mxa consulting

The Case for Australian Sovereign AI

December 2023

Executive Summary

Australia is at a pivotal moment in its Artificial Intelligence (AI) journey. As this technology reshapes global economic and societal landscapes, our strategic response will determine our future prosperity and security. This white paper outlines the rationale and key strategic initiatives for Australia to capitalise on the AI revolution, emphasising the need for building sovereign capability to ensure government retains key accountabilities, defend against growing risk, and capturing economic value in a burgeoning market.

AI's Evolution and Australia's Economic Landscape

AI's recent step-change from Advanced Analytics to Generative AI (GenAI) has radically altered its potential applications. As a result, Australia's economic landscape now faces significant disruption and opportunity from AI. Studies illustrate AI's dual role in reshaping employment, necessitating a balanced and empathic approach as large numbers of people undertake difficult skills or job transitions. Whilst AI's contribution to Australia's economy could reach $115 billion annually by 2030, this transition poses challenges for workers and families, calling for proactive government and business interventions.

Sovereign AI Capability: National Security and Societal Cohesion

AI's integration into cybersecurity and infrastructure protection is a critical component of Australia's national defence. AI will drive cyber warfare and disinformation to unprecedented heights, risking national security and societal cohesion. Existing examples of AI-powered scams and the increasing potential of synthetic content to disrupt underscore the urgency of building sovereign capability.

Balancing National Capability with Global Trends

Australia's AI landscape is marked by promising developments within its tech and SME sector, juxtaposed with challenges of multinationals executing lock-in strategies. This paper advocates for cultivating homegrown AI talent and capability while addressing Big Tech's impact on policy and outcomes for Australians. This approach will ensure our public sector remains robust and aligned with national interests.

Revolutionising Government Policy with AI

AI offers an unprecedented opportunity to address the complexity of key policy areas like welfare, immigration, and taxation. This paper proposes leveraging AI to simplify these systems, and make better trade-off decisions between policy and technology cost or risk. This will ensure more responsive, fair, effective and implementable policy.

Improving Government Technology with AI

Recognising software as *the* fundamental enabler of government services and a significant consumer of tax-dollars, we suggest AI-driven solutions to enhance code agility, security, and operational effectiveness. The deployment of sovereign AI agents to provide insights into code and technology infrastructure will foster a more agile and secure digital government environment whilst allowing us to retain accountability and capability.

Becoming an AI-Compute Superpower

Capitalising on our natural resources and strategic position, we have the opportunity to create a new category of export commodity and capitalise on one of the world's fastest growing "synthetic resources"; AI compute. The paper advocates for large-scale investment in solar-powered AI-focused data centres, emphasising the need for policy incentives, infrastructure development, and international collaboration.

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1. Digging Shallow

Our Opportunity

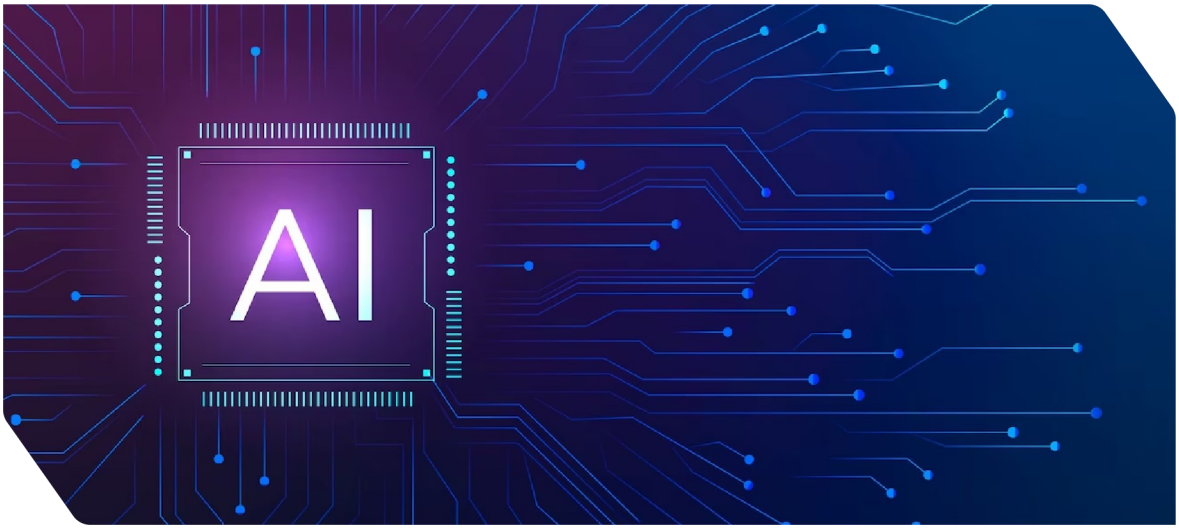
Artificial Intelligence (AI) is emerging as the most transformative technology in the history of humanity. At the heart of this transformation lies a compelling opportunity for Australia to create a prosperous and happy future for our citizens and friends by combining the potential of AI with the strategic advantages of Australia.

The history of humanity is driven by technological revolutions, each fundamentally reshaping society. However, in 2023, gone are the days where government and business leaders could think of technology as just one of many “cost-centres”. Today, technology is everywhere and drives everything. It is the central driving capability of government service and value. In such an environment, we must not allow our strategic technology decisions to be outsourced to multinational tech companies and other nations.

