

Submission to the Department of Industry, Science, Energy
and Resources

Australia's Artificial Intelligence Action Plan

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AUSTRALIA'S ARTIFICIAL INTELLIGENCE ACTION PLAN

The Australian Academy of Technology and Engineering (ATSE)¹ welcomes the opportunity to comment on the discussion paper for Australia's Artificial Intelligence (AI) Action Plan. ATSE's comments build on our response to the 2019 AI Ethics Framework² and also the AI Technology Roadmap, developed in conjunction with CSIRO Data61.

ATSE has a strong and established interest in using innovative technology to drive Australia's economic and social success. ATSE would be delighted to continue to support a thriving AI plan for Australia, and would welcome further consultation and collaboration with the Government to support this mutual aim.

As well as responding to specific questions in this consultation, we also commend to the Department ATSE's 2018 action statement, *Positioning Australia as a leading digital nation*, as a valuable reference document that provides several recommendations to encourage digital leadership in industry, foster research and industry partnerships, safeguard and strengthen our digital workforce and capability pipeline, ensure whole-of-government action, and deliver research sector reforms.

AI presents a pathway for economic recovery from the COVID-19 global pandemic. The ability to leverage Australia's existing capability in AI into competitive advantages for local businesses, supported by Australia's international leadership through the Global Partnership on AI, will depend on how well Australia can create the right conditions to enable the sector to grow. With the right conditions, digital technologies, including AI, are potentially worth AU\$315 billion to the Australian economy by 2028.³ Strategic development and investment are essential if Australia is to reach this potential.

ATSE welcomes the \$800 million funding injection in the 2020-21 Federal Budget to enable businesses to take advantage of digital technologies to grow their businesses and create jobs. To make this a reality, ATSE recommends that the Australian Government focuses on creating a fertile environment for investment in AI by breaking down the barriers that have limited growth to date. These barriers are explored in further detail below, but broadly they are:

- variable data quality and access, including security
- underdeveloped digital and data infrastructure
- limited investment and access to venture capital
- limited access to the necessary skills and talent

To address these barriers, ATSE recommends that the Australian AI Action plan focuses on:

- **Strengthening cyber security** against increasing opportunities for attack and misuse of data and AI.
- **Building valuable datasets that underpin AI** under proper governance and making them open source where possible to unlock the potential of the data while returning public good.
- **Ensuring Australia has the infrastructure** to support AI, particularly in regional areas.
- **Regulation to govern data accuracy, privacy, transparency, and use**, and define the AI sector.

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/artificial-intelligence-australias-ethics-framework-discussion-paper/>

³ <https://www.data61.csiro.au/en/Our-Research/Our-Work/AI-Roadmap>

- **Safeguarding and strengthening our workforce and capability pipeline** through curriculum support, industry-supported traineeships, and incentives to attract and retain international talent.

Government

Do we have the right vision for AI in Australia?

ATSE agrees that urgent action is needed to take advantage of the coming AI transformation, which offers significant benefits to sectors including manufacturing, health, mining, defence, and infrastructure. Australia has an opportunity to leverage the very high quality and reputation of Australian research, one of our great strengths, into commercial, health and social success through AI. Australia has a diverse population that allows less data bias in a manageable population size, which is a strength for training AI and algorithms. This ‘good’ data can still be misused by ‘good’ AI algorithms, however. The AI Ethics Framework has been an important starting point and ATSE recommends that it be emphasised (and compulsory) in all training curricula.

Security is underplayed in this discussion paper, however. Data should be seen as a precious resource and safeguarded as such through ensuring appropriate availability, privacy and integrity of all data types.⁴ Cyber threats will increase in future because AI can be used to increase the threat vector, and the more sensors and actuators are networked the more vulnerable systems will become. Advances in cyber security are critical in parallel with AI development. AI can itself be used in security applications such as predicting likely threats and vulnerabilities, tools and techniques for achieving real-time comprehensive cyber situational awareness, and methods for ensuring business and government continuity in the face of cyber-attack.⁵

Australia’s vision must also commit to open source AI developments. IBM, a leader in open source projects including blockchain, deep learning and quantum computing software, has found that open source projects attract large communities and help to create vibrant ecosystems for projects to grow.⁶

What can be done to reduce barriers to AI adoption in Australia?

