

The Australian Mathematical Sciences Institute (AMSI) welcomes the opportunity to make a submission to this review of the National Science and Research Priorities.

As a peak body for the mathematical sciences in Australia, AMSI is well placed to make comment and provide advice pertaining to mathematical sciences research and its applications. With regard to the critical research, needed to achieve the high-level Science and Research Priorities and Objectives, we believe that the role of fundamental STEM research needs to be more strongly emphasized, particularly for draft Priority 3: “Enabling a Productive and Innovative Economy.”

Fundamental research delivers long-term benefits to the economy, via a multi-stage pipeline. The final stages of the research pipeline is typically supported through private investment and partnerships with industry. The initial stages, however, tend to be high-risk for the private sector and are therefore not possible without public investment. Given the importance of enabling research across the whole pipeline, public funding of excellent research and supporting a strong scientific workforce will always be in Australia’s long-term national interest.

Fundamental research can generate truly transformative ideas and discoveries which often come out of left field. It has played an essential role in applications that we can no longer live without, such as the internet, online banking, Wi-Fi and GPS. Such transformative projects are common in the mathematical sciences. For example, the RSA cryptography used in bank ATMs relies on mathematical research in number theory, that is centuries old. None of the underlying research was undertaken with this (or any other) practical outcome in mind, nevertheless it has had a truly transformative impact.

There is no guarantee that the current or revised Science and Research Priorities will remain in Australia’s future national interest. Targeted funding alignment in certain research areas, linked to short term priorities, will inevitably lead to lost opportunities in other research areas. In this century fundamental and basic research has been struggling to retain funding support; the share of Higher Education R&D (HERD) expenditure for fundamental research has decreased across all the sciences (De Gier, Keegan & Wienk 2022).

To safeguard research capacity in future areas of importance, Australia must continue to invest in a broad-based research community, that produces fundamental research of the highest quality. It is important to recognise that many fields not listed in the draft Priorities, will equally lead to growing knowledge, and have the same potential for transformative impacts, which generate future innovation and productivity.

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