Australia faces a decision that will shape its future in the global economy and society. In embracing AI, Australia can redefine its economic landscape, bolster its national security, and enhance societal cohesion.

Let’s not miss this opportunity.

1.1 A Brief History of AI



How did we get here?

AI's potential extends from understanding and predicting complex patterns to creating innovative content. This range signifies a leap from traditional data analytics, which primarily focuses on interpreting past and present data trends, to a dynamic era where AI aids in sculpting the future.

Between 2015 and 2022, most commercial Artificial Intelligence applications were applications of "Machine Learning" better called "Advanced Analytics". These technologies focused on explaining the past and making recommendations for the future by learning through iteration, rather than applying explicit instructions encoded by subject matter experts. The insight that it is better to tell a computer "how to learn to fish" rather than "how to fish" is where the term "Machine Learning" comes from.

These Advanced Analytics models were powered by three compounding revolutions; 1) a proliferation of data driven by the growth of the internet, Software as a Service platforms and Social Media, 2) the improvement in gaming chip (GPU) performance and the realisation that these were exactly the technology we needed for Machine Learning to be fast, and 3) step-changes in mathematical techniques called "Deep Learning" that were used to model intelligence, memory, and attention.

As everyday citizens, the most common way we were impacted by this technology was through marketing. Here, AI algorithms determine which ad is best to show us in order to maximise the chances of a sale. This, for example, is how Google, Facebook, or TikTok decides which ads to show you, or how Netflix recommends what to watch next. However, a vast array of other applications were already in use and hidden to most people. These include risk analysis of financial products, anti-money laundering techniques to monitor for suspicious transactions, AI generated circuitry designs, predictive maintenance, traffic rerouting, and countless more.

Government intervention in this early stage of commercialisation consisted largely of ensuring these AI systems were not used to undesirably discriminate. For example, 'explainable' AI systems were developed to demonstrate that bank lending models did not inadvertently discriminate on the basis of protected characteristics such as race, religion, or gender.

1.1 A Brief History of AI (cont'd)

The Dawn of Generative AI

The landscape of AI underwent a seismic shift with the introduction of OpenAI's GPT -3 model in June 2020, marking the beginning of commercially viable Generative AI (GenAI). The GPT-3 model was developed off the back of Google's groundbreaking invention; the "Transformer". This technology helps Deep Learning models figure out which parts of context they should pay most attention to.

Since then, the generation of new text, video and audio content using AI has undergone exponential growth, with the inflection point being the launches of OpenAI's ChatGPT (text) in Nov 2022 and MidJourney's V3 (images) in July 2022. These new models have unlocked a whole new class of products and services based around the creation of content that feels much more human, such as creating advertising copy that matches a company's tone of voice, imagery that reflects a particular designer or artist's style, voice generation that can match a singer or actor's voice and video content. It can even be used by technology consultancies to co-write white papers on AI. A McKinsey survey in August 2023 revealed that a third of business respondents were already officially using GenAI tools in at least one business function to conduct activities such as product development and supply chain optimisation.[1]

Currently, there is a large push for "the opposite" of generative AI, called "synthesis AI", which involves condensing down large volumes of information to help us understand clearly the "so what".[2] These technologies are challenging because they require combining the text, video and audio capabilities of Generative AI with the quantitative analysis technologies from Advanced Analytics.

[1] https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year
[2] https://a16z.com/for-b2b-generative-ai-apps-is-less-more/

1.2 Where Are We Going?

The Economic and Employment Landscape of AI

The impact of AI on the economy and employment will be immense. Authoritative sources have widely documented AI's dual role as both a disruptor and a creator in the job market.

Boston Consulting Group (BCG)[3], in collaboration with Faethm, explored the potential impact of various technologies on jobs in countries including Australia. Their study underscores a nuanced reality: while AI and related technologies will undoubtedly eliminate some jobs, they are also poised to create many others. This technological shift, accelerated by the COVID-19 pandemic, is expected to fundamentally alter the workforce landscape. The net effect is not just about the number of jobs lost or gained; it's about the economic disruption and the transformation of each job's nature. BCG's research also highlights that automation will reduce both unskilled and white-collar positions while creating significant opportunities in areas where human abilities like empathy, creativity, and emotional intelligence are irreplaceable.

Finally, in Australia, specific sectors will face challenges in filling jobs, with significant shortfalls anticipated in fields such as computer and mathematics, management, healthcare, and business operations. At the same time, technology is likely to create workforce surpluses in areas like production and office administration.

The World Economic Forum's Future of Jobs Report 2023[4] further reinforces this perspective. It suggests that nearly a quarter of all jobs globally (23%) will undergo significant changes over the next five years due to technological advancements, including AI. This change encompasses a growth of 10.2% and a decline of 12.3% in different job sectors. The report emphasises the need for resilience and investment by governments and businesses to support this transition, ensuring a shift toward new job opportunities and sectors that emerge in the AI era.

The OECD Employment Outlook 2023[5] provides critical insights into AI's evolving role in the labour market. Notably there will be significant influence on job quality, stemming from the capacity to reduce monotonous and hazardous tasks. Conversely, it acknowledges risks such as intensified work environments.

To bring this to life, imagine an accounting firm that bills clients by the hour. If AI makes their accountants 30% more efficient, the firm will either have to move to a new business model, take a 30% reduction in revenue, or ask its accountants to deliver to 43% more billable work.

