The future of Artificial Intelligence (AI) in Australia

COMMITTEE FOR MELBOURNE

December 2020
Shaping Melbourne's future

Contents

1

Foreword

Committee for Melbourne's (the Committee's) members recognise the extraordinary benefits that Artificial Intelligence (AI) is already delivering via efficiency and effectiveness gains in augmented decision-making (e.g. medical diagnosis) and autonomous decision-making (e.g. cybersecurity). Our members also recognise the importance of Melbourne and Australia being at the forefront of the development, adoption and deployment of AI. With the sustained level of investment being made in AI, the pace of advances will continue to accelerate.

AI has made it easier and more efficient for consumers to make online purchases and to connect with friends and family via online applications. Businesses can be made more efficient and profitable through the use of technology underpinned by AI, in order to better target products and services and improve their operations. Research and development can be greatly enhanced through the application of AI, such as effective data analysis and research trials. The community benefits from AI applications that improve the delivery of health, education and insurance services.

Melbourne's economic prosperity and growth is linked to the success of particular sectors, such as: health; supply chain logistics; advanced manufacturing; education; research; and the experience economy – all of which can be underpinned by effective use of AI. The Australian Government has recognised that sectors such as natural resources and environment; health, ageing and disability; and cities, towns and infrastructure will benefit from a strategic approach to AI. AI will underpin innovation and research, drive growth and accelerate proficiencies in these sectors into the future.

The proliferation of AI applications in our lives is already raising questions about data and privacy, security and human rights. Higher internet speeds and further miniaturisation of massive computing power and memory / storage will further enable AI applications to be better connected, predictive, distributed and ubiquitous.
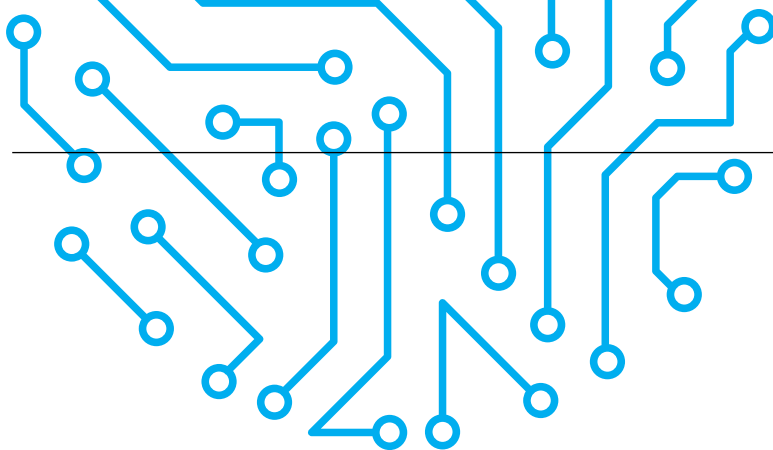
Whilst we discover more innovative applications for AI, we must ensure that we consider the ethical, social and human implications of deployment, and that our regulatory and legal systems at least keep pace with the challenges, or – even better – anticipate them.

This is especially true when AI is deployed in systems and processes which critically underpin community trust and well-being. These systems need an ethical framework within which to operate, with a special emphasis on harm minimisation. Furthermore, such systems need to be able to rapidly identify, rectify and remediate problems, and the accountability for achieving desired outcomes also needs to be clearly defined.

Collaboration between government and the private sector will be essential to ensure that required protections are in place for the benefit of the community.

Committee for Melbourne's AI Taskforce has identified in this report the key stakeholder collaboration mechanisms and governance frameworks for the ethical development, adoption and deployment of AI.

The Victorian All-Party Parliamentary Group on AI has already been established and should be re-convened. The establishment of an AI hub would also enable greater networks and collaboration across Greater Melbourne and potentially also facilitate pilot programs that could test and implement future AI initiatives.

In June, the Victorian Government committed $1.5 million to fund the establishment of an accelerator and investment fund for AI scaleups. This is an important initiative which recognises that startups in AI need particular support. Backed by LaunchVic, Boab AI (in partnership with Artesian), Victorian universities and Artesian's international partner programs, the new accelerator will help AI scaleups access much needed private sector capital.

The impact of the COVID-19 pandemic on businesses, jobs, society and the community has created a generational challenge. We are being compelled to do new things at speed. AI will have numerous critical roles to play on our road to recovery. As such, the initiatives outlined in this report are more important than ever and warrant urgent consideration.

We trust that the recommendations in this report and continued collaboration between the public and private sector will enable Melbourne to play a leading role in promoting the ethical application of AI for Australia and other parts of the world.

Scott Tanner
Chair,
Committee
for Melbourne

Martine Letts
CEO,
Committee
for Melbourne

2

From the participants

Richard Spurio
Managing Partner, Allens

"Developments in AI present great opportunities to deliver innovative and more efficient solutions and services for our community. We need to put in place an appropriate governance framework so that the use of artificial intelligence meets community expectations for fairness and transparency, while also allowing us to unlock the benefits of AI."

Rob Hillard
Chief Strategy & Innovation Officer, Deloitte

"Australia's well known focus on good governance and robust leadership has placed the country in a good position to develop future technologies that need to be trusted, for example in areas like financial services, government and health sectors. However, a balance must be struck, to enable the exploitation of AI for the benefit of society, while demonstrating the right protections for society. It is pleasing to see that this is already happening, and the Committee for Melbourne demonstrates thought leadership in this report which aims to strike that balance."

Gavin Seewooruttun
Partner and Asia-Pacific Advisory Leader for Artificial Intelligence (AI) and Analytics, EY

"As commercial interests accelerate the development of digital technology, there are opportunities to leverage AI to improve the life chances of citizens. The biggest areas of application are in improving people's health and wellbeing; optimising the allocation of resources, particularly in a crisis; and augmenting people's capability to deliver essential services. The technology is available now and requires focused and purposeful leadership to translate into operational capability."

Patrick Hill
Senior Vice President, Jacobs

"At Jacobs, our objective is to make the world smarter, more connected, and more sustainable, so we are delighted to apply our vision to the future of the country's AI infrastructure. Australia and Victoria have an opportunity to play a leading role in the development and application of AI to help improve the way we understand and solve the most important issues facing our community. Through considered policy, investment, and practical application we are realising a broader range of AI-derived improvements to help make a real difference in the lives of Victorian families."

Professor Joanna Batstone
Director of the Monash Data Futures Institute, Monash University

"Adoption of AI technology has accelerated rapidly with the potential for significant societal change, with AI-driven benefits for consumers, businesses, governments and communities. This valuable report highlights the opportunity for continued dialogue around the need for investment and leadership in AI technology innovation with the ability to attract and train a new workforce, balanced with a societal discussion around ethics, privacy and AI for social good."

Tim Orton
Managing Director, Nous Group

"The power of AI is transformative for our society. As it becomes a greater part of our lives we have to make sure that it strengthens the rights and interests of all of us as human beings."

Professor Matt Kuperholz
Chief Data Scientist and Partner, Analytics, PwC

" 'With great power comes great responsibility'. First stated over 200 years ago and restated famously by Winston Churchill and more recently Ben Parker (Spiderman's uncle), this quote is relevant when considering Artificial Intelligence (AI). I have been using AI to solve my clients' problems for over twenty years. I've seen the evidence of how it frequently and increasingly empowers businesses in all industries. It's now time to formalise considerations relating to the increased responsibility that comes with this increased power, which is what this report's recommendations are for. As businesses use AI to improve productivity, reduce risk and operating costs, and when promoting rapid innovation governments can assist them to adequately consider the risks associated with AI implementation. Risk mitigation requires AI is developed, deployed, governed, operated, and maintained in a responsible fashion. We are very proud to have contributed to this report."

Sami Mäkeläinen
Technology Insights Principal, Telstra

"AI has quickly embedded itself to the core of innovation, creating economic and social benefits in a wide variety of sectors. However, as AI continues to have a greater impact on all aspects of society, challenges associated with the use of AI technologies also increase. This is why it's critical for organisations at the forefront of these changes to come together and lead the discussion on how to meet the challenges while making the best possible use of the benefits that AI can bring in a thoughtful, considerate manner."

3

Contributors

About Committee for Melbourne

Committee for Melbourne (Committee) is an apolitical, not-for-profit, member-based entity that brings together over 150 organisations from Greater Melbourne's business, academic and civic sectors, who share a common vision to make Melbourne a better place to live, work and do business.

As an independent organisation we represent no single interest group or political position, but seek to challenge conventional thinking and to develop innovative ideas to continue to enhance our position as an economically prosperous and highly liveable global city.

Our thanks

The Committee would like to express its appreciation to our member organisations who helped contribute to the development of this report.
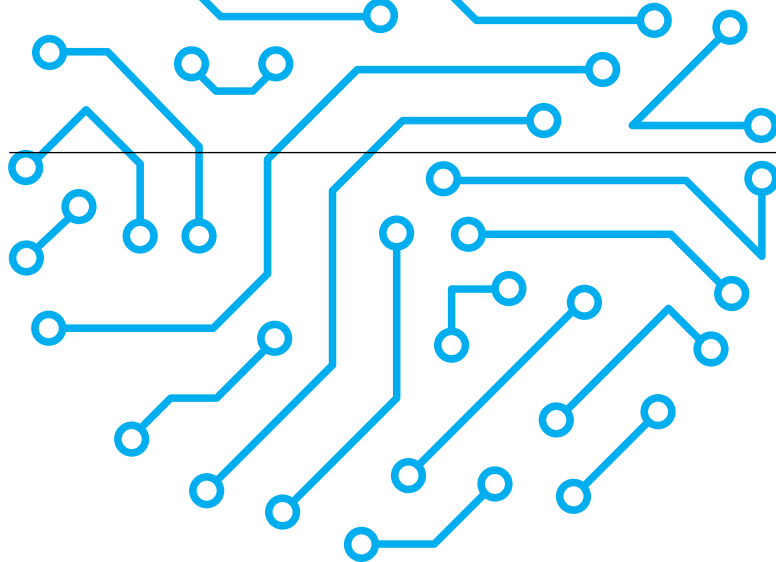
AI Taskforce Steering Committee

To assist with development of actions in this space, a Committee for Melbourne AI Taskforce was established, led by a Steering Committee of industry leaders from a broad range of sectors, and chaired by the Committee's Chair, Scott Tanner (Chair, Committee for Melbourne).

The Taskforce and Steering Committee were drawn from the Committee's cross sectorial membership from various industries, including technology, finance, infrastructure, housing associations, developers, legal, academia and consulting firms. Each sector leader brought unique methods and ideas to contribute to the report based on their expertise. The Steering Committee was made up of contributors including: Allens, Commonwealth Bank, CSIRO's Data61, EY, Deloitte, Jacobs, Monash University, Nous Group, PwC and Telstra.

This report has also been produced with the assistance of representatives from Committee for Melbourne's Secretariat, including Leanne Edwards, Director of Policy & Research.

Disclaimer
Please note, the views in this publication reflect the synthesis of the Committee's diverse and cross-sectorial membership. All material expresses a merging of these differing perspectives and the concepts presented in this report should not be attributed to any individual member organisation.

Victorian All-Party Parliamentary Group on Artificial Intelligence (VAPPGAI)

With assistance and advocacy from the Committee, members of the Victorian Parliament established an All-Party Parliamentary Group on Artificial Intelligence (VAPPGAI) in 2018 to learn more about AI and the impact it will have on Victorians in the future. Meetings held by this group, as well as the Committee for Melbourne's AI Summit on the 27 October 2019, have started the discussion and education required towards finding the mechanisms to manage and make the most of AI innovation.

The Committee's AI report will be delivered to VAPPGAI, governments at all levels and broader community stakeholder groups, to continue the discussion and encourage practical actions and outcomes.

The Committee has commenced discussions with the Federal Government, in the hopes that an Australian All-Party Parliamentary Group on Artificial Intelligence (AAPPGAI) might be established, with the same aim across the country.

4

Purpose of
this report

In September 2016, the Committee launched its Melbourne 4.0 strategy to help prepare Greater Melbourne for the accelerating speed of innovation and disruption that has catapulted us to the early stages of the 'Fourth Industrial Revolution'. The Committee's Melbourne 4.0 project makes it clear that if we keep progressing with 'business as usual', the future of our city may not be all that bright. The Committee therefore identified nine strategic needs that we must address if we are serious about underpinning a liveable and flourishing Greater Melbourne in the future.

Two of the strategic needs identified were **'digital capability'** and **'competitive internet'** and how to prepare Greater Melbourne and Victoria for the challenges and opportunities of the 21st century.

Artificial Intelligence (AI) was considered to be the key issue in the context of the digital capability and increasing technological requirements of our community. AI is arguably one of the most important technological issues facing us in the future. AI offers many benefits and opportunities, as well as many challenges – we now need a prominent and informed public debate about AI in Victoria.

This report considers eight key areas, highlights the trends and activities and makes recommendations for action by government, business and stakeholders. The eight key areas in this report are:

• Data
• Governance
• Equity and Equality
• Skills
• Trade
• Infrastructure
• Entrepreneurship and Innovation
• Security

There is a great deal of work being done on all questions related to AI across Australia and overseas. Accordingly, this report takes into account work being done in Australia and overseas and provides a series of recommendations for the community, industry and government as a practical contribution to resolving the challenges faced in Greater Melbourne as a result of the use of AI.

? **Purpose of this report:**
This report aims to provide education, information and recommendations for action under each of the eight key areas highlighted above to ensure a balance is struck between regulating to protect human rights, equity and equality and allowing innovation to occur so that society as a whole is able to benefit from the outcomes of AI.

5 Introduction to Artificial Intelligence

Artificial Intelligence (AI)

There is no commonly agreed definition of Artificial Intelligence (AI), but the definition identified by the Australian Government in its AI roadmap in November 2019 titled *Artificial Intelligence: Solving problems, growing the economy and improving our quality of life* **(Commonwealth Government Roadmap)** was:

> *"Artificial intelligence (AI) may be defined as a collection of interrelated technologies used to solve problems autonomously and perform tasks to achieve defined objectives, in some cases without explicit guidance from a human being. Subfields of AI include machine learning, computer vision, human language technologies, robotics, knowledge representation and other scientific fields. The power of AI comes from a convergence of technologies."* [1]

AI applications can be broadly classified into two categories based on their purpose, enabling Augmented Intelligence or Autonomous Intelligence.

