

Artificial intelligence in communications and media

Discussion paper

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Executive summary

We are currently within a period of disruptive technological change—the transition from conventional computing to ‘artificial intelligence’ (AI).

Already, forms of ‘narrow’ AI technologies, which complete specific tasks, have become embedded into Australians’ lives through popular products and services provided by global technology giants such as Google, Facebook, Amazon and Netflix. AI is organising social media feeds, enabling virtual assistants to understand and respond to our questions and commands, and recommending what we might want to watch or buy next.

The automated decision-making and predictive capabilities of AI offer a variety of benefits to industry, the public sector and individuals. These include opportunities for organisations to boost productivity and efficiency through the automation of repetitive tasks or integration of AI into work activities. Managed strategically, applications of AI can enable organisations to enhance the quality of services and engagement with individuals. AI is also being applied to address complex national and globally shared challenges across a range of disciplines including, for example, in health and energy.

However, there is a tension between the benefits of AI and concerns about the potential risks. As AI technologies are increasingly used by communications and media businesses, it is important that we, as the sector regulator, have a clear understanding of how AI will be used and its potential impacts.

Recognising this, the Australian Communications and Media Authority (ACMA) is undertaking work to more fully understand the regulatory implications of AI within the communications and media sector.

We have developed this paper to initiate a discussion with Australian industry and the community about AI within the sector. This forms part of our work, as outlined in our corporate plan,¹ to research and analyse the evolving communications and media environment. This enables us to identify potential regulatory pressure points and effectively minimise harms within our remit.

Where technologies such as AI challenge the regulatory framework we oversee, we will consider how the framework can be adapted to ensure it continues to be fit-for-purpose and delivers on public policy objectives.

The paper consists of three parts:

- > **Part 1** provides background on AI and examples of AI applications across the communications and media sector.
- > **Part 2** maps potential regulatory pressures resulting from AI applications within the communications and media sector. This includes discussion on accommodating AI within the existing regulatory framework, new risks that may appear, and a discussion of the ethical challenges relevant across industry.

¹ ACMA, [Corporate plan 2019–20](#), 2018.

- > **Part 3** outlines, at a high level, key components of regulatory practice to enable beneficial outcomes in an AI-enabled environment.

Your comments and feedback on the consultation questions are valuable to us. We see this consultation as an opportunity to gain a better understanding of AI applications across the communications and media sector, and how their use may change the regulatory environment.

Feedback received on this paper will inform the development of a public-facing consultation paper in 2020. This public-facing paper will seek further feedback on the potential regulatory pressure points resulting from AI applications across the sector.

The regulatory environment for AI technologies is evolving.

The ACMA acknowledges that the national discussion about AI and regulation is ongoing. Australia is among several countries that are progressing regulatory responses to AI, both at a national level and collaboratively through intergovernmental organisations. As AI technologies are developed and deployed, community standards and expectations may also change, or new expectations may arise, and these may further influence regulatory developments and approaches.

The ACMA will continue to monitor and analyse developments in technology and regulation in order to identify regulatory pressure points within our remit and advise government as needed. As a part of this work, there may be a need for the ACMA to consult further with its industry and consumer stakeholders on the regulatory settings for AI technologies within the sector.

Issues for comment

The ACMA invites comments on the issues set out in this paper:

1. Are there types of AI applications not represented in Figure 2, including those that may sit outside the communications stack model, that are significant to the communications and media sector and its consumers?
2. Which AI applications are currently having a significant impact on the communications and media industry and its consumers, or will have a significant impact over the next five years?
3. What are the greatest advantages, to both businesses and consumers, of using AI within the communications and media sector over the next five years?
4. Building on the discussion in Part 2 of this paper, are there any other potential regulatory pressures or challenges that have not been mentioned?
5. Are there any new areas of consumer vulnerability that could result from the use of AI applications within the communications and media sector?
6. Have you identified regulatory barriers to enabling AI innovations which, if removed, could benefit the communications and media sector and its consumers?
7. How are ethical concerns about AI being addressed in practice within the communications and media sector? What frameworks, practices, and processes are in place or being developed?
8. What business practices and processes would build and maintain consumer confidence in the ethical design and use of AI within the communications and media sector?
9. Is there a role the ACMA could play in enabling ethical AI innovation or use in the communications and media sector?
10. Do you see a need for sector-specific regulation to address the risks of AI applications within the communications and media sector? If so, where would sector-specific regulation be valuable?

Key terms

The following is a non-exhaustive list of key terms that provide some background on how artificial intelligence (AI) technologies are built.

Algorithm

A process or set of rules in calculations or other problem-solving operations.²

Artificial intelligence

A collection of interrelated technologies used to solve problems autonomously and perform tasks to achieve defined objectives without explicit guidance from a human being.³

Deep learning

The process of machine learning using deep neural networks.

Deep neural network

A neural network that has multiple layers of neurons.⁴ The results of the first layer feed into the second layer, and so on.

Machine learning

A subset of AI, machine learning is the ability for a computer to perform tasks without being given explicit instructions on how. Instead, the machine ‘learns’ how to perform those tasks by finding patterns and making inferences.⁵

There are different methods for training machine learning technologies. These include, for example, supervised learning, unsupervised learning, semi-supervised learning and reinforcement learning.⁶

Model

The part of a machine learning system that learns how to perform tasks by making predictions or decisions.⁷

Neural network or ‘artificial neural network’

This describes a common way of performing machine learning, which is inspired by the neural network of the brain. A neural network is made up of sets of algorithms, called ‘neurons’. Each of these neurons helps perform a part of a larger task. Neurons have connections to other neurons (called ‘edges’) with varying strengths (called ‘weights’) that adjust as learning takes place.⁸

Training data

The data used to train and develop AI technologies.⁹

² Lexico, [algorithm](#), accessed 18 September 2019.

³ D. Dawson and E. Schleiger, J., J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft, and S. Hajkowicz, [Artificial Intelligence: Australia’s Ethics Framework](#), Data61 CSIRO, 2019, p.14.

⁴ *ibid.* Office of the Victorian Information Commissioner, [Closer to the machine: Technical, social, and legal aspects of AI](#), p.5.

⁵ *ibid.*, p.3.

⁶ *ibid.*, p.4-5.

⁷ *ibid.*, p.3.

⁸ *ibid.*, p.4.

⁹ *ibid.*, p.3.

Part 1: Introduction

Artificial intelligence (AI) is already embedded in many of our lives. It enables smartphones and smart devices to answer our questions, brings up relevant search results and recommendations for products and services, and enables vehicles to drive autonomously. Across industries, AI has been applied to increase efficiency through automation and provide useful insights from data.

In recent years, the convergence of three technology trends has propelled research and development in AI forward: an explosion in the amount of data we create (the emergence of 'big data'), a step-change in computing power and capacity, and progress in the design and development of the algorithms on which AI technologies are built.¹⁰

Developments in AI and consumer-grade applications are led by a handful of large, global companies primarily based in the United States and China. This includes, for example, Google and Baidu.¹¹ However, the barrier to entering the AI marketplace appears to be lowering. Open-source tools and the provision of cloud-based AI services are enabling more widespread application of AI technologies.¹² Over the next few years, AI is expected to become a general-purpose technology, fulfilling a wide range of tasks across the economy.¹³

Deloitte Global has predicted that by 2020, 87% of companies that use AI software will use enterprise software with integrated AI, and 83% will use cloud-based AI platforms.¹⁴

Governments internationally are investigating approaches that could help realise the benefits of AI.¹⁵ Having recognised the potential economic value of AI,¹⁶ several governments have taken steps to support research and development. As with previous developments in technology, there is also the need to scrutinise how the requirements and consumer protections of existing regulation will apply to AI and whether new risks could emerge.

One key area of focus is how AI will align with ethical expectations. This reflects the unique qualities of AI technologies, in particular those built using machine learning and deep learning techniques. While these technologies may help inform or make decisions that impact people, how they use data to reach a conclusion may be unclear. AI technologies designed to learn over time may also eventually operate in a way that its developers had not anticipated. These point to practical challenges for ensuring that AI systems and the organisational arrangements around them meet a range of expectations—including for fairness, transparency, accountability and privacy.

Australia has recently released ethical principles for AI and is working with industry to build tools to support AI development and adoption.¹⁷ Similar work has been

¹⁰ Jacques Bughin, Jeongmin Seong, James Manyika, Michael Chui, Raoul Joshi, [Notes from the AI Frontier: Modeling the Impact of AI on the World Economy](#), McKinsey & Company, 2018, p.5-6.

¹¹ Australian Computer Society, [Artificial Intelligence: A Starter Guide to the Future of Business](#), 2018, p.44.

¹² *Ibid.*, p.49.

¹³ Organisation for Economic Co-operation and Development, [Artificial Intelligence in Society](#), 2019, p.35.

¹⁴ Deloitte, [Technology, media and Telecommunications Predictions 2019](#), 2018, p.14.

¹⁵ Forbes, [Wrestling with AI Governance Around the World](#), 27 March 2019.