There are 200,000 accountants in Australia[6]. How will they handle the increase in intensity? Where will the potential new billable work come from?

These challenges underscore the necessity for decisive policy development to maximise AI's workplace benefits while safeguarding workers' rights and well-being. As with BCG's research, the OECD report emphasises the evolving skill requirements due to AI, highlighting the need for targeted training and education strategies to bridge skill gaps and manage the risk of exacerbating inequalities.

[3] https://www.bcg.com/publications/2021/impact-of-new-technologies-on-jobs
[4] https://www.weforum.org/publications/the-future-of-jobs-report-2023/
[5] https://www.oecd-ilibrary.org/employment/oecd-employment-outlook-2023_08785bba-en
[6] https://labourmarketinsights.gov.au/occupation-profile/accountants?occupationCode=2211

1.2 Where Are We Going? (cont'd)

Tough Times Ahead

On the economic front, Australia stands to gain immensely from the responsible adoption of GenAI. A collaborative report by Microsoft Australia and the Tech Council of Australia[7] projects that GenAI could contribute up to $115 billion annually to Australia's economy by 2030. This contribution will come through two primary channels: enhancing existing industries and fostering the creation of new products and services.

What is rarely called out however is that the transition from a given set of jobs to another is hugely traumatic for most people. Any major technology and economic transition will involve real human beings who will have to dramatically change their skills and or careers, and this is hard on those people and their families. We are likely to see large impacts in mental health, financial stress, and even domestic violence, as we go through this transition. For those who are still reeling from the impact of Covid-19 and the current rise in the cost of living, this will be a compounding impact.

Given that Australia's economy is so dependent on white-collar workers in Healthcare, Financial Services, Education and Professional Services, these issues will be material and must be addressed by Government and Business in advance of the impact being felt.

[7] https://techcouncil.com.au/newsroom/generative-ai-could-contribute-115-billion-annually-to-australias-economy-by-2030/

2. The Importance of Sovereign AI

A Pillar of National Security and Societal Cohesion

In the digital age, the development of sovereign AI capability is not just beneficial but essential for Australia's national security, political stability, and societal cohesion.

2.1 Cybersecurity and Infrastructure Protection

The integration of GenAI into the realm of cybersecurity and infrastructure protection is a critical frontier for national defence and security. Recent advancements highlight the urgent need for Australia to develop sovereign capabilities.

For example, Microsoft's voice-cloning AI, VALL-E, demonstrates this advancement with its ability to mimic a person's voice from just a three-second audio sample[8].

Simply answering your phone with *"Hello, this is Company X, how may I help you?"* will soon be enough of an audio sample to mimic someone's voice and call their bank or children.

[8] https://arxiv.org/pdf/2301.02111.pdf

2.1 Cybersecurity and Infrastructure Protection (cont'd)

Cyber warfare is a growing existential threat to national security. AI and quantum computing significantly enhance cyber warfare capabilities, creating a landscape where attacks can be more frequent, sophisticated, and damaging[9]. AI's ability to develop extensive problem-solving, planning, and speech recognition skills further complicates the cyber domain, introducing challenges in defending against AI-powered cyberattacks.

The rise of AI in cyber warfare has already impacted international relations, with major global powers actively investing in AI technology to gain a competitive advantage. Sovereign AI capability in Australia is vital to protect against such threats, ensuring resilience and independence in the digital domain.

[9] https://www.iwp.edu/cyber-intelligence-initiative/2019/03/27/how-artificial-intelligence-and-quantum-computing-are-evolving-cyber-warfare/

2.2 Political Stability and Societal Cohesion

Equally important is the role of sovereign AI in maintaining political stability and societal cohesion. As GenAI advances, it has significant potential misuse in disinformation campaigns and foreign interference. This will in turn reduce trust in our institutions, create political divide, and increase the general anxiety level of the population[10].

Recent research from the ANU Research School of Psychology highlights the emergence of new social divides in Australian society, such as the vaccinated versus the non-vaccinated[11]. This division is not just about health choices but also reflects underlying societal fractures, where perceived injustices and differences can lead to reduced confidence in government and institutions, potentially increasing risks for society as a whole. These divides underscore a broader trend where societal cohesion is challenged, and trust in institutions and legitimacy is at risk.

The advent of AI-generated content compounds these issues. Europol's warning that up to 90 percent of online content may be synthetically generated by 2026 should be cause for immediate concern[12]. A serious problem is that many consumers are unable to tell the difference between real and AI-generated content. Indeed, a recent Forbes survey found 76 percent of consumers worried about AI-generated misinformation and only 56 percent believe they can differentiate between real and AI-generated content[13].

Closer to home, AI-powered "deepfake" technology is already being used to scam Australian citizens. A recent example[13] includes AI-generated videos showing Andrew "Twiggy" Forest, Gina Reinhart, Dick Smith and Federal Treasurer Jim Chalmers advocating for a scam financial product. Social media sites such as Facebook, Instagram and TikTok have so far shown themselves to be incapable to detecting and removing this content due to the scale and sophistication of the problem. If Australia does not build national capability to do so, we are leaving the safety of our citizens in the hands of incapable international corporations.

Considering these developments, it is even more important that Australia develop sovereign AI capability. Sovereign capabilities would allow for better monitoring, regulation, and counteraction of AI's impact on societal cohesion, all with the critical lens of Australian values and with accountability held by Australian institutions and companies (where it belongs).