- **Augmented Intelligence:** Augmented Intelligence, as defined by Gartner, is a design pattern for a human-centred partnership model of people and AI working together to enhance cognitive performance, including learning, decision making and new experiences. Essentially, Augmented Intelligence applications would involve a human as part of the action or decision-making chain where the AI system provides the information required to enable the decision. For instance, an AI algorithm can analyse a patient's symptoms and vital signs, compare it with the history of the patient, her family and those other patients it has in store, and give her doctor suggested diagnoses for him to decide upon. Siri and the Google assistant are forms of AI that fall into this category. [2]

- **Autonomous Intelligence:** Autonomous systems operate in complex and open-ended environments with high levels of independence and self-determination. For instance, unmanned or self-driving vehicles, autopilot systems in aeroplanes and drone-based delivery systems are AI systems that fall into this category. Such systems differ from Augmented Intelligence systems due to the fact that they can make a decision and execute on it without requiring a human in the loop. [3]

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[1] Hajkowicz SA[1+], Karimi S[1], Wark T[1], Chen C[1], Evans M[1], Rens N[3], Dawson D[1], Charlton A[2], Brennan T[2], Moffatt C[2], Srikumar S[2], Tong KJ[2] (2019). *Artificial Intelligence: Solving problems, growing the economy and improving our quality of life.* CSIRO Data61, Australia, p2.

[2] See for example: https://www.gartner.com/en/information-technology/glossary/augmented-intelligence

[3] See for example: https://www.bosch.com/research/fields-of-innovation/fully-autonomous-systems/
https://www.businessinsider.com.au/autonomous-artificial-intelligence-is-the-real-threat-2015-9?r=US&IR=T

AI is pervasive in our society and its use and application throughout our society is having a profound impact on individuals' quality of life, business operations, government services, economics and democratic processes.

In March 2018, VAPPGAI released an Artificial Intelligence Primer **(VAPPGAI Primer)**. The VAPPGAI Primer highlighted that there are many uses and benefits that have been delivered from AI for the community. For example:

- **Consumers** are more readily able to purchase goods and services online, make travel bookings, access news and information and connect with friends and family through social media.

- **Businesses** are able to understand consumers' preferences and deliver on their needs with greater understanding, accuracy and efficiency.

- **Governments** are using AI to provide services, research policies and to campaign and advertise to voters.

- **Community** benefits in many sectors such as health, education, insurance and retail have been derived from the use of AI.

There are a range of sectors that have benefitted from AI. As the EU describes:

> "AI technologies can be **extremely beneficial from an economic and social point of view** and are already being used in areas such as healthcare (for instance, to find effective treatments for cancer) and transport (for instance, to predict traffic conditions and guide autonomous vehicles), or to efficiently manage energy and water consumption. AI increasingly affects our daily lives, and its potential range of application is so broad that it is sometimes referred to as the fourth industrial revolution." [4]

However, there are also a number of potential issues and risks that arise from the use of AI, such as ethical, legal and economic concerns. Therefore, a balance needs to be struck to ensure these concerns can be dealt with, while ensuring that the benefits outlined above can be achieved for the whole of society.

The development of AI

The VAPPGAI Primer highlights that AI is developing exponentially and that:

> "We can expect massive advances in AI in the near future – making it hard to predict where AI might take us in the short to medium term, let alone long term."

The pace of innovation in AI, and use of AI, has been accelerating faster than the ability of governments to understand and regulate its development and use. Accordingly, there are concerns about how AI could be used to breach the rights of individuals (such as to facilitate mass data collection or surveillance), be applied for anti-competitive practices and undermine democratic processes (amongst many potential concerns). The threat of jobs losses and skills shortages due to lagging education programs are also of concern. It is important to note that the risk of 'bias' associated with the use of AI, resulting from a variety of factors including bias in data inputs, is also a considerable challenge being faced.

The capacity to benefit from, and adapt to, the challenges and opportunities presented by AI is one of the major strategic issues facing Victoria and Australia. Already many countries around the world are considering ways of meeting the challenges of AI. As outlined in the Commonwealth Government's Discussion Paper, *'Artificial Intelligence, Australia's Ethics Framework'* [5], CSIRO Data 61's analysis reveals that over the past few years, 14 countries and international organisations have announced AU$86 billion for AI programs looking at the ethical issues associated with AI development (as depicted in the infographic below from the same Discussion Paper).

4 Tambiama Madiega, *EU Guidelines on Ethics in Artificial Intelligence: context and implementation*, EU Briefing, European Parliamentary Research Service, Members' Research Service, PE 640.163 – September 2019 http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2019)640163 (accessed 3 February 2020): *EPRS briefing on Economic impacts of artificial intelligence* by Marcin Szczepański, July 2019.

5 Dawson D and Schleiger E*, Horton J, McLaughlin J, Robinson C∞, Quezada G, Scowcroft J, and Hajkowicz S† (2019) Artificial Intelligence: Australia's Ethics Framework. Data61 CSIRO, Australia, p 4. *Joint first authors ∞CSIRO Land and Water †Corresponding author

Figure 1: Map of recent developments in artificial intelligence ethics worldwide
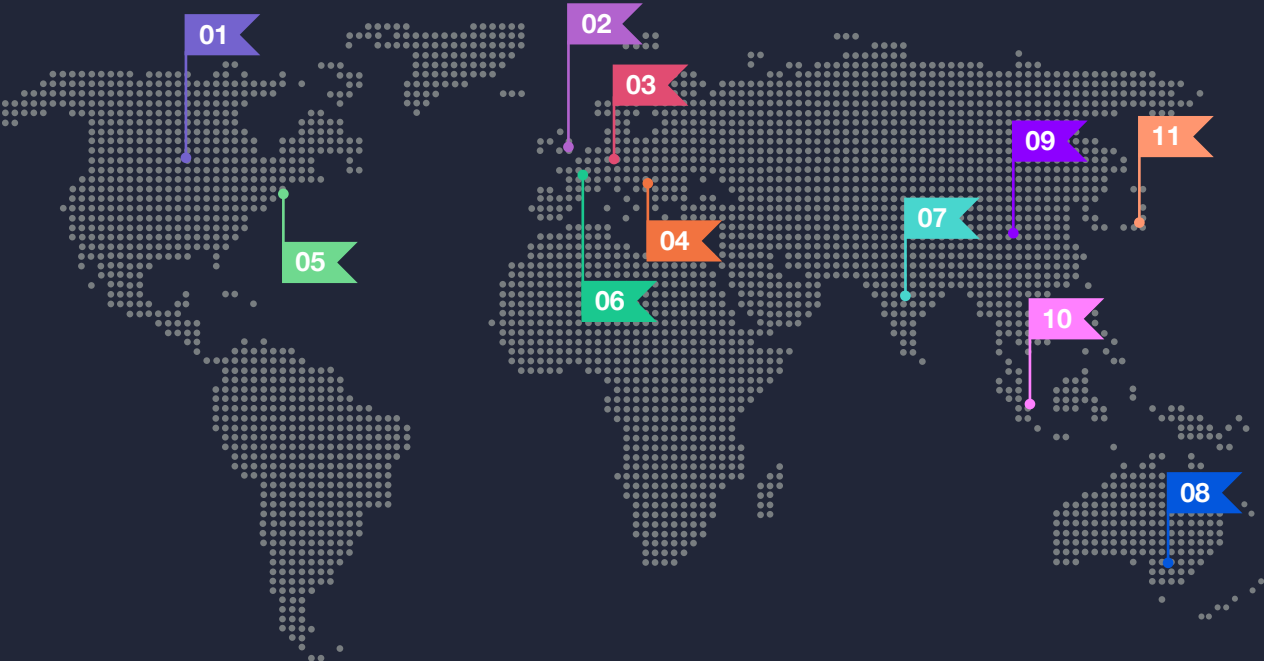
01
Canada
November 2017
AI & Society program announced by Canadian Government to support research into social, economic and philosophical issues

02
United Kingdom
November 2018
The Centre for Data Ethics and Innovation is announced to advise government on governance, standards and regulation to guide ethical AI

03
Germany
June 2017
Federal Ministry of Transport release guidelines for the use of autonomous vehicles including 20

04
European Union
October 2018
European Commission appoints an expert group to develop ethical, legal and social policy recommendations for AI

05
New York
May 2018
Mayor De Blasio announces Automated Decisions Task Force to develop transparency and equity in the use of AI

06
France,
March 2018
President Macron announces AI strategy to fund research into AI ethics and open data based on the Villani report recommendations

07
India,
June 2017
National Institute for Transformation of India publish their National Strategy for AI with a focus on ethical AI for all

08
Australia
2018
Federal Government announces funding for the development of a national AI ethics framework

09
China
April 2018
Ministry of Transport release standards for the testing of autonomous vehicles

10
Singapore
August 2018
Singapore Advisory Council on the Ethical Use of AI and Data appointed by the Minister for Communications

11
Japan,
February 2017
The Ethics Committee of Japanese Society release Ethical Guidelines with an emphasis on public engagement

The Victorian and Commonwealth Governments should increase their focus on AI to keep up with opportunities and challenges, and to maintain a competitive position on the world stage.

Role of private sector and community in AI

The private sector and community must be leaders in driving change and innovation in this area.

The private sector should be included in developing frameworks and standards for AI use.

The Committee has also been instrumental in establishing VAPPGAI and providing this report. It is hoped that all levels of government will accept the recommendations and help facilitate collaboration with academia, business and the community.

Coordinated approach needed

This report considers eight key areas and highlights the trends and activities and makes recommendations for action by government, business and stakeholders. Those eight key areas are: data; governance; equity and equality; infrastructure; security; trade; skills and innovation.

In order to develop a strategic approach to AI, a coordinated approach will be needed from all levels of government, private industry and the community.
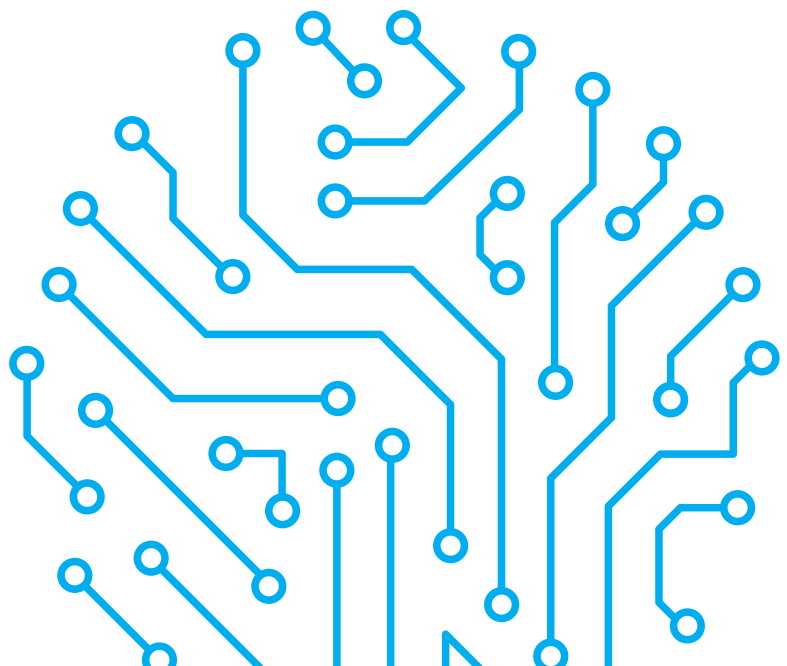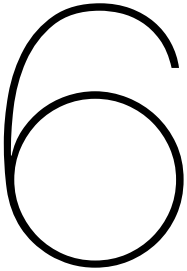
6

Summary of key recommendations

Key recommendations

Key Recommendations for the Commonwealth Government in AI

1 Key Recommendation 1:
Set up a National Centre of AI Ethics and Innovation (NCAIEI)

2 Key Recommendation 2:
Set up an AI Ombudsman

3 Key Recommendation 3:
Amend relevant Commonwealth laws or enact new laws and adopt new standards for AI

4 Key Recommendation 4:
Equip regulators to enforce the laws

5 Key Recommendation 5:
Provide information and education (including to set up AAPGAI)

6 Key Recommendation 6:
Set up an AI Fund

7 Key Recommendation 7:
Develop skills, curriculum and general AI literacy

Key Recommendations for the Victorian Government in AI

8 Key Recommendation 8:
Conduct feasibility study into an AI Precinct

9 Key Recommendation 9:
Amend relevant Victorian laws or enact new laws for the Victorian public sector

10 Key Recommendation 10:
Develop skills, curriculum and general AI literacy

11 Key Recommendation 11:
Create an AI Fund

12 Key Recommendation 12:
Provide information and education

Key Recommendations for VAPPGAI

13 Key Recommendation 13:
Provide information and education, through a continued VAPPGAI meetings program

14 Key Recommendation 14:
Accept the Committee's report and work with the Victorian Government to implement the recommendations

Key recommendations for the Commonwealth Government in AI

The Committee congratulates the Commonwealth Government for having already developed a proactive agenda of activities focused on progressing Australia's strategy on AI, including releasing Australia's AI Ethics Framework and AI Technology Roadmap, both in 2019[6]. The Office of the Australian Information Commissioner (OAIC) also published a Guide to Data Analytics and Australian Privacy Principles in 2018.

The Commonwealth Government has a significant role in the following areas:

• development and enforcement of appropriate laws regulating the use of AI

• adopting or defining standards and frameworks for the use of AI (including assigning responsibility)

• information sharing

• providing incentives and support for development of AI initiatives

• ensuring a pipeline of talent is attracted to and retained in Australia

There are a number of recommendations for the Commonwealth in this report, including the establishment of a **National Centre of AI Ethics and Innovation (NCAIEI)**. Such a body might have significant roles, including to: develop policy, technical standards, codes of practice and frameworks; drive strategy and initiatives; and provide technical support or guidance to regulators in enforcing laws where there is AI involvement (such as privacy, discrimination, competition and corporate misconduct) as well as information where trends are changing in the industry. The NCAIEI should proactively engage with business, government and technology firms to establish consistent guidelines that help define the roles and responsibilities of the AI industry generally and also any organisations involved in developing, testing and using AI, including promoting fair, transparent, explainable and secure use of AI in a manner that is consistent with appropriate ethical considerations and community expectations. The NCAIEI should be instructed to take a measured approach that balances technological progress and commercial interests with the importance of embedding human rights and ethical decision-making as the norms in the development and use of AI algorithms across the private and public sectors.