¹⁶ PwC, [Sizing the prize](#), 2017, accessed 15 October 2019.

¹⁷ D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019.

progressed by other countries, the European Union¹⁸ and through intergovernmental organisations.¹⁹ Ethical principles and guidelines to date are generally non-binding or voluntary and designed to apply broadly across industries. They provide important direction to all organisations about how AI can be developed and used to meet legal obligations, align with broader ethical expectations, and in doing so build trust and confidence in the use of AI. They complement, and build on, existing regulatory frameworks including industry-specific requirements.

This paper has been developed to focus discussion on AI and the regulatory framework applying to the communications and media sector. As AI technologies are anticipated to become pervasive across the sector, it is important to consider how the regulatory framework may come under pressure and whether any regulatory gaps will emerge. Identifying and addressing these with the right regulatory mix—whether that involves change to regulatory arrangements or additional guidance from us on how existing requirements apply—is an important part of enabling the potential benefits of AI.

Scope of this paper

This paper explores the impacts of AI within the frame of the ACMA's regulatory remit and the public policy objectives within that remit.

The paper first looks at how AI will be used across the communications and media sector. This includes looking at AI applications across a range of economic and social activities (see Figure 2, page 10). The potential pressures these applications may place on regulatory arrangements is then discussed.

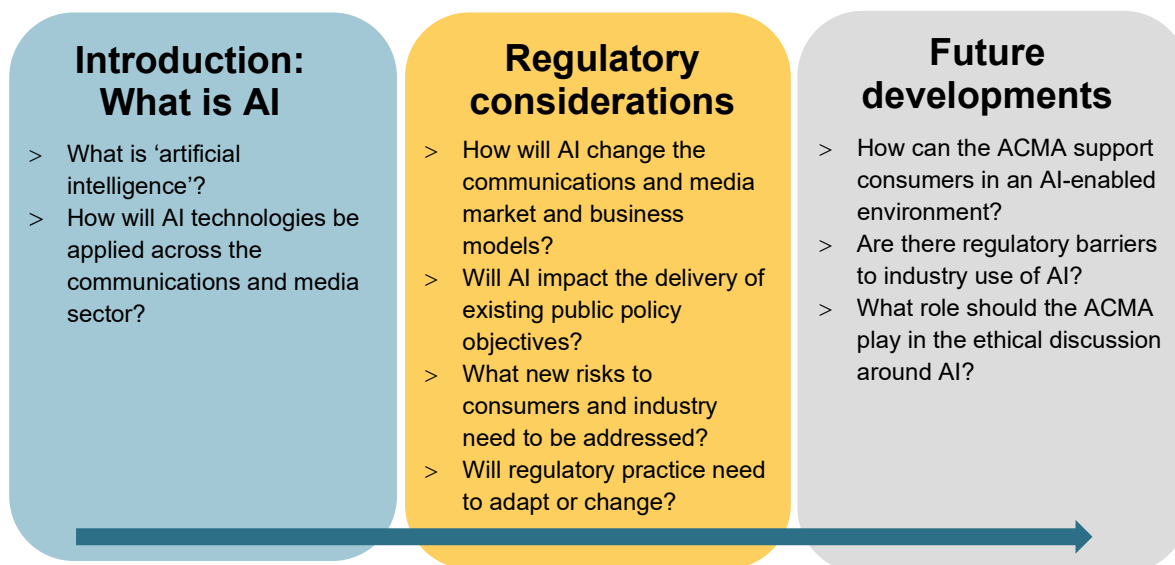
The regulatory framework overseen by the ACMA operates alongside other regulatory frameworks to deliver outcomes for industry and Australia citizens. This includes, for example, regulation protecting the interests of consumers, competition and individual privacy. In this paper, we have taken a broad view of the potential pressures and public concerns that may arise from AI that could have implications for our regulatory remit. We recognise, however, that some of the issues discussed are also relevant across other regulatory jurisdictions.

We have developed this paper to initiate a discussion with industry, consumers and interest groups about the anticipated impacts of AI and the roles of regulation in minimising harm and enabling the benefits of technology.

¹⁸ European Commission, [Ethics Guidelines for Trustworthy AI](#), accessed 18 September 2019.

¹⁹ Organisation for Economic Co-operation and Development, [Recommendation of the Council on Artificial Intelligence](#), 22 May 2019; G20, [G20 Osaka Leaders' Declaration](#), Ministry of Foreign Affairs of Japan, 2019.

Figure 1: Scope of this paper



What is out of scope

AI technologies are expected to become integrated across a wide range of industries globally, from healthcare to retail, agriculture, financial services and communications and media. Consequently, AI may result in new pressure points across regulatory frameworks overseen by different regulators. Pressures not related to the ACMA's remit are not explored in this paper. However, we continue to monitor the potential challenges of AI across industries to anticipate potential pressures within our remit.

Defining artificial intelligence

'AI is one of the most important things humanity is working on. It is more profound than, I don't know, electricity or fire.'—Sundar Pichai, CEO, Google.²⁰

The term 'AI' was coined in 1956 to describe an area of research focussed on developing machines that could simulate intelligence.²¹ Today, AI is a multifaceted field that has developed machines capable of imitating various cognitive tasks, including learning, reasoning, problem-solving, understanding language and pattern recognition.

This progress has occurred without a universal, concrete definition that frames which technologies could be considered AI. The historical problem of defining AI stems largely from dispute over what constitutes 'intelligence'. It has become a phenomenon that when a computational system achieves intelligent behaviour, it is met by critics that argue it is not 'real' intelligence.²²

The Australian Government has put forward the following definition, where AI is:²³ 'a collection of interrelated technologies used to solve problems autonomously and

²⁰ MSNBC, [Google CEO Sundar Pichai on A.I. being more important technology than electricity](#), accessed 2 May 2019.

²¹ John McCarthy, Marvin L. Minsky, Nathaniel Rochester, Claude E. Shannon, *A proposal for the Dartmouth Summer Research Project on Artificial Intelligence, August 31 1955*, *AI Magazine*, Vol 27 No.4: Winter 2006, Association for the Advancement of Artificial Intelligence, December 2006, p.12.

²² Katherine Bailey, [Reframing the "AI Effect"](#), Medium, accessed 18 September 2019.

²³ D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019, p.14.

perform tasks to achieve defined objectives without explicit guidance from a human being’.

This is a broad definition covering a range of technologies. It encompasses AI that is developed using neural networks and less sophisticated technologies, such as automated decision systems.²⁴

Categories of artificial intelligence

Broadly, AI technologies can be viewed as belonging to either of two conceptual groups— ‘narrow’ or ‘weak’ AI, and ‘general’ or ‘strong’ AI.²⁵

AI technologies today are considered ‘narrow’ because they can only be used to solve narrow problems or complete specific tasks. There are a broad range of AI applications that fall within this category, some of which appear more complex than others in their operation. For example, email spam filters and self-driving cars (also known as ‘automated vehicles’) are both examples of narrow AI in action.

General AI would be capable of general decision-making and automation outside of narrow specialties. It would demonstrate a range of cognitive abilities and perform a variety of tasks as well as, or better than, humans. General AI has yet to be developed and is not anticipated for several decades. Ray Kurzweil, futurist and director of engineering at Google, has predicted computers passing human levels of intelligence around 2045.²⁶ Other experts have predicted this will occur much later.

This paper focuses on the increased development and implementation of narrow AI technologies. These technologies are increasingly prolific and are anticipated to become even more integrated across the communications and media sector in the coming decade.

AI in the communications and media sector

Across industry, businesses are increasingly looking to AI as a means of achieving key business drivers, including productivity and efficiency gains. Businesses across the communications and media sector have various opportunities to automate activities, increase their efficiency and subsequently lower their operating expenses through AI. AI also promises to increase productivity by ‘augmenting’ how activities are completed, assisting and building on human analytical capabilities.²⁷

One market intelligence organisation identified 258 discrete AI use cases in the global market in late 2018.²⁸ In this context, there are potentially a multitude of ways that AI will intersect with the communications and media market.

AI in practice: Contextual ad placement for broadcast television

Seven West Media has announced its partnership with Amazon Web Services to bring an AI-powered contextual ad placement service called 7CAP to its broadcast network.

²⁴ *ibid.*

²⁵ Future Today Institute, [2018 Tech Trends Report](#), 2018, p.48; Centre for Public Impact, [Destination unknown: Exploring the impact of Artificial Intelligence on Government Working Paper](#), 2017, p.5.

²⁶ Office of the Victorian Information Commissioner, [Closer to the machine: Technical, social, and legal aspects of AI](#), p.16.

²⁷ Nitin Mittal, David Kuder, Samir Hans, [AI-fueled organisations: Reaching AI's full potential in the enterprise](#), Deloitte, January 2019, accessed 2 May 2019.

²⁸ Tractica, 2018, [Artificial Intelligence Deployments Have Expanded to Include 258 Unique Use Cases Across Enterprise, Consumer, and Government Markets](#), December 2018, last accessed 20 March 2019.

