

Submission to the Australian Research Council

Review of the ERA and EI assessment frameworks

12 October 2020



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REVIEW OF THE ERA AND EI ASSESSMENT FRAMEWORKS

The Australian Academy of Technology and Engineering (ATSE)¹ is pleased to contribute to the ARC review of the Excellence in Research for Australia (ERA) and Engagement and Impact (EI) assessment frameworks.

This review presents an important opportunity to not only look at advances and developments in the measurement of Australia's research engagement and impact, but to also create a research evaluation system that engages with end-users and that has a positive impact on Australia's society.

Since its launch in 2010, the ERA has largely succeeded at achieving its objectives, and is now an accepted benchmark for understanding and measuring Australia's research achievement at the discipline level. The more recent EI is an important compliment to the ERA, in capturing the impact of research and engagement with industry.

ERA and EI methodologies face challenges in accurately assessing impact and engagement. We refer you to our previous submissions regarding the ERA and EI, in which we have addressed these issues in detail. This response focuses instead on enhancing the value of the ERA and EI data and outputs to end-users, and opportunities to extend their usefulness.

In summary, ATSE recommends that the ARC consider:

- Ensuring that end-users, including government, policymakers, industry and business, research and the non-profit sector can effectively use and interrogate ERA and EI data.
- Creating incentives to encourage use of ERA and EI data to further promote impact and engagement.
- The potential of artificial intelligence (AI) to automate reporting and repositories for collecting research outputs (including data) and making them immediately open and accessible.
- Open science to promote transparency of the ERA and EI and improve the measurement of impact and engagement.

Improving the value of the ERA and EI

ATSE has previously provided extensive input into the development of the ERA and EI assessment frameworks.^{2,3} Including the Research Engagement for Australia (REA) report released in 2016, which contains measures and recommendations for evaluating research engagement.⁴

In the time since these consultations and the release of the ERA report, the global research environment has continued to evolve. Global rankings by organisations such as the Times Higher Education, QS, Altmetrics and CWTS Leiden have been expanding their scope to capture new measures such as the United Nations 2030 Sustainable Development Goals, collaboration, open

¹ The Australian Academy of Technology and Engineering 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.

² <https://www.atse.org.au/research-and-policy/publications/publication/engagement-and-impact-assessment-consultation-paper/>

³ <https://www.atse.org.au/research-and-policy/publications/publication/excellence-in-research-australia-era-initiative-proposal-to-include-uptake-of-research-as-an-indicator-for-the-assessment-of-applied-research/>

⁴ <https://www.atse.org.au/research-and-policy/publications/publication/research-engagement-for-australia-measuring-research-engagement-between-universities-and-end-users/>

access, and gender equity. The rapid digitisation of science, technology and innovation is also driving change, leading to the emergence of the new “Open Science” paradigm.

Open Science is underpinned by three pillars (p.12):⁵

- Open access to scientific publications and information (such as metadata),
- enhanced access to research data, and
- broader engagement with stakeholders (such as government, policy or policymakers, industry and business and the non-profit sector) to improve the quality and relevance of research and its translation into practice.

Open Science promotes accurate verification of results, improves trust, and encourages engagement in science by removing obstacles to the free flow of research, data, and ideas. It has accelerated the pace at which research can be undertaken, enabling it to be more responsive to global challenges. For example, the rapid transmission of research on COVID-19 has been made possible by preprint repositories for sharing publications and data repositories for sharing outputs with researchers around the world.⁶ This is not to say that Open Science does not pose challenges to research quality, particularly in relation to peer-review and the use of preprints as a source of reliable information.^{7,8}

Open Science is essential for addressing issues associated with the measurement of impact and engagement. Measuring research is complicated by structural inequalities, random chance and anomalies, and should take into account the benefits of experimentation and the right to make mistakes, all which can distort research impact measurements.⁹

The ERA and EI provide a platform for Australia to encourage research quality and promote positive research culture. By incorporating Open Science, they can address issues associated with the measurement of impact and engagement to lead positive change. For example, by improving the quality and scope of the metadata published to include linked information on publications, co-authors, collaborators, funding and research data the ERA and EI can ensure that context is provided along with the data and outputs published.¹⁰ This contextual information can enhance transparency of the ERA and EI by allowing accurate and ethical interrogation of the data and outcomes published to address issues such as gender equity.

Better availability of linked metadata and research data will also help to improve impact. Recent work by the Australian Research Data Commons (ARDC) investigating the link between access to research data and impact supports the case for making research data available and accessible to end-users for interrogation. Two studies looking at the UK Research Excellence Framework and the EI reveal that the research data itself can generate impact if made publicly available for analysis, curation and product development by government, policy or policymakers, industry and business and the non-profit sector.¹¹

Regularly releasing ERA and EI data via the ARC’s data portal would allow end-users to ask their own questions and make the data and outcomes useful beyond the purpose of pure reporting. For example, ATSE is interested in understanding the expertise strengths related to specific industries,

⁵ <https://www.oecd.org/going-digital/digitalisation-of-STI-summary.pdf>

⁶ <http://www.oecd.org/coronavirus/policy-responses/why-open-science-is-critical-to-combatting-covid-19-cd6ab2f9/>

⁷ [https://doi.org/10.1016/S2214-109X\(20\)30113-3](https://doi.org/10.1016/S2214-109X(20)30113-3)

⁸ <https://doi.org/10.1186/s12916-020-01650-6>

⁹ <https://link.springer.com/article/10.1007/s10734-016-9995-x>

¹⁰ <https://data-feminism.mitpress.mit.edu/pub/ctxq9dfs5/release/2>

¹¹ <https://ardc.edu.au/resource/investigating-the-link-between-research-data-and-impact/>

identifying high-performing teams in different fields of research and recognising strong links or collaboration between universities (multi-university research).

Desirable features for a data portal include the ability to search and export linked metadata (for example to look at publications, co-authors and funding sources across the ERA and EI exercises), produce simple graphs, access case studies of successful partnerships, and generate comparisons between universities, which would enable end-user led interrogation of the data and outcomes. Releasing the data and information provided to review panels would also further improve transparency.

Impact and engagement reporting could be further enhanced through data to help observers understand what it takes to build sufficient human capital and expertise to realise impact, for example by showing:

- dependencies and interdependencies (such as existing funding, in-kind support, relationships, and collaborations) as part of the engagement and impact study data,
- impact of multidisciplinary research compared with research conducted within a single field,
- how long it has taken for the impact to be realised, from the initial conduct of the research.

ATSE welcomes the ARC's identification of opportunities presented by technological development, particularly for data collection (the research outputs) and publication of evaluation data and outcomes. ATSE agrees with the case for using persistent digital identifiers such as ORCIDs¹² and Digital Object Identifiers. The ARC should also consider adopting AI technologies for automation and repository infrastructure (e.g. Trove¹³) to improve data collection and reporting. Removing the need for self-reporting by institutions could significantly speed up the exercise and reduce the overall burden.

It is also worth considering the separation of data collection and reporting from the evaluation. This would allow more immediate release and access to data, perhaps annually, and enable a reduction in the frequency of the ERA and EI. This further presents an opportunity for the ERA and EI to consider other kinds of evaluation and reporting. For example, by broadening the evaluation focus to consider long-term impact and engagement, over a 10- or 20-year period, to look at impact and engagement maturity.

¹² <https://orcid.org/>

¹³ <https://trove.nla.gov.au/>