[6] Hajkowicz SA[1+], Karimi S[1], Wark T[1], Chen C[1], Evans M[1], Rens N[3], Dawson D[1], Charlton A[2], Brennan T[2], Moffatt C[2], Srikumar S[2], Tong KJ[2] (2019) *Artificial intelligence: Solving problems, growing the economy and improving our quality of life.* CSIRO Data61, Australia.

At present, existing laws and governance frameworks are either not in place or not fit-for-purpose for AI. Although contract law, tort law, discrimination law and consumer protection laws may have some application in specific circumstances, there is uncertainty surrounding the extent of their application. At best, current laws indirectly regulate the use of AI by regulating the uses of information as an input to AI systems through privacy and data protection laws. Accordingly, the Commonwealth Government (through the Federal Parliament) must also propose **appropriate and balanced legislative reforms to areas of the law affected by AI**, such as privacy, discrimination, competition and corporations laws. However, any changes to these legislative frameworks to apply them to AI will require careful consideration of what amendments should be made to achieve the desired protections. Due to Australia's federal system of laws, some of this legislative change will need to be undertaken at a state level and some reforms will need to occur at a Commonwealth level. However, it is important that these changes are consistent.

The Commonwealth Government must also **equip the existing regulators in these areas to enforce these new laws –** and to ensure that these regulators have the ability to enforce these new laws in the context of AI. This would require that these regulators have the necessary understanding of AI technologies and capabilities, whether as an internal resource or available to them externally. This might include the provision of technical support or guidance from the NCAIEI.

As a separate body, an **'AI Ombudsman'** could act as an independent complaints resolution service for the public on AI related issues.

The Commonwealth also has a role in sharing information and educating the community, including government, businesses, academia and other stakeholders about the importance, uses and trends of AI. In order to be nimble and able to respond to that information, a bi-partisan approach may be needed. Accordingly, just as the Victorian Parliament has established the VAPPGAI, an **Australian All-Party Parliamentary Group on Artificial Intelligence (AAPPGAI)** might be established to achieve those aims.

The key recommendations and more detailed supporting recommendations for the Commonwealth Government are summarised in the tables below.
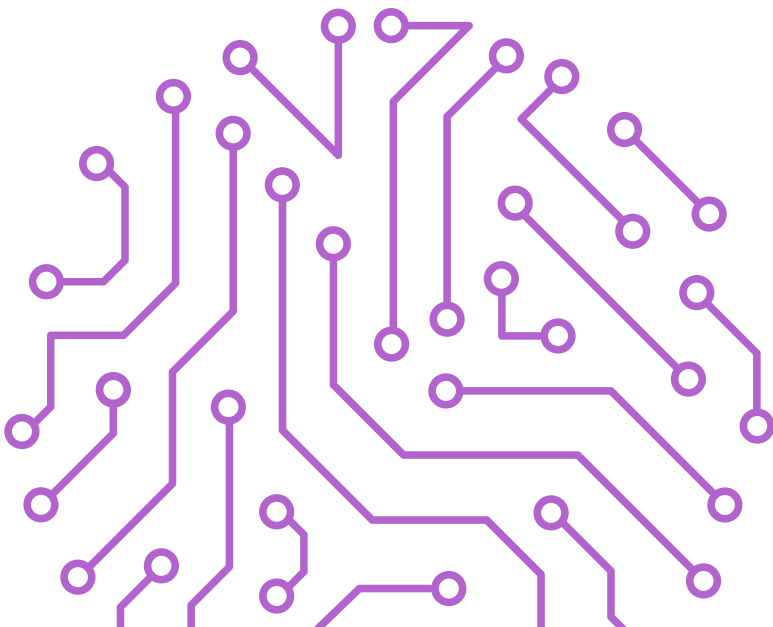
**(1)   Key Recommendation 1 –
Set up a National Centre of AI Ethics and Innovation (NCAIEI)**

Made up of a range of industry experts from government, academia and the private sector to provide AI expertise, standards, research and support. Works with other government agencies to collaborate on the development of AI-related initiatives.

Role	Working with organisations like	Relevant supporting recommendations in this report	
Develop policy, technical standards and frameworks, to: • develop and publish guidelines for data and AI development and management standards; and • develop technical standards for AI compliance with applicable laws, rules and frameworks (e.g. standards for compliance with ethical principles).	Office of the Australian Information Commissioner (OAIC), Office of the National Data Commissioner (ONDC) , CSIRO, Australian Bureau of Statistics (ABS), Australian Computer Society (ACS), Standards Australia, the Australian Human Rights Commission (AHRC), academia, professional bodies and service organisations (and all relevant international organisations and standard setting bodies)	**Recommendation b:** Expand the scope of Australia's current data sharing frameworks and partnerships to include public-private data exchange supported by sustainable incentives for data sharing. The **NCAIEI and ONDC** may be well placed to oversee the public-private data exchange initiative. **Recommendation d: Data Trusts** should be piloted in Australia focusing on low data-risk, high-value use cases initially. The NCAIEI may be well placed to oversee the establishment and policies around Data Trusts, in collaboration with Commonwealth departments.	**Recommendation e:** A national level Technical Strategy should be developed to provide guiderails allowing for standardisation of data collection, management and exchange of information for AI. This could be a joint initiative between **CSIRO, Standards Australia, ABS and professional services firms** with expertise in this space. **Recommendation f: Commonwealth Government** to consider the **development and implementation of principle-based frameworks and codes of practice** for AI technologies. The **NCAIEI** can assist with standards setting – working with agencies like **CSIRO** and **Standards Australia.**
Drive strategy, research and initiatives, covering: • technical innovation and research (including in AI security and commercialisation of AI); • policy and funding for data and AI programs; • strategy and opportunity identification for AI (including data strategy); • provide input into skills innovation and policy setting; and • sharing information and support on innovation and ethical standards to the community (like SMEs).	ONDC, the Department of Industry, Science, Energy and Resources (DISER), Prime Minister and Cabinet (PM&C), departments relating to technical research in areas such as cities, health and resource management, skills etc as well as industry and academia	**Recommendation a:** Implement **data collection and management initiatives** to support AI for **mission-critical outcomes** in the key areas identified by the Commonwealth Government. This could potentially be a joint exercise between **DISER; the NCAIEI working in concert with the ONDC.** **Recommendation g: NCAIEI** to conduct research into ethical use of AI and coordinated research. **Recommendation x: NCAIEI** should research and provide guidance to industry on how to incorporate security into the design, development and deployment of AI. Industry should be encouraged to participate in this research.	**Recommendation y: NCAIEI** is funded to undertake research into the development of appropriate and balanced legislation, frameworks and standards designed to ensure the security of AI systems and protect these systems from being abused or compromised by malicious third parties. **Recommendation z:** Research between government and private sector into AI tooling for advanced cyber threat detection. **Recommendation cc: NCAIEI** to conduct research and provide advice and education to the community, government and business on commercialisation of AI. **Recommendation aa:** Research into whether there are areas where it is essential to make AI systems, networks (e.g. 5G) and algorithms highly available, and how this might be achieved.

1	**Key Recommendation 1 –** **Set up a National Centre of AI Ethics and Innovation (NCAIEI)** **(Continued)**

Made up of a range of industry experts from government, academia and the private sector to provide AI expertise, standards, research and support. Works with other government agencies to collaborate on the development of AI-related initiatives.

Role	**Working with organisations like**	**Relevant supporting recommendations in this report**
Provide technical **support to regulators:** • in enforcing laws where there is AI involvement (e.g. privacy, discrimination, competition, corporate misconduct etc); • information where trends are changing in the industry; and • to amend laws to update them for AI.	Regulators who need technical support and guidance e.g. Australian Competition and Consumer Commission (ACCC), the Australian Prudential Regulation Authority (APRA), Australian Securities & Investments Commission (ASIC) etc	**Recommendation h:** **NCAIEI** to provide resources and support for regulators to regulate the use of AI. **Recommendation l:** **Commonwealth Government** to consider mechanisms of partnerships, collaborations and funding mechanisms – to ensure that the **NCAIEI, AI Ombudsman and all regulators** are sufficiently resourced, funded, skilled and adaptable to keep up with constantly changing trends and innovations.
Provide support to an **AI Ombudsman** to support the public on AI issues.	Augment capabilities of existing agencies e.g. Australian Financial Security Authority (AFSA), Fair Work Commission etc	**Recommendation i:** **AI Ombudsman** to be set up by the **Commonwealth Government** as an independent body outside of the **NCAIEI** to act as an independent complaints-handling body for consumer complaints arising from the use of AI.

2	**Key Recommendation 2 –** Set up an AI Ombudsman	

The public may need support where they believe AI has contributed to a complaint.

Role	Working with organisations like	Relevant supporting recommendations in this report
Act as an independent complaints-handling body for the public.	NCAIEI provides support	**Recommendation i:** **AI Ombudsman** to be set up by the **Commonwealth Government** as an independent body outside of the **NCAIEI** to act as an independent complaints-handling body for consumer complaints arising from the use of AI.
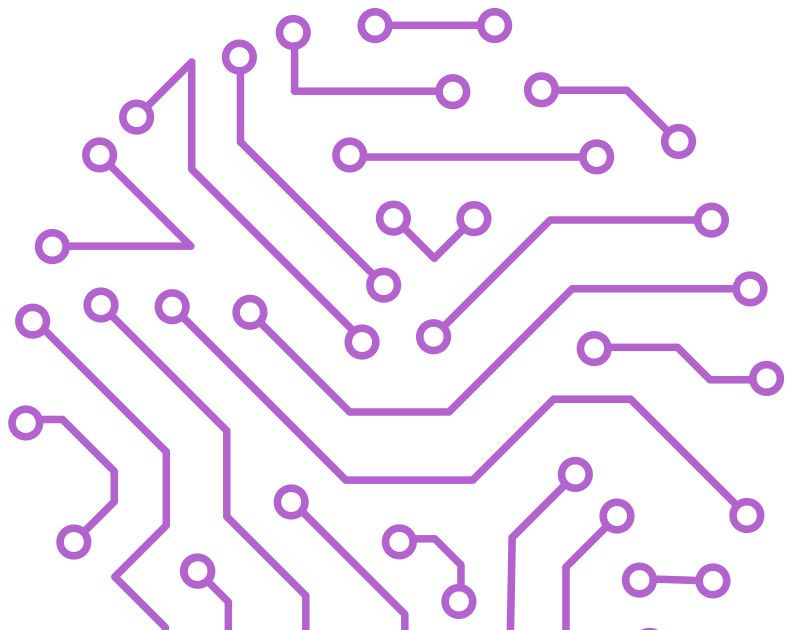
3	**Key Recommendation 3 –** Amend relevant Commonwealth laws or enact new laws and adopt new standards

Many laws require updating to make them relevant in the context of AI and may require updating over time as trends change.

Role	Working with organisations like	Relevant supporting recommendations in this report
Support regulators to amend relevant laws (e.g. privacy, corporations, competition discrimination, broadcasting and media).	NCAIEI provides support for the regulators and Parliament to amend laws or regulate/or advise the adoption and use of AI.	**Recommendation c:** Future data-related legislation must align with internationally expected standards and aim to balance protection and utility for AI. The **NDCO and OAIC** may be appropriate to advise on such initiatives. **Recommendation j: Commonwealth Government bodies** should consider appropriate changes to existing legislation and consult with industry on developments in this area, including the preferred regulatory model (including possibly creating a professional standards body for the AI industry), prior to implementing any new requirements. **Recommendation n: Commonwealth Government** to consider appropriate changes to existing legislation, with a first step being making minor amendments to existing privacy laws to require the disclosure of the use of AI in automated processing or decision-making.

4	**Key Recommendation 4 –** Equip regulators to enforce the laws

Resources will need to be given to regulators, to ensure they have the skills to regulate their areas of responsibility.

Role	Working with organisations like	Relevant supporting recommendations in this report
Government departments and regulators will need to be funded to ensure in-house expertise is provided within relevant regulators (e.g. ACCC, ASIC, OAIC, APRA, etc).	NCAIEI, academia, private sector	**Recommendation k:** Additional governance frameworks will need to be considered and implemented in order to support and enforce any legislative changes. This will require clarifying the jurisdiction of existing regulators in relation to AI, including **the ACCC and the OAIC**, and equipping these regulators with the necessary technical capacity to understand and regulate the use of AI systems within the scope of their jurisdiction. **Recommendation o: Governments at all levels** should play an active role in making information available and accessible with regards to the use of AI in the public domain.

5 **Key Recommendation 5 –**
Provide information and education (including to set up AAPPGAI)

Ensure industry, community and stakeholders are provided with relevant information.

Role	Working with organisations like	Relevant supporting recommendations in this report
Ensure that industry has access to information, trends and the ability to innovate – which may include: • setting up AAPPGAI to ensure education, dialogue and nimble reactions on AI issues.	Bi-partisan support convening all parliamentarians across all portfolios, as well as community	**Recommendation m: Commonwealth Parliament** to establish **AAPPGAI** **Recommendation o: Governments at all levels** should play an active role in making information available and accessible with regards to the use of AI in the public domain.

6 **Key Recommendation 6 –**
Set up an AI Fund

Ensure funds are available to encourage innovation, foster development of start-ups/SMEs, foster scaling-up of enterprises and retain jobs in Australia.

Role	Working with organisations like	Relevant supporting recommendations in this report
Setting up an AI Fund to enable AI innovation.	PM&C, Department of Treasury and Finance, DISER, Venture Capital collaborators/partners, Australian Research Council (ARC), National Health and Medical Research Council (NHMRC)	**Recommendation nn: Commonwealth (and/or Victorian Government)** to establish an Innovation Fund – or reprioritise existing grant programs – to target projects which accelerate AI development. This could include dedicating a proportion of existing funding streams such as: ARC, NHMRC and Innovations Connections program funding.

| **7** | **Key Recommendation 7 –** Develop skills, curriculum and general AI literacy |

Ensure that AI skills are attracted and retained into all industries.