Through 7CAP, AI is used to analyse and code all Seven programming, identifying objects, environments and moods within the content. This enables brands to align with the moments within programs that are of greatest relevance to them. Seven West Media said that ‘using 7CAP, ad recall is doubled and brand awareness is significantly boosted. With 7CAP the effectiveness of digital targeting arrives to broadcast’.²⁹

Figure 2 below illustrates the current breadth of AI applications across the communications and media sector. It also highlights that applications of AI can enhance existing practices and processes as well as enable new service types, products or technologies.

Figure 2 is based on a conceptual model developed by the ACMA, which describes the communications and media sector as a four-layered stack of services and activities. This model reflects the areas where regulation may be targeted to achieve public policy objectives.³⁰

The four layers of this ‘communications stack’ are:³¹

- > **Applications/content layer**—this includes content delivered on subscription and free-to-air digital television or applications (such as Netflix and iView). This layer also includes software applications or platforms that support additional functions, such as the ability to make voice and video calls (for example, Skype or Facebook Messenger).
- > **Devices layer**—devices that enable access to communications networks. Examples include televisions, radios, mobile phone and tablets.
- > **Transport layer**—this layer provides the intelligence needed to support applications and functionality over the network. Technical standards also enable interoperability and any-to-any connectivity between different networks.
- > **Infrastructure layer**—includes passive infrastructure and electromagnetic mediums that support the transmission of raw bit streams over a physical medium.

As an example of regulation across these layers, the ACMA’s remit provides for a range of consumer safeguards. This includes redress and complaint mechanisms about broadcast content (which falls within the applications/content layer), unsolicited communications (also the applications/content layer), and carriage services (the transport layer).

This model reflects a shift away from thinking of the sector as consisting of well-defined industry silos—telecommunications, broadcasting and online. The distinctions between these industries have become increasingly blurred, with rapid change in the business models used over the past two decades. Within this model, each layer in the stack provides services to the layer above and concurrently depends on the layers below. The layers are not always clearly distinguishable because they are deeply interconnected.

²⁹ Seven West Media, [Seven Delivers for Partners in 2020](#), 23 October 2019, p.5.

³⁰ The 2016 *Review of the Australian Communications and Media Authority* identified eight ‘enduring policy concepts’, which are public policy objectives that are likely to remain relevant to the communications sector regardless of future changes in the market, society and technology and where regulation is likely to have an ongoing role. The Department of Communications and the Arts, [Review of the Australian Communications and Media Authority Final Report](#), 2016, p.86.

³¹ *Ibid.*, p.8.

Figure 2: Examples of AI applications across the communications stack

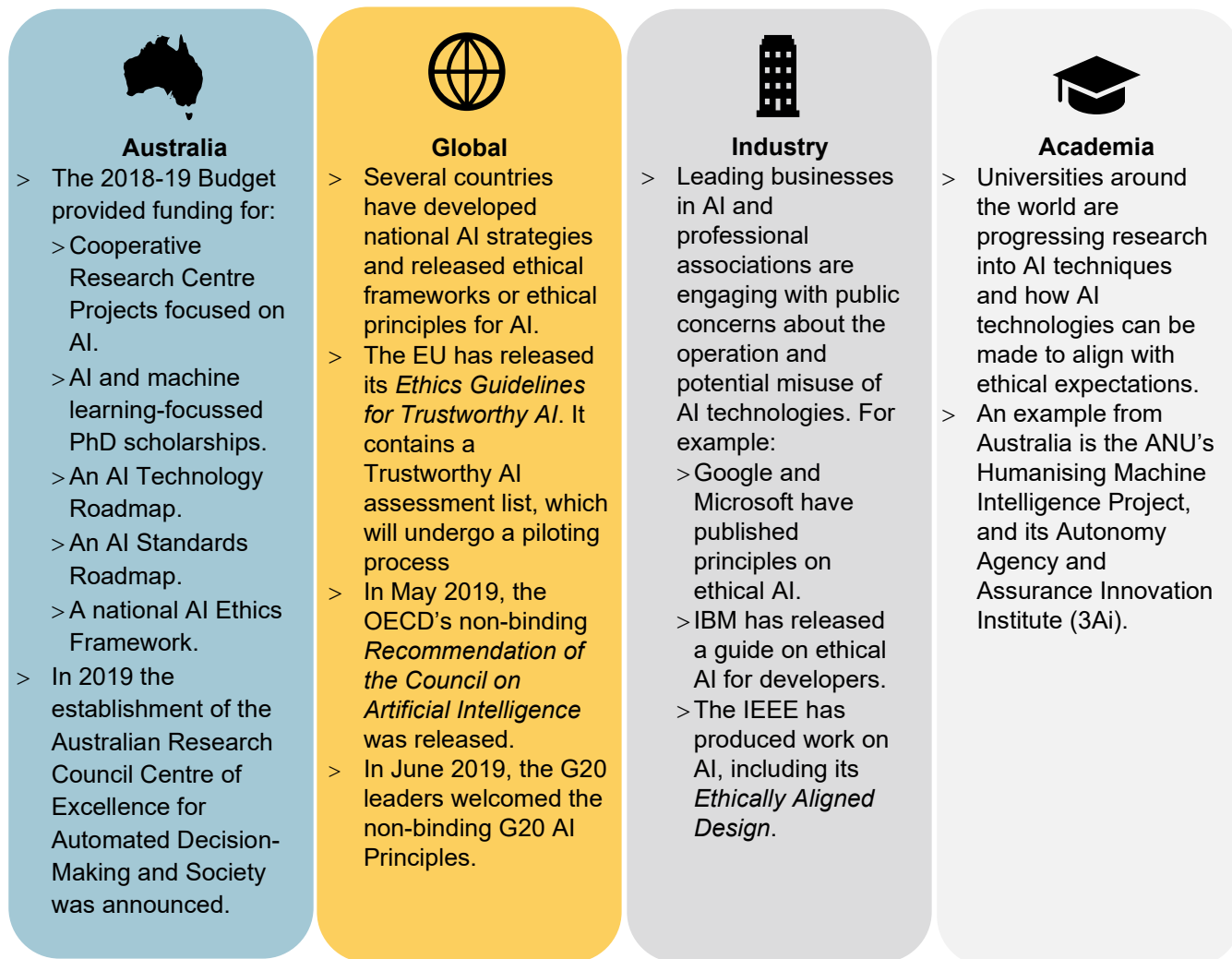
Applications/ content layer	<ul style="list-style-type: none"> > Personalised content or product recommendations/subscriptions/social media feeds. > Automated content management (e.g. captioning, metadata tagging). > Automated news production. > Spam detection. 	<ul style="list-style-type: none"> > Virtual customer service agents and 'chatbots'. > Language translation. > Automated content production (e.g. highlight reels). > Automated detection/removal of harmful content. > Virtual assistants (e.g. Siri).
Devices layer	<ul style="list-style-type: none"> > Facial/voice/object recognition in smartphones. 	<ul style="list-style-type: none"> > Internet of Things (IoT) devices (e.g. Amazon's Alexa and Google Home).
Transport layer	<ul style="list-style-type: none"> > Detection and diagnosis of anomalies in network operations or service-level agreement breaches in real time and the recommendation of solutions. 	<ul style="list-style-type: none"> > Automated network management (e.g. dynamic 5G network slicing) and optimisation of network performance.
Infrastructure layer	<ul style="list-style-type: none"> > Predictive maintenance, enabling providers to proactively identify and address likely equipment failures. 	<ul style="list-style-type: none"> > Assist in network capacity planning.

Developments in regulatory approaches to AI

Since 2017, numerous governments have released nationally focussed AI strategies or plans. This includes China, the United Kingdom (UK), France, Germany, Finland, Canada, Japan, South Korea, India, and Singapore.³² AI strategies vary in their focus areas, but broadly speaking, key priorities include enabling AI development, such as through scientific research, talent and skill development, private-sector adoption of AI, and increased data sharing. There has also been a shared focus across several strategies on the ethical development and use of AI technologies.

³² Tim Dutton, [An Overview of National AI Strategies](#), Medium, June 2018, accessed 2 May 2019.

Figure 3: Developments in the regulatory environment for artificial intelligence



In October 2019, the Australian Government announced \$31.8 million in funding to establish the Australian Research Council (ARC) Centre of Excellence for Automated Decision-Making and Society, based at RMIT University.³³ Researchers from RMIT, experts from seven Australian universities, and 22 academic and industry partner organisations together provide an additional \$39.3 million in funding and in-kind support for the Centre. 'Automated decision making' refers to the process where machines make decisions without human involvement, which includes decisions made by AI technologies. The Centre's research will 'formulate world-leading policy and practice, inform public debate, and train researchers and practitioners'.³⁴

The Australian Government previously provided \$29.9 million over four years in the 2018-19 Budget to strengthen AI and machine learning capabilities. This included funding for Cooperative Research Centre (CRC) projects focused on AI. CRC projects are industry-led collaborative research projects with research organisations. The government's funding also provided for AI and machine learning-focussed PhD

³³ Minister for the Department of Education, [Improving automated decision making](#), 9 October 2019.

