Initiatives in AI Governance

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A pre-read paper from the Schwartz Reisman Institute for Technology and Society

Innovating AI Governance: Shaping the Agenda for a Responsible Future
December 2020

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Executive Summary

The advent of artificial intelligence systems into the world around us has introduced not only untold benefits but real challenges to society as well. Many statements of ethical principles and guidelines have been written and published by organizations across sectors, but little has been done beyond that to remove unnecessary obstacles while ensuring that society's interests are considered and protected as AI development progresses. In order to ensure governance that creates accountability and actionability, decisionmakers must consider which policy instruments are appropriate to particular situations. This paper examines AI governance initiatives that have been tangibly implemented by policymakers around the world in a number of subject areas, to provide opportunities for readers to draw lessons from what has been done.

1. Introduction

Artificial intelligence has, seemingly overnight, become ingrained into many aspects of how we interact with the world around us, from search engines[1] to agricultural yield predictions[2] to nanny camera analytical insights.[3] While the adoption of AI is already generating significant benefits to society, it also poses serious challenges. Some of these challenges are ethical in nature, such as discriminatory biases in credit loans due to biases present in historical training data.[4] Problems also arise when AI systems are too effective at doing what they do, as when the drive to increase short-term engagement with a social media platform results in digital addiction.[5] At other times, AI displaces human labour, leaving trails of unemployment even in seemingly unassailable industries.[6] Some problems with AI are specific to the specific context of application, such as the risks to humanity posed by lethal autonomous weapons systems or the issues related to the use of facial recognition technology in law enforcement. Many problems are pervasive across multiple contexts, such as accountability, fairness, safety, and transparency.[7] Ethical guidelines and

[1] Clark, Jack. "Google Turning Its Lucrative Web Search Over to AI Machine," Bloomberg, 26 Oct. 2015, www.bloomberg.com/news/articles/2015-10-26/google-turning-its-lucrative-web-search-over-to-ai-machines
[2] "Progressive Environmental & Agricultural Technologies." PEAT, https://peat.technology/
[3] Cooper, Daniel. "Nanit the AI Nanny Tries to Unravel the Mysteries of a Restless Baby." Engadget, 6 Mar. 2020, www.engadget.com/2017-08-10-nanit-ai-baby-monitor-impressions.html
[4] Erdelyi and Goldsmith, "Regulating Artificial Intelligence: Proposal for a Global Solution," 2018 Conference on AI, Ethics, and Society"
[5] Montag et al., "Addictive Features of Social Media/Messenger Platforms and Freemium Games against the Background of Psychological and Economic Theories"
[6] Muro et al., "What Jobs Are Affected by AI? Better-Paid, Better-Educated Workers Face the Most Exposure." Brookings, Brookings, 5 May 2020, www.brookings.edu/research/what-jobs-are-affected-by-ai-better-paid-better-educated-workers-face-the-most-exposure/.
[7] Cath, "Governing artificial intelligence: ethical, legal and technical opportunities and challenges"

declarations have been released by governments, private corporations, think tanks, and civil society organizations, but little has been done beyond that. The purpose of this paper is to look past voluntary AI ethical principles by exploring governance initiatives that have actually been implemented by governing bodies around the world. In doing so, this will provide opportunities to better draw lessons from the experiences of policymakers using specific policy instruments under specific circumstances.

The challenges presented by the increasingly ubiquitous presence of AI in our everyday lives are no longer hypothetical. While some ponder whether a rogue AI tasked with protecting humanity will take over or what warfare in the age of lethal autonomous weapons might look like, consequential failure related to the use of AI is already occurring every day. [8] Examples such as fatal car accidents caused by autopiloted vehicles[9]; gender bias in applicant recruiting AI systems[10], or supercomputers providing dangerously unsafe prescription recommendations to cancer patients[11], are all real-life occurrences caused by poorly implemented AI. Despite high-profile failures and inherent uncertainty related to the usage of new technology, more and more organizations across both the private and public sectors are turning towards AI to solve complex challenges. As increasingly risk-intensive tasks are being delegated to AI systems every day, pressure is now mounting to ensure that the AI systems of tomorrow are designed and operated properly.[12]

Over the course of just a few years, an overwhelming number of documents outlining ethical principles to mitigate deleterious effects caused by AI have been produced. International organizations, governments, large corporations, and think tanks alike have collectively published almost a hundred different AI ethics guidelines between 2016 and 2020.[13] To

[8] Scherer, "Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, And Strategies"
[9] Chokshi, Niraj. "Tesla Autopilot System Found Probably at Fault in 2018 Crash." The New York Times, The New York Times, 25 Feb. 2020, www.nytimes.com/2020/02/25/business/tesla-autopilot-ntsb.html
[10] Dastin, Jeffrey. "Insight - Amazon Scraps Secret AI Recruiting Tool That Showed Bias against Women." Reuters, Thomson Reuters, 10 Oct. 2018, www.reuters.com/article/amazon-com-jobs-automation/insight-amazon-scraps-secret-ai-recruiting-tool-that-showed-bias-against-women-idINKCN1MK0AH.
[11] Chen, Angela. "IBM's Watson Gave Unsafe Recommendations for Treating Cancer." The Verge, The Verge, 26 July 2018, www.theverge.com/2018/7/26/17619382/ibms-watson-cancer-ai-healthcare-science.
[12] Cath, "Governing artificial intelligence: ethical, legal and technical opportunities and challenges"
[13] Jobin et al., "The global landscape of AI ethics guidelines"

highlight a few, the OECD[14], UNESCO[15], European Union[16], U.K. House of Lords[17], Google[18], Microsoft[19], the U.S. Chamber of Commerce[20], OpenAI[21], and the city of Dubai[22], have all produced some version of AI ethics guidelines. Similarly, scholars have published several papers analyzing and synthesizing these guidelines. Fjeld et al. identify various approaches to AI principles through eight reoccurring themes that appear in 36 ethical principle guidelines.[23] Zeng et al. catalogue and dissect 74 sets of principles[24] while Jobin et al. categorize 84 total principles.[25] But there is no guarantee that those who merely adopt a set of principles will behave ethically in the absence of ways to translate principles into practice or proper legal accountability mechanisms.[26] Moreover, in most contexts appropriate behaviour is not obvious: it is only determined by the policy choices made by a relevant constituency.

