Of the 1241 applications not addressing the SRPs 765 or 61 per cent were in STEM fields (including Psychology and Cognitive Science) (See Table 5, Discussion Paper, p22). Fields with over 50 percent of awarded grants not aligned with the SRPs include: Mathematics (70 per cent), Physical Sciences (53 per cent), and Psychology and Cognitive Sciences (70 per cent). In the Humanities and Creative Arts fields (HCA) the only field that has a majority of funded projects in SRP areas is Built Environment and Design (with only 25 percent of projects not addressing an SRP). It is therefore not a clear-cut case of STEM

(across the board) delivering more on the priorities than HASS – but nor should it be made a STEM versus HASS issue.

3. Are there other challenges or areas of priority that you consider require focus in ARC funding (by being included in NCGP research priorities) to:

(i) achieve the ARC's purpose of growing knowledge and innovation for the benefit of the Australian community

Yes. In theory, HASS fields are relevant across all the current SRPs. There is a human dimension to each of these priority areas, but in practice HASS expertise has not been mobilised as well as it might have been in supporting SRP research. This is a function of the fact that the current SRPs are not delivering in areas of real need for society such as migration, cohesion and social inclusion; building communication and trust in a digital world; or ensuring technology and AI developments are safe, ethical, accountable and inclusive.

In the medical research arena, we note that the NHMRC sets strategic priorities which take account of SRPs but also extend on these in areas of identified need. In fact, the "NHMRC Act requires the CEO to identify major national health issues likely to arise during the four-year period covered by [the NHMRC's Corporate] plan" (NHMRC, Corporate Plan 2017-18).

Internationally, there is a much more sophisticated approach to research priority setting. Countries such as Canada, the UK, Germany, France and Switzerland have themes and programs which specifically address cultural and social priority areas. This is the case in merit-based curiosity-driven programs as well as more targeted efforts. For example, the EU Horizon 2020 program has a broad category called 'Europe in a changing world – inclusive, innovative and reflective societies' whose work program for 2018-2020 includes AI, migration, etc. Attachment A sets out some of the various models in play internationally from which we might take impetus. There is a strong argument for aligning our research priorities with international partners, or at the very least keeping these in view, as the basis for building collaborative research networks and agenda.

(ii) support an appropriate balance of research in across disciplines within the ARC's funding remit

Yes. There have been some positive developments in support of achieving balance across the disciplines, but potential to do much more.

In 2017 the ARC's Learned Academies Special Projects scheme included new priority areas of focus directed at research workforce sustainability, including advancing gender equity and diversity and professional development for early and mid-career researchers. This is an important and ongoing area of need across both STEM and HASS. The ARC's investment in a National Indigenous Research and Knowledges Network is also a priority area of current and future focus in building capacity in the Indigenous research workforce.

Since 2012, the ARC has supported a range of multidisciplinary projects that has brought Australia's four Learned Academies together through the Council of Learned Academies (ACOLA) to support research for the Chief Scientist and the former Commonwealth Science Council, now National Science and Technology Council. Through the Securing Australia's Future and Horizon Scanning programs, the humanities, arts, social sciences, technology, engineering and scientific expertise is brought to bear on significant challenge areas including: Australia's engagement in the Asia region; skills and capabilities for Australian enterprise

innovation; deployment of artificial intelligence; and the Internet of Things. The multidisciplinary nature of the program has been an underpinning principle and vital to moving us beyond a one-dimensional S&T framing of research questions and solutions.

We would also point to the need to review and augment schemes such as the Industrial Transformation Centres and associated Research Training Scheme, which are closely allied to the Industry Growth Centres. The Research Training Scheme has invested $133,819,826 in 38 research training initiatives since 2013 – overwhelmingly in STEM areas. There is an opportunity to broaden into other areas of growth and competitive advantage for Australia: education, service industries, and the creative sector.

(iii) complement and maximise the benefits from overall existing government support for research.

From a whole-of-government perspective, Australia's SRPs are far from comprehensive of the national research needs. The majority of government expenditure lies in areas of health and welfare and education which are almost totally outside the current SRPs. In the UK, all government departments produce a set of 'Areas of Research Interest' which are priority research questions they are facing. The UK's Science Research and Innovation Challenges include 'changing world' challenges, which encompass migration, conflict and divisions in society; and 'economic and productivity' challenges such as the future of work, the gig economy and labour market inequalities.

In Australia, the SRPs have been augmented in various national programs. Successive National Research Infrastructure Roadmaps in Australia have scoped in a priority capability for the humanities, arts and social sciences. The latest roadmap includes nine priority areas one of which is Platforms for HASS and Indigenous research in recognition that "Advancing research in these areas is critical to our future, and requires a nationally coordinated approach to infrastructure development to drive transformations in the way researchers discover, access, curate and analyse Australia's social and cultural data" (2016 National Research Infrastructure Roadmap, p5).

