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Regulation of Artificial Intelligence in Selected Jurisdictions

January 2019

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Comparative Summary

This report examines the emerging regulatory and policy landscape surrounding artificial intelligence (AI) in jurisdictions around the world and in the European Union (EU). In addition, a survey of international organizations describes the approach that United Nations (UN) agencies and regional organizations have taken towards AI. As the regulation of AI is still in its infancy, guidelines, ethics codes, and actions by and statements from governments and their agencies on AI are also addressed. While the country surveys look at various legal issues, including data protection and privacy, transparency, human oversight, surveillance, public administration and services, autonomous vehicles, and lethal autonomous weapons systems, the most advanced regulations were found in the area of autonomous vehicles, in particular for the testing of such vehicles.

The Oxford Dictionary defines AI as "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages." The majority of surveyed jurisdictions see AI in a positive light and aspire to become leaders in the field. Many countries have therefore developed or are in the process of developing national AI or digital strategies and action plans. Canada was the first country to launch such a national AI strategy in 2017. The strategies and action plans highlight, among others things, the need to develop ethical and legal frameworks to ensure that AI is developed and applied based on the country's values and fundamental rights. Many countries have established specific commissions to look into these issues. However, with the exception of the EU, no jurisdiction has yet published such specific ethical or legal frameworks for AI. In December 2018, an expert group of the European Commission released draft AI ethics guidelines that set out a framework for designing trustworthy AI. South Korea in 2008 enacted a general law on the "intelligent robot industry" that, among other things, authorized the government to enact and promulgate a charter on intelligent robot ethics. However, it appears that no such charter has yet been enacted.

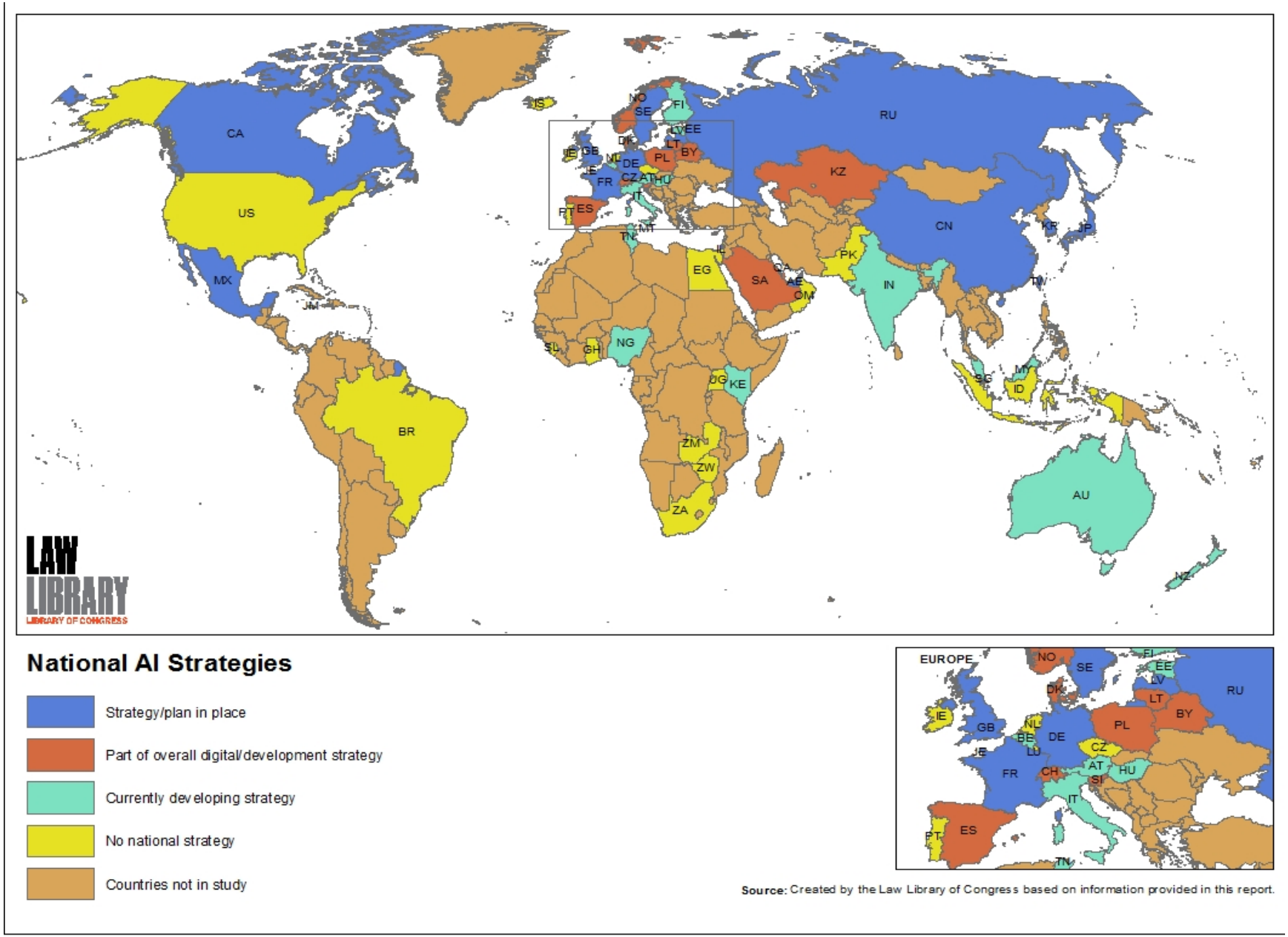
Some countries have taken the first steps to use AI in the area of justice. In Portugal, a legal assistance tool will be launched that conducts research on the requests made and learns from them. In the future, it might be used to predict the probability of success of a judicial process. Likewise, in France the Courts of Appeals of Rennes and Douai tested predictive justice software on various appeals cases in 2017.

Many of the surveyed countries are contracting parties to the 1968 Vienna Convention on Road Traffic, an international agreement with the objective to "facilitate international road traffic and to increase road safety through the adoption of uniform traffic rules." A 2016 amendment to the Convention on Road Traffic removed legal obstacles for the contracting parties to allow transferring driving tasks to automated technologies. Countries that have enacted regulations to allow for the testing of autonomous vehicles on public roads generally require that a human driver be present in the car who can take over the driving functions if necessary. As an exception, the Netherlands and Lithuania have passed legislation that allows the experimental use of self-driving vehicles without a human driver present in the car on public roads. Israel passed a regulation and a directive for experimentation in autonomous vehicles. Authorization to conduct experiments in autonomous vehicles requires, among others, a review by a professional committee. Spain, Qatar,

and the United Arab Emirates authorize the testing without a human driver present on a case-by-case basis, but have not enacted specific legislation. New Zealand, unlike other countries, has no specific legal requirement for vehicles to have drivers. However, the government has not received any formal requests to test autonomous vehicles on public roads. In Singapore and the Province of Ontario, Canada, it is up to the discretion of the responsible authority to approve driverless testing. Other testing requirements for autonomous vehicles may include insurance, the transmission of certain data to the government, or accident recorders in the vehicle. Finland allows the testing of autonomous vehicles, but one political party has suggested forbidding nonautonomous vehicles as a long-term goal.

With regard to lethal autonomous weapons systems (LAWS), countries regularly meet in the Governmental Group of Experts (GGE) of the Convention on Certain Conventional Weapons (CCW) to discuss the applicability of international humanitarian law norms to LAWS. The majority of countries agree that meaningful human control is necessary for LAWS. Countries either support the adoption of a new, legally-binding treaty to ban the use of LAWS; support the adoption of a political declaration as a middle ground to develop a shared understanding of the challenges posed by LAWS; oppose the adoption of a treaty as basic principles remain ill-defined; or think that no action is necessary at this point.

The following visuals give an overview of the different positions and actions that countries have taken with regard to national AI strategies and actions plans, autonomous vehicles, and LAWS.


National AI Strategies
Strategy/plan in place
Part of overall digital/development strategy
Currently developing strategy
No national strategy
Countries not in study
EUROPE
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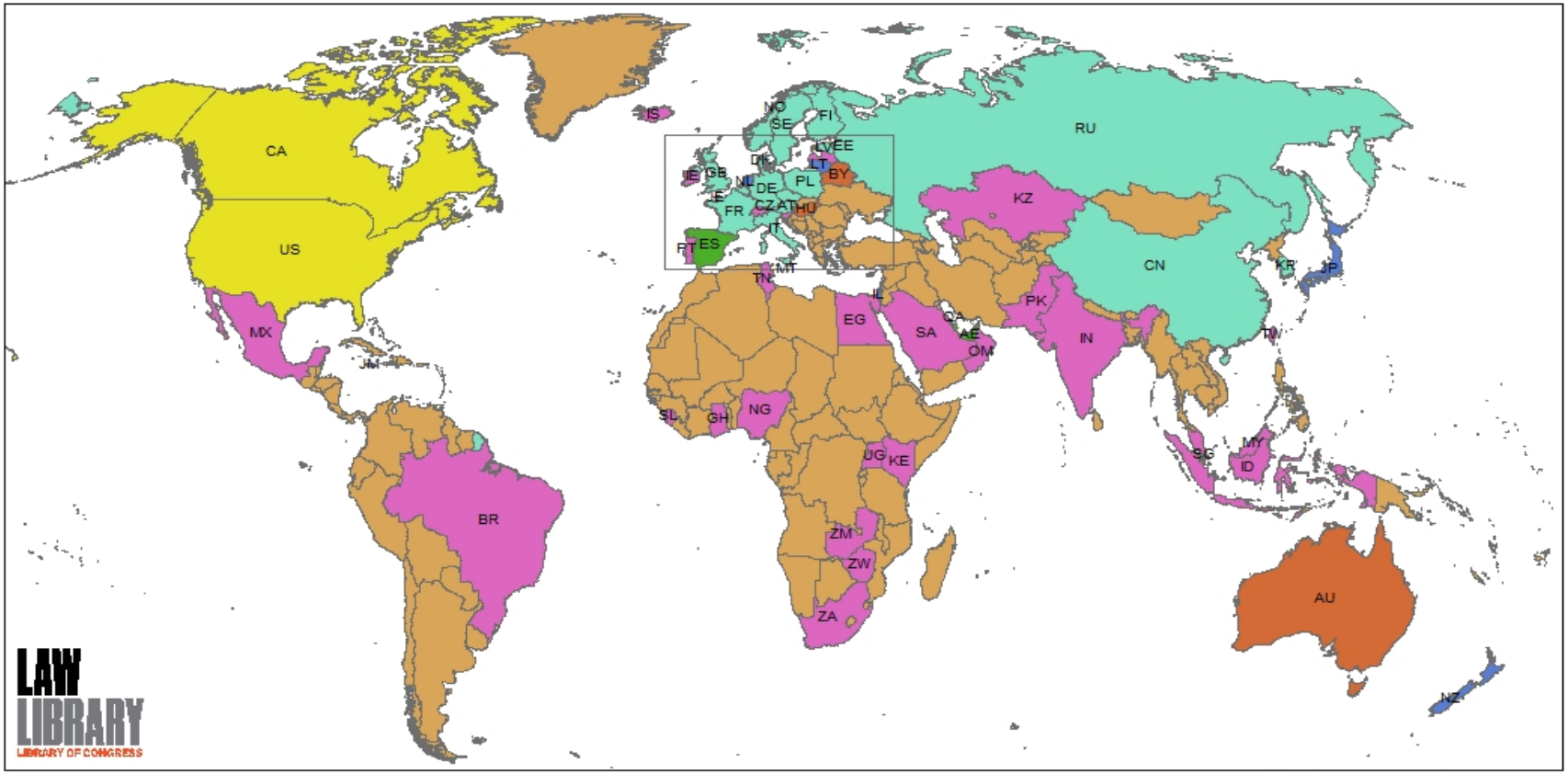
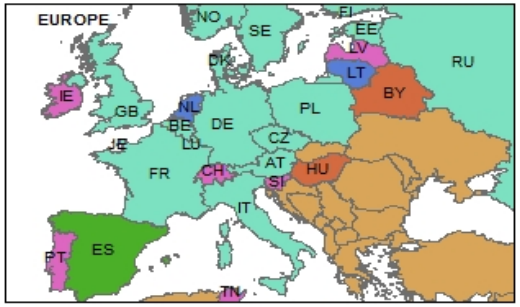