As noted by Microsoft president Brad Smith in the domain of facial recognition technologies: "the only way to protect against this race to the bottom is to build a floor of responsibility that supports healthy market competition. And a solid floor requires that we ensure that this technology, and the organizations that develop and use it, are governed by the rule of law".[27] With little consensus on whose AI ethics are supposed to be guiding development and deployment, policy challenges will continue to go unmet. Challenges abound: Google shut

[14] "OECD Principles on Artificial Intelligence - Organisation for Economic Co-Operation and Development." OECD, www.oecd.org/going-digital/ai/principles/
[15] "Elaboration of a Recommendation on the Ethics of Artificial Intelligence." UNESCO, 29 Oct. 2020, https://en.unesco.org/artificial-intelligence/ethics.
[16] "Ethics Guidelines for Trustworthy AI." Shaping Europe's Digital Future - European Commission, 9 July 2020, https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai.
[17] "AI in the UK: Ready, Willing and Able?" Select Committee on Artificial Intelligence, UK House of Lords, 16 Apr. 2018, https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf
[18] "Our Principles." Google AI, https://ai.google/principles/
[19] "Responsible AI Principles from Microsoft." Microsoft, www.microsoft.com/en-us/ai/responsible-ai.
[20] "Principles on Artificial Intelligence." US Chamber, US Chamber of Commerce, 23 Sept. 2019, www.uschamber.com/sites/default/files/chamber_ai_principles_-_general.pdf.
[21] OpenAI. "OpenAI Charter." OpenAI, OpenAI, 2 Sept. 2020, https://openai.com/charter/
[22] "AI Principles & Ethics." Artificial Intelligence Principles & Ethics | Smart Dubai, www.smartdubai.ae/initiatives/ai-principles-ethics
[23] Fjeld et al., "Principled Artificial Intelligence: Mapping Consensus in Ethical and Rights-Based Approaches to Principles for AI" - the eight principles identified in their paper, Principled Artificial Intelligence: Mapping Consensus in Ethical and Rights-based Approaches to Principles for AI are: privacy, accountability, safety and security, transparency and explainability, fairness and non-discrimination, human control of technology, professional responsibility, and promotion of human values.
[24] Zeng, Enmeng, and Cunqing, 2019
[25] Jobin et al., "The global landscape of AI ethics guidelines"
[26] Mittelstadt, "Principles alone cannot guarantee ethical AI"
[27] Smith, Brad. "Facial Recognition: It's Time for Action." Microsoft on the Issues, 5 May 2020, https://blogs.microsoft.com/on-the-issues/2018/12/06/facial-recognition-its-time-for-action/

down its internal ethics advisory board due to controversy;[28] the EU High-Level Expert Group on AI was heavily criticized for being stacked with industry voices;[29] a controversial news report suggested big tech firms manipulate academia to avoid regulation.[30] Such challenges have caused substantial doubt as to whether principles are sufficient in ensuring the development of ethical AI. Governing bodies around the world must introduce policies to ensure that the disruptive nature of AI is properly addressed without inhibiting society's ability to benefit from AI advancement and deployment.

Some observers, such as MIT's Andrew McAfee and Intel CEO Brian Krzanich, have cautioned that it is "way too early for explicit AI policy." Others, such as physicist Stephen Hawking and entrepreneur Elon Musk, have gone on the record warning of the dangers of AI and the need to regulate it.[31] The crux of the public debate revolves around whether governance will stifle innovation and prevent AI from attaining success, particularly as the technology is still in its infancy. The idea that over-regulation can lead to undesired reductions in innovation and entrepreneurialism is often heard from industry outlets.[32] However, with AI already in wide use, affecting "billions of lives trillions of times a day", some are asserting that if AI is mature enough to have such consequential impacts on the way almost every one of us lives and does business, it is mature enough to be governed.[33] Moreover, in many cases AI is already governed—through policies and laws designed for an earlier era of technology. The mismatch between the regulation we need and the regulation we have is simultaneously inhibiting the robust deployment of AI, particularly in the public domain, and the development of the kinds of regulation needed to ensure that AI is safe, beneficial and trustworthy—and not disruptive of core values and commitments.

Good governance with broad public engagement promotes safety, accountability, and ethical conduct in the research, development, and deployment of AI systems.[34] In *Artificial Intelligence and Its Implications for Income Distribution and Unemployment*, economists Korinek and Stiglitz show that AI's benefits to society cannot be taken for granted, but rather are determined by the quality of the market-structuring regulatory environment. The lack of