[10] https://www.aph.gov.au/About_Parliament/Parliamentary_departments/Parliamentary_Library/pubs/rp/rp2324/Quick_Guides/ForeignInterferencethroughSocialMedia
[11] https://psychology.anu.edu.au/news-events/news/social-divide-emerging-heres-how-keep-it-together
[12] https://www.europol.europa.eu/cms/sites/default/files/documents/Europol_Innovation_Lab_Facing_Reality_Law_Enforcement_And_The_Challenge_Of_Deepfakes.pdf
[13] https://www.forbes.com/advisor/business/artificial-intelligence-consumer-sentiment/
[14] https://www.abc.net.au/mediawatch/episodes/deepfake/103155960

3. Fostering Australian AI

Balancing National Capability and Global Trends

3.1 Cultivating Homegrown AI Talents and Capabilities

Australia stands at a pivotal moment to bolster its AI capabilities, with a burgeoning AI community that presents a unique opportunity for national capability development.

Leading Australian tech companies, such as Atlassian[15], Canva[16], and Afterpay[17], are making significant strides in AI, demonstrating the capability of the Australian workforce. The startup scene, although navigating a conservative venture capital landscape throughout 2023[18], continues to show impressive growth[19]. Simultaneously, the Small and Medium-sized Enterprises (SME) sector is quietly building robust AI capabilities to support government initiatives, though these efforts have not garnered widespread attention.

These developments signal a ripe opportunity for Australia to nurture its domestic AI sector, embedding it into the national fabric of technological advancement.

[15] https://www.atlassian.com/software/artificial-intelligence
[16] https://www.afr.com/technology/canva-s-ai-products-power-revenue-jump-to-2-7b-20231003-p5e9h6
[17] https://afterpay-corporate.yourcreative.com.au/wp-content/uploads/2021/08/Afterpay-iQ-Next-Gen_US-Release_August-2021.pdf
[18] https://kpmg.com/au/en/home/media/press-releases/2023/07/ai-and-climatetech-sectors-defy-slowdown-in-vc-activity.html
[19] https://www.afr.com/technology/aussie-vcs-ready-for-the-next-tech-boom-generative-ai-20230112-p5cc7w

3.2 Addressing the Challenge of Multinational 'Vendor Lock-In'

Concurrently, Australia faces the challenge of multinational corporations implementing 'vendor lock-in' strategies.

GenAI technologies are panning out to be "sustaining" innovations more so than "disruptive" ones[20]. This means that they are allowing established companies to deliver extra value by leveraging existing interfaces and data, rather than allowing new companies to "disrupt" them out of their contracts. This may have some advantages from a short-term cost lens, but it creates risk from a sustainable government procurement standpoint.

Companies like Microsoft are pushing their AI solutions to governments[21], and Big AI companies such as OpenAI are building vendor-specific capabilities and integrations to major platform services[22]. These actions form part of a "vendor lock-in" playbook, well-honed over the past decade, where vendors win contracts through very tangible short-term benefits whilst acting to ensure switching costs and risks become so obscene that it takes a very brave (and end-of-career) public servant to take the chance. The appeal of such "turn-key" systems to a public service that has been progressively outsourced and deskilled over many years is high.

These trends not only risk locking the Australian government into specific technologies but also limits the growth and integration of local AI enterprises. The scenario paints a concerning picture of the Australian Public Sector (APS) increasing its dependence on a few dominant tech companies, which could lead to increased costs, reduced flexibility, and exposure to foreign influences that may not align with Australia's interests.

While AI has the potential to significantly increase the efficiency and effectiveness of the APS, over-reliance on multinational technology providers could lead to a reduction in APS numbers without a corresponding increase in core capabilities. The power of AI-driven efficiency will need more, not less, technical expertise from the APS, or we risk making the scope of policy and its implementation subservient to the product strategy of technology companies.

The road ahead involves careful navigation to ensure that the integration of AI into government processes enhances rather than diminishes Australia's sovereign capabilities and aligns with the nation's long-term strategic interests. Given the recent reports and senate enquiries around the dependency of the APS on the "big 4" consultancies[23], history is set to repeat itself unless a more Australian-centric approach is taken with this new generation of technologies.

[20] https://stratechery.com/2023/openais-misalignment-and-microsofts-gain/
[21] https://www.pm.gov.au/media/australian-government-collaboration-microsoft-artificial-intelligence
[22] https://openai.com/blog/new-models-and-developer-products-announced-at-devday
[23] https://www.themandarin.com.au/220875-political-donations-foster-apss-4bn-addiction-to-big-four-cpi/

4. Opportunity 1

Create Sovereign AI to Simplify Government Policy

In the quest to simplify and align government policy, AI presents a transformative opportunity to tackle the complexity that has accumulated over decades. Key policy areas like welfare payments, immigration, and tax have become increasingly complex, despite billions spent in attempts to streamline them.