Testing of Autonomous Vehicles

- Allowed without human driver
- Allowed only with human driver
- Allowed but no specific legislation
- Countries not in study
- Allowed with/without human driver
- Varies by state/province
- Not allowed/no specific legislation



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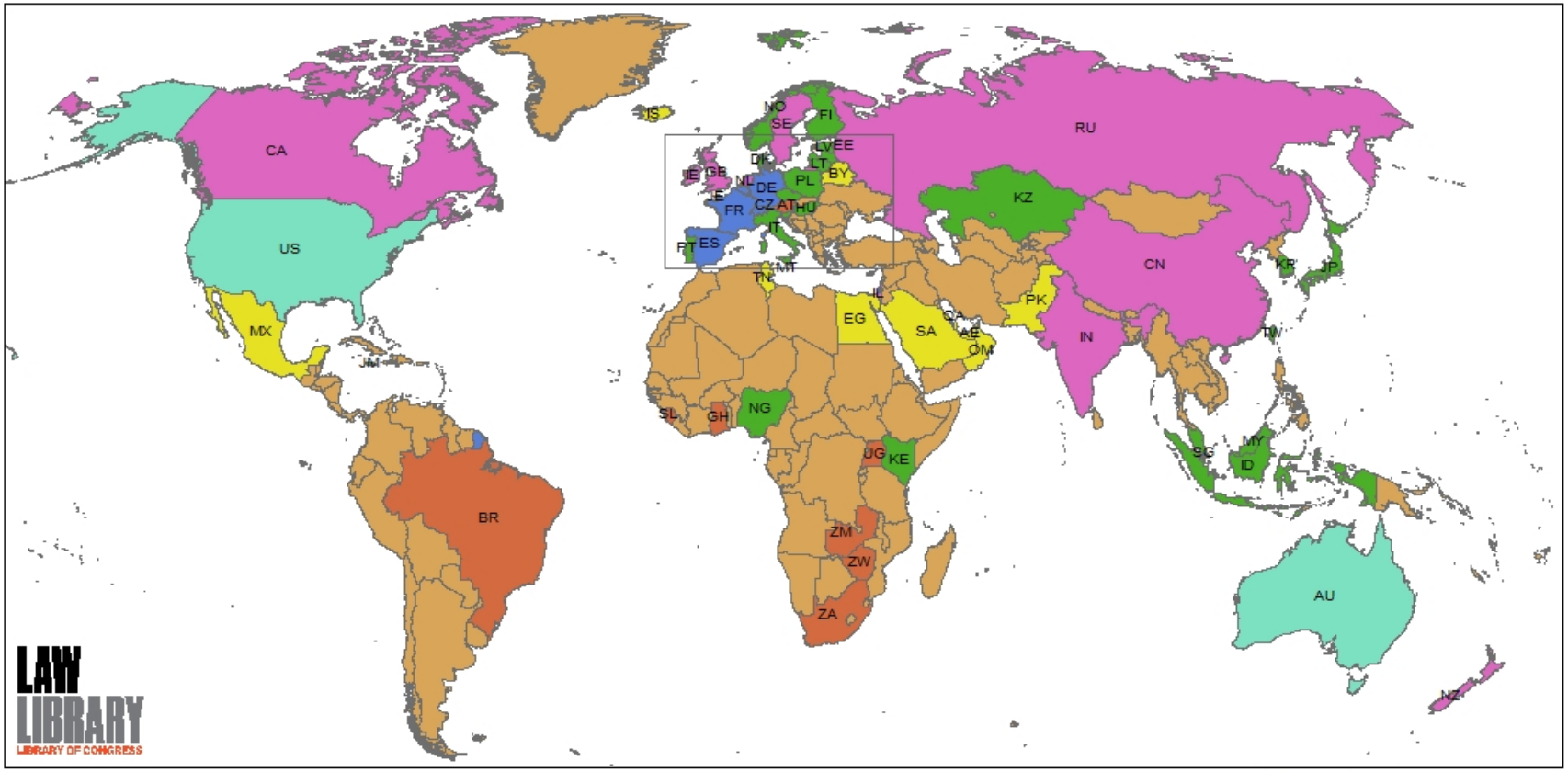

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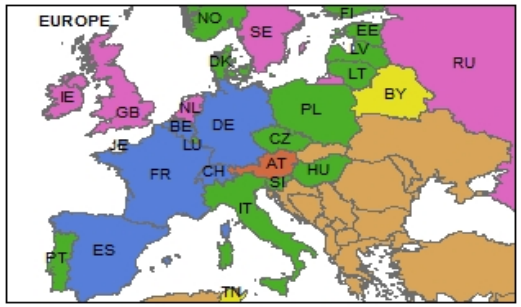
Position on Lethal Autonomous Weapons Systems

- Adoption of political declaration
- Ban supported
- Negotiate treaty
- Further study/definitions needed
- No action necessary at this time
- No official position
- Countries not in study



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International and Regional Approaches

I. International Measures

A. United Nations Law and Policy

1. UNICRI and Centre for Artificial Intelligence and Robotics

In early 2015, the United Nations Interregional Crime and Justice Research Institute (UNICRI) established a center on AI and robotics to "help focus expertise on Artificial Intelligence (AI) throughout the UN in a single agency."[1] With the support of the Municipality of the Hague and the Ministry of Foreign Affairs of the Netherlands, UNICRI "signed the host country agreement for the opening of its Centre for Artificial Intelligence and Robotics in The Hague, the Netherlands, in September 2017."[2] This Centre is focused on "understanding and addressing the risks and benefits of AI and robotics from the perspective of crime and security through awareness-raising, education, exchange of information, and harmonization of stakeholders."[3] UNICRI has developed a "large international network of stakeholders with whom it collaborates, including the International Criminal Police Organization (INTERPOL), the International Telecommunications Union (ITU), the Institute of Electrical and Electronics Engineers (IEEE), the Foundation for Responsible Robotics, the World Economic Forum, Centre for Future Intelligence, and many more."[4] According to the UNICRI website,

> [d]uring the 71st session of the United Nations General Assembly, on 29 September 2016, the Director of UNICRI, Ms. Cindy J. Smith, announced that UNICRI was in the process of opening of the first Centre on Artificial Intelligence and Robotics within the United Nations system. She explained that "The aim of the Centre is to enhance understanding of the risk-benefit duality of Artificial Intelligence and Robotics through improved coordination, knowledge collection and dissemination, awareness-raising and outreach activities. The Centre will open in The Hague, The Netherlands. The main outcome of the above initiative will be that all stakeholders, including policy makers and governmental officials, possess improved knowledge and understanding of both the risks and benefits of such technologies and that they commence discussion on these risks and potential solutions in an appropriate and balanced manner."[5]

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[1] *AI Policy – United Nations*, FUTURE OF LIFE INSTITUTE, https://futureoflife.org/ai-policy-united-nations/ (last visited Jan. 4, 2019), *archived at* https://perma.cc/9CZ2-ETNX.

[2] *Centre on Artificial Intelligence and Robotics*, UNICRI, http://www.unicri.it/topics/ai_robotics/centre/ (last visited Dec. 10, 2018), *archived at* https://perma.cc/475Y-ZZ6N.

[3] *Id*.

[4] *Id*.

[5] *The Hague, The Netherlands UNICRI Centre for Artificial Intelligence and Robotics*, UNICRI, http://www.unicri.it/in_focus/on/UNICRI_Centre_Artificial_Robotics (last visited Dec. 10, 2018), *archived at* https://perma.cc/RCN7-92BL.