Role	Working with organisations like	Relevant supporting recommendations in this report	
Working at all levels of education to ensure that the next generation of skills in Australia is educated in AI.	Australian Skills Quality Authority (ASQA), Tertiary Education Quality and Standards Agency (TESQA), Department of Education, DISER	**Recommendation p: Commonwealth and Victorian Governments** to ensure that ethics and equity and human rights principles are incorporated into any AI curriculum. The national AI curriculum could be developed by the **NCAIEI** in conjunction with departments like the **Department of Education, ASQA and TESQA.** **Recommendation q: Commonwealth Government** to consider policies and mechanisms such as community-based projects, government funded PhD scholarship places (that focus on diversity and inclusion of AI talent development to drive diversity and inclusion in next generation of AI talent).	**Recommendation gg: Commonwealth and/or Victorian Government** growing the number of AI specialists entering Australia's workforce, including via direct support for undergraduate, graduate and PhD scholarships, to encourage students to progress their careers into needed capability streams. **Recommendation ii: Commonwealth and/or Victorian Government** to develop and fund education programs in schools and higher education/VET that develop soft skills such as creativity and innovation. **Recommendation jj: Commonwealth and/or Victorian Government** to develop and fund micro-credentials in schools and higher education/VET.
Incentives and initiatives used to attract people into the technology industry, as well as to attract them to Australia from overseas.	Department of Immigration, Department of Education	**Recommendation dd: Commonwealth and/or Victorian Government** incentivising and promoting companies who invest early in building the AI skills base in their organisations. **Recommendation ee: Commonwealth and/or Victorian Government** to provide incentives for AI skilled people and businesses to come to, or return to, Australia – e.g. specialist taxation and business incentives.	**Recommendation ff: Commonwealth Government** to introduce and actively promote a special **AI Talent visa category**, to demonstrate Australia's prioritisation of these skills, in migration practices. **Recommendation hh: Commonwealth and/or Victorian Government** to undertake a targeted promotional campaign to support workers and organisations in better understanding the potentially positive impacts of AI on their careers and profitability, through highlighting new role opportunities created – and productivity or community impacts realised – by early AI adopters.

Key recommendations for the Victorian Government in AI

The Committee congratulates the Victorian Government for having already developed an important agenda of activities on AI. The Committee has collaborated with the Victorian Government on some of these initiatives, such as the VAPPGAI and – for the last two years – the **Committee's AI Summit** held to coincide with the Victorian Government's yearly **Digital Innovation Festival.**

To further the AI agenda, the Victorian Government has a significant role in:

• educating the community about their rights and the benefits that can be obtained from AI;

• educating and equipping the workforce with skills to ensure that we can attract and retain the right talent in Australia and Victoria for the innovation and application of AI;

• assisting stakeholders (public, private, educational etc) to commercialise, use, adapt and share information – including through practical use and testing of AI;

• development of appropriate regulation; and

• providing incentives and support for development of AI initiatives, innovation, business development and attracting talent from overseas.

This report, recognising the work already being done by the Victorian Government, identifies some key areas that could be considered by the Victorian Government to further the AI agenda. One of the key recommendations for the Victorian Government in this context is to take the lead on development of a **world class AI Precinct.**

The Victorian Government should consult industry, community and local councils to identify an AI precinct program. This might involve a **feasibility study** in the first instance, conducted in **partnership with some major industry investors.**

It is anticipated that an AI Precinct would play a role as a 'hub' for AI technology (including for the regions), whereby other innovation precincts and hubs around Victoria could connect virtually into the central coordination centre. There are a lot of initiatives already available to organisations in Victoria, and for coordination purposes and to ensure that people within and external to Australia are able to take advantage of those initiatives, it would be beneficial to have a central coordination role for that activity. Coordination and prioritisation of AI activity will be critical to limit duplication within the ecosystem and enable knowledge sharing.

The AI Precinct would also have the benefit of being a 'physical space' where learning and innovation could take place, including where AI initiatives could be publicly piloted and tested, showcased and developed with citizens engaged in the design and uptake process in order to demonstrate the benefits of AI. This would also enable the testing of public support for AI infrastructure and initiatives before committing to larger Smart City-scale rollouts, such as those via City Deals. The AI Precinct should ideally:

• be populous and have world class digital connectivity;

• be highly accessible to public and private research communities;

• have close proximity or connection to cities that offer an attractive lifestyle – to ensure the attraction and retention of skills; and

• have a mix of business, industry, academia, residential and artistic community groups.

Finally, any legislative reforms to be proposed in Victoria should be consistent with any changes that are occurring at a Commonwealth level. For example, changes to existing privacy laws to cover the use of AI systems in automated processing by Victorian public sector agencies would need to be made at a Victorian level, while reforms relating to the use of AI systems by businesses and Commonwealth Government entities will need to be made at a Commonwealth level. Nevertheless, there are significant opportunities for Victoria to take a leading role in these discussions and to influence a national discussion on the use of AI.

The key recommendations and more detailed supporting recommendations for the Victorian Government are summarised in the tables below.

Summary of key recommendations and supporting recommendations for the Victorian Government

8 **Key Recommendation 8 –** Conduct feasibility study on an AI Precinct

The Victorian Government should partner with key business leaders to develop a feasibility study on an AI Precinct and to determine where and how that investment might happen.

Role	Working with organisations like	Relevant supporting recommendations in this report
The Victorian Government should conduct a feasibility study into an **AI Precinct which would allow** AI initiatives to be developed and piloted and AI skilled professionals will be attracted to the precinct.	Key business leaders that can assist in partnering with government to conduct (and fund) the feasibility study	**Recommendation oo:** **Victorian Government** to develop a **feasibility study on an AI Precinct** and to consider the location, timing and how to establish this Precinct, with the understanding that different precincts offer different, unique opportunities to learn. **Recommendation s:** **Victorian government** develops an **AI Precinct** that is able to test and pilot AI initiatives to ensure they are fair and equitable for the community. **Recommendation w:** **Victorian Government to advocate for the development an AI Precinct,** which would enable careful exploration of the emergent issues of AI infrastructure in society. **Recommendation bb:** **Commonwealth Government,** through the **NCAIEI,** and **Victorian Government through the development of an AI Precinct,** financially supports and educates SMEs to access and benefit from the use of AI systems. **Recommendation kk:** **Victorian Government to explore establishment of an (or several) AI Precincts** to further AI skills via information and innovation sharing and creating an attractive place for skilled AI professionals to work, to collaborate or to find out about other work opportunities around Victoria. **Recommendation ll:** **Victorian Government to establish an (or several) AI Precincts** in Australia as a mechanism to test, develop, promote and showcase the use of AI in more innovative, yet-to-be commercialised settings focusing on the physical environment. **Recommendation pp:** **Victorian Government** to develop an AI Precinct with cross-industry and interdisciplinary collaboration as a design guideline.

9	**Key Recommendation 9 -** Amend relevant Victorian laws or enact new laws for the Victorian public sector

Many laws and standards require updating to make them relevant in the context of AI and may require updating over time as trends change.

Role	Working with organisations like	Relevant supporting recommendations in this report
• **Support regulators to examine and amend relevant laws** (e.g. privacy, corporations, competition discrimination, broadcasting and media). • **Develop standards and policies** that support AI implementation (eg through procurement policies that facilitate AI in infrastructure).	Department of Environment, Land, Water and Planning (DELWP), Victorian Planning Authority (VPA), Infrastructure Victoria	**Recommendation j: Victorian government bodies** should consider appropriate changes to existing legislation to cover the use of AI systems by government agencies. **Recommendation t: DELWP, the VPA and local civil design agencies should engage with Standards Australia** to specify minimum, good, and best practice design for incorporating AI systems into civil infrastructure. **Recommendation u: Infrastructure Victoria** should collaborate with design agencies to ensure Victoria's 30-year infrastructure strategy acknowledges AI infrastructure as an integral piece of Victoria's infrastructure, and encourages AI infrastructure to be designed in and built in to Victoria's future civil infrastructure, in accordance with relevant laws, ethical standards and national interoperability requirements. **Recommendation v: Department of Treasury and Finance and Buying for Victoria** (formerly Tenders Victoria) should collaborate with industry representatives to align the state's procurement process with the Commonwealth Government Artificial Intelligence Roadmap.

10	**Key Recommendation 10 –** Develop skills and curriculum

Ensure that AI skills are attracted and retained into all industries.

Role	Working with organisations like	Relevant supporting recommendations in this report
Working at all levels of education to ensure that the next generation of skills in Australia is educated in AI.	Department of Education and Training Victoria, Victorian Curriculum and Assessment Authority (VCAA) and Skills Victoria	**Recommendation gg: Commonwealth and/ or Victorian Government** growing the number of AI specialists entering Australia's workforce, including via direct support for undergraduate, graduate and PhD scholarships, to encourage students to progress their careers into needed capability streams. **Recommendation ii: Commonwealth and/ or Victorian Government** to develop and fund education programs in schools and higher education/VET that develop soft skills such as creativity and innovation. **Recommendation jj: Commonwealth and/ or Victorian Government** to develop and fund micro-credentials in schools and higher education/VET.
Incentives and initiatives used to attract people into the technology industry, as well as to attract them to Australia from overseas.	Department of Premier and Cabinet, Department of Treasury and Finance and Department of Jobs, Precincts and Regions	**Recommendation dd: Commonwealth and/ or Victorian Government** incentivising and promoting companies who invest early in building the AI skills base in their organisations. **Recommendation ee: Commonwealth and/or Victorian Government** to provide incentives for AI skilled people and businesses to come to, or return to, Australia – e.g. specialist taxation and business incentives.

| **11** | **Key Recommendation 11 –** Create an AI Fund |

Ensure funds are available to encourage innovation, foster development of start-ups/SMEs, foster scaling-up of enterprises and retain jobs in Australia.

Role	Working with organisations like	Relevant supporting recommendations in this report
Setting up an AI Fund to enable AI innovation	Department of Premier and Cabinet, Department of Treasury and Finance, VC collaborators/partners	**Recommendation nn: Commonwealth (and/or Victorian Government)** to establish an Innovation Fund to help accelerate AI development across the AI sector.

| **12** | **Key Recommendation 12 –** Provide information and education |

Ensure industry, community and stakeholders are provided with relevant information.

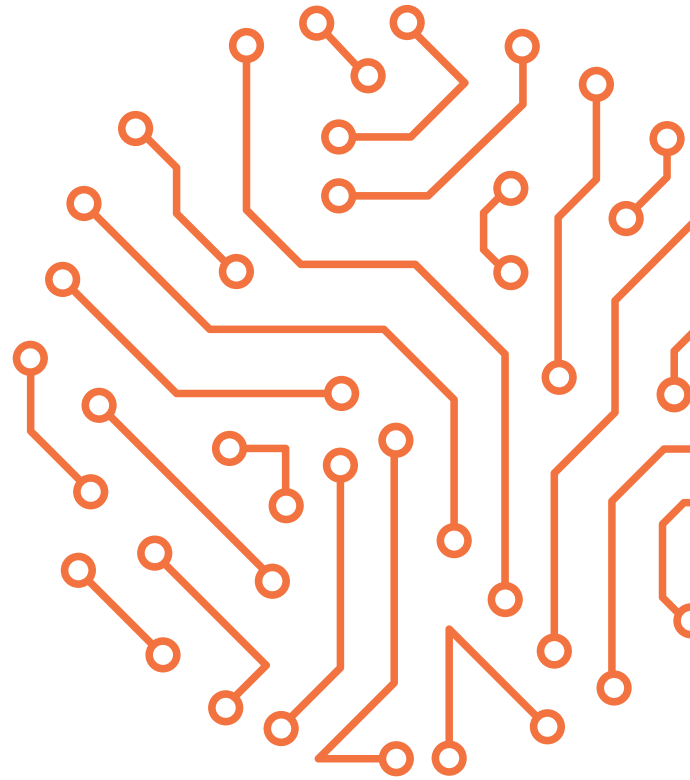| Role	Working with organisations like	Relevant supporting recommendations in this report
Ensure that industry has access to information, trends and the ability to innovate – which may include setting up an AI Fund to enable AI innovation.	VAPPGAI, NCAIEI	**Recommendation o: Governments at all levels** should play an active role in making information available and accessible with regards to the use of AI in the public domain. **Recommendation r: Victorian Government (possibly with VAPPGAI)** should explore partnerships with industry stakeholders in developing case studies and education programs. **Recommendation mm: Victorian Government** to invest further in incubators, accelerators, events and co-working spaces to provide an environment where expertise can be shared, cultivating a culture of collaboration which is the key for Australia's digital growth. **Recommendation nn: Commonwealth (and/or Victorian Government)** to establish an Innovation Fund to help accelerate AI development across the AI sector.

Key recommendations for VAPPGAI

With assistance and advocacy from the Committee, members of the Victorian Parliament established VAPPGAI as a bi-partisan group to learn more about AI and to educate government, industry and the community about the impacts of AI.

VAPPGAI is intended to play an important bi-partisan role in educating the community, facilitating reform and advocating for important policy change on AI. Therefore, VAPPGAI has a crucial role in continuing to educate the government and community about AI and ensure that there are continued avenues for dialogue and discussion. The continued efforts of VAPPGAI, following the meeting at the Victorian Parliament on 27 August 2019, must include a continued program of **VAPPGAI meetings in 2020**.

The Committee's AI report will be delivered to VAPPGAI, governments at all levels and broader community stakeholder groups, to continue the discussion and encourage practical actions and outcomes.

Key Recommendations for VAPPGAI

13 **Key Recommendation 13:**
Provide information and education, through a continued VAPPGAI meetings program

14 **Key Recommendation 14:**
Accept the Committee's report and work with the Victorian Government to implement the recommendations

7

Supporting recommendations

A

Data recommendations

The performance of AI is highly dependent on the depth, variety, and accuracy of data it is trained with. Put simply, to build AI, having access to large quantities of robust data is a prerequisite; consequently, creation and management of good quality and large volumes of data for AI forms a key theme in the AI strategy for several countries.

The Australian Government published its AI Roadmap in November 2019 titled *Artificial Intelligence: Solving problems, growing the economy and improving our quality of life* (Commonwealth Government Roadmap).[7] Co-developed by CSIRO's Data61 and the Department of Industry, Innovation and Science, the intention of the report is to identify *"strategies to help develop a national AI capability to boost the productivity of Australian industry, create jobs and economic growth, and improve the quality of life for current and future generations"*.[8] The Commonwealth Government Roadmap identifies three high potential areas of AI specialisation for Australia: natural resources and environment; health, ageing and disability; and cities, towns and infrastructure.

Figure 2: AI Specialisations from the Commonwealth Government Roadmap

Artificial Intelligence Specialisations
Solving significant problems at home, exporting the solutions to the world and building-off our strengths.

Natural Resources and Environment
Develops AI for enhanced resource management to reduce the costs and improve the productivity of agriculture, mining, fisheries, foresty and environmental management.