4.1 An Overly Complex Welfare System

The welfare payment system exemplifies the complexity of government policy. As was written by Don Arthur in "A Simpler Welfare system" as part of the 2017-2018 budget review:

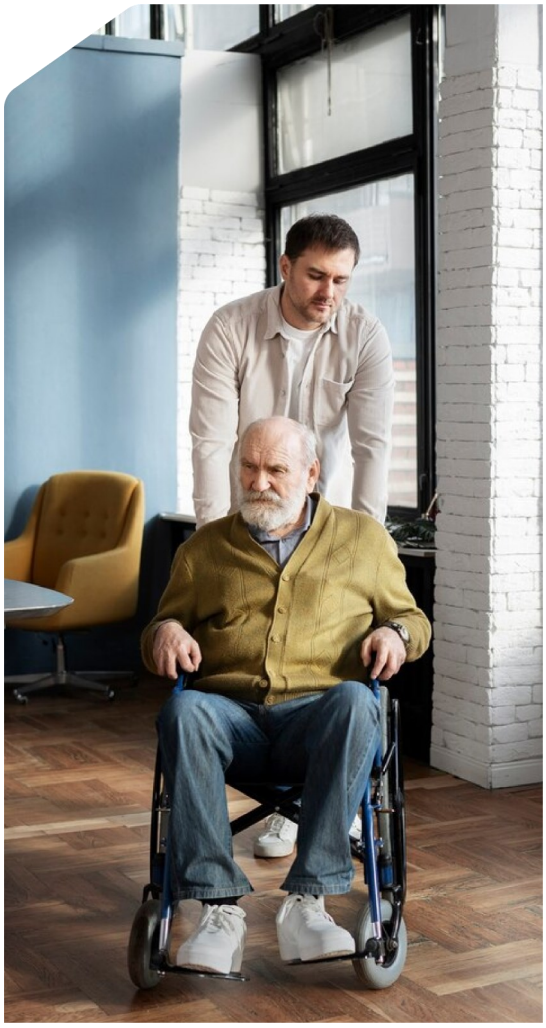
"Australia's social security system is made up of around 20 income support payments and 55 supplementary payments. Each payment has its own eligibility rules and the way income and assets tests work can vary between payments".

4.1 An Overly Complex Welfare System

The 2015 report of the Reference Group on Welfare Reform (the McClure review) described the system as an inequitable and incoherent "patchwork quilt"[24]. According to the review, the lack of coherence can undermine the system's ability to help people into paid work.

Significant work has been done since then, but it is an uphill battle with little impact. This was noted in the 2021 enquiry into the Disability Support Pension[25]

"The committee notes the numerous programs, schemes, and payments available to people with disability across Australia and the evidence indicating that there is a lack of coordination across these supports, at both the federal level and across governments. The committee considers that a more integrated approach is necessary to support people living with disability in Australia, and that such an approach would result in streamlined processes and less duplication for claimants, consistent definitions across supports, and better outcomes for individuals."



[24] https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/BudgetReview201718/SimplerWelfare#_ftn4

[25] https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Community_Affairs/DisabilitySupportPensio#:~:text=On%2013%20May%202021%2C%20the,report%20by%2030%20November%202021.

4.2 An Overly Complex Immigration System

Similarly, Australia's immigration system, one of the most complex among major Western countries[26], faces challenges in contributing to the economy due to its intricacy. The current legislative framework has been in place since the 1990s, with incremental additions resulting in a system with over 100 different visas and intricate admission requirements. Add to that a web of regulations and policy advice manuals. Such a system is impossible for any human to understand holistically or in detail, regardless of whether they are experienced public servants or hopeful migrants. The ICT solutions required to manage such complexity are immense and fragile, with change expensive and risky.

Reviews like the Nixon Review[27] and the Parkinson Review[28] in 2023 have underscored the need for simplification to reap the economic and well-being benefits of a well-functioning immigration system. In the latter review[29], it was noted that

"The Panel found that what is behind legislative complexity is often policy complexity. Simplification of user experience can be achieved without undoing some of this... However, broader efforts to reduce complexity will require changes to policy."

This begs the question, if no human can understand the policy due to its complexity, how can it be simplified?

[26] https://journals.sagepub.com/doi/abs/10.1111/imre.12169
[27] https://www.homeaffairs.gov.au/reports-and-publications/reviews-and-inquiries/departmental-reviews/rapid-review-exploitation-visa-system#:~:text=The%20Nixon%20Review%20was%20established,abuse%20of%20Australia's%20visa%20framework.
[28] https://www.sydney.edu.au/news-opinion/news/2023/04/28/australia-s-immigration-system-set-for-overhaul-after-damning-re.html
[29] https://www.homeaffairs.gov.au/reports-and-pubs/files/review-migration-system-final-report.pdf

4.3 An Overly Complex Tax System

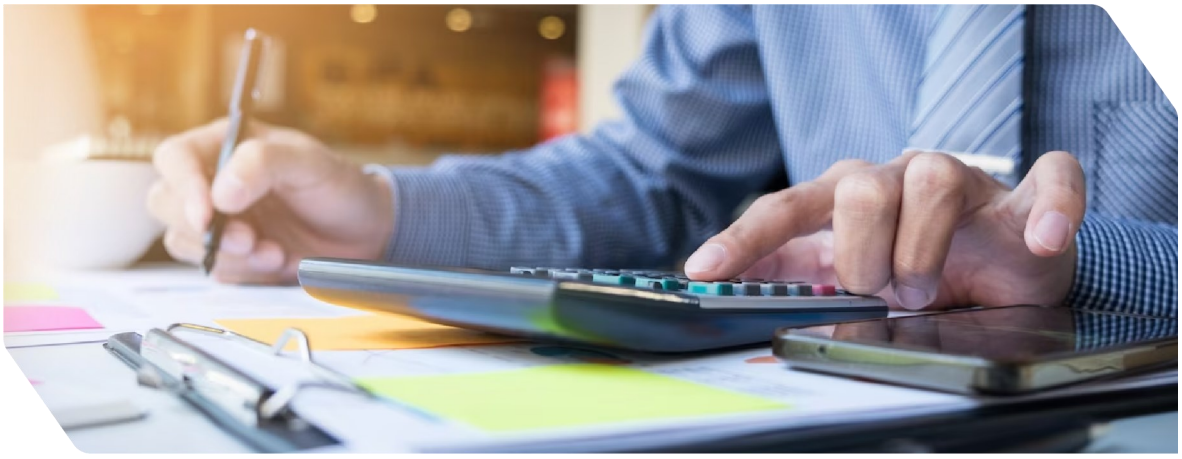
The Australian taxation system is widely regarded as complex, as evidenced by several studies and surveys.