[28] Wakefield, Jane. "Google's Ethics Board Shut Down." BBC News, BBC, 5 Apr. 2019, www.bbc.com/news/technology-47825833
[29] Metzinger, Thomas, and Sonja Alvarez. "Ethics Washing Made in Europe." Der Tagesspiegel, www.tagesspiegel.de/politik/eu-guidelines-ethics-washing-made-in-europe/24195496.html
[30] Ochigame, Rodrigo. "How Big Tech Manipulates Academia to Avoid Regulation." The Intercept, 20 Dec. 2019, https://theintercept.com/2019/12/20/mit-ethical-ai-artificial-intelligence/
[31] Kharpal, Arjun. "A.I. Is in Its 'Infancy' and It's Too Early to Regulate It, Intel CEO Brian Krzanich Says." CNBC, CNBC, 7 Nov. 2017, www.cnbc.com/2017/11/07/ai-infancy-and-too-early-to-regulate-intel-ceo-brian-krzanich-says.html
[32] Thierer, "Permissionless Innovation: The Continuing Case for Comprehensive Technological Freedom"
[33] Brundage and Bryson, "Smart Policies for Artificial Intelligence"
[34] Cihon et al., "Should Artificial Intelligence Governance be Centralised"

global governance and poorly fitting regulatory structures around privacy and data governance on a global scale are, in fact, likely hindering the development and deployment of AI in socially beneficial domains. This lack of a specific regulatory environment, particularly around obstacles to the aggregation of data, concerns about undefined legal liability, issues regarding trade secret disclosure, and the general risk of technologies that face an uncertain regulatory future, all hinder both financial and time investment into AI. Obstacles, such as existing data protection approaches and vague regulatory regimes, sometimes explicitly disallow the safe and secure assembling of the data in the public sector for health, education, and other applications. Furthermore, seemingly benign solutions may trigger challenges such as bias and misuse of AI. Even firms that do anticipate these risks often face legal and other advice that the regulatory terrain is highly uncertain and volatile. The unpredictability of regulation and uncertainty in existing legal liability systems make the risks involved in the investment and use of AI difficult to predict, creating an environment that is not conducive to investment and innovation. [35] [36]

Indeed, industry has been calling for regulation in many cases: Amazon implemented an internal moratorium on police use of their facial recognition technology to provide lawmakers a chance to catch up in regulations in the wake of the George Floyd protests.[37] The onus is on governments, the private sector, and civil society to collectively decide on an appropriate level of regulation to ensure equilibrium between public and private interests in the regulatory process.[38] By clearly identifying the specific challenges that need to be overcome and matching a proportionate solution, governance can ameliorate harmful effects without creating undue hardship on those responsible for researching, developing, and deploying AI. [39]

2. Policy Instruments

It is imperative that all stakeholders think broadly about what policy, governance, and regulation mean. Action can encompass a broad spectrum of different interventions, which can accelerate, decelerate, or change the direction of AI development. [40] Different policy

[35] Erdelyi and Erdelyi, "The AI Liability Puzzle and A Fund-Based Work-Around"
[36] Kuan, "Adopting AI in Health Care Will Be Slow and Difficult." Harvard Business Review, https://hbr.org/2019/10/adopting-ai-in-health-care-will-be-slow-and-difficult
[37] Matsakis, Louise. "Amazon Won't Let Police Use Its Facial-Recognition Tech for One Year." Wired, Conde Nast, www.wired.com/story/amazon-facial-recognition-police-one-year-ban-rekognition/
[38] Wirtz et al., "The Dark Sides of Artificial Intelligence: An Integrated AI Governance Framework for Public Administration"
[39] "One Hundred Year Study on Artificial Intelligence: Artificial Intelligence and Life in 2030." Stanford University, https://ai100.stanford.edu/sites/g/files/sbiybj9861/f/ai100report10032016fnl_singles.pdf
[40] Brundage and Bryson, "Smart Policies for Artificial Intelligence"

instruments require differing amounts of effort and knowledge from the government, and result in varying levels of effectiveness, efficiency, equity, legitimacy, and political support. [41] Policymakers must be deliberate in their diagnosis of the problem at hand, the desired outcome, as well as the level of resources and knowledge available. Only by doing so can they apply situationally appropriate policies to maximize societal benefits while minimizing costs to AI development and deployment.[42]

Though many different typologies and taxonomies of policy instruments exist, differing in specificity and emphasis upon diverging criteria, this paper will use the relatively simple "coercive, remunerative, normative" powers classification. Introduced by Amitai Etzioni in *Comparative Analysis of Complex Organizations*, policy instruments are divided into coercive powers (regulatory measures), remunerative powers (market interventions), and normative powers (voluntary actions). Though policy instruments will be grouped into the above three categories, it is important to not let the relatively minimalist classification blunt thinking around the application and modality of various instruments.

Coercive powers consist of what are often referred to as regulation or legal instruments. This involves government, either directly through legislation or indirectly through administrative bodies like regulators. Failure to comply with mandated requirements can result in sanctions, whether criminal, civil, or administrative. Traditional coercive regulation has taken a "common and control" approach, with often detailed specification of the actions and technologies that must be adopted by regulated entities. The increasing complexity and pace of change in economics and society has put increasing pressure on command-and-control approaches. As a result, over the last few decades governments have increasingly explored outcomes-, performance- and risk-based approaches.[43] In these approaches, governments focus on specifying the goals of regulation—such as desired levels of safety—and work with industry and regulated entities to develop strategies for achieving these goals. These, and novel approaches such as regulatory markets (in which the strategies for achieving goals are developed in a sector comprised of third-party independent regulators who compete to supply regulatory services under government license) are likely to be particularly important for AI. [44]

[41] Pearl et al, "Designing Government: From Instruments to Governance"
[42] Rist, "Choosing the Right Policy Instrument at the Right Time"
[43] Carrigan and Coglianese, "The politics of regulation: From new institutionalism to new governance"
[44] Clark and Hadfield, "Regulatory Markets for AI Safety"

Remunerative powers are instruments that rely on economic incentives or markets to reward market actors for taking desired actions such as improving the safety of their products. Traditional examples include incentives such as subsidies or tax credits and disincentives such as levies or user fees. Other economic instruments include tradeable permits, economic property rights, and government procurement. These instruments have played a major role in modern policymaking, from reducing emissions through carbon taxes to the development of AI platforms.[45] They frequently require less action on behalf of firms than direct regulations, and ultimately provide greater leeway as to whether firms or individuals decide to take action at all.[46] However, this makes situations of catastrophic failure more difficult to prevent than imposing direct requirements. Furthermore, remunerative instruments generate more unpredictable results than direct regulation, leaving some policymakers hesitant to introduce such policy instruments when certainty is politically significant.