Australia’s size and broadly dispersed population presents a unique digital infrastructure challenge, with a growing urban/rural digital divide. Australian data infrastructure must be improved in order to fully take advantage of AI-defined networks. This includes high speed internet (faster than the current National Broadband Network), 5G networks, LEO satellite constellations and distributed data repositories such as data lakes.

The development of ‘trust marks’ or ‘comparative performance’ for consumer use of AI for data driven solutions would also help to give consumers and investors confidence, and confer a competitive advantage on businesses who adhere to best practice AI. These trust marks could include minimum standards of privacy, security, data curation, storage and management.

In order to develop these trust marks, the government will need to standardise the definition of AI and its variants. Different companies and organisations have created their own definitions, leading to some misleading marketing claims that products or services use AI, where this is not the case.⁷

⁴ https://www.atse.org.au/wp-content/uploads/2018/11/AS-2018-10-30-APPLIED_Positioning-Australia_DigitalFutures-01-D3-screen-1.pdf

⁵ <https://www.atse.org.au/research-and-policy/publications/publication/australias-2020-cyber-security-strategy-a-call-for-views/>

⁶ <https://developer.ibm.com/depmodels/cloud/articles/cl-open-architecture-update/>

⁷ <https://www.forbes.com/sites/parmyolson/2019/03/04/nearly-half-of-all-ai-startups-are-cashing-in-on-hype/?sh=32255d08d022>

What is the role for government to support the uptake and use of AI technologies in Australia?

AI is a tool that draws its capabilities from the large amounts of data it uses. Therefore, ATSE also recommends regulation to set out the parameters for the data sets used in AI applications. This will ensure that the data are accurate, and the parameters are sufficiently complete to cover all variants. Regulation should also ensure transparency and privacy, with clear guidelines for accessibility and use. This would support the safe release of public data and public-sponsored data sets for exploration. Open access data, research and publishing contributes to faster and greater scientific progress.⁸

AI will become a critical part of our national infrastructure, so there would be merit in establishing a national AI agency. Such an agency would be responsible for coordinating domestic AI research activities, highlighting AI translation opportunities, supporting the development of Australia's commercial AI industry, and facilitating international engagement in AI.

Government can also support the uptake and use of AI technologies through investment. Australia is overly dependent on overseas companies for AI software, cloud computing services, and cybersecurity. Government-sponsored venture capital arrangements have proven vital in the growth of overseas AI companies. Recognising that the Australian Government recently committed \$800 million to developing digital capability in Australia, focused investment in AI will ensure Australia remains internationally competitive and continues to develop sovereign capability. As a comparison, France has promised €1.5 billion in AI investment by 2022, Germany is investing €3 billion over six years, and the United States spent US\$973 million in the 2020 financial year on AI, with commitments to increase this over the next two years.⁹

Research

What are the problems Australia is facing where the development and application of AI could provide long-term solutions, and how could these be prioritised?

The development and application of AI has the potential to improve almost every sector in Australia, including:

- **Defence and security** – information warfare
- **Agriculture and aquaculture** – automated advisors and vision sensors
- **Health and medicine** – medical records, medical imaging, personalised medicine, prosthetics and other medical devices
- **Energy** – forecasting demand in the national electricity grid to reduce the risk of disruptions to electricity supply
- **Environment** – sensors to monitor quality indicators
- **Transport** – prediction algorithms to forecast travel choices and transport demand, supporting better planning and decision making in freight transport, and autonomous vehicles¹⁰

The priorities for development do not need to be problem-specific. AI is a tool and deserves investment as an enabler, with many benefits and applications across industries and sectors. This will require collaboration in research and development at an international scale.