In October 2015, during the 70th Session of the UN General Assembly, UNICRI held a side event titled "Rising to the Challenges of International Security and the Emergence of Artificial Intelligence" that took place in United Nations Headquarters, New York.[6]

2. International Telecommunication Union

The ITU is a specialized agency of the UN for information and communication technologies, and "has become one of the key UN platforms for exploring the impact of AI."[7] The ITU website states that it "will provide a neutral platform for government, industry and academia to build a common understanding of the capabilities of emerging AI technologies and consequent needs for technical standardization and policy guidance."[8] The Future of Life Institute (FLI) notes that

> ITU organized the event, "AI for Good Global Summit" in 2017 and 2018, which was billed as "the leading United Nations platform for dialogue on AI." The Summits have focused on strategies to ensure trusted, safe and inclusive development of AI technologies and equitable access to their benefits. Teams at the Summits highlighted the ability of AI to help to achieve the Sustainable Development Goals (SDGs) through abilities such as mapping poverty and aid with natural disasters using satellite imagery, and helping achieve Universal Health Coverage.
>
> ITU also has a Focus Group on Machine Learning for Future Networks including 5G intended to draft technical reports and specifications for machine learning for future networks.[9]

B. Convention on Certain Conventional Weapons and Lethal Autonomous Weapons Systems

1. CCW Informal Meeting of Experts (2013–2016)

The Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (usually referred to as the Convention on Certain Conventional Weapons, CCW) with three annexed Protocols was adopted on October 10, 1980, and entered into force on December 2, 1983.[10] According to the UN Office at Geneva (UNOG),

> [t]he purpose of the Convention is to ban or restrict the use of specific types of weapons that are considered to cause unnecessary or unjustifiable suffering to combatants or to affect civilians indiscriminately. The structure of the CCW – a chapeau Convention and

[6] *AI Policy – United Nations*, *supra* note 1.

[7] *Id*.

[8] *Artificial Intelligence*, ITU, https://www.itu.int/en/ITU-T/AI/ Pages/default.aspx (last visited Dec. 10, 2018), *archived at* https://perma.cc/MMQ3-DNTA.

[9] *AI Policy – United Nations*, *supra* note 1.

[10] *The Convention on Certain Conventional Weapons*, THE UNITED NATIONS OFFICE AT GENEVA (UNOG), https://www.unog.ch/80256EE600585943/(httpPages)/4F0DEF093B4860B4C1257180004B1B30?OpenDocument (last visited Dec. 28, 2018), *archived at* https://perma.cc/7RG3-PCUX.

> annexed Protocols – was adopted in this manner to ensure future flexibility. The Convention itself contains only general provisions. All prohibitions or restrictions on the use of specific weapons or weapon systems are the object of the Protocols annexed to the Convention.[11]

In the last few years, the CCW Meeting of High Contracting Parties has held meetings to discuss LAWS. In 2013, the CCW Meeting of State Parties decided that the "Chairperson will convene in 2014 an informal Meeting of Experts to discuss the questions related to emerging technologies in the area of [LAWS]."[12] The first informal Meeting of Experts was held in 2014 and it included sessions on the technical, ethical and sociological, legal, and operational and military aspects of LAWS.[13] According to one journal article,

> [i]n the session on legal aspects, States examined whether LAWS could, at the current state of technology (or people's lay understanding of technology), comply with existing international law, in particular international humanitarian law (IHL), including the 1949 Geneva Conventions, the Martens Clause, and customary international law. States and legal experts stressed that any development and use of LAWS would need to comply with IHL and there were divergent views regarding whether it would be possible for LAWS to comply with the rules, especially given the current state of technology.[14]

Two informal Meetings of Experts were also held in 2015[15] and 2016.[16] The 2015 Meeting "intended to build upon the work from the previous year by delving deeper into the issues surrounding the legal, technical, ethical, and operational and military aspects of LAWS. The legal weapons review process was discussed in the session devoted to challenges to IHL due to increasing degrees of autonomy."[17]

Approximately eighty countries attended the three informal CCW meetings on LAWS at the UN in Geneva, "together with key UN agencies, the International Committee of the Red Cross, and the Campaign to Stop Killer Robots. These meetings helped increase awareness and understanding

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[11] *Id.*

[12] *Background on Lethal Autonomous Weapons Systems in the CCW*, UNOG, https://www.unog.ch/80256EE600585943/(httpPages)/8FA3C2562A60FF81C1257CE600393DF6?OpenDocument (last visited Dec. 17, 2018), *archived at* https://perma.cc/UV9C-EP3T.

[13] U.N. CCW, 2014 Sess., U.N. Doc. CCW/MSP/2014/3 (June 11, 2014), https://documents-dds-ny.un.org/doc/UNDOC/GEN/G14/048/96/pdf/G1404896.pdf?OpenElement, *archived at* https://perma.cc/2C2R-NY3X.

[14] Michael W. Meier, *Lethal Autonomous Weapons Systems (Laws): Conducting a Comprehensive Weapons Review*, 30 TEMP. INT'L & COMP. L.J. 119, 121 (2016), https://sites.temple.edu/ticlj/files/2017/02/30.1.Meier-TICLJ.pdf, *archived at* https://perma.cc/PP8G-ULAU.

[15] U.N. CCW, 2015 Sess., U.N. Doc. CCW/MSP/2015/3 (June 2, 2015), https://documents-dds-ny.un.org/doc/UNDOC/GEN/G15/111/60/pdf/G1511160.pdf?OpenElement, *archived at* https://perma.cc/PV85-NHJP.

[16] *2016 Meeting of Experts on LAWS*, UNOG, https://www.unog.ch/80256EE600585943/(httpPages)/37D51189AC4FB6E1C1257F4D004CAFB2?OpenDocument (last visited Dec. 17, 2018), *archived at* https://perma.cc/38GB-TFPC.

[17] Meier, *supra* note 14, at 122.

of the ethical, human rights, legal, operational, proliferation, technical, and other challenges posed by these weapons."[18]

2. CCW Group of Governmental Experts Meetings (2017–2018)

Building on the three informal sessions, at the 2016 Fifth CCW Review Conference, presided over by Ambassador Tehmina Janjua of Pakistan, the High Contracting Parties decided to establish a Group of Governmental Experts (GGE) on LAWS to meet in 2017 with a "mandate to assess questions related to emerging technologies in the area of lethal autonomous weapons systems. The GGE was chaired by Ambassador Amandeep Singh Gill of India."[19]

At their 2017 Meeting,[20] the High Contracting Parties to the CCW agreed that the GGE on LAWS would meet again in 2018[21] for a duration of ten days in Geneva, and that meeting took place April 9–13, 2018. A second meeting was held August 27–31, 2018. Ambassador Amandeep Singh Gill of India chaired both meetings. The following "overarching issues" were discussed during the 2018 meetings:

> 1. Characterization of the systems under consideration in order to promote a common understanding on concepts and characteristics relevant to the objectives and purposes of the CCW;
> 2. Further consideration of the human element in the use of lethal force; aspects of human-machine interaction in the development, deployment and use of emerging technologies in the area of lethal autonomous weapons systems;
> 3. Review of potential military applications of related technologies in the context of the Group's work;
> 4. Possible options for addressing the humanitarian and international security challenges posed by emerging technologies in the area of LAWS in the context of the objectives and purposes of the Convention without prejudging policy outcomes and taking into account past, present and future proposals.[22]

Certain states and nongovernmental organizations (NGOs) have expressed frustration that, despite five years of work on AWS and calls for urgent action on this issue, there has been little progress. However, it appears momentum has been growing for "negotiations on a legally binding

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[18] Human Rights Watch, *Statement to the UN General Assembly First Committee on Disarmament and International Security* (Oct. 10, 2017), https://www.hrw.org/news/2017/10/10/statement-un-general-assembly-first-committee-disarmament-and-international-security, *archived at* https://perma.cc/T7KQ-CK3Q.

[19] *Background on Lethal Autonomous Weapons Systems in the CCW*, *supra* note 12.

[20] *2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS)*, UNOG, https://www.unog.ch/80256EE600585943/(httpPages)/F027DAA4966EB9C7C12580CD0039D7B5 (last visited Dec. 17, 2018), *archived at* https://perma.cc/V224-228X.

[21] *2018 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS)*, UNOG, https://www.unog.ch/__80256ee600585943.nsf/(httpPages)/7c335e71dfcb29d1c1258243003e8724?OpenDocument&ExpandSection=7 (last visited Dec. 17, 2018), *archived at* https://perma.cc/7CQ7-W5SF.

[22] *Id.*; U.N. CCW, Geneva, 9–13 April 2018 and 27–31 August 2018, U.N. Doc. CCW/GGE.1/2018/3 (Oct. 23, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/20092911F6495FA7C125830E003F9A5B/$file/CCW_GGE.1_2018_3_final.pdf, *archived at* https://perma.cc/C5Z3-Q9T4.

instrument to prevent the development and use of LAWS."[23] According to Amnesty International, "[t]he majority of states at the last CCW meeting in April 2018 emphasized the importance of retaining human control over weapons systems and the use of force, and expressed support for developing new international law on lethal autonomous weapons systems."[24] Twenty-six of these states called for a total ban (including Austria, Brazil, and Egypt) and China has also called for a "new CCW protocol to prohibit the use of fully autonomous weapons systems."[25]

However, a number of states "oppose creating legally binding prohibitions, including governments who are already known to be developing autonomous weapons systems, such as France, Israel, Russia, South Korea, the US, and the UK."[26] According to the NGO Reaching Critical Will, "[t]he Non-Aligned Movement,[27] the largest bloc of states operating in the UN, has called for a legally binding instrument stipulating prohibitions and regulations of AWS. Austria, Brazil, and Chile collectively tabled a recommendation for a new CCW mandate 'to negotiate a legally-binding instrument to ensure meaningful human control over the critical functions' of weapon systems."[28] In a September 2018 report Reaching Critical Will notes that

> [a] few others, mostly European states, expressed their interest in other mechanisms, such as a political declaration proposed by France and Germany. They envision a declaration to be a good vehicle to outline principles for the development and use of AWS, such as the necessity of human control in the use of force and the importance of human accountability. Some also suggested the development of a code of conduct on the development and use of AWS could be useful in this context.[29]

The August 2018 meeting ended with states agreeing on the conclusions and recommendations from the meeting rather than a decision on starting to negotiate a treaty.[30] These included possible guiding principles, characterization of the systems under consideration, the human element in the use of lethal force, a review of potential military applications of related technologies, and the possible options for addressing the humanitarian and international security challenges related to

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[23] Ray Acheson, Reaching Critical Will, *Mind the Downward Spiral*, CCW REPORT Vol. 6, No. 11 (Sept. 4, 2018), http://reachingcriticalwill.org/disarmament-fora/ccw/2018/laws/ccwreport/12930-ccw-report-vol-6-no-11, *archived at* https://perma.cc/4CNZ-YQZR.