³⁴ *ibid.*

scholarships, and the development of a Technology Roadmap, AI Standards Roadmap and a national AI Ethics Framework.³⁵

The Department of Industry, Innovation and Science (DIIS) recently undertook consultation on the AI Ethics Framework discussion paper (AI Ethics discussion paper)³⁶ and has subsequently released an updated set of AI ethics principles.³⁷ Standards Australia is consulting on how standards and related material can support AI in Australia as a first step to delivering an AI Standards Roadmap.³⁸ Relatedly, the Australian Human Rights Commission (AHRC) is also conducting a project on human rights and technology.³⁹

Several other countries have also developed, or are developing, regulatory frameworks or principles to address ethical concerns for AI. This includes China,⁴⁰ Japan,⁴¹ Singapore,⁴² Canada⁴³ and the United Kingdom.⁴⁴

The ethical issues of AI have also recently been a focus for intergovernmental organisations. Australia was one of 42 countries to formally endorse the Organisation for Economic Co-operation and Development's (OECD's) non-binding *Recommendation of the Council on Artificial Intelligence* in May 2019.⁴⁵ In June 2019, the G20 leaders welcomed the non-binding G20 AI Principles, which are drawn from the OECD's Recommendation.⁴⁶

The European Commission High-Level Expert Group on Artificial Intelligence (AI HLEG) has released its *Ethics Guidelines for Trustworthy AI*.⁴⁷ These guidelines put forward a human-centric approach on AI, where AI is used to serve humanity and with the goal of improving human welfare and freedom. Seven key requirements that AI should meet are outlined alongside a non-exhaustive Trustworthy AI assessment list, which the AI HLEG is testing through a piloting process between June and December 2019.

Meanwhile, leading businesses in AI and professional associations are also engaging with public concerns about the operation and potential misuse of AI technologies. For example, both Google⁴⁸ and Microsoft⁴⁹ have published principles on ethical AI. Google has published its *Perspectives on Issues in AI Governance* white paper, which identifies issues where government may provide guidance.⁵⁰ IBM has released material including a guide on ethical AI for developers.⁵¹ The Institute of Electrical and Electronics Engineers (IEEE), a professional membership and standards body, has

³⁵ Commonwealth of Australia, [Budget 2018-19: Budget Measures Budget Paper No.2 2018-19](#), p.151-152.

³⁶ D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019.

³⁷ Department of Industry, Innovation and Science, [Artificial intelligence](#), accessed 7 November 2019.

³⁸ Standards Australia, [Developing Standards for Artificial Intelligence: Hearing Australia's Voice — Discussion Paper June 2019](#), June 2019.

³⁹ Australian Human Rights Commission, [Human Rights and Technology](#), accessed 15 July 2019

⁴⁰ Beijing Academy of Artificial Intelligence, [Beijing AI Principles](#), 28 May 2019.

⁴¹ Japanese Society for Artificial Intelligence, [About the Japanese Society for Artificial Intelligence Ethics Guidelines](#), 28 February 2017.

⁴² Infocomm Media Development Authority and Personal Data Protection Commission Singapore, [A Proposed Model AI Governance Framework](#), 29 June 2019.

⁴³ Government of Canada, [Responsible use of artificial intelligence \(AI\)](#), accessed 18 September 2019

⁴⁴ GOV.UK, [Centre for Data Ethics and Innovation](#), accessed 28 October 2019.

⁴⁵ Organisation for Economic Co-operation and Development, [Recommendation of the Council on Artificial Intelligence](#), 22 May 2019.

⁴⁶ G20, [G20 Osaka Leaders' Declaration](#), Ministry of Foreign Affairs of Japan, 2019.

⁴⁷ European Commission, [Ethics Guidelines for Trustworthy AI](#), accessed 18 September 2019.

⁴⁸ Sundar Pichai, [AI at Google: our principles](#), June 2018, accessed 2 May 2019

⁴⁹ Microsoft, [Microsoft AI principles](#), accessed 2 May 2019.

⁵⁰ Google, [Perspectives on Issues in AI Governance](#), 2019.

⁵¹ IBM Corporation, [Everyday Ethics for Artificial Intelligence](#), September 2018.

produced work on AI.⁵² There is research and development also taking place that is focused on aligning the technical operation of AI with ethical and moral principles.⁵³

Ethical frameworks and principles, as well as potential standards for AI, complement and build on existing regulatory requirements at state, federal and international levels. In many instances, regulatory requirements have been designed to apply to practices, processes or activities without specifying the technologies involved. As a result, a raft of legislative and other regulatory requirements, including those surrounding privacy, discrimination, competition, consumer protection and regulation within the ACMA's remit will continue to guide industry actions as AI is further developed and used.

There may be instances where regulation needs to be amended to meet the needs of industry and consumers in an AI environment. This would be the case where regulation becomes outdated or is otherwise no longer delivering on the public policy objectives it is intended to achieve. There may also be regulatory gaps that appear and need to be addressed to mitigate new risks.

Australian regulators, including the ACMA, monitor and analyse these types of pressures on regulatory frameworks to identify when change is necessary. The ACMA continues to track developments in AI technologies and regulatory responses in order to assess the implications for the communications and media sector and delivery of public policy objectives within existing regulation.

Questions

1. Are there types of AI applications not represented in Figure 2, including those that may sit outside the communications stack model, that are significant to the communications and media sector and its consumers?
2. Which AI applications are currently having a significant impact on the communications and media industry and its consumers, or will have a significant impact over the next five years?
3. What are the greatest advantages, to both businesses and consumers, of using AI within the communications and media sector over the next five years?

⁵² IEEE, [The IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems](#), accessed 18 September 2019.

⁵³ See for example the Australian National University [Humanising Machine Intelligence project](#), accessed 18 September 2019.

Part 2: Regulatory framework considerations

One of the key questions for regulators looking at AI is a familiar one: how can regulation enable the benefits of AI while also appropriately mitigating risk? This question is asked whenever new technologies that have the potential to reshape business models, organisational practices or the market emerge.

The analysis below explores where industry applications of AI may place pressure on regulatory arrangements for the communications and media sector. This includes exploration of how AI applications will intersect with existing regulatory settings. It also looks at new potential risks resulting from the changes AI is anticipated to bring to business practices, services and products.

Ongoing monitoring of the risk environment and the application of regulation is essential to ensuring regulatory settings remain fit-for-purpose, with appropriate compliance and enforcement mechanisms in place. Where we identify pressures to existing regulation that result in risks, including potential harm to consumers, we will consider how the framework we administer can be adapted to ensure it continues to deliver on public policy objectives.

As research and development progresses, new and more enhanced AI applications will appear. These developments may result in community expectations around AI changing over time, or the emergence of additional regulatory pressure points to those reflected below.

AI in practice: AI and internet safety

In 2019 the eSafety Commissioner signed on to a pilot with Project Arachnid, a technology platform based at the Canadian Centre for Child Protection.

Project Arachnid autonomously detects child sexual abuse material (CSAM) by crawling URLs and comparing the media displayed to a database of known signatures that have been assessed by analysts. If CSAM is detected, a notice is sent to the hosting provider requesting its removal.

Since its establishment in 2016, Project Arachnid had sent more than 4.5 million notices to providers.

Pressures within the communications and media regulatory framework

Technical standardisation

ACMA technical standards made under the *Telecommunications Act 1997*⁵⁴ and the *Radiocommunications Act 1992*⁵⁵ are focused on ensuring compliance with physical safety and certain operational requirements.

⁵⁴ [Telecommunications Act 1997](#), Volume 1, Part 21, Division 3, s376.

⁵⁵ [Radiocommunications Act 1992](#), Chapter 4, Part 4.1, Division 3, s162.

The ACMA is aware of a range of work exploring the potential need for greater certainty and interoperability in AI technologies.

Recognising the importance of machine learning to future telecommunications networks,⁵⁶ the International Telecommunication Union (ITU) established the Focus Group on Machine Learning for Future Networks including 5G in 2017. This Group is analysing the need for standardised formats for machine learning in areas such as the training and exchange of machine learning algorithms, and to ensure algorithms correctly interact with each other and fulfil certain security and personal information protection requirements.⁵⁷

Another example of cooperation on the development of standards can be observed in the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) Joint Technical Committee 1 (JTC 1), which created Subcommittee 42—Artificial Intelligence (SC 42) in 2017.⁵⁸ SC 42 has various standards under development, focussed on areas including terminology, big data reference architecture and risk management. In 2018, Standards Australia formed a mirror committee to JTC 1/SC 42, to ‘provide an Australian voice and vote on matters concerning JTC 1/SC 42, enabling Australia to play a role in setting global standards concerning AI’.⁵⁹

Standards Australia has consulted on how standards and related material, such as technical specifications, can support AI in Australia.⁶⁰ Feedback from this consultation will inform the Standards Australia Artificial Intelligence Roadmap Report, which is expected to be delivered to the Australian Government in 2019.