The Academy recommends a broad consultation on research priority setting in Australia through a process that seeks out expertise in the sciences and humanities, and that will involve all government agencies, not just those whose agendas are focused on STEM-oriented productivity that takes too little account of human factors.

4. **What is your understanding of the implementation of the National Science and Research Priorities under the NCGP?**

The Academy understands that the SRPs are referenced in the selection criteria for the NCGP. Across the various schemes, applicants are asked to indicate whether their project accords with an SRP. The SRPs do not have a specific impact on the peer assessment of grants (by way of being a stand-alone or mandated criteria of assessment) but they are taken into account by assessment panels. There is not an independent assessment undertaken of SRP alignment. The ARC provides a statistical account of the number of projects addressing the SRPs in its reporting to government.

5. **What is your understanding of the implementation of the National Science and Research Priorities in relation to Australia's broader research system?**

The SRPs are a touchstone across most publicly-funded science and research programs. In the humanities research community there is a strong perception that the current SRPs are STEM-focused, which has meant that the current SRPs have functioned to block the participation of humanities-based fields of knowledge. The SRPs are only part of system-level priority setting and should not act to inform the entire system, thus ensuring that there is continued support for fundamental and emerging areas of research outside the SRPs.

ATTACHMENT A

1. CANADA

The Canadian Social Science and Humanities Research Council (SSHRC) is one of three major federal granting agencies, alongside the Natural Sciences and Engineering Research Council and Canadian Institute for Health Research. Together these three agencies are referred to as "the tri-council."

The SSHRC manages four main program areas, being the Talent Program; the Insight Program; the Connection Program; and the Future Challenge Areas.

The Future Challenge Areas is framed through a focus on six future challenge areas, with a goal of addressing future societal challenges and responding to opportunities through social sciences and humanities research. Each challenge area includes a range of possible – yet, not exclusive – issues and sub-questions that explore the complexity of each respective issue.

1. What new ways of learning, particularly in higher education, will Canadians need to thrive in an evolving society and labour market?
2. What effects will the quest for energy and natural resources have on our society and our position on the world stage?
3. How are the experiences and aspirations of Aboriginal Peoples in Canada essential to building a successful shared future?
4. What might the implications of global peak population be for Canada?
5. How can emerging technologies be leveraged to benefit Canadians?
6. What knowledge will Canada need to thrive in an interconnected, evolving global landscape?

As part of its 2018 Budget, Canada has also announced the establishment of a new tri-council fund to support research that is international, interdisciplinary, fast-breaking and high-risk to accelerate Canada's transition to a more modern approach to research. For further details see: https://www.tradecommissioner.gc.ca/innovators-innovateurs/strategies.aspx?lang=eng

2. FRANCE

National Research Strategy, 2020

The Ministry of National Education, Higher Education and Research

The French National Research Strategy identifies 10 challenges for the 21st century. These challenges have been defined with reference to the objectives of the European program Horizon 2020, taking into account the fact that research relies on collaboration across the broader scientific community. The identified challenges are:

1. Resource management and adaptation to climate change
2. Clean, safe and efficient energy
3. Industrial renewal
4. Health and well-being

5. Food security and demographic changes
6. Transport networks and sustainable urban systems
7. Information society
8. Developing innovative, inclusive and adaptable societies
9. European space initiative
10. Freedom and security of European citizens and residents

Within this set of challenges, five issues are highlighted as needing to be treated with particular urgency:

1. Big Data
2. The primary role of science and innovation in the analysis and management of climate change risks
3. New and enhanced understanding of what constitutes a human being, in the context of developments within the biological sciences
4. The development of innovative health care (precise medicine)
5. The critical importance of knowledge of human cultures

The French national research agency CNRS (Centre national de la recherche scientifique) funds a range of projects across all HASS and STEM disciplines. In 2017 it ran a special program entitled CNRS-Momentum, which called for researchers to submit proposals for what the agency identified as 13 emerging, transdisciplinary fields that will hold great relevance in the future. The program included topics such as 'new frontiers in machine learning for artificial intelligence,' 'collective and social human behaviour,' 'inspiration and mimicry,' 'participatory science,' and others.

3. GERMANY

German Research Foundation DFG (Deutsche Forschungsgemeinschaft) runs a set of grant and fellowship programs within two streams, being Individual Grants Programs and Coordinated Programs.

Within the Coordinated Programs stream, there is a Priority Program. A particular feature of the Priority Program is the nationwide collaboration between participating researchers. The DFG Senate may establish Priority Programs when the co-ordinated support given to the area in question promises to produce particular scientific advances. The Senate convenes once a year to discuss initiatives aimed at establishing Priority Programs proposed by researchers. These programs run across a range of HASS and STEM disciplines.