Health, Ageing and Disability
Develops AI for health, ageing and disability support to reduce costs, improve wellbeing and make quality care accessible for all Australians

Cities, Towns and Infrastructure
Develops AI for better towns, cities and infrastructure to improve the safety, efficiency, cost-effectiveness and quality of the built environment.

For AI pursuits in these arenas, data requirements will most likely extend beyond what is freely available in the public domain, which may necessitate new access to data that is owned and created by citizens or organisations. This will require careful consideration of a number of issues, including data privacy, ownership and security, as well as data quality.

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[7] Hajkowicz SA[1+], Karimi S[1], Wark T[1], Chen C[1], Evans M[1], Rens N[3], Dawson D[1], Charlton A[2], Brennan T[2], Moffatt C[2], Srikumar S[2], Tong KJ[2] (2019) *Artificial intelligence: Solving problems, growing the economy and improving our quality of life*. CSIRO Data61, Australia.

[8] https://data61.csiro.au/en/Our-Research/Our-Work/AI-Roadmap

a) Collection and use of data for citizen benefit

To accelerate AI development, driving data initiatives will be a critical underpinning for sustained value realisation. This necessarily requires data to be collected and managed in crucial areas and industries.

The Commonwealth Government has identified three key areas (as outlined above), but there may also be further areas for the government to consider over time, such as education or the media sector.

Recommendation a:
Implement **data collection and management initiatives** to support AI for **mission-critical** outcomes in the key areas identified by the Commonwealth Government. This could potentially be a joint exercise between the **Department of Industry, Science, Energy and Resources (DISER), the NCAIEI working in concert with the Office of the National Data Commissioner (ONDC).**

The Commonwealth Government has already committed to a National Data Commissioner to support a new data sharing and release framework, oversee the integrity of data sharing and release activities of Commonwealth agencies.

However, greater and faster innovation and AI development can be achieved through public-private collaboration around data.

Recommendation b:
Expand the scope of Australia's current data sharing frameworks and partnerships to include public-private data exchange supported by sustainable incentives for data sharing. The **NCAIEI and ONDC** may be well placed to oversee the public-private data exchange initiative.

b) Data privacy and protection laws

A key and relevant concern of individuals in society is around the use of data and how it might breach the privacy of individuals or be used for inappropriate means. A right to privacy needs to be protected.

Mechanisms need to be put in place to a) control the use of data, b) to provide transparency in the use of data, and c) ensure the trust and understanding in the community about the protection of data.

Australia has strong foundations by virtue of its privacy and competition laws, however a review is required to determine whether there are gaps that need to be covered. The Commonwealth Government has already committed to a **new Consumer Data Right law** to allow people to harness and have greater control over their data and a legislative package that will streamline data sharing and release, subject to strict data privacy and confidentiality provisions. In addition, the ACCC's *Digital Platforms Inquiry: Final Report* **(ACCC Report)** dated June 2019 has also discussed proposed recommendations (that are currently being considered by the Commonwealth Government after a period of public consultation) relating to possible reforms of consumer protection and privacy measures.

Perhaps the most stringent form of privacy-related legislation that has been seen globally is in the EU with the General Data Protection Regulation, or 'GDPR', which has imposed significant new obligations on the use and processing of personal information, but has resulted in significant increases in compliance costs for businesses. Taking lessons from this, Australia should be considering how support might be given to businesses in the case of any new laws or guidance that arises.

Recommendation c: Future data-related legislation must align with internationally expected standards and aim to balance protection and utility for AI. The **ONDC and OAIC** may be appropriate to tackle such initiatives.

c) Frameworks and mechanisms for collection, management and sharing of data for AI

To promote faster AI development, there is a need for transparent, safe and repeatable avenues to collect and manage the required data for different initiatives and domains. As such, Data Trusts, which have had some success overseas, are a concept that allow exploration of such frameworks – covering legal, technical, governance and policy-related mechanisms – which help increase access to data while retaining trust.

Recommendation d: Data Trusts should be piloted in Australia focusing on low data-risk, high-value use cases initially. The **NCAIEI** may be well placed to oversee the establishment and policies around Data Trusts, in collaboration with Commonwealth departments.

Currently, there are several key, yet isolated, data-related initiatives in progress, for example Australian Computer Society's Data Sharing Framework and CSIRO's development of the Consumer Data Standards. However, not all of these initiatives specifically relate to the use of data for AI systems. There is a need for AI-specific initiatives that focus on technical standards, proof of concepts and data sharing frameworks to support a future of AI in the public domain. There is a need for such pursuits to be managed more strategically under a coherent technical framework that provides clear and consistent guidelines for recommended design practices, importantly with consideration of how this impacts or promotes the use of such data for AI pursuits. The intent is for such architectural guidelines to drive more consistent and interoperable data and AI products at scale.

Recommendation e: A national level Technical Strategy should be developed to provide guiderails allowing for the standardisation of data collection, management and exchange of information for AI. This would encompass:

- data design principles and standards for managing data quality, security and aspects of data life cycles (like lineage and provenance management);

- a drive towards common standards for data exchange mechanisms, and

- providing best-practice technical guidelines on technologies for data assets such as Data Trusts.

This could be a joint initiative between **CSIRO, Standards Australia, ABS and professional services firms** with expertise in this space.
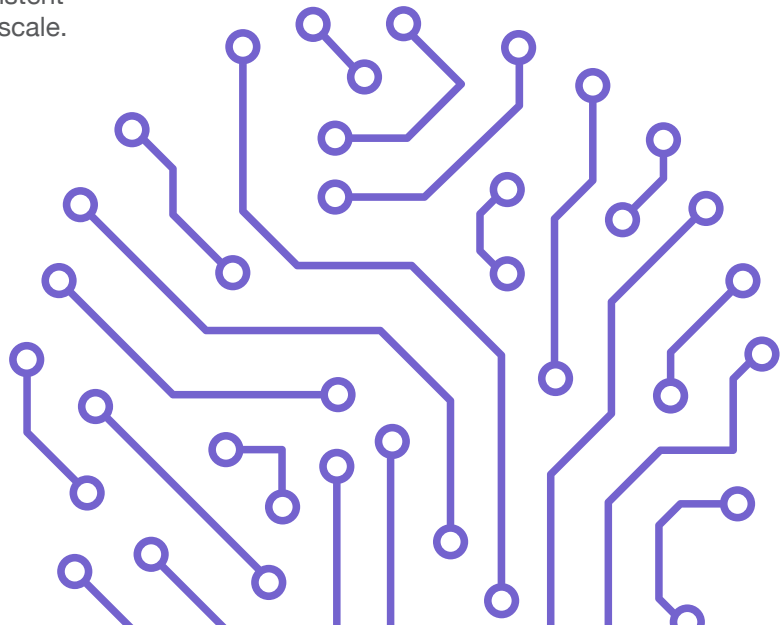
B Governance recommendations

AI is increasingly playing a role in the community and can have both beneficial and harmful consequences. For example, whilst AI can be used to deliver more efficient and effective services, it has also been used during electoral processes to deliver misleading information directly to voters through social media channels.

Whilst AI can be intentionally misused, there is also a possible risk of unintentional negative consequences arising from the use of AI. For example, AI is increasingly being used for service delivery in the public and private sector – such as insurance provision, finance access and employment application assessments. How these decisions are being made, what data is being used to generate those decisions (and whether there are any inherent biases in that data) and what impact they are having on the community are key issues that need to be considered.

a) Governance frameworks

The algorithms that underpin AI systems need to be understood, governed and monitored – but in a manner that is balanced to enable innovation and efficiencies to continue to be harnessed in an appropriate way. Therefore, a framework is required to enable this governance.

Of the many issues that need to be considered in this context, 'explainable AI' is an important factor in affording trust and transparency around the use of AI.

To align with the principle of transparency (which is already found in existing privacy laws in Australia), specific disclosures could be required where AI systems are used to make decisions that could affect the rights and obligations of individuals. One example of this can be found in Article 22 of the European Union's General Data Protection Regulation, including Articles 13 and 14 (which require notification of any automated decision-making and provision of meaning information

about the logic involved) and Article 22 (which limits the use of automated processing or profiling and requires that suitable protection measures are in place). These protection measures include the ability for affected individuals to request that an actual person review the automated decision. Implementing a similar legislative reform in Australia could be achieved relatively easily.

Even with such a requirement being implemented, questions remain about explainability that continue to need consideration. For example, what counts as an explanation? Who (or what) needs to understand the explanation? The 'explainability' of AI is important to avoid the 'black box' effect, where the results of algorithm decision-making are not able to be understood or explained by suitably qualified humans. The EU has explained how equity and fairness need to be protected by ensuring explainability:

> *"Explainability is therefore particularly important to* **ensure fairness** *in the use of algorithms and to identify potential* **bias** *in the training data. This far-reaching requirement means that an explanation should be available on* **how AI systems influence and shape the decision-making process,** *on how they are* **designed,** *and on what is the* **rationale** *for deploying them. Explainability must address both the technical processes of an AI system and the related human decisions taken in accordance with the EU guidelines."*[9]

There is a plethora of issues that need to be dealt with by a governance framework (whether in the form of legislation, industry standards or voluntary ethical principles). For example, the concept of human oversight and the mechanisms for humans to override a decision made by a system would be key areas to consider. Additionally, ensuring fundamental human rights are protected is also important, particularly in circumstances where AI systems are increasingly being used in areas where subjective decision-making might be needed, such as applying laws or issuing credit or insurance.[10]

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[9] Tambiama Madiega, *EU Guidelines on Ethics in Artificial Intelligence: context and implementation,* EU Briefing, European Parliamentary Research Service, Members' Research Service, PE 640.163 – September 2019 http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2019)640163 (accessed 3 February 2020)

[10] https://theconversation.com/csiro-wants-our-laws-turned-into-computer-code-heres-why-thats-a-bad-idea-130131

An ethical framework may therefore need to consider requirements for developers to consider the mechanisms and measures for human oversight and consideration of human rights.

Another area of the law that will need to be clarified is attributing liability for the actions and decisions of AI systems. This poses a number of difficulties from a legal perspective, such as liability for a car accident involving an autonomous vehicle or financial 'robo-advice' given by an AI system. This would mean that in a hypothetical case of harm, affected individuals are likely to seek compensation from the entity that deployed the AI. Where it could be determined that harm was due to any regulatory obligations or governance frameworks not being complied with by the entity that developed the AI, then responsibility may be traced back to that entity instead. If the harm flowed from a breach of professional obligations, a professional negligence case could be brought against the IT company that trained or developed the AI system.

(i) Ethics principles

The Commonwealth Government has proactively engaged with industry players to establish guidelines. In April 2019, the Commonwealth Government sought views on its Discussion Paper to inform the Government's approach to AI ethics in Australia.[11]

Following receipt of more than 130 submissions to the Discussion Paper (and a round of workshops), the Commonwealth Government published 8 AI ethics principles intended to be used when designing, developing, integrating or using AI systems to:

• achieve better outcomes;

• reduce the risk of negative impact; and

• practice the highest standards of ethical business and good governance.

The principles are voluntary. They are aspirational only and not intended to have legal effect.

[11] The Ethics Framework research was funded by the Commonwealth Government in the 2018 May Budget. The work was guided by a steering committee of experts from industry, government and community organisations as well as researchers from CSIRO and Data61.

The eight AI ethics principles are summarised as follows:

01 **Human, social and environmental wellbeing:** Throughout their lifecycle, AI systems should benefit individuals, society and the environment.

02 **Human-centred values:** Throughout their lifecycle, AI systems should respect human rights, diversity, and the autonomy of individuals.

03 **Fairness:** Throughout their lifecycle, AI systems should be inclusive and accessible, and should not involve or result in unfair discrimination against individuals, communities or groups.

04 **Privacy protection and security:** Throughout their lifecycle, AI systems should respect and uphold privacy rights and data protection and ensure the security of data.

05 **Reliability and safety:** Throughout their lifecycle, AI systems should reliably operate in accordance with their intended purpose.

06 **Transparency and explainability:** There should be transparency and responsible disclosure to ensure people know when they are being significantly impacted by an AI system, and can find out when an AI system is engaging with them.

07 **Contestability:** When an AI system significantly impacts a person, community, group or environment, there should be a timely process to allow people to challenge the use or output of the AI system.

08 **Accountability:** Those responsible for the different phases of the AI system lifecycle should be identifiable and accountable for the outcomes of the AI systems, and human oversight of AI systems should be enabled.

Source: accessed 11/11/2019 https://www.industry.gov.au/data-and-publications/building-australias-artificial-intelligence-capability/ai-ethics-framework/ai-ethics-principles

Commonwealth Bank of Australia, Telstra, National Australia Bank, Microsoft and Flamingo AI have signed on to trial the new set of principles governing the development of systems using AI, following the government consultation period for a national ethical framework. These companies have agreed to a trial period during which decisions taken on developing systems using AI will be referenced against the checklist of principles, to try to avoid creating unintended harmful consequences.[12]

Any guidelines established should help define layers of roles and responsibilities of industry at large, firms, and individuals, including executives and developers, in playing their parts and making them accountable in advancing rigorous testing of AI algorithms that minimise their risks to society and promote fair, transparent and secure use, based on the highest ethical considerations. The standards released by the Commonwealth Government should encourage business to undertake an AI risk analysis and put in place mitigating strategies to prevent harms in the use of AI.

At present these levels of accountability, and specifics in responsibilities, are implied but not explicitly incorporated into the ethics principles that have been proposed by the Commonwealth Government. If these principles are to be adopted more widely or if compliance with these ethics principles is to become a legal or other binding obligation, further detail and interpretive guidance will be required.

(ii) Further standards setting

The ethics principles established by the Commonwealth Government have gone some way towards providing high level guidance on these issues, but there are still questions around the clarity that the principles provide for how people can comply with them, as well as the layers of responsibility and who is responsible and accountable. More work is needed to ensure clarity around these issues is provided.

Government will be required to form an opinion over time on how it will manage these concepts and this may involve the development of a legislative framework. The Commonwealth Government could consider the setting up an independent ethical body along the lines of the Centre for Data Ethics and Innovation in the UK (the purpose of which is to connect policymakers, industry, civil society and the public to develop the right governance regime for data-driven technologies).

One of the key recommendations in this document is for a National AI Centre of Data Ethics and Innovation (NAICEI) to be established.

