Australian Academy of Science submission on
Australia's Productivity Pitch, Pillar 3: Harnessing data and digital technology

Artificial intelligence (AI) is transforming how everyday tasks are performed around the world. In research and development, AI is fundamentally shifting scientific processes. To realise the full scientific, economic, and social benefits of AI, regulation must be clear and flexible while effectively managing potential risks.

AI development will not pause while a policy framework is established, therefore Australia must act with urgency.

To build national sovereignty in AI, regulatory arrangements must avoid placing disproportionate burden on Australian productivity and guard against the concentration of AI capability and influence overseas.

The Academy recommends the Australian Government:

- Develop a national strategy and infrastructure investment plan to build sovereign AI capability, including coordinated investment in fundamental AI and next-generation High-Performance Computing and Data (HPCD)

- Urgently implement a policy framework that provides necessary consistency across the economy for AI development. Implement the UNESCO Recommendation on Open Science to unlock the full potential of Australian data to power AI research and innovation.

This submission focusses on the 'Enable AI's productivity potential' reform area of Pillar 3.

Sovereign capability in AI is a necessity

Australia is in a productivity slump. AI is a promising tool to help reverse this productivity trend.

AI has significant potential to improve productivity in science through advanced data analysis, synthesis of academic literature, and automation, allowing researchers to ideate and address scientific problems more efficiently.

Australia must urgently develop a national strategy to build sovereign AI capability and guide the productive and responsible adoption of AI across the science sector.

Sovereign AI capability is essential to ensure Australia has the domestic ability to manage AI development, regulation, and adoption in our national interest. This includes the infrastructure, scientific knowledge, and skilled workforce required to participate in AI research and development to boost economic productivity and innovation.

At present, Australia relies on foundational AI models developed overseas. These models reflect external data priorities and biases, limiting their relevance to the Australian context.

Australian researchers critically rely on overseas infrastructure to access AI models, creating vulnerabilities for Australian research should access policies change abruptly. These dependences raise national security concerns and limit Australia's ability to govern the application of AI in sensitive or strategic areas. A national strategy should set a clear investment plan that scales fundamental AI research, builds domestic expertise, and anticipates workforce shortages.

Targeted programs are required to attract and develop AI talent. AI training should upskill Australia's scientific workforce, ensuring researchers can use AI tools effectively and responsibly, without falling behind international peers. Investment in workforce must meet escalating global demand for AI talent and ensure Australia can attract, retain, and train a highly skilled domestic AI workforce.

Secure next-generation supercomputing infrastructure to realise AI's full potential

High-performance computing and data (HPCD) infrastructure, also known as supercomputers, underpin modern AI development and deployment.

Access to onshore HPCD infrastructure is critical. Australia's ageing Tier-1 and Tier-2 facilities cannot meet escalating demand posed by AI. Reliance on international HPCD introduces long wait times, national security concerns, potential loss of domestic AI talent, and forces the deprioritisation of high-value projects due to limited capacity.

Australia needs an immediate and strategic investment in next-generation HPCD infrastructure to ensure national competitiveness, security, and scientific leadership.

Australia must commit up to $2 billion over ten years for a long-term National HPCD Program to upgrade existing Tier-1 and Tier-2 facilities, with co-located data storage and computing resources for maximum efficiency. National coordination and co-investment to build a next-generation Tier-0 (exascale) supercomputing facility will keep Australia connected to the forefront of global scientific and technological advancement.

Immediate investment will accelerate fundamental AI discovery onshore and maintain Australia's competitiveness in the global AI landscape.

The Academy has undertaken extensive work in this area and is available to brief the Productivity Commission. Further information about the Academy's proposal to meet Australia's supercomputing needs can be found at our website.

An Australian AI Act is necessary, but timely action is critical

Technological advances in AI are propelled by an unprecedented pace of innovation and investment. This rate of advancement is outstripping the ability of existing regulatory frameworks to adapt. Without urgent implementation of a clear and flexible policy framework, Australia risks missing the window of opportunity to capture full productivity benefits of AI. Delays will leave Australia lagging as global AI development accelerates and AI-enabled scientific innovation shifts overseas.

Timely action is critical to ensure the Australian science sector has the necessary infrastructure, ethical guidelines, and educational programs for Australian researchers to harness AI's potential effectively and responsibly.

Delayed policy response will leave Australia exposed to diminished influence, offshore concentration of AI capability, and lost competitive advantage as other nations move quickly to shape and harness the global AI landscape.

In 2024, The Australian Government undertook a formal consultation process on proposed mandatory guardrails for AI use in high-risk settings. In its submission, the Academy supported the creation of an Australian AI Act and the establishment of an independent AI regulator to provide necessary consistency across the economy, but emphasised the need for urgency and care in implementing mandatory AI guardrails.

Open data and open science culture to support responsible AI uptake

Australian data are essential in the development of AI tools for Australian interests. However, fragmented policies for research access and data sharing means much of these data are not accessible or interoperable. Without consistent standards and investment in national data infrastructure, Australia risks falling behind global peers in leveraging AI to address economic and societal challenges.

An open, well-governed data strategy will enhance AI transparency, accountability, and performance, enabling trustworthy AI applications that deliver productivity gains for Australia. Implementing the UNESCO Recommendation on Open Science, in conjunction with the FAIR (Findable, Accessible, Interoperable, and Reusable) and CARE (Collective benefit, Authority to Control, Responsibility, and Ethics) principles, will enhance data discoverability, accessibility, interoperability, and stewardship, while respecting Indigenous data governance.

To discuss or clarify any aspect of this submission, please contact science.policy@science.org.au.