Finally, normative powers use exhortation and voluntary measures to establish social norms that promote social welfare. By opting out of using legal or economic coercive measures to achieve outcomes, governments using these regimes attempt to reach their goals by influencing actors through communication and persuasion.[47] The only thing used by governments in these cases are data, facts, knowledge, arguments, and moral appeals.[48] Though these instruments do not mandate any individual or firm undertake any action, they can achieve high rates of compliance in situations where there is a collaborative environment among industry stakeholders just by setting a higher bar on common industry norms. Similarly, voluntary programs set out by governments and civil society often motivate firms to go beyond legal requirements to achieve positive goals, thereby allowing these firms to advertise their corporate responsibility and good reputation to their stakeholders.[49] Needless to say, as the most lenient form of governance, normative powers should not be used when universal compliance is necessary – it is rarely sufficient to merely remind people not to murder and steal.[50] Rather, these tools should be used in cases when the desired actions are both in the interests of the private sector and the public. Many modern

[45] Dai, Sarah. "Hangzhou Supports China's Push for AI Dominance with Huge Subsidies." South China Morning Post, 16 Feb. 2020, www.scmp.com/tech/policy/article/3044286/hangzhou-dangles-30-million-yuan-ai-subsidies-support-countrys-push
[46] Vedung, "Policy Instruments: Typologies and Theories"
[47] Eztioni, "A Comparative Analysis of Complex Organizations"
[48] Vedung and van der Doelen, "The Sermon"
[49] Madarang, "Environmental Policy Instruments"
[50] Vedung and van der Doelen, "The Sermon"

regulators, particularly in science and technology fields, often use normative powers to reach desired policy goals.

Figure 1, below, is a list of some of the most common policy instruments available to governments and society. Many of these have not been considered for use in the field of AI governance.

Figure 1

Policy Instruments		
Control  Choice	Coercive	Public ownership
		Legislation
		Command and control regulation
		Risk-based regulation
		Outcome-based regulation
		Inspection and testing
		Mandatory impact assessments
		Regulatory markets
		International agreements
		Mandatory reporting
	Remunerative	Taxation
		Licensing (corporate or professional)
		User fees
		Tradable permits
		Government procurement
		Subsidies and grants
		Tax incentives
	Normative	Standards and third-party certification
		Non-binding guidance
		Voluntary program
		Advisory bodies
		Self-regulation
		Principles
		Labelling
		Public awareness campaigns

Proper governance of AI will, as with any other area of governance, require all three approaches working cohesively to function properly.[51] Remunerative instruments rarely function properly without coercive powers being exercised to enforce basic industry rules to

[51] Mannes, "Governance, Risk, and Artificial Intelligence"

follow, nor would norm-setting work without sufficient incentives for regulated entities to undertake action.[52] As it currently stands, norm-setting is the dominant approach in AI governance with little to no remunerative or coercive instruments be applied. Selecting the right mix of policy instruments is critical to attaining policy success while minimizing risk, both in terms of what type of instruments to select and how broad the governance should be. Darrell M. West from the Brookings Institution notes that AI governance must include both "horizontal and vertical rules", with horizontal rules referring to AI challenges such as privacy that apply across all sectors, while vertical rules refer to AI risks that might differ between areas like retail and national defense.[53] Other scholars have also begun calling for layered models for AI governance moving forwards to address challenges brought upon by AI in multiple arenas and modes, thereby providing the best tool for each individual component of any problem.[54] [55]

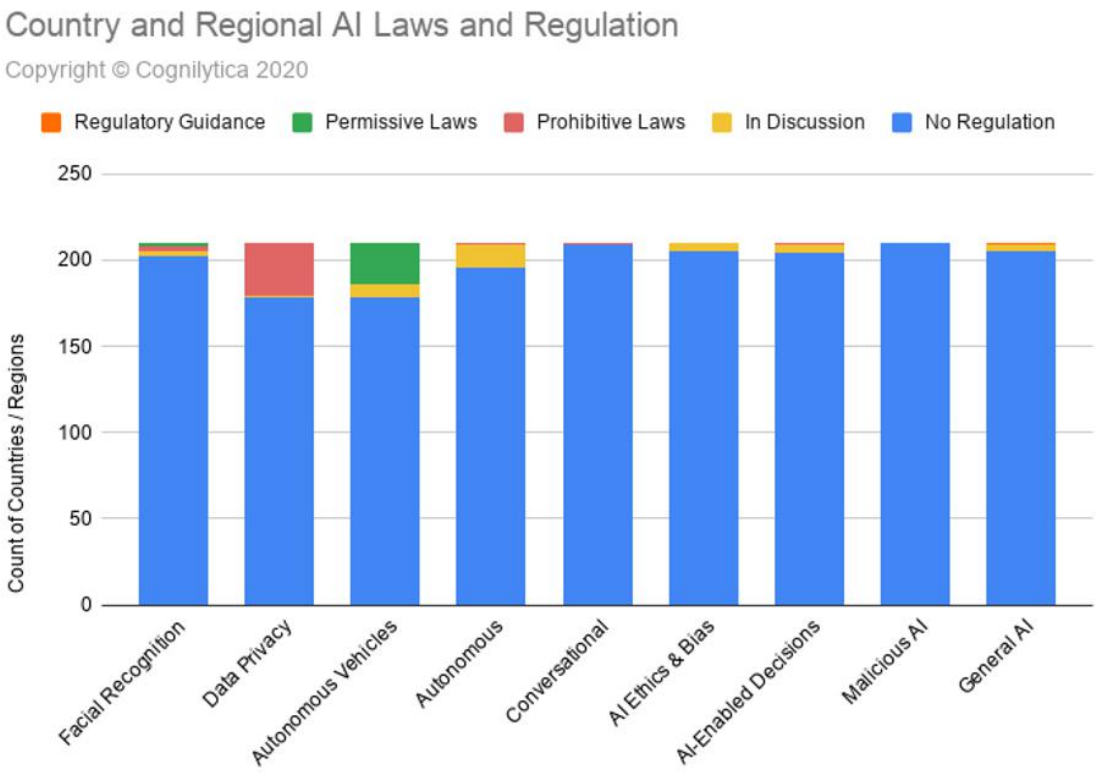
3. AI Governance Initiatives Around the World

