

4 April 2023

Science Strategy and Priorities Taskforce
Department of Industry, Science and Resources
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Re: Developing Australia's Science and Research Priorities and National Science Statement – A National Conversation Starter

The University of Queensland (UQ) welcomes the opportunity to contribute to revitalisation of *Australia's National Science and Research Priorities and National Science Statement*.

Challenges that science could help to address and opportunities to seize:

The challenges that Australia faces are shared globally and are increasingly driven by geo-political changes affecting economic and international relations. In addition to addressing challenges at a domestic level, there are tremendous opportunities for Australian Science to work internationally and with the South-East Asian region in particular. There is also an opportunity for Australia to play a major role in the South-East Asian region in collaboration with other countries, including Japan and Singapore. This will require much greater science and research engagement.

The major challenges require cross-sectoral inputs in which science can play a part through a more integrative approach that involves many of the priorities (sectors) identified in 2015.

Key areas from which challenges might be developed include:

- Adapting to and mitigating the societal and environmental effects of climate change
- Sovereign manufacturing capabilities and food security
- Evolving Australia's competitive and comparative trading advantages
- Critical issues in health and well-being for all Australians, with particular reference to the widening gap between Indigenous and non-Indigenous health outcomes and our ageing population

In framing these challenges, the Department might wish to adopt a similar approach to that taken by the European Union (EU) in the development of its Missions Framework to help direct funding of its Horizon Program.

Open access and open research

Open access and data sharing present a significant opportunity for a renewed national science statement. Increasing open access and data sharing practices will reduce collaboration barriers across sectors and increase accessibility, visibility and influence of Australian science. It would be to Australia's advantage if there were a national approach to open access that combined transformative publisher agreements with a strong rights retention strategy to maximize the benefits of research, including commercialisation routes and broad dissemination via open channels (including institutional repositories).

Further, open access is not a stand-alone feature of the scholarly communication landscape, being tightly coupled to the rise of a broader open science and open innovation agenda, partly in response to concerns around the reproducibility of research and data integrity. It would therefore be beneficial for the national science statement to clearly articulate the importance of ensuring trust in science, enabled by open research

practices where appropriate. In addressing data sharing and “openness”, the national statement should reflect global developments in which both the [FAIR Data Principles](#) and [CARE Principles for Indigenous Data Governance](#) are applied to the management and sharing of research data and other research outputs.

Strengths we should maintain or build:

Life Sciences and Environmental Sciences

Australia has outstanding research strength and depth in Life Sciences and Environmental Sciences. There is potential for Australia to be leaders in developing new technologies and applications relating to health, but this will require an ability to build on our strength in basic Life Sciences. Similarly, our strength in Ecology and related environmental and geographical sciences positions Australia to develop sophisticated management solutions relating to climate change.

Biomanufacturing and vaccines

Australia’s health system is facing growing pressure due to a rapidly ageing population and increasing burden of disease and health inequality. The next generation of therapeutics are moving to cure and heal rather than merely ameliorate symptoms, which will require early and meaningful collaboration between health care providers, clinicians, researchers, product developers and manufacturers.

In Australia, the severely limited capacity for small-scale manufacture of therapeutic and vaccine products suitable for progressing into clinical trials is a significant gap in the development pipeline between discovery research and scale-up manufacturing. Next-generation therapeutics, specifically biotherapeutics and vaccines, presents an emerging and rapidly growing opportunity for Australian science.

Neuroscience Research

Australia has a strong tradition of ground-breaking neuroscience research (including a Nobel Prize to Eccles). Listing neuroscience as one of Australia’s Science and Research Priorities would exploit our current outstanding capabilities in this area and elevate Australia to the top echelons of the neuroscience and biomedical sciences, and as a consequence, provide an innovative platform with which to attract worldwide biotech investment.

Physical Sciences

Australia needs to build its strengths in Physical Sciences (especially Physics), Mathematics and Computer Science. Australia does not have sufficient numbers of researchers in these fields from which many leading-edge innovations and technologies arise. National capability in the physical sciences will be vital to support strategic initiatives such as the AUKUS Nuclear-Powered Submarine Pathway.

Labour and Skills Research

There is an urgent need and opportunity to develop sustainable, long-term and future focused research that will help inform policy and practice in relation to labour and skills challenges facing Australia. Post-COVID, a new and unsettling challenge has emerged that is affecting nearly all sectors of the economy: a lack of available labour and a deficit in the necessary skills to operate businesses. According to the OECD, Australia has second-worst labour shortages in the developed world, and service organisations have been particularly hard hit. Current labour and skills shortages do not discriminate by type of role or industry, with shortages of fruit pickers, nannies, IT professionals, engineers, food and beverage workers, retail and many others – and Australia’s overreliance on international and migrant labour markets have proven a flawed dependency. Addressing issues of underemployment, fuller workforce participation for women and greater inclusiveness for disadvantaged groups would provide domestically sustainable alternatives and enhanced economic and social benefits.

Australia's capability and capacity to address these challenges, opportunities and strengths:

Funding full costs of research

Australia has well-developed capabilities to address these challenges and has benefited considerably from the investment in research by universities that has been made possible by growth of international student (coursework) fee-income. However, this market-dependent investment is not a sustainable or stable way to invest in research and innovation. With the changes to the Commonwealth Block Grant that align funding with the cost of teaching the problem of funding direct costs for Chief Investigators to participate in research projects is emerging. This is additional to the challenge of developing a stable and securely employed early and mid-career workforce, rather than one that is currently in a highly precarious position and dependent on short-term project grants. To maintain the level of capability to match ambition, there needs to be much greater direct (salary) investment in universities and other research providers rather than just relying on competitive grant schemes. In addition, the indirect costs that are paid to underpin research are not sufficient to maintain infrastructure or research specialist support and, again, have been subsidised in universities by international student (coursework) fee-income. This also needs to be addressed.

International collaboration

Although Australia has a vibrant world-class research sector, its small size means that it is unlikely that it has the capacity to address contemporary challenges without international collaboration. This is already acknowledged, but the level of funding through the Global Science and Technology Diplomacy Funds and two dedicated bilateral funds (with China and India) is not sufficient. It is also questionable whether such schemes should be managed by Learned Academies and it would be better to align a much larger international funding investment with a government strategy involving the Department of Industry and Department of Education, perhaps managed through the Australian Research Council.

Research Governance and Mature Funding Agencies

Australia faces significant challenges in areas such as environmental and climate change, sovereign manufacturing capability, artificial intelligence and IT, defence, and health. The proposed priority areas under the National Reconstruction Fund recognise such areas of strategic innovation need.

Australia's two major research funding agencies, the ARC and NHMRC provide governance frameworks over pre-award selection of projects based on peer review, and post-award management of expenditure and outcomes. However, many government sources for funding research do not receive the same governance oversight, and the shift to mission-based, large-scale funding (welcome as that is) has exacerbated this issue. Integration of discovery and mission-based funding into a small number of mature and well-funded research agencies could be accomplished by ensuring each funding agency administers both discovery and mission-based programs.

Principles shaping the priorities

The principles as outlined in the Conversation Starter are appropriate.

Thank you again for the opportunity to comment on the Priorities and Statement. We would welcome the opportunity for ongoing engagement and consultation as the process continues over the course of 2023.

Kind regards,



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