[24] *UN: Decisive Action Needed to Ban Killer Robots – Before It's Too Late*, AMNESTY INTERNATIONAL (Aug. 27, 2018), https://www.amnesty.org/en/latest/news/2018/08/un-decisive-action-needed-to-ban-killer-robots-before-its-too-late/, *archived at* https://perma.cc/78XB-CFHK.

[25] *Id*.

[26] *Id*.

[27] GOVERNMENT OF INDIA, MINISTRY OF EXTERNAL AFFAIRS, MEMBERS AND OTHER PARTICIPANTS OF NAM MOVEMENT, https://www.mea.gov.in/Images/pdf/Members-and-other-participants.pdf (last visited Jan. 4, 2019), *archived at* https://perma.cc/DZ3V-ZLMK.

[28] Ray Acheson, Reaching Critical Will, *New Law Needed Now*, CCW REPORT Vol. 6, No. 9 (Aug. 30, 2018), http://www.reachingcriticalwill.org/disarmament-fora/ccw/2018/laws/ccwreport/12927-ccw-report-vol-6-no-9, *archived at* https://perma.cc/GG5X-VKLU.

[29] Acheson, *Mind the Downward Spiral*, *supra* note 23.

[30] *Id*.

LAWS.[31] A decision was made to continue the GGE's work in 2019, and at the CCW's Annual Meeting it was decided to meet on March 25–29, 2019, and August 20–21, 2019.[32]

C. General Assembly

The First Committee of the General Assembly "deals with disarmament, global challenges and threats to peace that affect the international community and seeks out solutions to the challenges in the international security regime."[33] On October 26, 2018, the First Committee held a meeting where delegates weighed "potential risks to international security posed by such new technologies as militarized drones" and "exchanged views today on ways to control these lethal autonomous weapons."[34] Moreover, "[d]uring the debate, many delegates expressed support for the Group of Governmental Experts on lethal autonomous weapons systems. Some called on the Group to find ways towards a common understanding and precise definitions of such weapons."[35]

In October 2017, the UN held a joint meeting of the UN Economic and Social Council (ECOSOC) and the Economic and Financial Committee (Second Committee) to "consider the role and impact of AI on sustainable development."[36]

D. International Human Rights

1. Human Rights Council

In 2017, two reports were submitted to the UN Human Rights Council (UNHRC) that discussed the implications of AI technologies on human rights.[37] On May 5, 2017, a report[38] from the Office

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[31] U.N. Doc. CCW/GGE.1/2018/3, *supra* note 22.

[32] U.N. CCW, Geneva, 21–23 Nov. 2018, U.N. Doc. CCWW/MSP/2018/… (Nov. 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/5A2AB60BAADB6712C125835B004327A5/$file/CCW_MSP_2018_CRP.1_as+submittedfromgDocRev.1CleanforWebsiterevEdits5December2018Final.pdf (advance copy), *archived at* https://perma.cc/229P-QNYV.

[33] *Disarmament and International Security (First Committee)*, GENERAL ASSEMBLY OF THE UNITED NATIONS, http://www.un.org/en/ga/first/ (last visited Dec. 17, 2018), *archived at* https://perma.cc/46RZ-DJ4U.

[34] *First Committee Weighs Potential Risks of New Technologies as Members Exchange Views on How to Control Lethal Autonomous Weapons, Cyberattacks*, UNITED NATIONS (Oct. 26, 2018), https://www.un.org/press/en/2018/gadis3611.doc.htm, *archived at* https://perma.cc/R5AR-ZLKY.

[35] *Id*.

[36] *Looking to Future, UN to Consider How Artificial Intelligence Could Help Achieve Economic Growth and Reduce Inequalities*, UNITED NATIONS (Oct. 9, 2017), https://www.un.org/sustainabledevelopment/blog/2017/10/looking-to-future-un-to-consider-how-artificial-intelligence-could-help-achieve-economic-growth-and-reduce-inequalities/, *archived at* https://perma.cc/9WGH-TSVT.

[37] Daniel Cullen, *Why Artificial Intelligence Is Already a Human Rights Issue*, OXFORD HUMAN RIGHTS HUB (Jan. 31, 2018), http://ohrh.law.ox.ac.uk/why-artificial-intelligence-is-already-a-human-rights-issue/, *archived at* https://perma.cc/A5T3-LF64.

[38] UN Human Rights Council (UNHRC), Thirty-fifth Session, 6–23 June 2017, U.N. Doc. A/HRC/35/9 (May 5, 2017), https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/219/52/PDF/G1721952.pdf?OpenElement, *archived at* https://perma.cc/V84G-ABVH.

of the High Commissioner for Human Rights on the topic of "ways to bridge the gender digital divide from a human rights perspective" made reference to "algorithmic discrimination and bias, and the potential for AI to drive improvements in women's health."[39] A report from the Independent Expert on the rights of older persons[40] "addressed the opportunities and challenges of robotics, artificial intelligence and automation in the care of older persons."[41]

2. *Special Rapporteur on the Promotion and Protection of the Right to Freedom of Opinion and Expression*

On October 2018, David Kaye, the UN Special Rapporteur for the promotion and protection of the right to freedom of opinion and expression, released his report on the implications of AI technologies for human rights.[42] The report[43] was submitted to the UN General Assembly on August 29, 2018,[44] and presented to the Social, Humanitarian and Cultural Committee at the UN General Assembly on October 22, 2018.[45] According to European Digital Rights,

> [t]he text focuses in particular on freedom of expression and opinion, privacy and non-discrimination. In the report, the UN Special Rapporteur David Kaye first clarifies what he understands by artificial intelligence and what using AI entails for the current digital environment, debunking several myths. He then provides an overview of all potential human rights affected by relevant technological developments, before laying down a framework for a human rights-based approach to these new technologies.[46]

The report examines the impact of AI on the "information environment, and proposes a human rights framework for the design and use of technologies comprising AI by states and private actors."[47]

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[39] Cullen, *supra* note 37.

[40] UNHRC, Thirty-fifth Session, 11–29 September 2017, U.N. Doc. A/HRC/36/48 (July 21, 2017), https://documents-dds-ny.un.org/doc/UNDOC/GEN/G17/219/52/PDF/G1721952.pdf?OpenElement, *archived at* https://perma.cc/TC8K-LN5F.

[41] Cullen, *supra* note 37.

[42] *UN Special Rapporteur Analyses AI's Impact on Human Rights*, EUROPEAN DIGITAL RIGHTS (EDRI) (Nov. 7, 2018), https://edri.org/un-special-rapporteur-report-artificial-intelligence-impact-human-rights/, *archived at* https://perma.cc/PX7A-Q5G4.

[43] U.N. General Assembly, Seventy-third Session, Report of the Special Rapporteur on the Promotion and Protection of the Right to Freedom of Opinion and Expression, U.N. Doc. A/73/348 (Aug. 29, 2018), https://freedex.org/wp-content/blogs.dir/2015/files/2018/10/AI-and-FOE-GA.pdf, *archived at* https://perma.cc/MZK9-DVV4.

[44] EDRI, *supra* note 42.

[45] *Prof. Kaye Reports on Artificial Intelligence and Human Rights at UN General Assembly*, UCI LAW (Oct. 25, 2018), https://www.law.uci.edu/news/in-the-news/2018/Kaye-UN-AI.html, *archived at* https://perma.cc/M7RH-TRQT.

[46] *UN Special Rapporteur Analyses AI's Impact on Human Rights*, EDRI (Nov. 7, 2018), https://edri.org/un-special-rapporteur-report-artificial-intelligence-impact-human-rights/, *archived at* https://perma.cc/PX7A-Q5G4.

[47] *Report of the Special Rapporteur to the General Assembly on AI and its Impact on Freedom of Opinion and Expression*, Office of the High Commissioner for Human Rights (OHCHR), https://www.ohchr.org/EN/Issues/FreedomOpinion/Pages/ReportGA73.aspx (last visited Dec. 31, 2018), *archived at* https://perma.cc/YJ6P-GFHT.

E. Amendments to the 1968 Vienna Convention on Road Traffic

On March 23, 2016, amendments to the 1968 Vienna Convention on Road Traffic entered into force that removed legal obstacles for the contracting parties to allow transferring driving tasks to the vehicle itself, provided that the technologies used are in conformity with UN vehicle regulations or can be overridden or switched off by the driver.[48] The Vienna Convention on Road Traffic is an international agreement currently with seventy-eight contracting parties, among them the major car-manufacturing countries.[49] Two of the major world powers, the United States and China, are not parties to the agreement.[50] According to its Preamble, the Convention "desires to facilitate international road traffic and to increase road safety through the adoption of uniform traffic rules." Originally, article 8 of the Convention required that "[e]very driver shall at all times be able to control his vehicle." In addition, on October 9, 2018, the UN Economic Commission for Europe's Global Forum on Road Traffic Safety adopted a "non-binding legal resolution serving as a guide for the contracting parties to the 1949 and 1968 Conventions on Road Traffic in relation to the safe deployment of highly and fully automated vehicles in road traffic."[51]

II. Regional Measures

A. Organization of American States

In a 2018 report, the Organization of American States (OAS) called on the banking sector in Latin America and the Caribbean to "[p]rioritize the development of capacities using emerging digital technologies, such as Big Data, Artificial Intelligence and related (such as cognitive computing and Machine Learning), which have an important potential in the optimization of resources destined for detection and prevention."[52] It found that "49% of banking entities are still not implementing tools, controls or processes using Emerging Digital Technologies, such as Big Data, Machine Learning or Artificial Intelligence. These are all very important for prevention of cyber-attacks or defining suspect patterns associated with fraud, among other detection capabilities."[53]

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[48] Convention on Road Traffic, Nov. 8, 1968, 1042 U.N.T.S. 15705, https://www.unece.org/fileadmin/DAM/trans/conventn/Conv_road_traffic_EN.pdf, *archived at* http://perma.cc/JNG9-ZJNE; U.N. ECONOMIC AND SOCIAL COUNCIL, ECONOMIC COMMISSION FOR EUROPE (UNECE), INLAND TRANSPORT COMMITTEE, WORKING PARTY ON ROAD TRAFFIC SAFETY, Report of the Sixty-Eighth Session of the Working Party on Road Traffic Safety 5, 9 (Apr. 17, 2014), http://www.unece.org/fileadmin/DAM/trans/doc/2014/wp1/ECE-TRANS-WP1-145e.pdf, *archived at* http://perma.cc/P4LT-YW5N.