As noted above, AI ethical principles have become ubiquitous across sectors and around the world. Jobin et al find that of the 84 ethical principles and guidelines they were able to locate in 2019, 19 came from private firms, 18 came from government agencies, and the rest, in descending order, were from academic or research institutions, intergovernmental organizations, non-profit organizations, professional associations, research alliances, one workers union, and one political party. More than one third of all AI ethical principles have come from the United States and United Kingdom together, followed by the European Union institutions, Japan, Germany, France, and Finland. From their analysis, as well as that of Zeng et al.'s, we find that there is global convergence across all sectors on five general principles – *transparency, fairness, non-maleficence, responsibility, and privacy.*[56]
As many have observed, however, general principles alone do not produce significant behavioral change. More fundamentally, despite sincere motivation to behave in ethical ways, abstract principles do not give much if any guidance to governments or regulated entities about what, in practice, to do to ensure that principles are met. They are not *actionable.* The challenges of complexity, speed of innovation and the global domain of many AI technologies, however, have to some extent paralyzed efforts to develop more concrete regulation. The result has been a substantial gap in *accountability.*

[52] Madarang, "Environmental Policy Instruments"
[53] West and Allen, "Turning Point"
[54] Wirtz et al., "The Dark Sides of Artificial Intelligence"
[55] Gasser, Urs and Almeida, "A Layered Model for AI Governance"
[56] Zeng et al., "Linking Artificial Intelligence Principles"

There is no shortage of extremely intelligent ideas on how governments might resolve challenges wrought by AI, utilizing creative solutions that blend policy instruments and generate incentives for all stakeholders to comply. Governance tools like regulatory sandboxes[57] and soft law approaches[58] (like Wi-Fi and LEED) have been implemented to some degree of success in other fields and have been thought to show potential for AI governance as well. Similarly, other ideas such as regulatory markets[59] and society-in-the-loop approaches[60] could be the future of generating common incentives between governments and AI developers. However, whether due to feasibility, capacity, or pure politics, the reality of what has been implemented as policy is far sparser. As seen below in Figure 2, almost all governments around the world have adopted "wait and see" approaches to governance of AI, with a few policies in place overseeing specific use cases such as lethal autonomous weapons systems, facial recognition and autonomous vehicles.[61]

Figure 2 [62]



[57] https://www.law.kuleuven.be/citip/blog/the-shifting-sands-of-regulatory-sandboxes-for-ai/
[58] https://www.brookings.edu/research/soft-law-as-a-complement-to-ai-regulation/
[59] Clark and Hadfield, "Regulatory Markets for AI Safety"
[60] Rahwan, "Society-in-the-loop: programming the algorithmic social contract"
[61] Cognilytica, "Worldwide AI Laws and Regulations 2020"
[62] Cognilytica, "Worldwide AI Laws and Regulations 2020"

Generally, the European Union has been the most active in proposing and implementing new laws and regulations around AI. On the other hand, the United States has taken a relatively permissive approach to AI governance at the federal level, though a number of states have taken a decidedly more vigorous regulatory approach.[63] Below is a compilation of tangible actions taken by governments and civil society in the past few years regarding responsible AI.

a. Standards

Standards are normative instruments established by non-governmental organizations that provide implementable guidelines for firms or individuals to abide by. These address some of the challenges regarding actionability that are presented by relying solely upon ethical principles by giving specific sets of management systems, provision of training and documentation, delegation of responsibilities, and internal performance audits. Standards are common across many industries – from food safety, to IT security, to environmental protection, and now to AI governance. Firms can demonstrate that they are able to conform to particular standards to be certified by standards organizations, providing them a reputational advantage over their competitors. A full list of standards compiled by the non-profit AI Global can be found here.

The most prolific standards organization across all industries is the International Organization for Standardization (ISO), and this remains true for responsible AI as well. The link above identifies 46 ISO standards relevant to responsible AI, which have either been released or are in the development process, including standards on the assessment of machine learning classification performance, how to address biases in AI systems, and big data standards. The Institute of Electrical and Electronics Engineers has also implemented 16 standards, such as how to manage privacy issues for systems or software that collect personal data by defining requirements that cover corporate data collection policies and quality assurance, and the technical elements required to create and grant access to a personalized Artificial Intelligence (AI) that will comprise inputs, learning, ethics, rules and values controlled by individuals.[64] Other standard-setting organizations that have published or are currently developing standards include Canada's CIO Strategy Council[65], the ITU-WHO Focus Group on Artificial Intelligence for Health (International Telecommunication

[63] ibid
[64] https://standards.ieee.org/initiatives/artificial-intelligence-systems/standards.html
[65] https://ciostrategycouncil.com/standards/technical-committees/

Union and World Health Organization)[66], and the European Telecommunications Standards Institute.[67]

b. Government Strategies, Directives, and Action Plans

Government strategies, directives, and action plans all outline how government institutions ought to address particular questions in the future. They map out what action government should take if or when they encounter AI challenges. Similar to ethical AI principles, they do not outline accountability or actionable items for AI developers and deployers but tend to be a good indicator of what tone governments will strike moving forwards. They represent a first step in governments' thinking on how best to govern AI in the future. Many governments around the world released strategies and action plans that outline how and why they plan on putting AI development on their political agendas. This generally involves expressing their willingness to invest in STEM education and research bodies, making recommendations on the application of AI in their various national industries, and how they plan on committing to developing laws and ethical norms that promote the development of AI.