The ACMA anticipates that, similar to the introduction of new technologies in the past, the common interest among industry participants to cooperate in developing technical standards will mean that the creation of standards relating to AI will largely be led by industry.

Changes to the content and news market

Content requirements within the Australian communications and media regulatory framework are designed to support a number of public policy objectives. This includes the protection of children from inappropriate material (through the classification scheme), accessibility for the hearing-impaired through broadcast captioning requirements, access to a diverse range of broadcasting services, and the accuracy and fairness of broadcast news.

In recent years, the growing role and influence of over-the-top (OTT) services⁶¹ and digital platforms in the market has called into question whether the regulatory arrangements for content producers and distributors in Australia are fit-for-purpose. The Australian Competition and Consumer Commission (ACCC) acknowledged the regulatory imbalance between legacy media organisations (i.e. broadcast and print

⁵⁶ Machine learning can enable information and communications technology networks and their components to operate autonomously to achieve goals in efficiency, security, and optimising user experience.

⁵⁷ International Telecommunication Union, [Focus Group on Machine Learning for Future Networks including 5G](#), accessed 2 May 2019.

⁵⁸ International Organization for Standardization, [ISO/IEC JTC 1/SC 42 Artificial intelligence](#), accessed 17 July 2019.

⁵⁹ Standards Australia, [Developing Standards for Artificial Intelligence: Hearing Australia's Voice — Discussion Paper June 2019](#), June 2019, p.15.

⁶⁰ Standards Australia, [Developing Standards for Artificial Intelligence: Hearing Australia's Voice — Discussion Paper June 2019](#), June 2019.

⁶¹ Over-the-top (OTT) services are delivered over another carriage service. Common examples of OTT services are Facebook, Skype, Netflix and YouTube.

organisations) and digital platforms in its Digital Platforms Inquiry Final Report.⁶² It notes that ‘despite digital platforms increasingly performing similar functions to media businesses, virtually no media regulation applies to digital platforms in comparison with some other media business’.⁶³

Recognising this ongoing discussion about regulation and digital platforms, the below section considers the impacts of AI applications involved in content production and distribution broadly.

AI in practice: AI and news

Reporters and Data and Robots (RADAR), a partnership between the UK Press Association and the tech-driven start up Urbs Media, was established in 2018.⁶⁴

It uses natural language generation (NLG) technology to help reporters produce thousands of localised news stories from open data sets.⁶⁵ In the first 12 months of its operation, six reporters filed 180,000 articles for news outlets across the UK.⁶⁶ This demonstrates how AI could be used to increase the amount of local news produced.

Personalised content delivery

A key offering of AI for businesses is generating greater value in marketing and sales operations through personalised offerings.⁶⁷

Personalisation is a feature of digital platforms such as Facebook and Google, which serve content or advertisements based on user interests. Popular OTT services such as Netflix personalise experience through AI-enabled content recommendations. In the future, other businesses may utilise AI in a similar way; for example, news organisations may personalise the selection of stories delivered to subscribers online.⁶⁸

One of the potential consequences of increased content and news personalisation is that individuals may increasingly experience ‘echo chambers’ of information.⁶⁹ This refers to individuals being repeatedly exposed to perspectives that affirm their own beliefs. Echo chambers could result from algorithms curating content based on user preferences or previous searches online.⁷⁰ They could also occur as the result of the sharing behaviour of users that a person connects with online.⁷¹

It is important to acknowledge that people can also experience echo chambers offline through their choices in news and content. A person might choose to only read newspaper articles, or watch broadcast programs, that align with their views. However, as noted by the ACCC, the difference is that it may not be transparent to consumers

⁶² Australian Competition and Consumer Commission, [Digital Platforms Inquiry—Final Report](#), June 2019, p.174.

⁶³ *ibid.*

⁶⁴ [RADAR](#), accessed 17 October 2019.

⁶⁵ PA Media, [More than 1,000 UK regional news titles now have access to stories jointly written by journalists and AI as RADAR launches new website](#), 18 June 2018.

⁶⁶ [RADAR, News](#), accessed 29 October 2019.

⁶⁷ Michael Chui, James Manyika, Mehdi Miremadi, Nicolaus Henke, Rita Chung, Pieter Nel and Sankalp Malhotra, [Notes from the AI frontier: Insights from hundreds of use cases](#), McKinsey Global Institute, April 2018, p.8.

⁶⁸ Chris Richardson, [The Future Of News Is Artificial Intelligence](#), Forbes, 2018, accessed 26 March 2019.

⁶⁹ Australian Competition and Consumer Commission, [Digital Platforms Inquiry—Final Report](#), June 2019, p.346.

⁷⁰ *ibid.*, p.512.

⁷¹ *ibid.*, p.346.

how news and content displayed online or provided in response to a search query is curated.⁷²

Whether echo chambers exist and the extent of their impact on the diversity of news available to individuals is not clear. Some digital platforms may increase the diversity of news to which users are exposed.⁷³ We are currently undertaking research into the news market and questions about the impact of digital platforms on the diversity of news available to Australians, including local news, are key considerations.

Concerns have also been raised about the potential for algorithms to negatively impact an individual's mental or emotional wellbeing through the content recommendations and feeds it delivers. This issue notably came to public attention in 2014, when it was reported that Facebook had experimented with filtering news feeds to make people feel more positively or negatively.⁷⁴ Some research has also indicated that algorithms may select or prioritise content that is more emotive or conveys more extreme viewpoints. For example, informal studies of YouTube's algorithm have found that it recommends content that increasingly is associated with far-right or far-left political leanings.⁷⁵ Monitoring the outcomes of content selection and delivery by AI technologies will be important to ensuring community standards continue to be met.

AI in practice: AI and captioning

IBM's Watson 'applies a range of cognitive functionality' to assess data captured through the spoken and aural elements of video assets.⁷⁶ It automatically generates captions for these videos using the Watson Speech to Text API. In 2016, Watson transcribed over 660 US Open match videos using this API.⁷⁷ This shows how AI can be used to increase the accessibility of video content.

Disinformation

There are existing regulatory arrangements targeting the accuracy of news and current affairs reporting. This includes the self-regulatory regime overseen by the Australian Press Council⁷⁸ and co-regulatory codes applicable to broadcasters overseen by the ACMA.⁷⁹ This is reflective of the societal value for reliably accurate news that enables citizens to understand issues and events and contributes to a healthy democracy.

The ACCC's Digital Platforms Inquiry highlighted concerns that individuals may be increasingly exposed to disinformation through digital platforms.⁸⁰ 'Disinformation' refers to false or inaccurate information that is deliberately created and spread to harm a person, social group, organisation or country. This type of information may be hard for individuals to identify, particularly on social media feeds where individual news stories are presented alongside unrelated content. Research has suggested that many Australians have experienced misleading news.⁸¹ In response to public concerns,

⁷² *ibid.* p.347.

⁷³ Australian Competition and Consumer Commission, [Digital Platforms Inquiry—Final Report](#), June 2019, p.349.

⁷⁴ Robert Booth, [Facebook reveals news feed experiment to control emotions](#), The Guardian, 30 June 2014.

⁷⁵ Australian Competition and Consumer Commission, [Digital Platforms Inquiry—Final Report](#), June 2019, p.349.

⁷⁶ IBM Corporation, [Watson at Work—Captioning goes cognitive: a new approach to an old challenge White Paper](#), 2017, p.3.

⁷⁷ *ibid.*

⁷⁸ Australian Press Council, [Statements of Principles](#), accessed 19 September 2019.

⁷⁹ This includes the Commercial Radio Code of Practice March 2017, Community Radio Broadcasting Codes of Practice 2008, Commercial Television Industry Code of Practice 2015, Community Television Codes of Practice 2011, the ABC Code of Practice 2019 and SBS Codes of Practice 2014. Codes can be accessed from the [ACMA's Register of broadcasting codes & schemes index](#).

⁸⁰ Australian Competition and Consumer Commission, [Digital Platforms Inquiry—Final Report](#), June 2019, p.345.

⁸¹ *ibid.*, p.354.

some digital platforms are taking steps to assess and communicate the reliability of content, including by down-ranking content or sources.⁸²

Concerns have also been raised that AI could potentially be used to create more convincing disinformation, including fake videos or 'deepfakes'. Recent research has shown how AI can be used to synthesise realistic videos of individuals speaking.⁸³ The produced video can then be edited to change the depicted individuals' facial expressions, head pose, and gaze. The researchers behind this technology outline how it may be used in movie post-production and virtual reality, among other functions. However, it may also be used to create fake videos designed to sway public opinion or defame an individual.⁸⁴ Similar concerns may apply to AI technologies designed to 'clone' individuals' voices or which have been created to produce fake news stories.⁸⁵

This application of AI demonstrates its possible use in influencing individuals' perception of events. Considered alongside the trend towards increasingly personalised content consumption, this use of AI may exacerbate divides between people that hold different social, cultural, and political values. The AI Ethics discussion paper noted that 'AI-based manipulations of this calibre will require new controls to ensure users can trust the content they receive'.⁸⁶

As in the case of detecting illegal and harmful content, AI may also play a role in solutions to this emerging issue. For example, the US Defense Advanced Research Projects Agency (DARPA) is reportedly developing AI tools to detect fake videos.⁸⁷ There have also been efforts to develop AI to detect fake written news.⁸⁸

AI in practice: AI and fake videos

Research from Imperial College in London and Samsung's AI Centre in the UK has shown how a single photo and audio file can be used to generate a talking or singing 'video portrait'.⁸⁹ This provides an example of the acceleration of AI-generated video techniques.