[49] *UN Transport Agreements and Conventions. Convention on Road Traffic, of 8 November 8, 1968*, UNECE, http://www.unece.org/trans/maps/un-transport-agreements-and-conventions-08.html (last visited Dec. 21, 2018), *archived at* http://perma.cc/3A6G-SXM2.

[50] *Id*.

[51] Press Release, UNECE, UNECE Adopts Resolution on the Deployment of Highly and Fully Automated Vehicles in Road Traffic (Oct. 9, 2018), http://www.unece.org/info/media/presscurrent-press-h/transport/2018/unece-adopts-resolution-on-the-deployment-of-highly-and-fully-automated-vehicles-in-road-traffic/doc.html, *archived at* http://perma.cc/V8WP-VZKP.

[52] OAS, STATE OF CYBERSECURITY IN THE BANKING SECTOR IN LATIN AMERICA AND THE CARIBBEAN 146 (2018), http://www.oas.org/es/sms/cicte/sectorbancarioeng.pdf, *archived at* https://perma.cc/3EM2-5B6Y.

[53] *Id*. at 8.

B. Council of Europe

On December 4, 2018, the European Commission for the Efficiency of Justice of the Council of Europe (CoE)—an international organization focused on human rights and comprised of forty-seven European countries—adopted the European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and Their Environment (European Ethical Charter).[54] The European Ethical Charter sets out five ethical principles and is intended to serve as a guideline for policy makers, legislators, and justice professionals when dealing with AI. In addition, the document provides a comprehensive overview of the current use of AI in judicial systems in CoE Member States, with a focus on processing judicial decisions and data, as well as a review of the different uses of AI in European judicial systems in light of the principles set out in the European Ethical Charter. The principles that should be observed are as follows:

- Respect for fundamental rights during the design and implementation of AI
- Nondiscrimination
- Quality and security when processing judicial decisions and data
- Transparency, impartiality, and fairness
- "Under user control"[55]

In addition, the Committee of Experts on Human Rights Dimensions of Automated Data Processing and Different Forms of Artificial Intelligence (MSI-AUT) of the CoE has published several draft documents on the implications of the use of AI for human rights. The studies and recommendations provide guidance for future standard-setting and encourage CoE Member States to implement the guidance when dealing with legislative issues in this field and to take all necessary measures to ensure that private actors respect human rights when designing and developing AI. So far, the MSI-AUT has made the following documents available:

[54] European Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and Their Environment (Dec. 3/4, 2018), European Commission for the Efficiency of Justice (CEPEJ)(2018)14, https://rm.coe.int/ethical-charter-en-for-publication-4-december-2018/16808f699c, *archived at* http://perma.cc/76QM-XTDA.

[55] *Id*. at 2.

- A Study of the Implications of Advanced Digital Technologies (Including AI Systems) for the Concept of Responsibility Within a Human Rights Framework[56]
- Draft Recommendation of the Committee of Ministers to Member States on Human Rights Impacts of Algorithmic Systems[57]
- Draft Declaration of the Committee of Ministers on the Manipulative Capabilities of Algorithmic Processes[58]

[56] MSI-AUT, A Study of the Implications of Advanced Digital Technologies (Including AI Systems) for the Concept of Responsibility Within a Human Rights Framework (Nov. 9, 2018), MSI-AUT(2018)05, https://rm.coe.int/draft-study-of-the-implications-of-advanced-digital-technologies-inclu/16808ef255, *archived at* http://perma.cc/85HA-SCNG.

[57] MSI-AUT, DRAFT RECOMMENDATION OF THE COMMITTEE OF MINISTERS TO MEMBER STATES ON HUMAN RIGHTS IMPACTS OF ALGORITHMIC SYSTEMS, Nov. 12, 2018, MSI-AUT(2018)06, https://rm.coe.int/draft-recommendation-on-human-rights-impacts-of-algorithmic-systems/16808ef256, *archived at* http://perma.cc/F2HQ-2YK2.

[58] MSI-AUT, DRAFT DECLARATION OF THE COMMITTEE OF MINISTERS ON THE MANIPULATIVE CAPABILITIES OF ALGORITHMIC PROCESSES, Nov. 16, 2018, MSI-AUT(2018)07, https://rm.coe.int/draft-declaration-on-the-manipulative-capabilities-of-algorithmic-proc/16808ef257, *archived at* http://perma.cc/72ND-8C8S.

The Americas and the Caribbean

Brazil

During the 2018 discussions of the GGE on LAWS that was established in 2016 during the Fifth Review of the UN Conference of the High Contracting Parties to the Convention on Certain Conventional Weapons, Brazil issued a joint statement along with Austria and Chile, which proposed to establish an open-ended GGE to negotiate a legally binding instrument to ensure meaningful human control over critical functions in LAWS.[1]

I. Data Protection Law

On August 14, 2018, Brazil enacted Law No. 13,709, the General Data Protection Law (Lei Geral de Proteção de Dados), which aims to give more security to consumers of technology.[2] Article 1 of the Law provides for the processing of personal data, including digital media, by either a natural person or a public or private legal entity, for the purpose of protecting a person's fundamental rights of freedom, privacy, and free development of personality.[3]

The protection of personal data is based on respect for privacy; informational self-determination; freedom of expression, information, communication, and opinion; the inviolability of intimacy, honor, and image; economic and technological development and innovation; free enterprise, free competition, and consumer protection; and human rights, free development of personality, dignity, and the exercise of citizenship by natural persons.[4]

II. Trade Negotiations

The Brazilian arm of the International Chamber of Commerce and the UN Conference on Trade and Development signed an agreement to work together to harness the power of cutting-edge technologies such as AI and blockchain to enhance and improve trade.[5] With the growing

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[1] Submission by Austria, Brazil, and Chile to the Group of Governmental Experts of the High Contracting Parties to the Convention on Certain Conventional Weapons, Proposal for a Mandate to Negotiate a Legally-binding Instrument that Addresses the Legal, Humanitarian and Ethical Concerns Posed by Emerging Technologies in the Area of Lethal Autonomous Weapons Systems (LAWS), U.N. Doc. CCW/ GGE.2/2018/WP.7 (Aug. 30, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/3BDD5F 681113EECEC12582FE0038B22F/$file/ 2018_GGE+LAWS_August_Working+paper_Austria_Brazil_Chile.pdf, *archived at* https://perma.cc/N8XU-M7YR.

[2] Lei No. 13,709, de 14 de Agosto de 2018, http://www.planalto.gov.br/ccivil_03/_Ato2015-2018/2018/Lei/ L13709.htm, *archived at* https://perma.cc/JY54-JZQL.

[3] *Id.* art. 1.

[4] *Id.* art. 2.

[5] *ICC Brazil and UNCTAD Sign Deal to Harness Technology and International Trade*, UNCTAD (Apr. 16, 2018), https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1722, *archived at* https://perma.cc/ ML9B-VBQB.

complexity of international trade agreements, the purpose of the use of AI is to reduce such complexity and help representatives of less favored nations achieve better results.[6]

III. Fraud Detection

The impossibility of inspecting all customs operations and identifying all fraud led the Brazilian Federal Revenue Service to establish partnerships with Brazilian universities to start making use of AI to detect such practices.[7] The idea is to develop a system to help customs officers identify suspicious customs operations, and to develop a product and foreign exporter information system to help importers in the registration and classification of their products and corresponding exporters.[8]

IV. Corruption Fight

The Ministry of Transparency and Controller General's Office (Ministério da Transparência e Controladoria-Geral da União, CGU) implemented a system to find evidence of deviations in the performance of public servants. The software uses machine-learning features, an AI technique that feeds data, presents criteria, and checks if the results of the analyses performed by the machine are within the expected range.[9] Another system created by the CGU to combat irregularities is intended to oversee contracts and suppliers. The tool analyzes the risks, including not only corruption, but also other problems such as failures to comply with an agreement.[10]

V. Criminal Investigation

The Public Prosecutor's Office of the State of Rio de Janeiro has decided to invest in advanced technologies to expedite investigations and prevent crimes from going unpunished.[11] The investment is geared towards data science and AI to collect, store, and analyze large volumes of

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[6] *Trade Negotiations: Next Frontier for Artificial Intelligence*, UNCTAD (June 18, 2018), https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1782, *archived at* https://perma.cc/2C98-889N.

[7] Luciano A. Digiampietri et al., *Uses of Artificial Intelligence in the Brazilian Customs Fraud Detection System*, *in* PROCEEDINGS OF THE 9TH ANNUAL INTERNATIONAL CONFERENCE ON DIGITAL GOVERNMENT RESEARCH, PARTNERSHIPS FOR PUBLIC INNOVATION 181–87, DG.O 2008 (Montreal, Canada, May 18–21, 2008), https://www.researchgate.net/publication/220268016_Uses_of_artificial_intelligence_in_the_Brazilian_customs_fraud_detection_system, *archived at* https://perma.cc/U3V3-4NXR.

[8] *Id.*

[9] *Orgãos Públicos Usam Inteligência Artificial para Combater Corrupção*, TECNOLOGIA – IG (Aug. 3, 2018), https://tecnologia.ig.com.br/2018-08-03/inteligencia-artificial-contra-a-corrupcao.html, *archived at* https://perma.cc/V9KQ-K6AF.