This seems to be in line with the proposal by the **Australian Human Rights Commission (AHRC)** in its 'Human Rights and Technology Discussion Paper' December 2019. Amongst the many proposals being consulted on (with a Final Report due in 2020), the AHRC in its Proposal 2 states:

> *"Proposal 2: The Australian Government should commission an appropriate independent body to enquire into ethical frameworks for new and emerging technologies to:*
>
> *(a) assess the efficacy of existing ethical frameworks in protecting and promoting human rights*
>
> *(b) identify opportunities to improve the operation of ethical frameworks, such as through consolidation or harmonisation of similar frameworks, and by giving special legal status to ethical frameworks that meet certain criteria."* [13]

Given that there are already many AI-focused initiatives underway across the country, a cohesive strategy for coordinating an approach to the governance of AI is essential – and needs to be considered as a matter of urgency. A strategic approach is needed to ensure that relevant research is consolidated and shared, resources are deployed efficiently, and that governments, industry, academia and other relevant stakeholders are involved in these discussions.

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[12] Federal Government, Media Release, 7 November 2019, *Businesses ready to test AI ethics principles* https://www.minister.industry.gov.au/ministers/karenandrews/media-releases/businesses-ready-test-ai-ethics-principles (accessed 18/02/20)

[13] Australian Human Rights Commission, Human Rights and Technology Discussion Paper, Executive Summary, 2019, page 7

As the AHRC points out in its Proposal 9 of the 2019 Human Rights and Technology Discussion Paper:

"Centres of expertise, including the newly established Australian Research Council Centre of Excellence for Automated Decision-Making and Society, should prioritise research on how to design AI-informed decision-making systems to provide a reasonable explanation to individuals." [14]

Another example of the work that is already being done is in the Melbourne Carlton precinct. Melbourne University's Melbourne Law School is spearheading some research agencies in this precinct as follows:

1) A **Centre for Artificial Intelligence and Digital Ethics** (CAIDE) made of groups being Melbourne Law School (MLS), the School of Computing and Information Systems (CIS) in the Melbourne School of Engineering and the Faculty of Arts. Acting as an 'interdisciplinary research body' – it will be located at **Melbourne Connect** in Carlton and one research focus is 'Fairness and Anti-Discrimination in Automated Decision-Making'.

2) They are setting up an **Australian Research Council (ARC) Centre of Excellence for Automated Decision-Making and Society.** MLS, CIS, other Australian universities and global industry partners using ARC funding. [15]

There are many examples of research such as this across the country. A coordinated approach should be taken, and the location might be important as well. As outlined later in this document, an AI Precinct as a central coordination point might well be an appropriate place to host such a centre.

Given the number of these bodies that are being established, the establishment of a central agency to coordinate such activities would be advisable.

Recommendation f: Commonwealth Government to consider the **development and implementation of principle-based frameworks and codes of practice** for AI technologies. The **National Centre of AI Ethics and Innovation (NCAIEI)** can assist with standards setting – working with agencies like **CSIRO and Standards Australia**

Recommendation g: NCAIEI to conduct research into ethical use of AI and coordinate research.

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[14] Australian Human Rights Commission, *Human Rights and Technology Discussion Paper,* Executive Summary, 2019, page 10

[15] Cat Knights, The ethics of Artificial Intelligence, Melbourne Law School, *mlsNews*, November 2019, pages 7-8
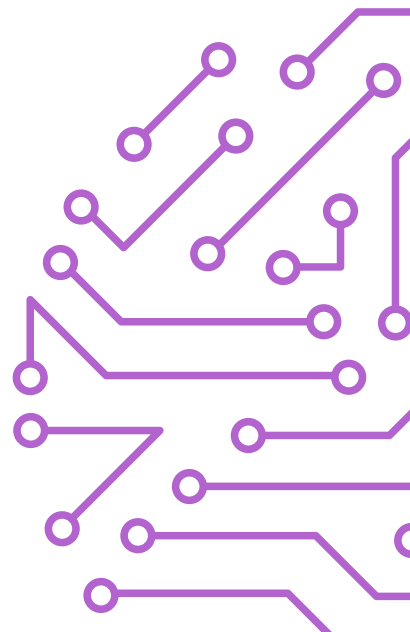
b) Ethical use of AI

Ethical use of AI needs to be incentivised and regulated. As discussed above, each regulator dealing with different legislative frameworks such as privacy (the OAIC), discrimination (the AHRC), competition (the ACCC), corporations law (ASIC) and financial services regulation (APRA) will need to have the resources and expertise to regulate AI within their area of responsibility. However, these agencies might need the support of a central body that has specific AI expertise.

Additional governance frameworks will need to be considered and implemented in order to support and enforce any legislative changes, as well as existing legislation requirements. Options for consideration will depend on the approach taken to legislative changes, but possible options (which would not be mutually exclusive) include:

• an AI Ombudsman that is empowered to deal with complaints from individuals in relation to the use of AI by businesses and government;

• clarifying the jurisdiction of existing regulators in relation to AI, including the ACCC, ASIC, APRA and the OAIC;

• creation of an AI Centre of Ethics and Innovation to coordinate research and development of ethical principles and governance frameworks and to provide support for regulators; and

• creation of a professional standards body/or specific standards for the AI industry (which could be developed through the NCAIEI).

(i) Provision of AI-related support by the NCAIEI

As set out above, there are many regulatory agencies that will need to investigate AI-related issues in the industries and areas that they regulate, whether that be privacy, discrimination, competition or corporations law. Whilst many of these agencies will need to have their own dedicated AI teams, they will also need support from a central body that can help with research and provide technical expertise.

An option would be to have a specific regulator which would be able to investigate breaches of laws, where AI is playing a role. However, there is no precedent for this yet around the world, and it is unclear whether a regulator for all industries is a possibility.

Whilst the EU has established new legislation (e.g. GDPR) they have stopped short of setting up a new regulatory body.[16] Accordingly, this report recommends that a body be set up with specific AI expertise, which regulators in general can draw upon for help. Rather than create multiple separate bodies, it would be more efficient for the provision of such support and guidance to be performed by the proposed NCAIEI.

Recommendation h: **NCAIEI** to provide resources and support for regulators to regulate the use of AI.

[16] Tambiama Madiega, *EU Guidelines on Ethics in Artificial Intelligence: context and implementation*, EU Briefing, European Parliamentary Research Service, Members' Research Service, PE 640.163 – September 2019 http://www.europarl.europa.eu/thinktank/en/document.html?reference=EPRS_BRI(2019)640163 (accessed 3 February 2020)

(ii) Ombudsman

An independent ombudsman as a complaint handling body is a typical mechanism in many industries. This body will deal with complaints in relation to the use of AI by businesses and government. Legislative change would be required to give jurisdiction to this ombudsman.

Recommendation i: **AI Ombudsman** is set up by the **Commonwealth Government** as an independent body outside of the **NCAIEI** to act as an independent complaint handling body for consumer complaints arising from the use of AI.

c) Updating existing laws

Victorian and Commonwealth government bodies should consider appropriate changes to existing legislation, potentially in the form of a multi-stage process of first making minor amendments to existing privacy laws to cover automated processing (and other relevant legislation like competition, corporations, discrimination laws) and subsequently developing principles-based AI-specific legislation. Governments should consult with industry on developments in this area prior to implementing any new requirements.

The ACCC's *Digital Platforms Inquiry: Final Report* (ACCC Report) dated June 2019, contains recommendations across areas like competition, consumer protection, copyright and privacy issues. Those recommendations are currently being considered and responded to by the Commonwealth Government. Although the Inquiry has had a particular focus on the conduct of Google and Facebook, its proposals go beyond these digital platforms.

The ACCC Report noted that laws across a range of areas should be considered as a part of the Commonwealth Government's review, for example (amongst others):

• merger laws and corporations laws;

• news media laws; and

• the Australian Consumer Law.

To align with the principle of transparency (which is already found in existing privacy laws in Australia), specific disclosures could be required where AI systems are used to make decisions that could affect the rights and obligations of individuals. Due to Australia's federal system of laws, some of this legislative change will need to be undertaken at a state and territory level and some reforms will need to occur at a Commonwealth level.
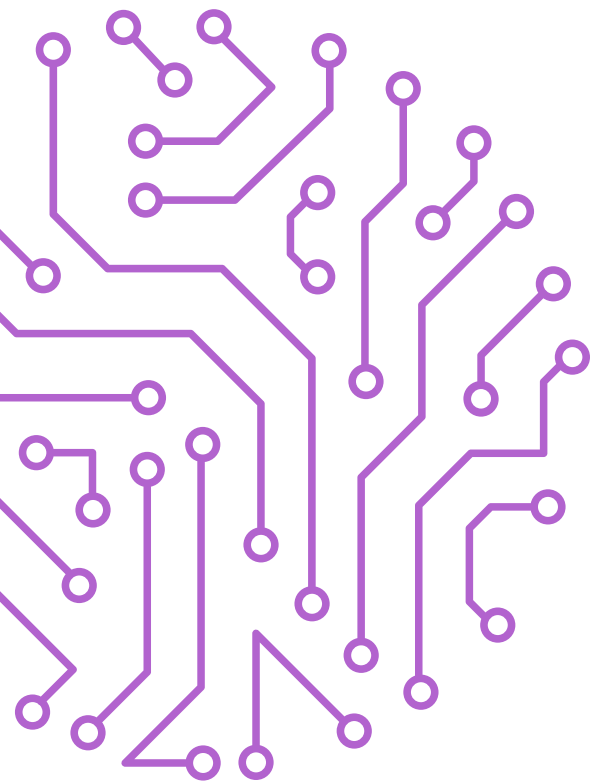
In addition to amending relevant laws, regulators may need to enhance their AI-related capabilities. For example, the ACCC Report highlighted that it may need a specialist unit of the ACCC to deal with digital markets. However, regulators may also need support from AI experts in regulating AI issues. Therefore – in addition to having internal expertise – regulators may need to draw upon knowledge provided by other government agencies, or through the NCAIEI.

✳ **Recommendation j: Commonwealth government bodies** should consider appropriate changes to existing legislation and consult with industry on developments in this area, including the preferred regulatory model (including possibly creating a professional standards body for the AI industry), prior to implementing any new requirements. **Victorian Government bodies** should consider appropriate changes to existing legislation to cover the use of AI systems by government agencies.

✳ **Recommendation k**: Additional governance frameworks will need to be considered and implemented in order to support and enforce any legislative changes. This will require clarifying the jurisdiction of existing regulators in relation to AI, including the **ACCC** and the **OAIC**, and equipping these regulators with the necessary technical capacity to understand and regulate the use of AI systems within the scope of their jurisdiction.

✳ **Recommendation l: Commonwealth Government** to consider mechanisms such as partnerships, collaborations and funding to ensure that the **NCAIEI, AI Ombudsman and all regulators** are sufficiently resourced, funded, skilled and adaptable to keep up with constantly changing trends and innovations.

The Commonwealth also has a role in sharing information and educating the community, including government, businesses, academia and other stakeholders about the importance, uses and trends of AI. In order to be nimble and be able to respond that that information, a bi-partisan approach may be needed. Accordingly, just as the Victorian Parliament has established the VAPPGAI, the **Australian All-Party Parliamentary Group on Artificial Intelligence (AAPPGAI)** might be established to achieve those aims.

✳ **Recommendation m:** Commonwealth Parliament to establish **AAPPGAI.**

C 🤝

Equity and equality recommendations

a) Embedding human rights into legislation and frameworks

A key and relevant concern of individuals in society is the use of data and how it might breach the privacy of individuals, but also, how it might be used for inappropriate means. People's rights need to be protected.

Increasingly, AI is being used to make decisions that affect the interests or rights of individuals. Mechanisms need to be put in place to a) protect people's rights and b) ensure equality of access for people – to prevent a system that reinforces the division in the community into 'have and have nots'.

Australia already has strong privacy and competition laws. However more can be done to specifically deal with AI creation and use in the AI space.

Governments, in partnership with technology firms and industry stakeholders, should develop and implement principle-based frameworks, in which human rights are protected in the development and use of AI technologies across public and private sectors.

Governments should build or strengthen capability within existing regulatory bodies to oversee changes and impacts resulting from AI adoption. A central advisory council or **NCAIEI** could be established to provide advice, collaboration and share learnings across government, central agencies, regulators and industry. This approach has been taken by countries such as the UK, Canada and Singapore, where non-profit advisory councils provide central coordination for research, funding and ethical considerations.

When AI systems are being developed, particularly for applications that can affect the wellbeing of individuals or produce outcomes with negative consequences, rigorous testing should be taken across the lifecycle. This includes but is not limited to: probing training data for bias; pre-release trials; independent auditing; ongoing monitoring; and verification. Specific analysis should be done to identify bias, discrimination or other harm. A set of good practices that provide guidelines rather than prescriptive regulation may help companies better deliver AI services and products.

The EU ethical guidelines for AI provide high-level principles for all of the issues identified, while not relying heavily on regulation (with the exception of data privacy through the General Data Protection Regulation (GDPR)). The Committee notes that the **AHRC** has considered many of these key issues in its 'Human Rights and Technology Discussion Paper' December 2019. Amongst the many proposals being consulted (with a Final Report due in 2020), the AHRC in its Proposal 1 states:

> *"Proposal 1: The Australian Government should develop a National Strategy on New and Emerging Technologies. This National Strategy should:*
>
> *(c) set the national aim of promoting responsible innovation and protecting human rights*
>
> *(d) prioritise and resource national leadership on artificial intelligence (AI)*
>
> *(e) promote effective regulation – this includes law, co-regulation and self-regulation*
>
> *(f) resource education and training for government, industry and civil society."* [17]

The recommendations in this section below are in addition to recommendations already outlined above, that seek to deal with ethics (such as the ethics principles as well as the establishment of a research agency to develop further initiatives around ethics).

✳ **Recommendation n: Commonwealth Government** to consider appropriate changes to existing legislation, with a first step being making minor amendments to existing privacy laws to require the disclosure of the use of AI in automated processing or decision-making.

✳ **Recommendation o: Governments at all levels** should play an active role in making information available and accessible with regards to the use of AI in the public domain.

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[17] Australian Human Rights Commission, Human Rights and Technology Discussion Paper, Executive Summary, 2019, page 6

b) Embedding equity into education and skills curriculum and talent pool

Governments, seeking input from the higher education sector and (global) industry, need to adapt education policy to foster the next generation of talent in AI, focusing on promotion of diversity and inclusion in those being educated, as well as ensuring the curriculum fosters an understanding of ethics and equity principles. Policy frameworks need to target early and higher education systems to train technically capable and ethically responsible pool of talents in AI. Policy should help develop and retain talent and researchers knowledgeable and comfortable in working with AI both from technical, ethical, and governance perspectives.

