SUBMISSION

Submission to the Department of Education

Submission to the Australian Research Council (ARC) Review

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Australian Academy of Technological Sciences & Engineering

The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

ATSE welcomes the opportunity to provide a submission to the review of the Australian Research Council (ARC). This submission argues that the ARC should be strengthened, supported, and legislated to be a national leader in research grant funding.

Recommendations

The ARC should be reformed to:

1. Develop and model best practices in research funding, including a two-stage approach to research funding applications, and propagate to other government funding programs
2. Ensure optimal value of public research funding by coordinating funding and research outputs across government funding programs, including to remove date and assessment conflicts and ensure alignment where possible and desirable
3. Strengthen Australian research by increasing research funding and provide full funding for indirect costs of research for all fields of research, not constrained by the National Science and Research Priorities
4. Champion research funding across the research pipeline, including curiosity-driven, null result and replication research
5. Promote public and sectoral trust in the research funding system by removing (or constraining and requiring full transparency for) the ministerial veto
6. Provide certainty to researchers, industry, and universities by adhering to legislated dates for grant outcome announcements
7. Embed Aboriginal and Torres Strait Islander research and researchers in the ARC through an uplift in representation and cultural competency
8. Engage with research outcomes including through the implementation of a grant renewal system for research yielding promising results
9. Highlight the impact and excellence of publicly funded research by rethinking the use of the National Interest Test (NIT) and the Excellence in Research Australia to create a single reporting mechanism
10. Enhance administrative resourcing to support the ARC in its expanded role in national research funding coordination and best practice approaches
11. Consider further avenues to reduce wastage in the grant application and assessment process, such as limiting the number of ARC applications from each university, while implementing measures to support gender equity in funding outcomes
12. Require its assessors to confirm that they have not been censured under a formal bullying or harassment investigation process

Positioning the ARC as an exemplar of best practice

This review is an opportunity to establish the ARC as a 'lighthouse' for government research funding: creating and exemplifying best practice for grant funding bodies across all of Government. Recent improvements to the ARC – such as the ARC Industry fellowships, the new user-friendly website, and timely grant announcements – are positive and welcome developments. However, Australian government research funding is disparate and disconnected, with competing deadlines, different application and assessment interfaces, and time-consuming application and assessment processes. Australian researchers spend an average of 34 working days per year writing grant applications (Mow, 2009). For researchers applying for NHMRC grants, this equates to a total of 550 working years per year collectively for the sector, despite many of these applications not attracting funding, and excluding time spent assessing applications (Herbert, Barnett, Clarke & Graves, 2013). Streamlining ARC dates and processes, and using this improved approach as a lighthouse to guide federal research funding across the breadth of the Australian Government, could reap

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enormous efficiency gains, and significantly improve leverage on existing investment in research. ATSE believes the ARC can and should lead a proactive reform agenda that expands and empowers the ARC to develop and model best practices.

The ARC has the broadest remit of fields of research of any Australian grant funding body and is recognised across all areas of the research community. Additional research funding in Australia is distributed through a vast number of funding bodies and programs, each running their own processes with no central strategic coordination or collaboration. The Innovation, Science and Research (ISR) review found that Government investment is split across 202 programs and 13 portfolios, and there is a lack of coordination and performance data (Department of Industry, Science, Energy and Resources 2021). This leads to inefficiency, duplication

or institutions working counter to each other. Given the size of Australia relative to international competitors, the research funding sector must have a strategic approach if it genuinely wishes to elevate Australian research to its full potential.

The ARC review is an opportunity to further the recommendations of the ISR review, including central coordination of government funding processes. This should include coordination of research applications, key dates and outputs that may inform other government research programs, consolidating efforts both on the part of funders and researchers who may be seeking grants from multiple sources.

For example, as the ARC receives an abundance of high-quality funding applications, applicants with unsuccessful yet high-scoring applications could be given the option for their applications to be passed to industry and other government funding bodies for consideration.

To improve coordination and emphasise the role of the ARC along the research pipeline, consideration should be given to bringing the ARC under the remit of the Department of Industry, Science and Resources (DISR) to allow closer links to industry funders and the National Science and Research Priorities. The ARC could also step into the role of coordinating and implementing bilateral funding programs with other nations' research funding agencies.