A survey conducted by the Association of Chartered Certified Accountants (ACCA) ranks Australia's tax system as the most complex among five developed economies. It's also viewed as unfair compared to systems in the UK, USA, Canada, Singapore, and Hong Kong[30]. This complexity comes at material cost; with estimates that Australian taxpayers spend over $40B annually in compliance costs.[31] One of the key reasons is the volume of laws and regulations, which are believed to encourage tax evasion and provide a significant advantage to large business, who can afford high-cost accounting support to implement tax minimisation schemes.

More recent reviews of tax complexity include the ATO-sponsored ACIL Allen review in 2016[32], a Monash University review in 2014[33]. Both the ACIL Allen review and the Monash review focused on the drivers of complexity in tax policy and law and how this complexity can be addressed. The ACIL Allen review noted several key issues with policy development and legislative drafting, including inadequate processes for developing policy and undertaking post-implementation reviews, a limited focus on simplifying the tax system, highly-detailed provisions in tax legislation and the frequency of changes to tax law. Many of these challenges are significantly difficult for humans to solve as individuals or a collective.

Unfortunately, one problem that is certainly outside the scope of Generative AI is that many changes to the tax system have historically been politically motivated, without thorough analysis of how these changes add to the system's complexity. There's a belief that the public does not fully understand or believe in the current tax system, highlighting the need for deeper, more substantial reforms, as well as better ways of increasing public understanding than traditional marketing and education campaigns.

These findings underscore the imperative of simplifying the Australian tax system, not only to alleviate its complexity but also to restore public trust and fairness.



[30] https://www.smh.com.au/national/australian-tax-system-complex-survey-20080619-2tgj.html
[31] https://apo.org.au/sites/default/files/resource-files/2015-03/apo-nid53883.pdf
[32] https://acilallen.com.au/projects/economic-modelling-and-analysis/addressing-complexity-in-the-australian-tax-system#:~:text=ACIL%20Allen%20was%20engaged%20by,in%20the%20nation%27s%20tax%20system
[33] https://research.monash.edu/en/projects/assessing-and-addressing-tax-system-complexity-in-australia

4.4 Specific GenAI Initiatives to Drive Policy Simplification

Human efforts alone have often fallen short to simplify policy in the above areas due to the sheer scale and interconnectedness of the problems (amongst other factors). This is where AI's potential to manage vast amounts of data and discern intricate patterns comes into play. AI can help parse through the complexities of these systems, offering novel insights and solutions. New GenAI tools excel at ingesting large amounts of textual data (such as policy or legislation) and deriving the underlying logical meaning. This allows for policy makers to analyse documents for contradiction, repetition and complexity, and generate accurate simplification.

The path forward involves leveraging AI not just to understand and make recommendations but also to facilitate the necessary reforms. This includes integrating AI-driven productivity gains and process reforms into the government workflow, enabling the adoption of new policies without overwhelming the existing system. The challenge will be to do so while overcoming apprehension stemming from past software failures and ensuring that AI implementations are ethically sound, transparent, and aligned with public interest.

Just like the simplification of large "monolith" software systems, the simplification of policy should be done incrementally in "chunks". AI models provide the perfect technology to understand the overall policy landscape and drive the "chunking down" of policy.

To overcome the challenges of complexity, we recommend the DTA and relevant agencies (particularly Home Affairs) implement the initiatives below.

The opportunity here is not just in utilising AI for operational efficiency but in reshaping government policy to be more responsive, fair, and effective. This requires a strategic approach that balances AI's capabilities with ethical considerations and public engagement to ensure that the technology is used in ways that align with our values and needs.

INITIATIVES

1. **Big Picture Agent:** Create sovereign "fine-tuned" Large Language models that can review complex policy areas and assist the development of strategic target states and principles. These models should then be deployed as guides to politicians and policy makers to understand trade-offs of high-level decisions.
2. **Policy Agent:** Create sovereign "fine-tuned" Large Language models that understand the entire policy landscape and make recommendations on simplification opportunities. Giving policy writers access to an agent that provides insights regarding the trade-off implications of policy choices can solve the key pain point of a disconnect between policy, impact and technology.
3. **User Agent:** Build AI-powered agents that are able to engage with customer service representatives or users (such as immigrants) and help them accurately navigate and understand policy, rules, guidelines and processes.

5. Opportunity 2

Create Sovereign AI to Improve Government Technology

5.1 The Need for a New Approach to Software Development

As technology development becomes increasingly complex and service development is outsourced, there is strategic imperative to elevate agility and quality in software development. This isn't just an IT issue; with most government services underpinned by a software system, agile and secure software is a cornerstone for delivering effective and secure service.