As a rule, Priority Programs receive funding for a period of six years. For a list of past Priority Programs, see:
https://www.dfg.de/en/funded_projects/current_projects_programmes/list/index.jsp?id=SPP

In April 2019, DFG announced an establishment of 14 new Priority Programs that cover all disciplines, from the humanities and social sciences to engineering sciences, life sciences and natural sciences. For the list of new Priority Programs, see:
https://www.dfg.de/en/service/press/press_releases/2019/press_release_no_10/index.html

4. SWITZERLAND

The Swiss National Science Foundation (SNSF) is a research support organisation run by the Swiss Federal Government. The SNSF consists of three main bodies, being the Foundation Council, the National Research Council and the Administrative Offices. The National Research Council makes funding decisions across its four divisions: Humanities and Social Sciences; Mathematics, Natural Sciences and Engineering Sciences; Biology and Medicine; and National Research Programs and National Centres of Competence in Research.

National Research Programs (NRP) represent one of 15 program areas currently managed by the SNSF. NRPs embrace research projects that seek to develop solutions to the key problems of today. Federal offices, research institutes, research groups and individuals propose topics and potential priorities for an NRP to the State Secretariat for Education, Research and Innovation (SERI). The Federal Council makes the final selection of topics, which it then refers on to the SNSF to address within the scope of an NRP.

Current NRPs include following topics:

- NRP 77 Digital Transformation
- NRP 76 Welfare and Coercion – Past, Present and Future
- NRP 75 Big Data
- NRP 74 Smarter Health Care
- NRP 73 Sustainable Economy
- NRP 72 Antimicrobial Resistance
- NRP 71 Managing Energy Consumption
- NRP 70 Energy Turnaround
- NRP 69 Healthy Nutrition and Sustainable Food Production
- NRP 68 Sustainable use of soil as a resource
- NRP 67 End of Life
- NRP 66 Resource Wood
- NRP 64 Opportunities and Risks of Nanomaterials

5. UNITED KINGDOM

The Arts and Humanities Research Council (AHRC) funding schemes are organised around six major programs:

Cross-Council Programs: This line of funding is focused on multidisciplinary projects, which are developed between the AHRC and other research councils. The projects are co-ordinated by the UK Research and Innovation agency, which brings together the seven research councils, Innovate UK, and Research England.

The AHRC is presently involved in several of the Cross-Council Programs, including Connected Communities; Partnership for Conflict, Crime and Security Research; Lifelong

Health and Wellbeing; Tackling AntiMicrobial Resistance; Living with Environmental Change; and Digital Economy.

UK Research Innovation runs a range of multidisciplinary research projects, which are broadly organised around following priority areas:

1. Digital economy
2. Energy
3. Global food security
4. Tackling Antimicrobial Resistance
5. Technology Touching Life
6. Urban Living Partnership

Strategic Programs: The AHRC strategic programs address issues of intellectual and wider cultural, social or economic urgency that the Council considered best supported by concentrated and coherent funding initiatives. The latest set of strategic objectives included: Beyond Text; Designing for the 21st Century; Diasporas, Migration and Identities; ICT in Arts and Humanities Research; Landscape and Environment; Religion and Society; and Science and Heritage.

Language-Based Area Studies: The five language-based centres were established with the aim of creating a world-class cadre of researchers with the necessary language skills to undertake contextually informed research in the Arabic speaking world; China; Japan; and Eastern Europe, including areas of the former Soviet Union.

AHRC Themes: The AHRC's themes provide a funding focus for emerging areas of interest to arts and humanities researchers. In recognising that interdisciplinary and collaborative research often requires particular forms of support to achieve its full potential, themed funding calls can be particularly supportive of developmental activity, partnership-based activities, and innovative approaches.

The themes were identified through the Future Directions for Arts and Humanities Research consultation in 2009. This indicated support for a number of research areas that were likely to shape or change aspects of multiple research fields over future years. These areas have been grouped under following themes:

1. Open World Research Initiative (OWRI)
2. Care for the Future: Thinking Forward through the Past
3. Digital Transformations in the Arts and Humanities
4. Science in Culture
5. Translating Cultures

Museum and Galleries Research Program: Launched in 2005/06, this program aims to pull together existing funding opportunities, offers specific funding for certain activities, and supports other activities of interest to the sector.

Research Centres: The AHRC Research Centres scheme aims to facilitate research of the highest quality in areas of demonstrably strategic importance across the arts and humanities. For the list of AHRC supported Centres, see: https://ahrc.ukri.org/research/fundedthemesandprogrammes/pastinitiatives/researchcentres/