The ARC should be reformed to not only provide research funding to the broader sector, but also be empowered to provide guidance and best practice for funding bodies and others in the sector to build upon. This leverages existing efforts with the Australian Research Integrity Division, and the ARC's work with the NHMRC to provide guidance on topics such as research integrity and ethics guidelines and requirements.

Dwindling research and development funding – including ARC funding – as a proportion of GDP also must be addressed as part of the review. The legislated yearly funding caps demonstrate the stagnation of research funding managed by the ARC following a decline since its peak in 2012. Many of the issues beleaguering the ARC – such as low success rates, the onerous application process, and the imposition of the National Interest Test – are symptoms of the austere funding environment, which has lagged behind other nations that are strategically investing in research and development. There should also be a return to funding the full cost of research (including indirect costs).

High funding application rejection rates, the creation of a transfer market for universities to entice highly published 'superstar' academics due to the interplay of restricted funding and seeking to improve metrics (Williams 2004), and ministerial interference all have the impact of reducing morale among researchers and diminishing trust in research funding processes. This review can establish the ARC as the gold standard and guard against this erosion of trust.

This review must also consider embedding Aboriginal and Torres Strait Islander research and researchers in the ARC through continuing to improve representation in the College of Experts and on the Board (if one is established), and by uplifting the cultural competency of non-Indigenous College of Experts members.

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Expanding the ARC's remit to provide a coordination role must come with additional administrative resourcing, to ensure success in this role, and support the ARC to stay abreast of international best practice and maintain a culture of continuous improvement.

Championing the research pipeline

The ARC has a distinctive role in providing funding across the research pipeline, inclusive of both fundamental and applied research. In the current competitive funding environment, proposals for truly original, curiosity-driven research struggle to compete against proposals for incremental research that builds upon proven or in-progress results.

ATSE suggests *the ARC must continue to be an advocate for curiosity-driven research*, with a clear distinction drawn between funding schemes for basic and applied research, to ensure basic research continues to be supported, with a strong research pipeline now and into the future. In addition to funding novel research, it is critical that as an exemplar of best practice, the ARC also funds projects for "null result research" and testing and verifying novel findings. Null result research, in which evidence is not found for the hypothesis, contributes to scientific progress by developing understandings of models, building new hypotheses, and identifying false positives or methodological errors in earlier research

The ARC's stated purpose is to grow knowledge and innovation for the benefit of the nation. This requires long-term, strategic support for research strengths and expertise. The National Science and Research Priorities define fields in the national interest. *These should not be used to restrict ARC-funded research to the priorities or election promises of the Government*. Instead, Government priorities should have their own funding pool and categories, with fundamental research funding protected in its own pool, so as not to narrow the diversity of fields being funded. Fundamental researchers often cannot point to what innovations their findings may spark. Restricting the focus and breadth of fundamental research ultimately restricts the goldmine of findings and knowledge upon which applied research and development relies.

Ensuring the independence of the ARC

The independence of the ARC is critical to upholding trust in the research system. The research community and the public must be able to trust that the ARC makes funding recommendations based on a robust peer review system. As articulated in ATSE's submission to the Senate inquiry into the ministerial veto, the use of ministerial veto weakens trust in the ARC as an arbiter of high-quality research (ATSE 2022). Removal of the veto should be strongly considered. If the veto is to remain, then it must have transparency requirements and guidelines on how it may be applied (for example, for applied research only, to ensure alignment with urgent national priorities), so researchers can make an informed decision about investing time into an application.

If an ARC Board is established, as posited by the consultation paper, it should contain representation from different industry sectors as well as research experts. The role of the Board and the CEO should be clearly outlined in the Act, including responsibilities for ethics, transparency, data management, and fairness.

Streamlining the grant application and review process

The current application and assessment process is highly inefficient, and the timeline between application to outcome is too long. The system requires a significant time investment by applicants and assessors, taking some of Australia's best researchers away from their core business of conducting research and teaching. This complicated process can also involve university research offices, with associated time costs to researchers in cases of administrative over-reach.

Reducing the administrative burden of the application process would re-focus applications on what matters: funding high-quality research. To provide certainty to the research sector, ATSE also recommends that the application closing dates and outcomes for each calendar year are legislated along with the total funding pool.

Slow turnaround by assessors represents a bottleneck. Reducing the burden upon assessors would also enable the attraction of a larger pool of reviewers, including international scholars. This would enable fewer applications per assessor as well as mitigate the issue of inappropriate assessors who have limited familiarity with the discipline, or who have a deep and incompatible conflict. ATSE proposes two strategies to reduce the workload upon applicants and reviewers: a two-stage review process, and engaging staff reviewers (the latter to check the procedural aspects).

