



ATSE VISION STATEMENT

JULY 2022

Strategic investment in Australia's artificial intelligence capacity

Australian Academy of Technological Sciences & Engineering

Artificial Intelligence (AI) is a collection of interrelated technologies that can be used to solve problems autonomously and perform tasks to achieve defined objectives.¹

AI is a transformational technology with a wide range of applications for almost every industry – from agriculture, to manufacturing, to education. It has a profound and increasing impact on the foundations of society, affecting industry, geopolitics, economies, job markets and democratic values.

To keep pace with this influential and rapidly changing technology, it is critical that Australia's national AI plan is bold and shows an ambition to lead a transformative step-change, drive national competitive advantage, ensure security, and seize game changing opportunities.

Australia's AI Action Plan, released in June 2021, outlines the Australian Government's intentions for ensuring Australia is a "global leader in developing and adopting trusted, secure and responsible AI".¹ The Australian Academy of Technological Sciences and Engineering (ATSE) welcomes this national framework, particularly the creation of the National AI Centre within CSIRO's Data61 and an additional \$124.2 million in 'direct measures'.² ATSE welcomes the recent investment but to continue to reap the benefits of commercialisation, Australia must produce new ideas that are translated into intellectual property at the forefront of AI. In addition to the National Artificial Intelligence Centre, we must continue to invest heavily in fundamental research.

ATSE proposes a vision in which a plan for fundamental AI research is developed to compliment the recently launched National Artificial Intelligence Centre. This will build on the National Artificial Intelligence Action Plan and advance Australia's sovereign AI capabilities, develop STEM skills and talent, and ensure Australia's worldwide competitiveness in our increasingly digital future.

Why invest in Australian strategic AI research?

THE POTENTIAL

Applications of AI in digital innovation are predicted to be worth more than \$300 billion to the Australian economy by 2028.³ But to unlock this potential, and to ensure the benefits are shared among Australian companies and people, Australia needs to boost its AI research through strategic investment aligned to national needs.⁴ Fundamental AI research – using AI techniques such as machine learning, data analysis and automation – creates ideas, algorithms and computer systems that can be used in AI applications for end users across industry and business. **A lack of Australian-led fundamental AI research threatens Australia's sovereign ability to make AI-driven advancements which support local communities and solve local problems.** Australia risks becoming heavily reliant on imported skills, software, and infrastructure to support AI expansion as these tools become increasingly essential across industries.

An impressive array of advanced fundamental research and innovation in AI is underway in Australia, representing strong potential to grow sovereign capability, fuel industry translation and stimulate business investment. An ATSE survey of AI research in Australia has identified at least 18 world-leading research groups whose research is accelerating development of AI at a significant pace. Australia has been identified as an AI hotspot, and its AI talent achieves impressive results compared with AI leaders – the United States, United Kingdom and China. However, Australia's AI potential is not currently being **strategically coordinated and leveraged.** These nations are making strategic investments in AI research and priming for future growth.⁵ With the right strategic investment, Australia is in a strong position to leverage existing research and talent and supercharge its potential to become a global competitor in AI.

CHALLENGES TO OVERCOME

Australia's AI research has been largely opportunistic up until now, resulting in sub-optimal alignment with national industry growth priorities and wider sectoral and societal need.

In the Global AI Readiness Index 2020, Australia ranked twelfth in the world in terms of readiness to take advantage of the AI-powered transformation but scored lower in our local technology sector's ability to supply AI tools (to the government and to the public), compared to other major economies.⁶ This is because Australia's local industry is less developed and competitive, and it relies nearly entirely on international fundamental research and technology development. Coordination and national priorities in AI can help drive the economic impact further, and reap more benefit from the exceptional talent in the country.

Australia's AI Action Plan commits the majority of new Government investment in AI to translation and commercialisation of research.¹ This contrasts with investment strategies of the high-achieving major technology companies and similar economies around the world (like the United States through its National Artificial Intelligence Initiative¹⁵ and Germany through Artificial Intelligence Strategy, 2020¹⁶), where the emphasis is on investing in the development of world-class intellectual property (IP) – through fundamental AI research – rather than translating what is already known.

SCALE OF INVESTMENT

Australia would benefit immediately from a nationally strategic AI research able to catalyse globally competitive AI value chains, energise industry, and create new and desirable domestic job opportunities. Governments of similar-sized economies are investing hundreds of millions of dollars in fundamental AI research, dwarfing Australia's investment and extinguishing prospects.

Governments typically rely on private enterprises to work with each other and with government to develop AI software, provide AI personnel, and deliver the AI advances. According to the 2022 Stanford AI Index report¹³, private venture investment in AI exploded to US\$93.5 billion in 2021, more than doubling the 2020 tally. The US leads investment in AI with approximately US\$5 billion in 2020¹⁴. The US also established the 'National Artificial Intelligence Initiative Office' in 2021 to serve as a focal point for all AI research and policies across academia, government, and industry. Leadership from both government

and the private sector is therefore required in the Australian context to create a long-term competitive marketplace in Australia. Australia must enter the race and engage in AI Research and development (R&D) on a large scale while assuring broad inclusion. It's a significant investment in ensuring future success.

Based on current investment figures Australia would have to increase investment in fundamental AI research by approximately \$100 million per year to remain internationally competitive – in addition to the A\$124.1 million investment already committed in the 2021-22 Federal Budget.

BENEFITS TO BE REALISED

Strong fundamental research skills and infrastructure are required to create and commercialise new AI research. Key to the success of AI hubs currently being created, is investment that is strategically aligned with the needs of society, government, industry, and national industry growth priorities – and which includes fundamental research.

A fundamental AI research plan could feed directly into AI hubs focused on commercialisation or even cultivate fundamental research within these hubs. Australia would benefit immediately from this strategic fundamental AI research engine and catalyse globally competitive AI value chains, drive translation, energise industry, and create new and desirable domestic job opportunities.

Furthermore, long-term investment in fundamental research could offer Australia a wealth of benefits to both industry and the broader STEM ecosystem. It could help deliver:

- the capacity to respond to growth and demand of AI and digital technologies, by creating pathways for STEM and associated skills development and training across school, accredited, and university learning.
- the capability to undertake AI research and development at the forefront of the field internationally.

ATSE also supports the ongoing goals of the National Artificial Intelligence Centres goals to deliver:

- ethical AI that can be translated and that can be adopted by business (in particular, highly regulated business).
- new more competitive governance, business strategies and models.
- the skills to evaluate, understand and apply AI technologies for various users across multiple domains and industry sectors, adapting and customising for local needs.
- a local ecosystem of start-ups and scale-ups that can translate AI research and develop ideas into commercially viable digital products and services.
- an inclusive AI sector in Australia, where social aspects of AI applications are considered as part of the development of the technology through deeper multidisciplinary engagement, leading to a more inclusive and culturally appropriate approach to health and social systems management.
- coordination to ensure the protection of National Data Sovereignty, including Indigenous Data Sovereignty.

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