⁸ https://www.atse.org.au/wp-content/uploads/2018/11/AS-2018-10-30-APPLIED_Positioning-Australia_DigitalFutures-01-D3-screen-1.pdf

⁹ <https://acola.org/hs4-artificial-intelligence-australia/>; <https://www.oxfordinsights.com/government-ai-readiness-index-2020>

¹⁰ <https://www.atse.org.au/wp-content/uploads/2019/04/Transport-Industry-Technology-Readiness-report.pdf>

How can Australia best coordinate its national research effort around areas of national priority?

It is important to recognise of AI as a critical stand-alone technology, that can benefit many applications across discipline areas. The creation of a new CRC for AI Development would expand AI research, supported by a national agency for AI to boost visibility and direct efforts across sectors. This will allow for effective investment and promote an agile AI sector that can be called on for rapid response to future challenges.

Identifying and promoting key national projects could promote alliances that allow more rapid development and deployment of digital technologies. Investment in on-going systematic development and upgrade of digital network infrastructure based on systems- and use-analysis would give the sector the tools and confidence to excel.

How can we better support industry-researcher engagement?

AI is often developed or deployed in industry, and identifying industry needs is therefore critical. ATSE's joint report with the Australian Academy of Science, [*Preparing for Australia's Digital Future*](#), found that Australia's research strengths are not necessarily aligned with industry needs, and areas of alignment were often due to luck.¹¹

ATSE is currently engaged in an AI capability-mapping project, which aims to address this lack of visibility. The project will provide a capability map of Australia's research strengths in AI and autonomous systems, and an analysis to highlight AI capability gaps and sovereign capability vulnerabilities such as deep dependence on overseas products and services. ATSE would welcome Government support for this important work, which will benefit Australia's potential to grow a thriving, appropriate, safe and highly utilised national AI capability.

Investment in incubators could also play an important role in AI development in Australia. The success of CSIRO ON and Defence D.Start could be emulated to boost collaboration and development. Universities and publicly funded research agencies could also actively pursue opportunities to become focal points for businesses involved in developing and commercialising digital technology to cluster around capabilities.¹²

People

What is the best way to ensure Australian businesses have access to the AI workforce they need for an AI enabled future?

Safeguarding and strengthening our digital workforce and capability pipeline must be a priority for an AI-enabled future.¹³ This may be achieved through reshaping culture in universities and publicly-funded research agencies, placing substantially higher emphasis on industry experience, placements and collaborations in hiring, promotion and research funding.

Attracting high-quality international talent also remains critical to research and development, including retaining these skilled workers at the completion of their formal studies.¹⁴ This both expands the skill base available to businesses, and promotes greater international engagement. To attract the best talent Australia must continue to position itself as a world leader in research and provide the right conditions and incentives for business and industry to invest in AI research, development and commercialisation in Australia.

¹¹ <https://www.atse.org.au/research-and-policy/publications/publication/preparing-for-australias-digital-future/>

¹² <https://www.atse.org.au/research-and-policy/publications/publication/preparing-for-australias-digital-future/>

¹³ <https://www.atse.org.au/research-and-policy/publications/publication/preparing-for-australias-digital-future/>

¹⁴ https://www.atse.org.au/wp-content/uploads/2018/11/AS-2018-10-30-APPLIED_Positioning-Australia_DigitalFutures-01-D3-screen-1.pdf

What is the best way to ensure Australians have the skills and capabilities they will need for an AI-enabled future?

Industry, government, education and technology leaders should work together to produce a long-term plan for a skilled digital workforce, identifying digital skills needs and the role of schools, tertiary education, VET programs, industry exchange programs, massive open online courses (MOOCs) and micro-credentials (such as digital badges).¹⁵

Governments should promote curriculum development for schools and the public service for data sharing and use, as well as data governance and analysis. Mathematics should also be taught with an angle on computing and human machine interaction from high school level. Work-integrated learning, undertaken at scale, would boost AI skill development and should be a core element of tertiary courses that relate to technology and engineering. This would have benefits for both workplace and education culture.¹⁶

¹⁵ https://www.atse.org.au/wp-content/uploads/2018/11/AS-2018-10-30-APPLIED_Positioning-Australia_DigitalFutures-01-D3-screen-1.pdf

¹⁶ <https://www.atse.org.au/research-and-policy/publications/publication/preparing-for-australias-digital-future/>