Notably, the United States Office of Science and Technology Policy released specific guidelines for agency regulators, mandating that they, among other things, consider a set of detailed principles before considering regulation, to avoid scenarios where regulators "needlessly hamper AI innovation and growth." Among countries, this is the first government directive where a government provides direct guidance to its regulators on how regulation should proceed.

A list of government strategies, directives, and action plans can be found here.

c. Regulatory Guidance

As a normative policy instrument, regulatory guidance serves as a way for government bodies and agencies to inform AI firms about the regulator's thinking on a topic. Though these guidelines do not confer any rights or any binding requirements, they often promote compliance through exhortation.

To date, only two governments have published regulatory guidance in the field of AI. The first is Canada's algorithmic impact assessment tool, released by the Government of

[66] https://www.itu.int/en/ITU-T/focusgroups/Pages/default.aspx
[67] https://www.etsi.org/committee/1640

Canada's Treasury Board Secretariat in August 2018, which develops a framework that helps institutions better understand and mitigate the risks associated with automated decision-making systems by providing the appropriate governance, oversight and reporting, and audit requirements. This tool is a questionnaire that makes a private assessment of an algorithm's business process, data and system designed decisions.[68] The second is the Guidance on the AI auditing framework, released by the United Kingdom Government's Information Commissioner's Office in February 2020. This document provides users with a methodology to audit AI applications and ensure that they process personal data fairly.[69] Neither of these documents mandates any kind of requirements or enforcement, but both go substantially further than voluntary ethical principles by providing means of assessing compliance.

d. Legislation and Regulation

In spite being a highly technical topic, the governance of AI is primarily conducted through legislatures as opposed to being conducted through independent or specialized agencies. In fact, AI and ML have been particularly hot topics in legislatures in recent years, as seen below in Figures 3.1, 3.2, and 3.3.[70] While it remains to be seen whether this will be the case moving forwards, or whether governments will choose to govern AI through existing regulatory bodies or even create all new ones, regulatory agencies are currently not the primary medium of AI governance.[71] Though many regulatory bodies have begun to examine AI governance, there has been little to no concrete regulation published as of yet, while bills and acts have already been enacted into law. AI-related topics legislated to date include autonomous vehicles, data privacy, facial recognition, lethal autonomous weapons systems, and a few other "one-offs".

[68] "Algorithmic Impact Assessment - Évaluation De L'Incidence Algorithmique." Open Government, Government of Canada, https://open.canada.ca/aia-eia-js/?lang=en
[69] "Guidance on the AI Auditing Framework: Draft Guidance for Consultation." Ico, Information Commissioner's Office, https://ico.org.uk/media/2617219/guidance-on-the-ai-auditing-framework-draft-for-consultation.pdf
[70] "Artificial Intelligence Index Report 2019." Human-Centred Artificial Intelligence, Stanford University, 2019, https://hai.stanford.edu/sites/default/files/ai_index_2019_report.pdf
[71] Cihon et al., "Should Artificial Intelligence Governance be Centralised? Design Lessons from History"