In late 2019, Facebook announced that it was launching a 'Deepfake Detection Challenge' in collaboration with the Partnership on AI, Microsoft, and academics from several universities. The goal of the challenge is to 'produce technology that everyone can use to better detect when AI has been used to alter a video in order to mislead the viewer'.⁹⁰

Unsolicited communications

Telemarketing is a concern for many Australians. In 2018–19, the ACMA received more than 36,000 complaints about telemarketing.

⁸² *ibid.*, p.359.

⁸³ Hyeonwoo Kim, Pablo Garrido, Ayush Tewari, Weipeng Xu, Justus Thies, Matthias Niessner, Patrick Pérez, Christian Richardt, Michael Zollhöfer, Christian Theobalt, [Deep Video Portraits](#), Stanford University, accessed 2 May 2019.

⁸⁴ Oscar Schwartz, [You thought fake news was bad? Deep fakes are where truth goes to die](#), The Guardian, November 2018, accessed 2 May 2019.

⁸⁵ Alex Hern, [New AI fake text generator may be too dangerous to release, say creators](#), The Guardian, 15 February 2019.

⁸⁶ D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019, p.46.

⁸⁷ Will Knight, [The Defense Department has produced the first tools for catching deepfakes](#), MIT Technology Review, August 2018, accessed 2 May 2019.

⁸⁸ Allen Institute for Artificial Intelligence (AI2), [Grover – A State-of-the-Art Defense against Neural Fake News](#), accessed 18 September 2019.

⁸⁹ Konstantinos Vougioukas, Stavros Petridis, Maja Pantic, [Realistic Speech-Driven Facial Animation with GANs](#), International Journal of Computer Vision, 2019.

⁹⁰ Facebook, [Creating a data set and a challenge for deepfakes](#), 5 September 2019.

Australia's laws include protections against receiving unsolicited telemarketing calls, including calls involving a synthetic voice. However, there may be added pressure on the effectiveness of existing regulatory arrangements if, in the future, AI is used to perform telemarketing activities at scale.⁹¹ Internationally, there are companies already offering AI applications for the purpose of cold-calling individuals and making sales. Reports have indicated that voice bots are increasingly used in China for cold-calling.⁹² There have been enhancements in developing human-sounding AI, which has raised concerns about the potential use of the technology to conduct scam phone calls.

AI that can recognise and interpret written text could also potentially be used to conduct scams, such as phishing emails or SMS/MMS.⁹³

AI in practice: AI and speech

The ability for AI to mimic human speech and hold simple conversations was demonstrated in May 2018 by Google Duplex, which is designed to complete specific tasks, such as scheduling appointments. In a demonstration of the tool, Google Duplex was shown making a haircut appointment.⁹⁴

Spectrum management

The ACMA is responsible for the management of spectrum, a national resource, in accordance with the *Radiocommunications Act 1992*.

AI may offer the potential to augment spectrum management and allocation approaches within government or industry. This could be valuable in an environment of increased demand for spectrum—driven, in particular, by the uptake of 5G technologies, which enable increased data speed, lower latency, and the ability to connect a greater number of devices simultaneously. This raises questions about how these new approaches might fit within the existing regulatory framework.

To date, spectrum sharing has largely focussed on static approaches that establish coexistence arrangements defined through fixed geographic and spectral boundaries. New technologies and techniques, including those driven by AI, could enable new approaches to spectrum sharing.⁹⁵ These include dynamic sharing approaches, sometimes referred to collectively as dynamic spectrum access (DSA). DSA techniques typically take advantage of time-based changes in spectrum use, in recognition that some spectrum users may not use all the spectrum, in all geographic areas, all the time.

DSA architectures have traditionally been based on simple decision processes, relying on a mix of technologies like geolocation with database look-up, sensing, and beacon transmissions to ascertain channel availability and assign access to devices accordingly.

There is potential for inclusion of more sophisticated AI in these processes. For example, machine learning could be incorporated to enhance, streamline or complement the assessment of channel availability, or for use in self-organising

⁹¹ Australian Computer Society, [Artificial Intelligence: A Starter Guide to the Future of Business](#), December 2018, p.39.

⁹² Wang Yiwei, [How AI-Powered Voice Bots Flooded China's Telemarketing Industry](#), Medium, March 2019, accessed 2 May 2019.

⁹³ George Dvorsky, [Hackers Have Already Started To Weaponise Artificial Intelligence](#), Gizmodo, September 2017, accessed 2 May 2019.

⁹⁴ Google, [Google Duplex: An AI System for Accomplishing Real-World Tasks Over the Phone](#), 8 May 2018.

⁹⁵ George I. Seffers, [AI Lays the Foundation for 5G Spectrum Sharing](#), SIGNAL, March 2019, accessed 2 May 2019.

networks (such as mobile ad-hoc networks or ‘MANETs’) to dynamically optimise network configurations.

There have been very few large-scale implementations of DSA and as a result, regulatory frameworks have not been widely developed to facilitate DSA arrangements. The only truly broad-scale DSA undertaking that has been commercially implemented internationally has been the US’s Citizens’ Broadband Radio Service (CBRS).⁹⁶

We will continue to monitor international regulatory and technical developments and investigate regulatory approaches to spectrum sharing, such as DSA and licensed shared access. In September 2018 we held a spectrum ‘tune up’ on DSA to get a feel for the appetite and opportunities for increased shared spectrum access in Australia.⁹⁷ We will also continue to monitor technological developments, including applications of AI, that could facilitate more intensive spectrum sharing.

AI in practice: AI and spectrum sharing

In DARPA’s Spectrum Collaboration Challenge (SC2), competitors develop new spectrum access strategies where radio networks autonomously collaborate to share radio frequency spectrum while avoiding interference. As described by DARPA, ‘the Challenge is designed to encourage researchers to develop smart systems that collaboratively, rather than competitively, adapt in real time to today’s fast-changing, congested spectrum environment—redefining the conventional spectrum management roles of humans and machines to maximize the flow of radio frequency (RF) signals’.⁹⁸

SC2 was a three-year competition. The SC2 finale was held on 23 October 2019 alongside the 2019 Mobile World Congress in Los Angeles.⁹⁹

Ethical design and use of AI

There has been a substantial collective focus across industry, academia and governments internationally on the potential ethical challenges of AI. This is reflective of the enhanced analytical and predictive capabilities of AI technologies, the anticipated scope of their use, and various case studies demonstrating that AI can fail to meet community expectations.

AI will be utilised across the private and public sectors to inform or automate decision-making processes. AI may, for example, be used to assist in selecting new employees, deciding an individual’s eligibility for a product or service, diagnose illnesses, predict whether a criminal will reoffend, or decide how government resources are allocated. These decisions will impact on individuals to varying degrees.

There have also been examples of AI delivering negative and unanticipated outcomes. In 2016, Microsoft’s chatbot ‘Tay’ learned to be racist from tweets and direct messages on Twitter.¹⁰⁰ Similarly, Amazon discontinued an experimental hiring tool that used AI to review resumes after the tool was found to be biased towards men.¹⁰¹ These and

⁹⁶ Federal Communications Commission, [3.5 GHz Band Overview](#), 17 September 2019.

⁹⁷ Australian Communications and Media Authority, [Spectrum tune-up: New approaches to spectrum sharing](#), 2 September 2019.

⁹⁸ Defense Advanced Research Projects Agency, [Spectrum Collaboration Challenge](#), accessed 17 October 2019.

⁹⁹ [Spectrum Collaboration Challenge](#), accessed 17 October 2019.

¹⁰⁰ Rachel Metz, [Why Microsoft Accidently Unleashed a Neo-Nazi Sexbot](#), MIT Technology Review, 24 March 2016.

¹⁰¹ Jeffrey Dastin, [Amazon scraps secret AI recruiting tool that showed bias against women](#), Reuters, 10 October 2018.

other examples heighten the importance of understanding how these technologies will be designed and used to align with ethical expectations.

As discussed, there have been a number of ethics frameworks and principles developed to solidify expectations for how AI should be designed and used. This work is being undertaken by a range of organisations including professional and industry groups,¹⁰² global businesses,¹⁰³ individual countries, and intergovernmental organisations.¹⁰⁴ In Australia, DIIS released a set of updated ethics principles and is working with industry to develop further guidance to support AI development and adoption.¹⁰⁵ In general, the ethics frameworks and guidelines developed to date are voluntary and complement existing regulation rather than introducing new regulatory requirements.