[10] *Id.*

[11] *MPRJ Aposta em Inteligência Artificial para Agilizar Investigações no Rio*, G1 (Oct. 1, 2018), https://g1.globo.com/rj/rio-de-janeiro/noticia/2018/10/01/mp-aposta-em-inteligencia-artificial-para-agilizar-investigacoes-no-rj.ghtml, *archived at* https://perma.cc/MYB5-99TW.

information.[12] The system allows information from different sources and bodies to be collected and also allows a series of real-time data to be collected from suspected criminals.[13]

Canada

I. Background

Canada's approach to AI appears to be focused on funding research as opposed to developing regulations and governance structures.[14] Canada has the "second largest tech sector outside Silicon Valley" and is considered a global leader in the field of AI.[15] In 2017, estimates indicated that funding raised by Canadian AI companies would "exceed US$250 million, representing an almost two-fold increase from the previous record historical high of US$143 million in 2015."[16]

Deloitte's AI practice published a recent report that raised the concern that Canada is falling behind in respect to demand and actually adopting the technology, stating, "[w]hile Canada's AI startup environment and talent pool is relatively strong, it's the other component of a leading AI economy—the need for robust demand—that is of greatest concern."[17] One report by *The Logic* found that Canadian firms have been filing fewer AI patents each year since 2016 despite large government investment.[18]

II. Pan-Canadian AI Strategy

In the 2017 Budget, the Canadian federal government provided CA$125 million (about US$93.3 million) to launch the Pan-Canadian Artificial Intelligence Strategy.[19] This made Canada the first country to release a national strategy for AI, although the strategy is primarily focused on research

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[12] *Id.*

[13] *Id.*

[14] Jesse Hirsh, *The Policy Deficit Behind Canadian Artificial Intelligence*, CENTRE FOR INTERNATIONAL GOVERNANCE INNOVATION (Feb. 13, 2018), https://www.cigionline.org/articles/policy-deficit-behind-canadian-artificial-intelligence, *archived at* https://perma.cc/CD3R-LWPY. *See also Artificial Intelligence (AI) in Canada*, THE CANADIAN ENCYCLOPEDIA (Feb. 6, 2006), https://www.thecanadianencyclopedia.ca/en/article/artificial-intelligence (last updated Nov. 13, 2018), *archived at* https://perma.cc/5FDM-VNVV.

[15] Carole J. Piovesan et al., *Artificial Intelligence: The Year in Review*, MCCARTHY TÉTRAULT (Jan. 16, 2018), https://www.mccarthy.ca/en/insights/blogs/cyberlex/artificial-intelligence-year-review, *archived at* https://perma.cc/4GE6-7LBW.

[16] *Id.*

[17] DELOITTE, CANADA'S AI IMPERATIVE: FROM PREDICTIONS TO PROSPERITY (2018), https://www.canada175.ca/en/reports/ai-imperative, *archived at* https://perma.cc/D2YS-3ZM7.

[18] *Canada Falling Behind in Global Race for Artificial Intelligence Patents*, THE LOGIC (Dec. 10, 2018), https://thelogic.co/news/exclusive/canada-falling-behind-in-global-race-for-artificial-intelligence-patents/, *archived at* https://perma.cc/A9KW-B5KY.

[19] GOVERNMENT OF CANADA, BUILDING A STRONG MIDDLE CLASS, #BUDGET2017, at 104 (Tabled [presented] in the House of Commons by the Honourable William Francis Morneau, P.C., M.P. Minister of Finance, Mar. 22, 2017), https://www.budget.gc.ca/2017/docs/plan/budget-2017-en.pdf, *archived at* https://perma.cc/5CEU-B3QB.

and talent.[20] The strategy is being led by the Canadian Institute for Advanced Research (CIFAR), a nonprofit, private institute of advanced study that is partly government funded, in collaboration with "three newly established AI institutes"—the Alberta Machine Intelligence Institute (Amii) in Edmonton, Mila in Montreal, and the Vector Institute in Toronto.[21] The strategy is intended to further build on Canada's AI research-based ecosystem[22] by pursuing four major goals:

- To increase the number of outstanding artificial intelligence researchers and skilled graduates in Canada.
- To establish interconnected nodes of scientific excellence in Canada's three major centres for artificial intelligence in Edmonton, Montreal and Toronto.
- To develop global thought leadership on the economic, ethical, policy and legal implications of advances in artificial intelligence.
- To support a national research community on artificial intelligence.[23]

The CIFAR AI and Society Program "examines the policy and ethical implications of AI."[24]

III. Regulatory Framework and Proposed Changes

A. Automated Vehicles

In Canada, motor vehicle transportation is a "shared responsibility between federal, provincial and territorial governments." [25] Provinces and territories have jurisdiction over "approving and overseeing trials of automated vehicles that take place within their jurisdiction."[26] Two provinces have enacted changes to allow testing for automated vehicles. On January 1, 2016, Ontario's Ministry of Transportation launched a pilot to allow the testing of automated vehicles though the promulgation of a regulation under Ontario's Highway Traffic Act.[27] The Ontario government

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[20] Ganesh Bell, *Why Countries Need to Work Together on AI*, WORLD ECONOMIC FORUM (Sept. 16, 2018), https://www.weforum.org/agenda/2018/09/learning-from-one-another-a-look-at-national-ai-policy-frameworks/, *archived at* https://perma.cc/D5PN-TJHY.

[21] *Growing Canada's Advantage in Artificial Intelligence*, DEPARTMENT OF FINANCE CANADA (Mar. 30, 2017), https://www.fin.gc.ca/n17/17-026-eng.asp, *archived at* https://perma.cc/KTB4-HS3U.

[22] *Pan-Canadian Artificial Intelligence Strategy*, INVEST IN CANADA, https://www.investcanada.ca/why-invest/pan-canadian-artificial-intelligence-strategy (last visited Nov. 16, 2018), *archived at* https://perma.cc/X9KM-BQ6X.

[23] *Pan-Canadian Artificial Intelligence Strategy*, CANADIAN INSTITUTE FOR ADVANCED RESEARCH (CIFAR), https://www.cifar.ca/ai/pan-canadian-artificial-intelligence-strategy, *archived at* https://perma.cc/E5PF-LDL2.

[24] Tim Dutton, *Artificial Intelligence Strategies*, MEDIUM (June 28, 2018), https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd, *archived at* https://perma.cc/5Z4W-45UB. *See also AI & Society*, CIFAR, https://www.cifar.ca/ai/ai-society, *archived at* https://perma.cc/J53B-ZAEN.

[25] TRANSPORT CANADA, TESTING HIGHLY AUTOMATED VEHICLES IN CANADA: GUIDELINES FOR TRIAL ORGANIZATIONS (May 16, 2018), https://www.tc.gc.ca/en/services/road/safety-standards-vehicles-tires-child-car-seats/testing-highly-automated-vehicles-canada.html, *archived at* https://perma.cc/DK3X-HG7B.

[26] *Id.*

[27] Pilot Project – Automated Vehicles, O. Reg. 306/15, https://www.ontario.ca/laws/regulation/r15306, *archived at* https://perma.cc/TT6F-UPLB.

"requires prior approval to test vehicles under the pilot project."[28] One of the requirements of the Ontario's Automated Vehicle Pilot Program is that "[t]he driver must remain in the driver's seat of the vehicle at all times and monitor the vehicle's operation, unless approved for driverless testing."[29] On April 18, 2018, assent was granted to Bill No. 165, amending the Québec Highway Safety Code to similarly allow a testing pilot for automated vehicles.[30] The first pilot project for autonomous buses and minibuses was authorized by an order of the Minister of Transport, Sustainable Mobility and Transport Electrification.[31] The order requires that "A driver must be able to immediately take over the driving of the vehicle should the need arise."[32]

The federal Senate Committee on Transport and Communications released a report in January 2018, which found that "Canada is ill-prepared for the fast-approaching future of transportation."[33] The report set out sixteen recommendations, including developing a coordinated national strategy. The strategy would "allow the government to prevent potential harms. Strong cybersecurity measures will be necessary to maintain public safety and confidence, and rigorous oversight is required to ensure personal information gleaned from connected and automated vehicles is securely held and not exploited."[34]

B. Privacy and Transparency Challenges

There are a number of laws at the federal and provincial levels in Canada that relate to the protection of personal information. The Personal Information Protection and Electronic

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[28] McCarthy Tétrault, From Chatbots to Self-Driving Cars: The Legal Risks of Adopting Artificial Intelligence in Your Business 14 (Sept. 2018), https://www.mccarthy.ca/sites/default/files/2018-09/McT_The%20Art_of_Artificial_Intelligence_WHITEPAPER_EN_SEPT2018.pdf, *archived at* https://perma.cc/X88N-N7G5; *Automated Vehicles – Driving Innovation in Ontario*, Ontario's Ministry of Transportation, http://www.mto.gov.on.ca/english/vehicles/automated-vehicles.shtml, *archived at* https://perma.cc/UA8P-VNN3.

[29] *Automated Vehicles - Driving Innovation in Ontario*, Ontario's Ministry of Transportation, http://www.mto.gov.on.ca/english/vehicles/automated-vehicles.shtml, *archived at* https://perma.cc/UA8P-VNN3; According to Ontario's Ministry of Transportation, for driverless testing, "full human oversight of the vehicle's functionality is required while it is operating on a public roadway. The overseer can be a passenger onboard the vehicle or someone monitoring the vehicle remotely, and must be capable of intervening during the vehicle's operation to bring it to a safe stop if necessary."

[30] Bill 165 (2018, chapter 7) An Act to Amend the Highway Safety Code and Other Provisions, http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=1&file=103461.pdf, *archived at* https://perma.cc/2FA2-A34F; *Québec to Recognize and Regulate Autonomous Vehicles*, Gowling WLG (Apr. 30, 2018), https://gowlingwlg.com/en/insights-resources/articles/2018/quebec-to-recognize-regulate-autonomous-vehicles/, *archived at* https://perma.cc/2GW2-EZVE.

[31] Autonomous Bus and Minibus Pilot Project, CQLR c C-24.2, r 37.01, https://www.canlii.org/en/qc/laws/regu/cqlr-c-c-24.2-r-37.01/latest/cqlr-c-c-24.2-r-37.01.html, *archived at* https://perma.cc/7Q6S-2HML.

[32] *Id.* § 15.

[33] Standing Senate Committee on Transport and Communications, Driving Change: Technology and the Future of the Automated Vehicle 9 (Jan. 2018), https://sencanada.ca/content/sen/committee/421/TRCM/Reports/COM_RPT_TRCM_AutomatedVehicles_e.pdf, *archived at* https://perma.cc/4347-F95D.

[34] Press Release, Standing Senate Committee on Transport and Communications, Federal Government Must Pave the Way for the Future of Transportation (Jan. 29, 2018), https://sencanada.ca/en/info-page/parl-42-1/trcm-driving-change/ (click on "News Release"), *archived at* https://perma.cc/Q4Y9-NHXK.