Figure 3.1

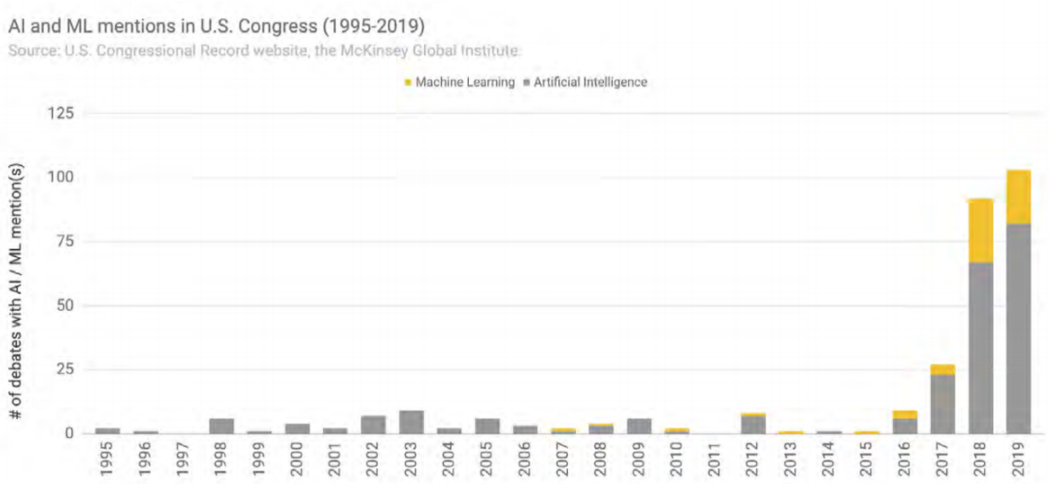


Figure 3.2

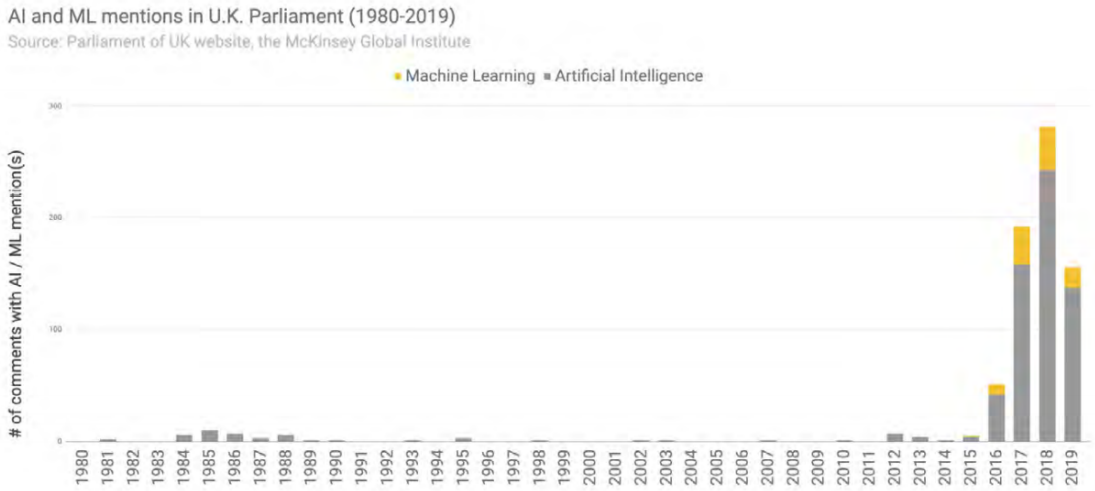
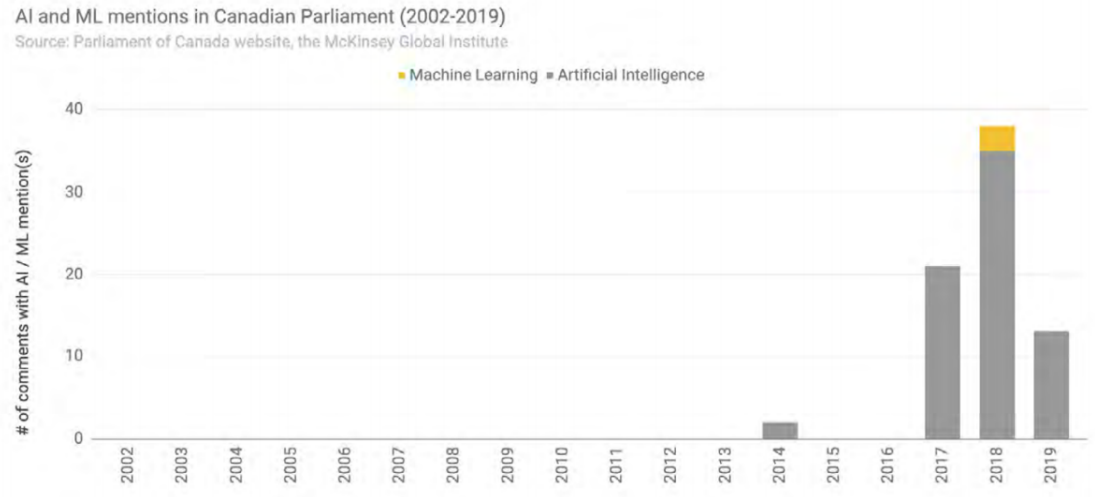


Figure 3.3



Autonomous Vehicles

According to a 2020 report from Cognilytica, the following 24 countries (primarily in North America, Europe, and East Asia) have permissive legislation allowing the testing and conditional use of autonomous vehicles: Australia (subnational), Austria, Belgium, Canada (subnational), China, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Lithuania, Netherlands, Poland, Singapore, Spain, Sweden, Taiwan, United Kingdom, United States (subnational). Eight other countries are currently in the midst of legislative proceedings to enable autonomous vehicle testing and usage.

Data Privacy

Though data privacy legislation and regulation are not exclusive to AI governance, it is highly relevant. Data-intensive machine learning techniques create a massive demand for data and as a result put pressure on existing approaches to data governance. 30 countries have been identified as having data protection laws that restrict sharing or exchange of data without prior consent. 27 of the 30 countries are European and therefore fall under the GDPR; while Brazil[72], the UK[73], and some jurisdictions within the United States have similar rights-based privacy legislation.[74]

Facial Recognition and Computer-Vision

As perhaps the most controversial application of AI, facial recognition and computer-vision technologies have been either restricted or outright banned in some United States jurisdictions. Illinois has passed legislation concerning consent around employers' use of AI analysis on video interviews of employees or potential employees.[75] Similarly, the New York State Senate and Assembly have both recently voted in favour of banning the use of facial recognition technology in public schools[76], while Oregon, New Hampshire, California, and Massachusetts have all passed legislation prohibiting state and local law enforcement agencies and officials from applying facial recognition technologies to body camera footage.[77] Both United States lawmakers and the European Union are currently considering

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[72] "Lei Geral De Proteção De Dados Pessoais (LGPD)." Planalto.gov.br, 2019, www.planalto.gov.br/ccivil_03/_Ato2015-2018/2018/Lei/L13709.htm

[73] "Data Protection Act 2018." Legislation.gov.uk, Queen's Printer of Acts of Parliament, 2018, www.legislation.gov.uk/ukpga/2018/12/contents/enacted

[74] "Texas Business and Commerce Code § 503.001." Findlaw, https://codes.findlaw.com/tx/business-and-commerce-code/bus-com-sect-503-001.html

[75] "EMPLOYMENT (820 ILCS 42/) Artificial Intelligence Video Interview Act." Illinois Compiled Statutes, Illinois General Assembly, www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=4015

[76] "NY State Assembly Bill A6787D." NY State Senate, New York State Senate, 24 July 2020, www.nysenate.gov/legislation/bills/2019/a6787

[77] Samsel, Haley. "California Becomes Third State to Ban Facial Recognition Software in Police Body Cameras." Security Today, 10 Oct. 2019, https://securitytoday.com/articles/2019/10/10/california-to-become-third-state-to-ban-facial-recognition-software-in-police-body-cameras.aspx

placing limitations on facial recognition technology. Conversely, China and Zimbabwe have gone the other way, and enacted permissive legislation to specifically allow facial recognition in ways not otherwise previously permitted by law.