Recommendation p: Commonwealth and Victorian Governments ensure that ethics and equity and human rights principles are incorporated into any AI curriculum. The national AI curriculum could be developed by the **NCAIEI** in conjunction with departments like **Department of Education, ASQA and TESQA.**

Recommendation q: Commonwealth Government to consider policies and mechanisms such as community-based projects and government funded PhD scholarship places that focus on diversity and inclusion of AI talent development to drive diversity and inclusion in next generation of AI talent.

c) Educate the community

The Victorian Government, specifically, should explore partnerships with industry stakeholders in developing case studies and piloting AI projects with various communities to increase understanding, enhance skills, and foster inclusion in the use of AI. In this way, making information available and accessible with regards to the use of AI in the public domain, will not only provide assurances and confidence to communities and safeguard rights to information, but also empower them and allay unwarranted fears of new technologies.

Recommendation r: Victorian Government possibly with VAPPGAI, should explore partnerships with industry stakeholders in developing case studies and education programs.

Recommendation s: Victorian Government develops an **AI Precinct** that is able to test and pilot AI initiatives to ensure they are fair and equitable for the community.

D Infrastructure recommendations

Infrastructure that enables AI adoption, innovation and activity needs to be planned and developed. This includes for example digital capability like smart sensors embedded in physical assets (e.g. hospitals, roads, airports etc), connectivity and computer power.

Committee for Melbourne advocates for an integrated transport plan that ensures that public and private transport options and different modes of transport and services are considered within the plan. This must necessarily include the incorporation of physical and digital AI capability throughout our transport infrastructure and planned services (e.g. the capability to adapt roads for appropriate technologies like smart sensors to accommodate autonomous vehicles in the future).

a) Frameworks for infrastructure design

Planning and operating our civil infrastructure efficiently is already highly complex and is becoming a key application area for AI. Unfortunately, much of our civic infrastructure is ageing and not designed to accommodate the AI infrastructure that could play a role in its management. Standards Australia and IEC are focused on communications network and data-related standards; less emphasis is placed on integrating AI infrastructure into civil infrastructure design.

The Department of Environment, Land, Water and Planning (DELWP), the Victorian Planning Authority (VPA) and civil design agencies should engage with Standards Australia to specify minimum, good, and best practice design so that future civil infrastructure can have AI infrastructure designed in while achieving energy and carbon neutrality and retaining present safely and performance benchmarks in compliance with the Planning and Environment Act.

Recommendation t: DELWP, the VPA and local civil design agencies should engage with Standards Australia to specify minimum, good, and best practice design for incorporating AI systems into civil infrastructure.

Recommendation u: Infrastructure Victoria should collaborate with design agencies to ensure that Victoria's 30-year infrastructure strategy acknowledges AI infrastructure as an integral piece of Victoria's infrastructure, and encourages AI infrastructure to be designed in and built in to Victoria's future civil infrastructure, in accordance with relevant laws, ethical standards and national interoperability requirements.

b) Procurement policies

Agencies responsible for developing state assets, including transport, power, water utilities etc need to have planned responses to AI technology.

Recommendation v: Department of Treasury and Finance and Buying for Victoria (formerly Tenders Victoria) should collaborate with industry representatives to align the state's procurement process with the Commonwealth Government Artificial Intelligence Roadmap (section 8.2 – "AI for Better Towns, Cities and Infrastructure"), including:

- Requiring AI enabling provisions to be specified and designed into future physical infrastructure projects to allow orderly and convenient transition to a future AI society.

- Encouraging collaboration between infrastructure owners and AI proponents at the planning, design and tendering stages of infrastructure projects.

- Placing increased gravitas on innovation and value over cost alone during the planning, design and tendering stages of infrastructure projects.

c) Innovation and development in AI infrastructure technology

A precinct-level strategy in Melbourne would complement existing recommendations in the Commonwealth Government Roadmap to consider smart cities. A precinct-level strategy might allow the opportunity to innovate and test for infrastructure development. The precinct-level strategy might also be the location for a NCAIEI.

Recommendation w: Victorian Government to advocate for development of an AI Precinct, which would enable careful exploration of the emergent issues of AI infrastructure in society.
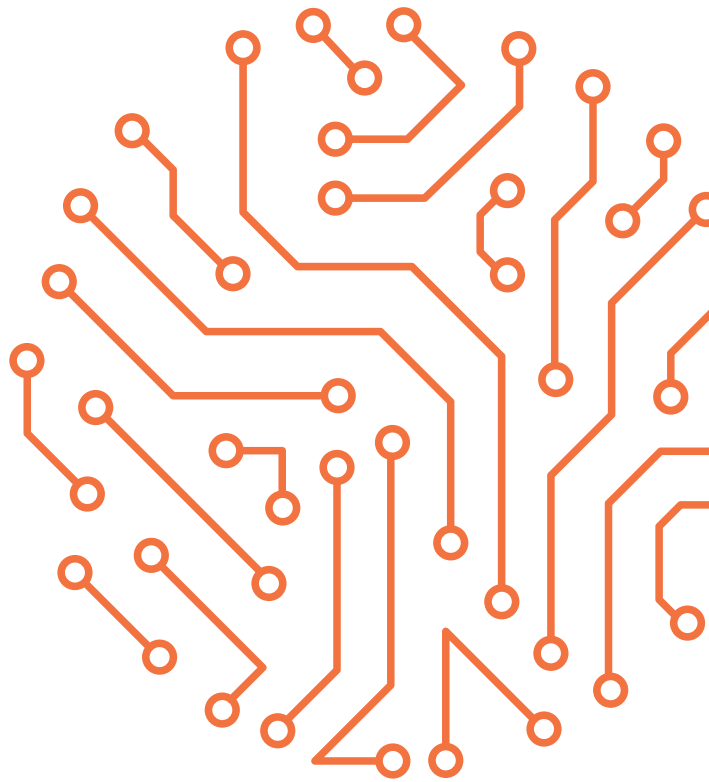
E 🔒 Security recommendations

Fundamentally, the security concerns in an AI-driven world are similar to the concerns of cyber security and there are more issues beyond cyber security: protection of confidentiality of data; intellectual property; protecting the integrity of the AI or computerised process; as well as the availability of the systems and the services being enabled by AI.

AI security is a field which has substantial overlap with the cyber security field; but neither the threats nor the remedies are necessarily the same. The AI security field is an extension of cyber security and cannot be considered in isolation from it.

There are similar concerns to cybersecurity that need to be addressed – that is – the protection of data and the protection of systems and users from malfeasance. For example:

a) The implementation of AI security should be assessed by assessing the 3D's - design, development and deployment: e.g. a traditional cybersecurity perspective.

b) Certain AI data must be housed in a secure ecosystem to ensure sensitive data remains secure.

However, there are new dimensions to AI security (over and above cyber security) which must be addressed as the modes and vectors of attack are different. For example:

c) Actors with bad intentions can learn to fool AI and exploit systems for criminal purposes through passive and active malfeasance.

d) AI can be used as a force multiplier to enhance security systems.

e) As society becomes more reliant on AI, then systems to ensure access to AI may need to be secured.

a) Security of AI implementation

AI implementation should be assessed by reviewing the factors which impact society and business should the AI system be compromised through cyber means. For example, AI algorithms should be designed to instil the right fail safe design controls, the use of secure coding practices and other safeguards against manipulation.

The security of AI implementation should be assessed by following the 3D's - Design, Development and Deployment.

✳ **Recommendation x: NCAIEI** should research and provide guidance to industry on how to incorporate security into the design, development and deployment of AI. Industry should be encouraged to participate in this research.

b) Security legislation and frameworks – protection from malfeasance and integrity compromise

Securing AI systems poses unique challenges. We must consider how we can use cyber security to effectively prevent threats posed to AI-based programs and applications.

There are two aspects to malfeasance:

• **passive malfeasance,** where an AI is not changed, but manipulated to produce outcomes not intended by the designer. Malfeasance and manipulation of AI algorithms to produce a biased or desired output has to be protected by the means of access control to the systems, rigorous testing using fail safe controls, where AI exceeds certain parameters of generated outputs etc (see for example Juuti et al. (2019)); and

• **active malfeasance** is where the AI is subverted, damaged or intruded upon in some way through issues such as data poisoning, subversion, adversarial attack etc. For example, a malicious adversary can surreptitiously manipulate the input data so as to exploit specific vulnerabilities of learning algorithms and compromise the security of the machine learning system using adversarial attack techniques by passing traditional controls which are supposed to protect the environment.

AI-fuelled insights will deliver higher quality of experience (QoE) and better services. Given the kinds of highly responsible tasks that AI algorithms have to carry out, the risk of algorithmic compromise makes the issue of cybersecurity in AI even more important.

> ✳ **Recommendation y: NCAIEI** is funded to undertake research into the development of appropriate and balanced legislation, frameworks and standards designed to ensure the security of AI systems and protect these systems from being abused or compromised by malicious third parties.

c) Using AI cybersecurity as a force multiplier

Use of AI in cybersecurity can act as a force multiplier for advanced threat detection as well as a key robustness feature in order to deter, detect and prevent threats from happening on mission critical systems.

This paradigm presents great opportunity. AI, in conjunction with machine learning and big data models, is being increasingly used in decision making with a high probabilistic certainty. This level of certainty can be close to the human certainty in solving the biggest cybersecurity challenges. Some of these challenges are those of identifying the right skilled resources and early identification of new and emerging attack vectors.

In addition, AI tooling for advanced cyber threat detection has led to a number of vendors and research labs establishing a number of cybersecurity AI-led detection initiatives, such as IBM (Watson), Darktrace (anomaly detection), advanced UEBA technologies etc.

> ✳ **Recommendation z:** Research between government and private sector into AI tooling for advanced cyber threat detection.

d) Protection of AI availability

Availability of AI systems and algorithms is a key challenge, as many of the ecosystems of the future are dependent on AI to decide, self-allocate and manage them (such as 5G, connected car ecosystem etc). Loss of availability for AI driven algorithms due to bugs, software security vulnerabilities and threats caused by various factors *may* lead to detrimental consequences (although many developments do take this into account, so that systems can continue to manage in the absence of AI).

> ✳ **Recommendation aa:** Research into whether there are areas where it is essential to make AI systems, networks (eg 5G) and algorithms highly available, and how this might be achieved.

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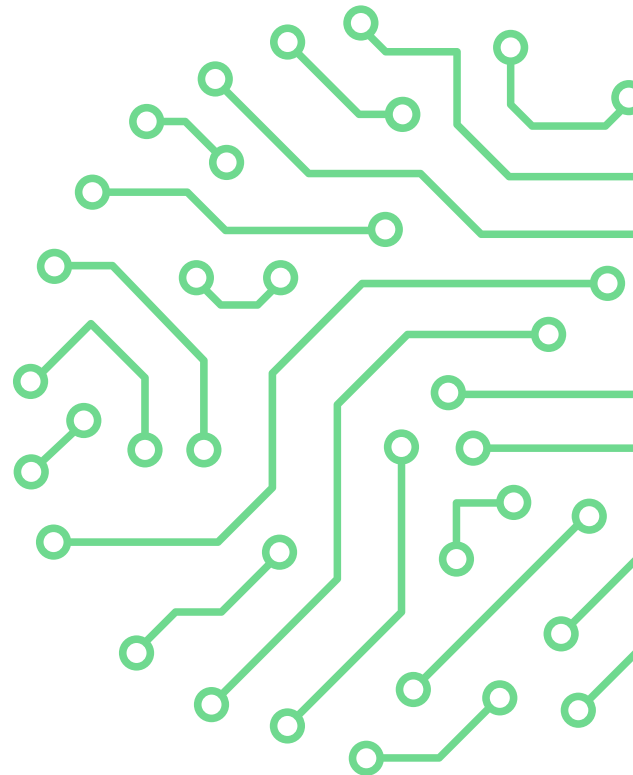
Trade recommendations

Just as the internet transformed the trade ecosystem in the late 1990s through the introduction of online catalogues, targeted marketing and a new age of customer convenience, AI has already transformed the trade landscape once more. Advances in machine learning and automated decision-making techniques – the engines that drive the majority of products falling under the AI umbrella – have brought forth a new wave of innovation that will soon be at the forefront of improving not only the internal efficiency of businesses but also the quality of products delivered to customers.

For businesses, AI will drive internal business optimisation of product development and delivery through improvements in the ability to extract information from existing big data. AI grants the ability to use analytics to develop products tailored to customers.

For consumers, AI also provides direct benefits (such as improving the accessibility of products through online platforms). For example, the recent development of sophisticated chatbots by organisations such as Alibaba provide a fast interface for customers to find the exact product they are looking for when browsing online, as well as automatically providing information on stock and delivery details that alleviate the need for cumbersome customer support networks.

a) Leveraging AI through internal business models

In order to reap the full benefit AI will offer, governments at a state and federal level must take the necessary provisions with respect to infrastructure and small and medium enterprise (SME) support to remain competitive against large overseas multinationals that will otherwise quickly outpace Australian organisations.

The vast majority of industries associated with trade rely on the traditional e-commerce business model of using consumer analytics to guide focused marketing strategies that funnel customers into several generalised products.

The recent increase in Platforms as a Service (PaaS) such as Amazon Web Services, Microsoft Azure and Google Cloud and AI utilities or software such as Software as a Service (SaaS) are some of the most significant driving forces for AI proliferation.

Being fundamental to data analysis and the training of machine learning models, PaaS allows SMEs to compete with large corporations in terms of leveraging AI to reap the benefits of a transformed business model. However, the benefit of an increasingly inter-dependant ecosystem comes with the challenge of requiring a fast and robust network infrastructure.

To take full advantage of PaaS, government bodies must work closely with industry to provide the proper infrastructure necessary for those organisations to adopt and use AI technology.

There are practical steps for businesses to leverage the AI opportunity: AI operating model, drive technology-led culture and participation in knowledge sharing. In order to facilitate knowledge sharing, the Government can facilitate SMEs from organisations, universities and institutions to create a community of industry experts and professionals. This community can then provide advice and consultation for businesses who are looking to bolster their AI capability.