Documents Act (PIPEDA) is a federal privacy law that is applicable to the private sector.[35] At a February 2017 appearance before the House of Commons Standing Committee on Access to Information, Privacy and Ethics, the Privacy Commissioner of Canada stated that

> [c]onsent has always been considered a foundational element of PIPEDA. Legally, organizations must obtain consent to collect, use and disclose an individual's personal information, subject to a list of specific exceptions. But obtaining meaningful consent has become increasingly challenging in the age of big data, the Internet of Things, artificial intelligence and robotics.[36]

The Standing Committee released a report on February 28, 2018, that included recommendations to update PIPEDA.[37] The report is said to be "heavily influenced by the direction set in the European Union General Data Protection Regulation."[38] It expressed concerns over transparency of AI decision-making ("users have little information about how they work, the data they collect and how they are used"[39]), and the risk of algorithms using personal information to "perpetuate prejudices or discriminatory practices."[40] One of the key recommendations of the report was that "the Government of Canada consider implementing measures to improve algorithmic transparency."[41]

On May 24, 2018, the Office of the Privacy Commissioner of Canada published two guidance documents, one on obtaining meaningful consent and the other on inappropriate data practices, to help organizations ensure they comply with their privacy obligations in the digital age. On announcing the publications, the Commissioner stated that, "[d]uring an extensive public consultation, we heard very clearly that the increasingly complex digital environment—with

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[35] Personal Information Protection and Electronic Documents Act, S.C. 2000, c. 5, *as amended*, http://laws-lois.justice.gc.ca/eng/acts/P-8.6/FullText.html, *archived at* https://perma.cc/KY5R-7YEM.

[36] *Appearance before the Standing Committee on Access to Information, Privacy and Ethics (ETHI) on the Study of the Personal Information Protection and Electronic Documents Act (PIPEDA)*, OFFICE OF THE PRIVACY COMMISSIONER OF CANADA (Feb. 16, 2017), https://www.priv.gc.ca/en/opc-actions-and-decisions/advice-to-parliament/2017/parl_20170216/, *archived at* https://perma.cc/6VQX-Y6LW.

[37] STANDING COMMITTEE ON ACCESS TO INFORMATION, PRIVACY AND ETHICS, TOWARDS PRIVACY BY DESIGN: REVIEW OF THE PERSONAL INFORMATION PROTECTION AND ELECTRONIC DOCUMENTS ACT (Feb. 2018), http://www.ourcommons.ca/Content/Committee/421/ETHI/Reports/RP9690701/ethirp12/ethirp12-e.pdf, *archived at* https://perma.cc/WVL5-5TPT.

[38] Charles S. Morgan et al., *Parliamentary Committee Recommends Substantial Revisions to PIPEDA – Part 2 – Consent*, MCCARTHY TÉTRAULT (Mar. 28, 2018), https://www.mccarthy.ca/en/insights/blogs/cyberlex/parliamentary-committee-recommends-substantial-revisions-pipeda-part-2-consent, *archived at* https://perma.cc/8SUR-DNR8.

[39] STANDING COMMITTEE ON ACCESS TO INFORMATION, PRIVACY AND ETHICS, *supra* note 37, at 23.

[40] *Id.*

[41] *Id.* at 25. The report defines "algorithmic transparency" as "when users have complete information about the workings of the artificial intelligence programs behind the websites they visit, the data they collect and how they are used."

technological innovations such as big data, the Internet of Things and artificial intelligence—is posing challenges for privacy protection and the consent model."[42]

C. Directive on Automated Decision-Making for Federal Institutions

According to the government of Canada, it is "increasingly looking to utilize technology and automated systems to make, or assist in making, administrative decisions to improve service delivery."[43] Under the authority of the Financial Administration Act, the Treasury Board of Canada issued a Directive on Automated Decision-Making, which took effect on November 26, 2018.[44] According to the Cyberjustice Laboratory of the University of Montreal,

> [the Directive] outlines the responsibilities of federal institutions using AI-automated decision systems. Supporting a host of policies in the federal public administration, the Directive aims at helping to better understand and better ensure an ethical and responsible implementation of AI. Compliance with its requirements is expected from all federal institutions by no later than April 1, 2020.[45]

The Directive applies to the use of automated decision systems that "provide external services and recommendations about a particular client, or whether an application should be approved or denied."[46] The Directive provides for a questionnaire, called an Algorithmic Impact Assessment, "designed to help [federal institutions] assess and mitigate the risks associated with deploying an automated decision system,"[47] which should be "completed prior to the production of any Automated Decision System to be used in federal administration."[48]

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[42] Press Release, Office of the Privacy Commissioner of Canada, Privacy Commissioner Issues New Guidance to Help Address Consent Challenges in the Digital Age (May 24, 2018), https://www.priv.gc.ca/en/opc-news/news-and-announcements/2018/nr-c_180524/, *archived at* https://perma.cc/E9WC-F9AD.

[43] *How Should I Implement an Automated Decision System? (Draft)*, GOVERNMENT OF CANADA DIGITAL PLAYBOOK, https://canada-ca.github.io/digital-playbook-guide-numerique/views-vues/automated-decision-automatise/en/automated-decision.html (last visited Dec. 18, 2018), *archived at* https://perma.cc/H6TP-UL9K.

[44] *See* Treasury Board Directive on Automated Decision-Making (In Development - v.2.5), https://docs.google.com/document/d/1LdciG-UYeokx3U7ZzRng3u4T3IHrBXXk9JddjjueQok/edit#, *archived at* https://perma.cc/N66K-BNMJ.

[45] *Canada Treasury Board's Directive on Automated Decision-Making*, CYBERJUSTICE LABORATORY (Nov. 25, 2018), https://www.cyberjustice.ca/actualites/2018/11/25/canada-treasury-boards-directive-on-automated-decision-making/, *archived at* https://perma.cc/VJL9-TENB.

[46] *Id.*

[47] *Algorithmic Impact Assessment (v0.2)*, GOVERNMENT OF CANADA DIGITAL PLAYBOOK, https://canada-ca.github.io/digital-playbook-guide-numerique/views-vues/automated-decision-automatise/en/algorithmic-impact-assessment.html (last visited Dec. 18, 2018), *archived at* https://perma.cc/R4MM-B3W6.

[48] *Canada Treasury Board's Directive on Automated Decision-Making*, *supra* note 45.

IV. International Cooperation

A. G7 Discussions

A 2018 report by Innovation, Science and Economic Development Canada states that, in the context of 2018 G7 Presidency,

> [i]n March 2018, Innovation Ministers expressed a shared vision of human-centric artificial intelligence for innovation and economic growth, and released a statement that confirms the need to safeguard privacy. This vision was also expressed by Leaders in their Common Vision Statement on Artificial Intelligence, and the G7 Leaders' Statement released in June 2018.[49]

On June 7, 2018, the governments of Canada and France released a joint statement on AI calling for "the creation of an international study group that can become a global point of reference for understanding and sharing research results on artificial intelligence issues and best practices."[50] The statement stated that Canada and France "wish to promote a vision of human-centric artificial intelligence grounded in human rights, inclusion, diversity, innovation and economic growth."[51] The two countries established a task force "in order to make recommendations on the scope, governance and implementation of the international study group. By the end of the year, the task force will submit a report on the implementation of the international study group, whose results will be shared within the G7."[52]

On October 17, 2018, the Minister of Innovation, Science and Economic Development announced that he would host a G7 Multi-stakeholder Conference on Artificial Intelligence on December 6, 2018.[53] During the conference, Prime Minister Justin Trudeau further discussed the International Panel on Artificial Intelligence and also announced an "investment of up to nearly [Can]$230 million for the AI-Powered Supply Chains Supercluster (SCALE.AI) based in Quebec."[54]

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[49] INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA, THIRD UPDATE REPORT ON DEVELOPMENTS IN DATA PROTECTION LAW IN CANADA: REPORT TO THE EUROPEAN COMMISSION (June 2018), https://www.ic.gc.ca/eic/site/113.nsf/eng/h_07662.html, *archived at* https://perma.cc/LV4K-X2L6. *See also* Annex B: G7 Innovation Ministers' Statement on Artificial Intelligence, https://g7.gc.ca/en/g7-presidency/themes/ preparing-jobs-future/g7-ministerial-meeting/chairs-summary/annex-b/, *archived at* https://perma.cc/C5UU-LB3W.

[50] Canada-France Statement on Artificial Intelligence (July 6, 2018), http://international.gc.ca/world-monde/international_relations-relations_internationales/europe/2018-06-07-france_ai-ia_france.aspx?lang=eng, *archived at* https://perma.cc/VH9F-LPN6.

[51] *Id.*

[52] *Id.*

[53] *Canada to Host Landmark G7 Conference on Artificial Intelligence*, INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA (Oct. 17, 2018), https://www.canada.ca/en/innovation-science-economic-development/news/2018/10/canada-to-host-landmark-g7-conference-on-artificial-intelligence.html, *archived at* https://perma.cc/MF79-ARRF.

[54] *Prime Minister Announces Investment in Artificial Intelligence to Create Over 16,000 Jobs for Canadians*, PRIME MINISTER OF CANADA (Dec. 6, 2018), https://pm.gc.ca/eng/news/2018/12/06/prime-minister-announces-investment-artificial-intelligence-create-over-16000-jobs, *archived at* https://perma.cc/K9JY-WCM9.

B. Lethal Autonomous Weapons Systems

At the 2017 meeting of the GGE on LAWS, Canada stated that it was "committed to maintaining appropriate human involvement in use of military capabilities that can exert lethal force."[55] At the 2018 GGE meeting Canada was "supportive of developing key Transparency and Confidence-Building Measures and looks forward to exploring these and other such ideas here."[56]

Jamaica

The Jamaican Government has reportedly been "looking to position Jamaica to take advantage of the benefits of artificial intelligence (AI) in boosting economic growth and job creation."[57] According to Science, Energy and Technology Minister Andrew Wheatley, there have been ongoing discussion involving the Ministry, the Jamaica Information Technology and Services Alliance, the Jamaica Computer Society, and the Business Process Industry Association of Jamaica on how AI can best be utilized to benefit the country. In Minister Wheatley's opinion, "while AI poses a potential threat to traditional call center operations in the business process outsourcing (BPO) sector, it presents opportunities in the high-skill areas of programming and development."[58] He therefore called for increasing the number of computer science graduates from Jamaican educational institutions, so that Jamaica "can take advantage of the clear opportunities that will come from the new demand for highly skilled programmers."[59]

No specific regulations related to aspects of AI technology applications were located.