Lethal Autonomous Weapons Systems (LAWS)

A number of countries are discussing the outright ban of lethal autonomous weapons systems, stemming from the April 2018 meeting of the United Nations Convention on Certain Conventional Weapons Group of Government Experts meeting on LAWS. As a result of these discussions, 13 countries, primarily in Europe, Africa, and Latin America, have discussed a ban on LAWS in their respective legislatures. Notably, Belgium has gone the furthest, and has passed a non-binding resolution in its parliament to prohibit the use of LAWS by Belgian armed forces.[78]

Miscellaneous

Other noteworthy pieces of AI governance legislation include Idaho's law requiring that all documents, data, and records use to build or validate pre-trial court risk assessment AI tools "shall be open to public inspection, auditing, and testing"[79], and California has been more active in general legislation around AI applications, such as their law prohibiting the use of chatbots that mislead people about whether they are real for commercial or political purposes[80], and law banning the use of deepfakes for political purposes[81]

The GDPR also guarantees individuals the right to have a decision not based solely on automated processing be made or to be reviewed by a natural person instead of a computer. And of course existing tools such as tort liability for automobile accidents or protections against fraud, defamation and misleading advertising are available to address some AI misuse.[82] In some cases, the absence of AI-specific legislation leaves the field open for developers to deploy as they wish; in others, deployment is blocked.[83] But to date, no jurisdiction has passed legislation governing malicious AI, AI bias, predictive policing

[78] "Preventive Regulation of Autonomous Weapon Systems." SWP, www.swp-https://berlin.org/en/publication/preventive-regulation-of-autonomous-weapon-systems/
[79] "PRETRIAL RISK ASSESSMENT TOOLS." Idaho State Legislature, https://legislature.idaho.gov/statutesrules/idstat/Title19/T19CH19/SECT19-1910/
[80] "SB-1001 Bots: Disclosure." California Legislative Information, State of California, 2018, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1001
[81] "B-730 Elections: deceptive audio or visual media." California Legislative Information, State of California, 2019, https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200AB730
[82] Brundage and Bryson, "Smart Policies for Artificial Intelligence"
[83] Reference to Canada's blocking deployment of autonomous marine research vehicles due to absence of regulation.

tools, or general AI legislation, but some jurisdictions, particularly in North America and Europe, have discussed these topics within their respective legislatures.

e. Pilot projects

Though they do not fit perfectly into any particular type of policy instrument, pilot projects are useful tools governments to consider how best to approach governance in the future. For instance, the United Kingdom's financial regulator, the Financial Conduct Authority, launched a regulatory sandbox pilot in 2015 which allowed firms to develop and test new financial and fintech products without needing to undergo rigorous authorization.[84] Though not permanently sustainable, this allows both firms to work out any issues with their products and for governments to gain insight and expertise on how best to regulate a new product.

The United States Food & Drug Administration (FDA) is currently piloting a Digital Health Software Program that helped "inform the development of a future regulation that streamlines oversight of software-based medical devices developed by manufacturers".[85] The FDA provides certification to firms in good standing with the agency prior to the release of their new products by focusing on the software or technology developer instead of the product, similar to how traditional medical devices are inspected. In doing so, the agency hopes to ensure rapid approvals of new AI-powered medical technologies. Similarly, the United Kingdom Government's Office for Artificial Intelligence is partnering with the non-profit, the Open Data Institute, to pilot new models of data governance through "data trusts".[86] In doing so, they aim to determine how and where data trusts should be applied with respect to data governance.

[84] "Regulatory Sandbox." FCA, 5 Oct. 2020, www.fca.org.uk/firms/innovation/regulatory-sandbox.
[85] "Digital Health Software Precertification (Pre-Cert) Program." FDA, www.fda.gov/medical-devices/digital-health-center-excellence/digital-health-software-precertification-pre-cert-program
[86] "UK's First 'Data Trust' Pilots to Be Led by the ODI in Partnership with Central and Local Government." Open Data Institute, 20 Nov. 2018, https://theodi.org/article/uks-first-data-trust-pilots-to-be-led-by-the-odi-in-partnership-with-central-and-local-government/.

4. Conclusion

Adoption of AI across society at large is happening worldwide as firms, individuals, and governments are all recognizing the immense benefits proper deployment of AI systems can confer. However, because of the very real challenges facing society that come hand in hand with the use of AI, the case for instituting tangible AI governance initiatives grows stronger every day. Unfortunately, there are far more suggestions and discussions on AI governance than actual laws and regulations. Whether they are ethical principles created by firms as a means of self-regulation or government strategies, little has been actually done to ensure that challenges sufficiently addressed. New legislation governing AI has tended to be focused on particular use cases, such as permitting the testing of autonomous vehicles or banning facial recognition for law enforcement agencies. As the various applications of AI become increasingly ubiquitous around the world, governments will soon be compelled to implement governance mechanisms. Given the pace of both AI adoption and AI principles being published, it is reasonable to assume that the landscape of AI governance will look significantly different in a few years' time. As with any area of governance, but particularly for something concerning both high benefits and high risks, it is imperative that governments consider which policy instruments are appropriate for particular situations, to ensure that both innovation and the public interest are maximized.

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