There has been a recognised need for further consideration of the regulatory arrangements surrounding AI to ensure these are fit-for-purpose. The AI Ethics discussion paper, for example, noted ‘an ethical framework on its own will not ensure the safe and ethical development and use of AI’ and that an ethical framework is one part of a ‘suite of governance mechanisms and policy tools which can include laws, regulations, standards and codes of conduct’.¹⁰⁶

It may be the case that sector-specific regulatory responses are needed to articulate expectations for how ethical concepts are translated into business activities or to address specific risks. Sectorial approaches may complement national ethics principles and provide greater clarity to industry about how AI should be developed and used. These approaches may take the form of regulatory guidance or industry-specific compliance requirements to address a specific risk within the market. This has the potential to support consumer confidence in the use of AI technologies.

Recognising the potential for development in sectorial approaches to AI, we are monitoring discussion and developments relating to ethics and AI. Below we explore some of the ethical issues raised about AI that are relevant to the communications and media sector.

Fairness

It has become well-recognised that AI has the potential to reproduce biases reflected in its training data, which can be incomplete, non-representative or skewed due to ingrained human biases and stereotypes.¹⁰⁷ This bias may cause harm in a few different ways. It might directly or indirectly discriminate against individuals or groups in its allocation or withholding of certain opportunities or resources. This has raised concerns that AI has the potential to perpetuate social injustices impacting vulnerable or underrepresented groups. AI technologies can also produce ‘representational harm’, which involves reproducing and amplifying harmful stereotypes.¹⁰⁸ This would be the case, for example, if an AI system perpetuated racist stereotypes.

Awareness, monitoring and testing of potential bias will be important across businesses involved in the supply and use of AI technologies. Detecting and reducing

¹⁰² IEEE Global Initiative on Ethics of Autonomous and Intelligent Systems, [Ethics+In+Action](#), accessed 2 May 2019.

¹⁰³ Microsoft, [Microsoft AI principles](#), accessed 2 May 2019; Google, [Perspectives on Issues in AI Governance](#), 2019; IBM Corporation, [Everyday Ethics for Artificial Intelligence](#), September 2018.

¹⁰⁴ Organisation for Economic Co-operation and Development, [Recommendation of the Council on Artificial Intelligence](#), 22 May 2019; G20, [G20 Osaka Leaders’ Declaration](#), Ministry of Foreign Affairs of Japan, 2019.

¹⁰⁵ Department of Industry, Innovation and Science, [Artificial intelligence](#), accessed 7 November 2019.

¹⁰⁶ *ibid.*, p.16.

¹⁰⁷ Alex Campolo, Madelyn Sanfilippo, Meredith Whittaker, Kate Crawford, [AI Now 2017 Report](#), AI Now, 2017, p 14.

¹⁰⁸ Kate Crawford, [The Trouble with Bias](#), YouTube, accessed 2 May 2019.

bias may already be required by regulation, including in the communications and media sector. As an example, requirements for fairness and the related concept of impartiality are already part of the *Commercial Television Industry Code of Practice 2015*¹⁰⁹ and the *ABC Code of Practice*.¹¹⁰ The *Community Television Codes of Practice*¹¹¹ includes the requirement for licensees to represent viewpoints fairly. The *SBS Codes of Practice* also includes a commitment to ensuring news and current affairs content is impartial.¹¹² The potential role of AI in news production may raise the need to consider the processes for detecting biases that may have implications for delivering on fairness and impartiality principles.

A variety of methods have been explored as options for ensuring AI operates fairly. Algorithmic impact assessments and risk assessments may assist in identifying when AI poses an undue risk to vulnerable or underrepresented individuals or groups. Transparency measures can also support fair outcomes by ensuring individuals are aware of when AI is used and that AI operations meet expectations for being explainable. There has also been discussion about enabling individuals to contest the output of algorithmic decision-making.¹¹³

Transparency and explainable outcomes

The technical complexity and adaptive nature of AI technologies raises questions around how to provide meaningful transparency about their use and impacts on individuals. Organisations will need to consider how they communicate with consumers about how an AI system has reached a prediction, recommendation or decision.

In some instances, it is not possible to analyse how AI has reached a conclusion from input data, which has led to some AI technologies being called ‘black boxes’.¹¹⁴ The proprietary nature of AI may also present challenges to transparency. To overcome these issues, there has been an increased focus on ‘explainable AI’ (XAI) techniques, which can provide greater insight into how AI has reached a conclusion without necessarily revealing the algorithms at the core of the technology.¹¹⁵

Transparency will help build assurance that AI technologies are operating in a way that aligns with community expectations. We will continue to monitor developments within the communications and media sector in order to identify if there is a need for specific measures dealing with transparency within our remit.

¹⁰⁹ Australian Communications and Media Authority, [Commercial Television Industry Code of Practice 2015](#), 2015, p.10.

¹¹⁰ Australian Broadcasting Corporation, [Code of Practice 2019](#), 2019, p.5.

¹¹¹ Australian Communications and Media Authority, [Community Television Codes of Practice](#), 2011, p.109.

¹¹² Special Broadcasting Service, [SBS Codes of Practice](#), 2019, p.6.

¹¹³ D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019, p.57.

¹¹⁴ Yavar Bathaee, [The Artificial Intelligence Black Box and the Failure of Intent and Causation](#), Harvard Journal of Law & Technology, Vol 31, No.2 Spring 2018.

¹¹⁵ Accenture, [Explainable AI: The next stage of human-machine collaboration](#), August 2018, accessed 2 May 2019.

AI in practice: AI and customer service

AI is anticipated to increasingly become a part of customer service. It may appear as a 'chatbot' or as a virtual assistant that individuals can interact with.

Important considerations for the use of this type of technology include providing meaningful transparency to ensure people can find out when they are engaging with an AI system and how that system has informed a particular outcome—including the factors used in its decision making.

Accountability

As outlined in the AI Ethics discussion paper, 'as an AI system has no moral authority, it cannot be held accountable in a judicial sense for its decisions and judgements. As such, a human must be accountable for the consequences of decisions made by the AI'.¹¹⁶

One of the key matters discussed in relation to AI and accountability is determining liability. AI deployment can involve multiple parties, including software engineers, the business that uses the AI, and potentially, third-party entities involved in the certification or testing of AI. Ultimately, these parties need mechanisms to ensure responsibilities for AI technologies and their outcomes are clear throughout the different stages of the supply chain. Organisations that procure AI applications should consider the frameworks and skills they need to have in place to ensure these technologies operate as expected.

It will also be important to consider what degree of human oversight is appropriate for AI applications. Meaningful human oversight requires individuals who can understand, scrutinise and explain how AI operates. Some AI applications will require greater oversight than others due to the potential risks of the decisions, predictions or recommendations it makes. For example, an incorrect movie recommendation is far less significant than AI that helps to determine whether an individual is eligible for a product or service. There appears to be general agreement that if a decision could have a significant adverse impact on an individual, it should not be made solely by AI.

Privacy

AI presents challenges to individuals' ability to control the collection of their personal information and how it is used. AI has the capability to predict and infer granular information about individuals, including potentially sensitive information, from the large datasets it consumes.¹¹⁷ Further, there is a challenge to providing meaningful transparency around how AI uses personal information. It is important that individuals can understand how their personal information is collected and used.¹¹⁸ Transparency is also essential to obtaining meaningful consent, which plays a role in several of the acts overseen by the ACMA—for example, the *Spam Act 2003*.¹¹⁹

Protection of individual privacy is supported by both economy-wide and sector-specific measures. The *Privacy Act 1988*, administered by the Office of the Australian Information Commissioner, provides economy-wide protections. Some businesses

¹¹⁶ D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019, p.36.

¹¹⁷ Alex Campolo, Madelyn Sanfilippo, Meredith Whittaker, Kate Crawford, [AI Now 2017 Report](#), AI Now, 2017, p.29.

¹¹⁸ Office of the Victorian Information Commissioner, [Artificial intelligence and privacy Issues paper](#), June 2018, p.11.

¹¹⁹ [Spam Act 2003](#).

may also have obligations under the privacy laws of other countries, such as the European Union's General Data Protection Regulation.

We acknowledge that the above only highlights a selection of ethical matters surrounding the development and use of AI. There is a range of other related issues being focussed on by regulators, such as decision-making that could impact individuals' safety.¹²⁰ The AI Ethics discussion paper includes a more broad-ranging discussion of ethical issues relating to AI.¹²¹

Depending on regulatory developments in this area, further work may be needed to articulate how ethical concepts translate into actions and processes on a sectoral basis. We will continue to monitor developments in order to identify and assess if there is a need for industry-specific regulatory guidance or compliance obligations to address risks within the communications and media market.