The current landscape of software development within government agencies presents challenges. Traditional tools for ensuring code quality, such as static code analysis and test automation, offer objective assessments but lack nuanced understanding and context. Moreover, the reliance on multiple tools leads to fragmented processes, confined within pre-defined rules and patterns.

The difficulty of software development combined with the adversarial nature of most government agency-software vendor relationships means the challenge goes beyond complexity and simplistic tooling. Unfortunately, the way government software development projects are determined to be successful can largely be summed up as “it worked on delivery”. Whether the code happens to contain significant security flaws, or is built to be expensive to change, are often things that surface “after the cheque has cleared”. Even then, the software vendor will likely be given another contract to make the updates (because only they understand what was built), creating a perverse incentive.

This reality underscores the need for an innovative approach to foster quality, speed, and security in software development.

5.2 The Waste of Funds from Technology Portfolio Complexity

In the realm of government ICT, complexity often translates into inefficiency and wasted taxpayer funds. A striking example is the 2012 Queensland Government ICT audit, which uncovered opportunities to save as much as $185 million by addressing issues in its technology portfolio[34].

Similarly, insights from McKinsey and Company reveal that companies, including governmental organisations, haemorrhage funds due to fragmented, patchwork IT systems, which require excessive resources for development, support, and maintenance[35].

This inefficiency typically stems from the accumulation of disparate systems and applications over time, leading to redundancy, duplication, and unsustainable integrations. Such sprawling technology portfolios not only drain budgets but also hinder operational effectiveness and the ability to keep government services in line with community expectations.

Traditionally, governments and big businesses manage this issue with large scale, expensive, and high risk "transformations" conducted every few years. This pattern stems from a combination of a lack of maintenance funding (most government ICT development is "project funded" to deliver new capability) and the fact that it is extremely difficult for ordinary ICT workers to keep abreast of growing inefficiency and risk whilst keeping on top of their "day job".

On the upside, many cost saving opportunities are relatively routine for experts who know where to look; which makes this problem ideal for an AI solution.

[34] https://documents.parliament.qld.gov.au/tableOffice/TabledPapers/2013/5413T2865.pdf
[35] https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/it-architecture-cutting-costs-and-complexity

5.3 Specific GenAI Initiatives to Improve Technology Agility, Security and Cost

To begin to address these challenges, we recommend the development of a pair of GenAI agents, built from fine-tuning open-source models.

Whilst it is promising to see the Australian government form partnerships with Microsoft[36] to "get started" with generative AI, there are good reasons related to capability, competitive fairness, and security that mean the government will need to expand its model use to many other vendors and products. This will expand what the government can do, minimise lock-in to Microsoft Azure services and ensure value-for money for the Australian public by keeping all vendors price-competitive, and provide a "back-up plan" to handle service disruptions if and when Microsoft capabilities are offline. Anyone affected by the recent Optus outage in Victoria[37] will understand why it is critical for government to have a backup plan (e.g., multiple vendors) so critical services remain online through technology outages.

Building on top of open-source models will allow Government to leverage AI effectively while reflecting the guidelines in the Long-Term Insights Briefing; that use of AI should improve the performance of public services and allow the transparency of technical decisions.

To overcome the challenges with government technology written above, we recommend the DTA and at-risk agencies implement the initiatives below.

These solutions will not only increase adherence to approved coding standards and architecture quality but also ensure transparency in technical decisions. Implemented correctly, this approach will align with the Digital Transformation Agency (DTA) and other agency guidelines, with developers retaining accountability for the final code and architecture outputs used in production.

The rollout plan for these should include building proofs-of-concept on secure Australian infrastructure, targeting low-risk projects at thought-leading agencies. This will be followed by a scale-out to more agencies, capturing data from certified high-quality government code for model fine-tuning. The process also should involve engaging with software development partners to develop processes for vendor use and evaluation.

INITIATIVES

1. **Government Software Agent:** Fine-tune an open-source model and deploy it to provide recommendations and statistics on code quality and security (particularly with vendor-developed software).
2. **Technology Portfolio Agent:** Fine-tune an open-source model and deploy it to scan government technology infrastructure to identify portfolio efficiency opportunities and non-standard/non-approved architectural patterns.

[36] https://www.pm.gov.au/media/australian-government-collaboration-microsoft-artificial-intelligence
[37] https://www.news.com.au/technology/online/internet/melbourne-transport-paralysed-by-optus-outage/news-story/deeb991118143d94f9cb5a69ce2ca739

6. Opportunity 3

Become an AI-Compute Superpower

6.1 Burgeoning AI-Compute Demand

In an era where AI is reshaping global industries, Australia stands at the cusp of an unprecedented opportunity. The nation's vast solar and renewable resources, coupled with strategic positioning in the Asia-Pacific region, give us the unique ability to become South-East Asia's leading provider of AI compute.

We should build vast solar-powered AI-focused data centres and sell the compute to our South-East Asian neighbours.

These solar-powered AI-focused data centres would benefit from the "all boats float in a rising tide" effect of a burgeoning market. The AI market, valued at USD 137 billion in 2022, is on an exponential trajectory with a projected compound annual growth rate (CAGR) of 37.3% from 2023 to 2030[38]. The appetite for AI compute is surging as technologies like ChatGPT drive a future where AI is integral to every digital interaction. OpenAI's research underscores this trend, revealing a doubling in computational power for training AI models every 3.4 months since 2012[39]. By 2030, AI could represent 3% to 4% of global power demand[40], especially if technologies like GenAI become ubiquitous in applications such as web searches. This level of growth is likely unmatched by any other technological shift occurring today.