ATSE recommends the ARC moves to a two-stage application process, with the first stage a two-page proposal and short CV, and the second (invited) stage a full application (simplified from the current onerous application). Assessment methods should be aligned with international best practices. Applicants who were unsuccessful in the ARC funding round, but whose application was high-scoring, should also be given the option for their application to be viewed by industry and other funding agencies. Assessors and the Selection Advisory Committee should additionally be supported by paid staff to undertake the more procedural aspects of assessment. The review must consider if ARC staffing requires an uplift in capability to reduce the administrative aspects undertaken by volunteer assessors and to create the changes that will be recommended by the review.

An additional option to reduce administrative burden is to place a limit on the number of ARC applications that each university can submit. To ensure this does not result in an opportunity to introduce gender bias, this could include the requirement to put forward an equal number of male- and female-led applications from each school in each university. Requiring gender equity in lead applicants at the school level is important to protect against the unintended consequence of further entrenching gender bias in disciplines in which women are under-represented. Such an approach has already been highlighted by the ARC in its work to improve gender imbalance in some fields.

Exemplifying robust review processes

A strong system of peer review via the College of Experts should be retained and legislated into the Act as part of the ARC's best practice in assessment processes. While ATSE recommends a two-step process with staff support, this should not be to weaken the role of the College of Experts.

Many reviewers will also be applicants in each round and may have also collaborated with other applicants. Any conflicts of interest should continue to be closely managed through disclosure as per the ARC Conflict of Interest & Confidentiality Policy, and any applications in which one assessor has ranked in a markedly different way to their peers required to be discussed by all assessors. Assessors should be required to attest that they have not been censured under a formal bullying or harassment investigation process.

The ARC should also consider implementing an asynchronous 'discussion phase' between assessors. This would typically consist of a two-week period in which assessors can see all reviews and add comments and questions. This improves accountability, peer learning and consistency among assessors and would enable more thoughtful assessment of novel and interdisciplinary applications.

Ongoing engagement with research progression

The grant funding system has blind-spots in adjusting project funding depending on outcomes. The ARC should consider a grant renewal system for projects demonstrating excellent outcomes (modelled on the United States National Institutes of Health (NIH) grant renewal mechanism). On the other hand, where

appropriate, the ARC could consider “fast fail” gates that would including provide applicants the option to pivot to a related research topic if their research is not attaining results or is outmoded by other emerging research. Research by its nature can lead to unanticipated outcomes, including null results, and ARC funding should be designed for this to extract more value from provided funding and encourage novel research.

Appropriately assessing research quality

Measuring research quality and outcomes is an important ongoing role for the ARC. As noted by the consultation paper, the National Interest Test (NIT) is intended to enhance the social licence for public research funding, and the Excellence in Research for Australia (ERA) could similarly strengthen social licence if well-executed.

These mechanisms are not currently fit-for-purpose to articulate the value of publicly funded Australian research. The NIT may even act as a brake on funding truly novel or risky research with unanticipated outcomes.

ATSE supports the decision to pause the Excellence in Research for Australia (ERA) for 2022. ERA requires significant resourcing from the sector, concentrated in university research offices, and, since ERA outcomes haves been divorced from the Sustainable Research Funding (SRE) allocations, conducting ERA regularly does not have a clear purpose. It is important to review the quality of Australian research but a reduced frequency and longer reference period would provide a more comprehensive and relevant understanding of research impact. ATSE has previously recommended a ten- to twenty-year reference period (Australian Academy of Technological Sciences and Engineering, 2020). The relationship between research and research assessment should be re-conceptualised such that project outcomes are tracked to optimise decision-making and ultimately outcomes for Australian research, along with a re-focused ERA with a longer reference period.

Supporting research workforce development

The current funding model does not support junior researchers and leads to attrition of the research workforce. Those early in their careers are less competitive in their grant applications as compared to senior researchers with more developed CVs. This attrition, disproportionately of women researchers, represents a great loss to Australia’s research strengths and limits Australia’s current and future potential to tackle complex problems, optimise fundamental research, and address critical areas of need. It is critical that the ARC should continue the mix of project grants and large multi-institutional grants, as well as research fellowships for developing research careers. Fundamentally, research funding including through the ARC must be increased to retain a valuable research workforce into the future.

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