Questions

4. Building on the discussion in Part 2 of this paper, are there any other potential regulatory pressures or challenges that have not been mentioned?
5. Are there any new areas of consumer vulnerability that could result from the use of AI applications within the communications and media sector?
6. Have you identified regulatory barriers to enabling AI innovations which, if removed, could benefit the communications and media sector and its consumers?
7. How are ethical concerns about AI being addressed in practice within the communications and media sector? What frameworks, practices, and processes are in place or being developed?
8. What business practices and processes would build and maintain consumer confidence in the ethical design and use of AI within the communications and media sector?
9. Is there a role the ACMA could play in enabling ethical AI innovation or use in the communications and media sector?

¹²⁰ The [National Transport Commission](#) (NTC), for example, is developing a safety assurance system for automated vehicles. The safety of the users of online services is being progressed by the [Office of the eSafety Commissioner](#).

¹²¹ D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019.

Part 3: Regulatory practice

The transition to an AI-enabled economy not only raises questions about the applicability of current regulatory frameworks, but also requires government regulators like the ACMA to consider the impact of AI on their regulatory practice.

AI technologies will drive accelerated change across the market, including products and services used by citizens. The marketplace for AI is also global, with many of the advances in AI being led by businesses operating internationally. Australians can be expected to purchase or use AI-enabled products and services from businesses based offshore. Australian businesses are also likely to use 'off-the-shelf' AI technologies developed in other jurisdictions.¹²² These factors raise challenges for regulators in delivering regulatory outcomes that satisfy the needs of consumers, industry and government.

Below we have outlined key components to regulatory practice to enable beneficial outcomes in an AI-enabled environment. We welcome feedback on whether there are other elements which may be significant in enabling AI technologies and services, or on the appropriateness of those identified below.

Global regulatory cooperation

The global market of AI technologies heightens the importance of collaborative relationships between regulators and information-sharing between them. These relationships enable a more holistic view of the developing technological landscape, potential risks, and the scope and value of regulatory solutions to specific challenges. Further, they enable alignment in the requirements for technologies, which provides greater certainty for both industry and individuals.

The importance of cooperation between jurisdictions on AI was highlighted on 22 May 2019, when 42 countries, including Australia, endorsed the OECD's non-binding *Recommendation of the Council on Artificial Intelligence*.¹²³ OECD members and non-members adhering to the Recommendation signalled their shared commitment to promoting and implementing principles designed to support the 'responsible stewardship of trustworthy AI'.¹²⁴

Industry and consumer engagement

AI is an evolving research area, with the potential to drive further change in market structures, business operations, products and services. Hearing from industry and consumers about their experiences with AI will expose regulators to issues as they appear. It is also important that a diverse range of voices within the Australian community, including vulnerable groups, are heard and represented in discussions about the impact of AI and potential regulatory or governance mechanisms.

Tools that can support this collaboration include, for example, multi-stakeholder forums involving regulators, industry and consumer representative bodies focussed on the deployment and application of AI technologies.¹²⁵

¹²² Deloitte, [Technology, Media and Telecommunications Predictions 2019](#), 2019, p.14.

¹²³ Organisation for Economic Co-operation and Development, [Recommendation of the Council on Artificial Intelligence](#), 22 May 2019.

¹²⁴ *ibid.*

¹²⁵ International Telecommunication Union, [Artificial Intelligence \(AI\) for Development Series – Module on Setting the Stage for AI Governance: Interfaces, Infrastructures, and Institutions for Policymakers and Regulators](#), July 2018, p.12.

Flexible and responsive regulatory approaches

AI technologies are among a range of technologies driving significant change across regulated industries, including to business practices, products and services. The pace of development in digital technologies has resulted in an increased focus on the potential application and value of more flexible regulation that accommodates and enables technology innovations.

Technology-neutral regulatory arrangements provide a means of better ensuring regulatory protections and requirements continue to apply as the technologies used by regulated entities are updated. Recently, the ACCC's Digital Platforms Inquiry has highlighted the potential value of a platform-neutral regulatory framework for organisations involved in content production and delivery in Australia. The ACCC suggested that this framework should include clear principles, which can 'accommodate continuing technological changes and shifts in how media services are created and delivered'.¹²⁶ This would enable the principles to be flexibly applied to new innovations within the sector.

Similarly, regulation that is focussed on outcomes may play a valuable role within the suite of regulatory tools available to deliver public policy objectives. Outcomes-based regulation focuses on describing the outcomes or objectives that regulated entities must achieve, without prescribing the means of doing so. This provides regulated entities with greater flexibility in the processes or practices used to achieve compliance. Regulators can support regulated entities by providing guidance on how compliance obligations can be met. Outcomes-based regulation can co-exist with other regulatory approaches, including self-regulation, co-regulation and rules-based regulation, to enable a regulatory framework that can better accommodate technological change.

There has also been a focus on regulatory approaches that support technology innovation. An example is found in the concept of a 'regulatory sandbox', which provides a risk-controlled, time-limited environment where a business can test innovative products or business models and regulators can test regulatory responses to market disruption. The Australian Securities and Investments Commission (ASIC) operates a financial technology ('fintech') regulatory sandbox, which allows eligible fintech companies to test certain products or services for up to 12 months without an Australian financial services licence or credit licence.¹²⁷ In the UK, the Information Commissioner's Office has recently launched the beta phase of its sandbox designed to support organisations who are developing products and services that use personal data in innovative ways.¹²⁸ These regulatory sandboxes can provide opportunities to test new innovations and align new technologies and business models with regulation.

Ultimately, a mix of regulatory approaches can be anticipated to apply to AI applications. Which regulatory approaches are taken for any given circumstance must be informed by the context of their use and the risks they are intended to address.

Applications of artificial intelligence for regulators

The benefits of AI are not limited to private enterprise. Government agencies around the world, including regulators, have been broadening explorations of where AI

¹²⁶ Australian Competition and Consumer Commission, [Digital Platforms Inquiry—Final Report](#), June 2019, p.201.

¹²⁷ Australian Securities & Investments Commission, [Fintech regulatory sandbox](#), accessed 18 September 2019.

¹²⁸ Information Commissioner's Office, [The Guide to the Sandbox \(beta phase\)](#), accessed 18 September 2019.

technologies can support regulatory compliance and enable more efficient and effective service delivery.

The successful deployment of AI within government is dependent on building a framework that enables public trust in the use of AI. This involves addressing the safety, security and reliability of AI, as well as ensuring AI development and use aligns with ethical expectations. To support this trust, the Australian Government is developing an AI Ethics Framework to help guide businesses and governments seeking to develop and use AI in Australia.

A variety of processes and activities will be needed to build trust in AI. This includes processes and activities designed to provide assurance in the high degree of accuracy and fairness of AI outputs, that AI outputs meet expectations for being 'explainable', and that AI is subject to robust oversight and review measures proportional to the potential impact on citizens. Having 'humans in the loop'¹²⁹ that can scrutinise and interpret the operation of AI, and manage more complex or unique decision-making scenarios, will be an important principle in a wide variety of contexts.

Recognising the potential benefits of AI to regulatory activities, we will explore where AI may enhance our own operations. This will build on our current focus, as outlined in our *Corporate plan 2019–20*, of growing our data analytical capability.¹³⁰ The ACMA collects a diverse range of data and there is potential to use it in ways that will better inform our regulatory decisions and yield valuable insights into the changes occurring within the communications and media sector.¹³¹ As an integral part to growing this capability, we are developing our processes to ensure the safe and appropriate use of our data, including through a governance framework.

Question

10. Do you see a need for sector-specific regulation to address the risks of AI applications within the communications and media sector? If so, where would sector-specific regulation be valuable?

¹²⁹ 'Humans in the loop' (HITL) is the concept of humans maintaining a supervisory role over automated technologies. D. Dawson and E. Schleiger, J. McLaughlin, C. Robinson, G. Quezada, J. Scowcroft and S. Hajkowicz, [Artificial Intelligence: Australia's Ethics Framework](#), Data61 CSIRO, 2019, p.34.

¹³⁰ ACMA, [Corporate plan 2019–20](#), 2018, p.8.

¹³¹ *ibid.*

Looking ahead

How regulatory frameworks may be adapted in response to the challenges of AI technologies is the subject of ongoing consideration nationally and internationally.

The ACMA is continuing to monitor and analyse regulatory developments to understand the potential impacts of AI within our regulatory remit. Further consultation with our stakeholders across industry, consumer and other interest groups may be needed in the future to gain a better picture of how AI technologies are being used within the communications and media sector and the implications for both industry and consumers.

Invitation to comment

Making a submission

The ACMA invites comments on the issues set out in this discussion paper.

Submissions and consultation enquiries can be emailed to regfutures@acma.gov.au.

Submissions by post can be sent to:

The Executive Manager
Regulatory Futures Section
Australian Communications and Media Authority
PO Box 78
Belconnen ACT 2616

The closing date for submissions is **COB, Thursday 5 December 2019**.

Publication of submissions

The ACMA does not intend to publish submissions on this discussion paper. Following this consultation, a version of this paper will be published on the ACMA's website for public consultation.

Privacy

Information on the *Privacy Act 1988* and the ACMA's privacy policy (including how to access or correct personal information, how to make a privacy complaint and how we will deal with the complaint) is available at acma.gov.au/privacy-policy.