Australia's has two natural competitive advantages that would allow us to succeed. The first lies in leveraging our near-limitless solar energy potential and vast land resources suitable for solar farms, allowing us to be price-competitive. The second is our trusted standing amongst our international neighbours, allowing us to secure contracts for a vast array of potential customers.

Finally, it's worth noting that Australia has a strong history of contributing resources to the global economy. Historically this has been with iron ore, coal, uranium, and other minerals, and more recently energy, via plans for hydrogen export and potentially electricity itself (c.f., SunCable[41]). The proposition with AI-focused data centres is to evolve our economy to capture greater economic benefits by keeping more of the value creating activities onshore (by turning electricity into compute, and selling compute).

[38] https://www.grandviewresearch.com/industry-analysis/artificial-intelligence-ai-market#:~:text=The%20global%20artificial%20intelligence%20market,healthcare%2C%20retail%2C%20finance%2C%20and%20manufacturing
[39] https://www.technologyreview.com/2019/11/11/132004/the-computing-power-needed-to-train-ai-is-now-rising-seven-times-faster-than-ever-before/#:~:text=In%202018%2C%20OpenAI%20found%20that,research%20lab%20has%20now
[40] https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/electric-power/101623-power-of-ai-wild-predictions-of-power-demand-from-ai-put-industry-on-edge
[41] https://www.suncable.energy/

6.2 Specific AI Initiatives to Become a Compute Superpower

To actualise this vision, we recommend the following policy initiatives to the Australian Government and the Digital Transformation Agency (DTA):

INITIATIVES

1. **Investment Incentives:** Implement financial incentives for AI-focused data centres. Tax credits, grants, preferred government contracts, or low-interest loans could significantly boost investments into Australian actors in this sector, catalysing growth and innovation.
2. **Infrastructure Development:** Upgrade infrastructure, including energy storage and grid modernisation, to support the construction and integration of large-scale solar farms and data centres. This step is vital to ensure seamless operation and maximum efficiency.
3. **International Collaboration:** Australia should actively seek partnerships in technology and energy sectors to facilitate technology transfer, knowledge exchange, and open markets for its AI compute services. Such collaborations could enhance the country's technological prowess and create new avenues for economic growth.
4. **Data Security and Privacy Laws:** Strengthening data security and privacy laws to continue to build trust among potential international clients. Assuring the safety of data processed in Australia is paramount to attracting global customers.

The opportunity to become a global renewables superpower was clear to any capitalist looking at the data on growing demand, yet we have so far missed it. Powering the word's AI is arguably a bigger financial opportunity, which we cannot afford to miss.

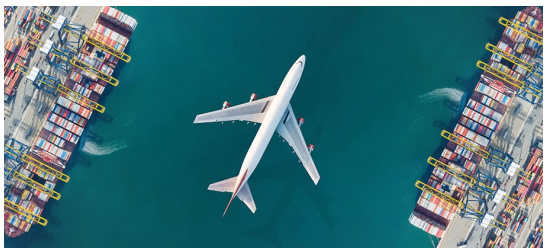
7. Appendix: About MXA

7.1 MXA and Our Services

MXA is an independent Australian strategy and technology consultancy with over 10 years' experience supporting over 25 public and private sector organisations with their biggest challenges.

We bring a strategic and pragmatic lens to our clients with experienced senior business leaders and technology practitioners. We also invest heavily in building internal AI capabilities to increase our effectiveness and set and example for the future of professional services.

1. **Strategy**
   - Digital Strategy & Transformation
   - Data, Analytics and Artificial Intelligence
   - Enterprise and Technology Architecture
2. **Design**
   - New Organisations and Ventures
   - New Products and Services
   - Customer Experience and Service Design
3. **Projects**
   - Business Cases Development and Review
   - Implementation Planning
   - Project Review and Advisory
4. **Operations**
   - ESG Advisory
   - Digital Talent and Operating Models
   - Process Reviews



7.2 The Authors

Dr Rishni Ratnam

Dr. Rishni Constantine Ratnam is a technology professional with extensive experience in strategy, artificial intelligence, data science, software development, startups and innovation. He has been working hands on with Artificial Intelligence and Machine Learning since 2015, including developing all aspects of Machine Learning value capture, from data collection and cleansing, model building, ML/LLMOps, cloud software building, model evaluation and more. He has also worked at the strategic level, including conducting prioritisation, feasibility and cost-benefit analysis, and establishing data and talent strategies for some of South-East Asia's largest organisations.

Rishni has been working extensively with Generative AI models since 2022. Over that time, he has built several LLM applications, including for MXA clients and for internal MXA use.

7.2 The Authors (cont'd)

Barry Saunders

Barry Saunders is an experienced digital consultant with deep expertise in AI, customer experience, solution design, product strategy and digital leadership. He has been working with Machine Learning and AI tools since 2015, including the development of recommendation systems for streaming, mine/industrial optimisation and preventative maintenance, customer personalisation, banking risk and AML, digital marketing and content creation.

In his work as Chief Product Officer at Oroton, he led the marketing, data and analytics teams through the development of several data and AI tools to automate copy creation, develop personalisation capabilities and simplify complex technical documentation.

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