Recommendation bb: Commonwealth Government, through the **NCAIEI**, and **Victorian Government through the development of an AI Precinct**, financially supports and educates SMEs to access and benefit from AI systems.

b) AI Commerce

The opportunity for industries to shift their business model also comes with the need to properly educate a specialised workforce that understands the capabilities and limits of AI within the business context. The insights that AI provides are only as valuable, for example, as the quality of the data inputs and the data scientist's ability to understand how those insights can be extracted in different contexts.

Case Study: Commonwealth Bank customer engagement engine

The Commonwealth Bank's customer engagement engine (CEE) allows the bank to have more proactive, needs-based conversations with customers, regardless of which channel the customer came in through. Over 200+ AI models drive next best conversations which aim to improve the financial wellbeing of CBA customers by providing relevant conversation starters such as notifying them of when a repayment is due to avoid late fees or even helping customers discover if they are missing out on benefits, rebates or concession payments. This AI led capability allows Commonwealth Bank to have relevant, meaningful conversations with their customers, delivering a one to one experience that makes the interaction with customers easier.

Recommendation cc: NCAIEI to conduct research and provide advice and education to the community, government and business on commercialisation of AI.
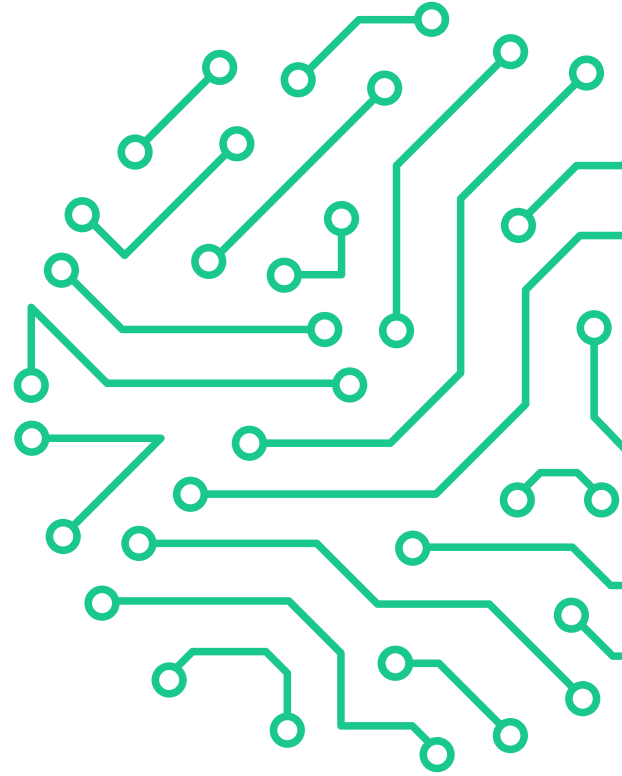
G Skills recommendations

There are three current challenges which are impacting Victoria and Australia's ability to realise the full benefits offered by the arrival of AI. These are: limited availability of AI skills; current low AI adoption rates in Australia due to limits in understanding of AI's potential or concerns regarding new risks it introduces; and limited information sharing between groups within the local ecosystem, on the value of AI to their operations.

The Australian Government Roadmap highlights the following:

- Australian industry needs up to 161,000 new specialist AI workers by 2030 in machine learning, computer vision, natural language processing and other AI technologies.

- The Australian information, communications and technology (ICT) sector employs 663,100 workers in fields related to AI. This will grow to 758,700 workers by 2023 at a rate of 20,000 additional workers per year. Today 66,000 ICT workers live in remote and regional areas.

Australia will need to invest in boosting AI specialist and general skills if it is to take full advantage of emerging opportunities generated by the arrival of AI.

This will include not only investing to help the current workforce to add new skills and understanding of AI, in particular in industries expected to be most impacted by AI's arrival, but also to boost the volume of AI specialists in Australia, to meet the expected rise in demand across the ecosystem.

Also, as global investment and demand for these skills increases, Australia will find itself competing to access – and retain – talent and to stay competitive, as AI usage increases.

a) Rewarding companies and organisations that invest in skills

In order to ensure Australia has and retains the skills needed to proactively embrace AI, focused initiatives are needed to encourage upskilling of the workforce, including new entrants and existing workers, to raise their aptitude to adopt and embrace AI in their roles.

This may include offering incentives for training, or investment into R&D into applying AI in their industry.

Recommendation dd: Commonwealth and/or Victorian Government incentivising and promoting companies who invest early in building the AI skills base in their organisations.

b) Attracting and retaining AI talent in Australia

In order to maintain and grow Australia's talent pool in AI, incentives should also be strengthened to encourage AI specialists to remain in Australia or relocate to take on industry opportunities here.

In addition, AI-skills should be given strong priority in the consideration of candidates for skillset migration to Australia. This may be delivered through an increased focus or priority for AI skills as part of the Government's recently launched Global Talent Independent Program (GTIP), including consideration of offering an AI Talent visa, considered along similar lines to the current Distinguished Talent visa.

Government might consider actively incentivising Australian AI skilled professionals to remain in Australia, or if currently boosting their expertise overseas, to return to Australia to support upskilling within the local ecosystem.

This type of promotion could assist Australia in competing in the global talent pool for specialist AI skills, with a focus on sectors where we have comparative need or advantage. This could include adding further focus to the existing talent visa programs to prioritise acceleration of applications for candidates with specialised AI skills.

The Government might also consider incentives to encourage Australian expatriate technology experts to return to Australia either individually, or bringing their businesses, including consideration of a one-off income or stamp duty subsidy (to offset a portion of reintegration costs for them to return to Australia).

Recommendation ee: Commonwealth and/or Victorian Government to provide incentives for AI skilled people and businesses to come to, or return to, Australia – e.g. specialist taxation and business incentives.

Recommendation ff: Commonwealth Government to introduce and actively promote a special AI Talent visa category, to demonstrate Australia's prioritisation of these skills in migration practices.

Recommendation gg: Commonwealth and/or Victorian Government to grow the number of AI specialists entering Australia's workforce, including via direct support for undergraduate, graduate and PhD scholarships, to encourage students to progress their careers into needed capability streams.

Recommendation hh: Commonwealth and/or Victorian Government to undertake a targeted promotional campaign to support workers and organisations in better understanding the potentially positive impacts of AI on their careers, and profitability, by highlighting new role opportunities created, and productivity or community impacts realised, by early AI adopters.

c) Helping people to be upskilled for new jobs

New and emerging jobs might require upskilling and reskilling for existing jobs.

Soft skills are transferable skills which can be applied to many different jobs and industries. They include problem solving, critical thinking, creativity, collaboration, leadership, teamwork and self-management. The capacity to innovate will be the bedrock of Australia's future competitiveness. In an age of accelerated transformation, new digital technologies are transforming traditional business processes and models and enabling people to communicate and collaborate in ways previously not possible. **Australia is now ranked 23rd in the world for innovation,**[18] **while our global competitiveness is at its lowest point in 18 years.**[19]

With the nature of work set for continuous change over the coming decades, there is the need to not only educate our community about the need for lifelong learning and upskilling, but to provide an environment that enables its implementation. For example, traditional roles like building and construction trades will continue in the future but may require some additional skills sets such as use of computer technology for the trade. The development and recognition of micro-credentials, which complement our existing educational framework, will be essential to facilitate lifelong learning and upskilling.

Recommendation ii: Commonwealth and/or Victorian Government to develop and fund education programs in schools and higher education/VET that develop soft skills such as creativity and innovation.

Recommendation jj: Commonwealth and/or Victorian Government to develop and fund micro-credentials in schools and higher education/VET.

d) Sharing information between organisations

Sharing information between groups within the local ecosystem on the value of AI to their operations will assist in training, skilling and equipping the workforce, especially where the ecosystem includes academia. This is outlined further in the innovation section below, however, the deliberate fostering of sharing through physical space, as well as virtual space, has been seen to have great benefits for skills and innovation (e.g. Silicon Valley).

Recommendation kk: Victorian Government to explore establishment of an (or several) AI Precincts to further AI skills via information and innovation sharing and creating an attractive place for skilled AI professionals to work, to collaborate or to find out about other work opportunities around Victoria.

[18] https://www.globalinnovationindex.org/gii-2018-report#

[19] https://www.weforum.org/reports/the-global-competitiveness-report-2017-2018

H

Innovation and entrepreneurship recommendations

a) Protect and promote Australian technology start-ups

Governments generally have an important role in exploring partnerships with industry stakeholders. This includes developing case studies and piloting AI projects with various communities to increase understanding, enhance skills, and foster inclusion in the use of AI, as well as to help in the development of new AI innovations and collaboration between academia, different industries and the community.

Given the rate of innovation in AI, there is a need to create an environment for start-up culture to thrive and accelerate translation to commercial success. One mechanism to foster this is to set up regional AI innovation centres that provide the support and services needed by aspiring AI tech start-ups, and access to consultative expertise when required, working in collaboration with existing industry bodies, including the Australian Growth Networks and Cooperative Research Centres (CRCs). The recent launch of the AI Hub in Melbourne is a great step in this direction. Additional considerations need to be made around availability of funding, expert assistance and global marketing of the programs and safe spaces to test and train AI in accordance with regulations and ethical goals.

Victoria is not always the leader in such trials. For example, RACWA's Automated Vehicle Program is trialling the autonomous vehicle technology in real-life traffic conditions through its RAC Intellibus program, to help us better understand and prepare for the changes it will bring to mobility.[20] Governments need to consider ways of facilitating pilot programs – and in the absence of a coordinated national approach, the Victorian Government has an opportunity to lead the way in this area.

The Victorian Government has a unique opportunity to conduct these programs, because there are already precincts around Greater Melbourne and in the regions that are focused on technology and innovation, and have pre-existing academic, private sector and government partnerships – like Monash, Parkville/Carlton and Fisherman's Bend.

[20] https://rac.com.au/about-rac/advocating-change/initiatives/automated-vehicle-program (Accessed 3 February 2020)

Recommendation II: Victorian Government to establish one or several AI Precincts in Australia as a mechanism to test, develop, promote and showcase the use of AI in more innovative, yet to be commercialised, settings focusing on the physical environment.

Recommendation mm: Victorian Government to invest further in incubators, accelerators, events and co-working spaces to provide an environment where expertise can be shared, cultivating a culture of collaboration which is the key for Australia's digital growth.

b) Scale-up AI-driven businesses

Availability of early finance is a key enabler for commercialisation of AI. Further, innovation funding could initially be targeted to public or private organisations promoting initiatives within Australia's AI focus arenas - towns and infrastructure, natural resources and environment and health, ageing and disability. The government should design specific funding streams for this program based on Australia's need, with every stream having its own set of objectives.

Recommendation nn: Commonwealth (and/or Victorian Government) to establish an Innovation Fund – or reprioritise existing grant programs – to target projects which accelerate AI development. This could include dedicating a proportion of existing funding streams such as: Australian Research Council (ARC), National Health and Medical Research Council (NHMRC) and Innovations Connections program funding.

c) Feasibility study on an AI Precinct

The reasons for an AI Precinct being useful are outlined in Section 4C and include its ability to operate as a virtual hub for the innovation precincts across Victoria, as well as a physical space where piloting and testing can be conducted.

The need to develop smart cities necessarily requires piloting of new AI technology at a sufficient scale - Fisherman's Bend as a new development area might allow for incorporation of new AI technology into developments as well as pilot programs. Some reasons that Fisherman's Bend might be a good opportunity to act as a central AI Precinct include the following considerations:

- Given that it is in development, it means that infrastructure, housing and other development in the area can incorporate new, embedded technologies that can be trialled in a contained environment.

- The area is a mixed-use of commercial (including Port of Melbourne freight), housing, academic, entertainment and cultural spaces. The interactivity of technologies in a mixed-use context can also be trialled.

- The area is also one of the largest precinct developments in the world, and therefore could lead the way globally for trialling AI technologies. Blueprints could feasibly be developed for suitable implementation of AI in the physical contexts that can be scaled globally.

- Fisherman's Bend's close proximity to Melbourne's CBD should make it an attractive place for overseas investment and attraction of skills.

- It provides an opportunity to build a world-class area specifically designed for interdisciplinary collaboration (see Section 5G(d)).

This precinct would need to have a plan for development which would then provide the certainty for private investment into the area. It may therefore offer specific incentives (e.g. financial and other kinds) for R&D and investment from the private sector into the precinct. It would also be important to ensure a talent pool is encouraged into the area and across Victoria, and therefore incentives for attracting and retaining AI talent into the area (e.g. taxation, financial, training etc) might also be considered. It might also house **the NCAIEI – making Victoria the leading centre for AI in Australia.**

Recommendation oo: Victorian Government to develop a **feasibility study on an AI Precinct(s)** and to consider the location, timing and how to establish this Precinct, with the understanding that different precincts offer different, unique opportunities to learn.

d) Fostering and enabling interdisciplinary collaboration

The most innovative solutions typically emerge when multiple industries or disciplines are combined or come together. While such collaboration can be serendipitous, this serendipity can, and arguably should, also be engineered – at any and all scales possible.

At the small end, initiatives fostering such collaboration can include events and workshops, inviting a wide range of participants and drawing on Melbourne's diverse skillset, integrating the expertise of other disciplines already well presented in the city. At the large end, the development of an AI Precinct could act as a significant catalyst; at best, it could provide for the development of AI-enhanced future societies, the equivalent of the Francis Crick Institute (a renowned biomedical research facility in London, purpose-built to foster interdisciplinary collaboration), albeit such an ambitious a goal would require significant funding.

Recommendation pp: Victorian Government to develop an AI Precinct with cross-industry and interdisciplinary collaboration as a design guideline.

e) Promote necessary culture changes

While the birthplace of many significant innovations, Australia is known globally for its risk-averse nature rather than risk-taking. This ingrained cultural feature, while appropriate in some domains, holds the country back from adopting and developing many cutting-edge technologies and solutions. The government has a role to play in shaping the culture towards one where entrepreneurship and appropriate measured risk-taking in general is not only accepted but celebrated.

About Committee for Melbourne

The Committee is an apolitical, not-for-profit, member-based entity that brings together over 150 organisations from greater Melbourne's business, academic and civic sectors, who share a common vision to make Melbourne a better place to live, work and do business.

As an independent organisation we represent no single interest group or political position but seek to challenge conventional thinking and to develop innovative ideas to continue to enhance our position as an economically prosperous and highly liveable global city.

We would like to thank Committee members for their helpful comments and contributions.

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