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[55] Hayley Evans, *Lethal Autonomous Weapons Systems at the First and Second U.N. GGE Meetings*, LAWFARE (Apr. 9, 2018), https://www.lawfareblog.com/lethal-autonomous-weapons-systems-first-and-second-un-gge-meetings, *archived at* https://perma.cc/PR4G-YLBS.

[56] *Canada: Opening Statement*, CCW States Parties GGE on LAWS Second Meeting, Apr. 9–13, 2018, Geneva, Switzerland, https://www.unog.ch/80256EDD006B8954/(httpAssets)/86612887B010EB33C12582720056F0C6/$file/2018_LAWSGeneralExchange_Canada.pdf, *archived at* https://perma.cc/DG5H-ECAP.

[57] *Gov't Set Sights on Artificial Intelligence to Push Growth*, JAMAICA OBSERVER (June 24, 2017), http://www.jamaicaobserver.com/news/gov-8217-t-set-sights-on-artificial-intelligence-to-push-growth_102830?profile=1373, *archived at* https://perma.cc/B3TH-JMHL.

[58] *Id.*

[59] *Id.*

Mexico

I. National AI Strategy and Directorate

In March 2018, the Mexican government announced the adoption of a strategy on AI.[60] The strategy provided for the creation of a Directorate on Artificial Intelligence tasked with the development of a framework aimed at fostering a multi-sector dialogue on AI.[61]

The Directorate was created in April 2018, within Mexico's Commission for the Development of Electronic Government, which "seeks to support Federal Public Administration agencies in the development, adoption and use of Artificial Intelligence for the design, implementation and evaluation of public programs, policies and services."[62]

In November 2018, the Mexican government published a document that includes general principles for the development and use of systems based on AI in Mexico's federal government.[63] Some of the most salient principles are as follows:

- Monitor and evaluate the impacts of AI systems in order to ensure that they achieve the expected results
- Promote transparency, by explaining to the users that interact with AI systems the decision process taken by such systems, the expected benefits as well as the potential risks derived from using such systems
- Protect privacy, by incorporating mechanisms of control and consent for the use of personal data during the design of AI systems
- Foster equality, by reducing risks of discriminatory biases derived from the utilized data
- Due process, by allowing individuals to dispute decisions made by AI systems[64]

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[60] Enrique Zapata, *Estrategia de Inteligencia Artificial MX 2018* [*Artificial Intelligence Strategy MX 2018*], MÉXICO DIGITAL (Mar. 22, 2018), https://www.gob.mx/mexicodigital/articulos/estrategia-de-inteligencia-artificial-mx-2018, *archived at* https://perma.cc/USA6-C4P2.

[61] *Id.*

[62] Press release, Presidencia de la Republica, The Government has Promoted the Digitalization of Services to Offer a Simple, Efficient and Inexpensive Service: Eduardo Sánchez Hernández (May 18, 2018), https://www.gob.mx/presidencia/prensa/the-government-has-promoted-the-digitalization-of-services-to-offer-a-simple-efficient-and-inexpensive-service-eduardo-sanchez-hernandez?idiom=en, *archived at* https://perma.cc/NMT8-PRRG.

[63] INNOVA MX, COMPILADO DE COMENTARIOS DE LA CONSULTA PUBLICA REFERENTE A LOS PRINCIPIOS Y GUÍA DE ANÁLISIS DE IMPACTO PARA EL DESARROLLO Y USO DE SISTEMAS BASADAS EN INTELIGENCIA ARTIFICIAL EN LA ADMINISTRACION PUBLICA FEDERAL [COMPILED COMMENTS FROM THE PUBLIC CONSULTATION REGARDING PRINCIPLES AND IMPACT ANALYSIS GUIDE FOR THE DEVELOPMENT AND USE OF SYSTEMS BASED ON ARTIFICIAL INTELLIGENCE IN THE FEDERAL PUBLIC ADMINISTRATION] (Nov. 2018), https://www.gob.mx/cms/uploads/attachment/file/415644/Consolidado_Comentarios_Consulta_IA__1_.pdf, *archived at* https://perma.cc/SP6W-QDGT.

[64] *Id.*

The presidential administration that adopted this strategy and its guiding principles ended on November 30, 2018. No information could be located on whether the new administration (which commenced on December 1, 2018) will continue with this strategy and its principles, or initiate a similar effort.

II. Lethal Autonomous Weapons Systems

According to information provided by the United Nations Office for Disarmament Affairs, the Mexican government has expressed its opposition to LAWS, as follows:

> On 16 October 2017, the Permanent Mission to the United Nations of Mexico partnered with the International Committee for Robot Arms Control, Human Rights Watch, Seguridad Humana en Latinoamérica y el Caribe and the Campaign to Stop Killer Robots to host a panel discussion entitled "Pathways to Banning Fully Autonomous Weapons" as part of the First Committee side event series for the 72nd Session General Assembly. *Ambassador Juan Sandoval Mendiolea, Deputy Permanent Representative of Mexico to the United Nations, introduced the discussion by noting that Mexico has joined other states in calling for a ban on lethal autonomous weapons systems, also known as fully autonomous weapons*. . . . Ambassador Mendiolea stressed the importance of continued research and education on these weapons systems and their possible dangers.[65]

III. Autonomous Vehicles

A recent study on autonomous vehicles (AV) readiness states that, as of 2018, Mexico has a number of obstacles to adopting this technology:

> AV adoption in Mexico currently faces a range of barriers, with a lack of specific regulations, no active tests and little industrial activity. . . . On policy and legislation, it scores low on both AV-specific and general variables, with no apparent regulations on AV testing on public roads and very limited testing so far. The country's current economic and political condition creates barriers for taking actions in order to adopt AV in the near future. It gets the lowest scores on industry partnerships, research and development AV hubs, patents and investments and the research has found no AV technology company headquarters . . . . On infrastructure, Mexico's roads receive a slightly below average rating for road quality, but lower scores on other variables. There are no active AV tests, contributing to its low rating on consumer acceptance.[66]

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[65] *Pathways to Banning Fully Autonomous Weapons*, UNITED NATIONS OFFICE FOR DISARMAMENT AFFAIRS (Oct. 23, 2017), https://www.un.org/disarmament/update/pathways-to-banning-fully-autonomous-weapons/ (emphasis added), *archived at* https://perma.cc/FBQ6-N7LV.

[66] *Mexico*, *in* KPMG INTERNATIONAL, AUTONOMOUS VEHICLES READINESS INDEX: ASSESSING COUNTRIES' OPENNESS AND PREPAREDNESS FOR AUTONOMOUS VEHICLES 35 (Jan. 2018), https://home.kpmg.com/content/dam/kpmg/co/images/2018/01/GM-TL-Carros%20aut%C3%B3nomos.pdf, *archived at* https://perma.cc/Q3RD-SZH4.

United States

United States lawmakers and regulators have mainly pursued AI in the area of autonomous or self-driving vehicles. The Department of Transportation is investigating what elements must be considered in drafting regulations for the use of such vehicles, including multi-vehicle convoys, and several states have adopted legislation and regulations allowing for the testing of autonomous vehicles. In addition, recent federal legislation has tasked part of the Department of Defense with the responsibility of crafting policies for the development and deployment of AI systems as they concern national defense.

I. Federal Legislation and Regulatory Action

In the 115th Congress, thirty-nine bills have been introduced that have the phrase "artificial intelligence" in the text of the bill.[67] Four of these bills have been enacted into law. Section 238 of the John S. McCain National Defense Authorization Act for Fiscal Year 2019 directs the Department of Defense to undertake several activities regarding AI.[68] Subsection (b) requires the Secretary of Defense to appoint a coordinator who will oversee and direct the activities of the Department "relating to the development and demonstration of artificial intelligence and machine learning." Subsection (g) provides the following definition of AI:

> (g) ARTIFICIAL INTELLIGENCE DEFINED—In this section, the term "artificial intelligence" includes the following:
>
> (1) Any artificial system that performs tasks under varying and unpredictable circumstance without significant human oversight, or that can learn from experience and improve performance when exposed to data sets.
>
> (2) An artificial system developed in computer software, physical hardware, or other context that solves tasks requiring human-like perception, cognition, planning, learning, communication, or physical action.
>
> (3) An artificial system designed to think or act like a human,
> Including cognitive architectures and neural networks.
>
> (4) A set of techniques, including machine learning, that is designed to approximate a cognitive task.
>
> (5) An artificial system designed to act rationally, including an intelligent software agent or embodied robot that achieves goals using perception, planning, reasoning, learning, communicating, decision making, and acting.

Subsection (f) instructs the Secretary of Defense to "delineate a definition of the term 'artificial intelligence' for use within the Department" no later than one year after the law's enactment.

[67] Results of bill text only search on Congress.gov using the phrase "artificial intelligence" on November 13, 2018.

[68] John S. McCain National Defense Authorization Act for Fiscal Year 2019, Pub. L. 115-232, § 238, 132 Stat. 1658 (2018), https://www.congress.gov/115/bills/hr5515/BILLS-115hr5515enr.pdf.

In 2018, Congress also advised the Federal Aviation Administration, in language inserted into the FAA Reauthorization Act of 2018, to periodically review, with industry and academic experts, the state of AI in aviation and take steps, as needed, to address new developments.[69]

In 2015, Congress included language in the Fixing America's Surface Transportation Act (FAST ACT) directing the Department of Transportation to fund research on the application of autonomous vehicles in developing and improving traffic patterns on highways.[70]

The United States Department of Transportation has solicited requests for comments for proposed studies of automated driving systems. One such request, issued by the Federal Highway Administration, asked for comments on "a range of issues related to assessing the infrastructure requirements and standards that may be necessary for enabling safe and efficient operations of ADS [Automated Driving Systems]."[71]

Another request for comment, issued by the National Highway Traffic Safety Administration, concerned possible barriers created by existing Federal Motor Vehicle Safety Standards to the testing of autonomous vehicles, especially those with nontraditional interior design elements such as vehicles that do not have steering wheels.[72]

II. State Legislation and Regulatory Action

In 2011, Nevada adopted the first legislation concerning the testing of autonomous vehicles.[73] The specific law defines autonomous vehicle as restricted to the operation of "the motor vehicle without active control or monitoring of a human operator."[74] The law also sets forth requirements for the testing of such vehicles,[75] and directs that regulations be issued governing their operation.[76]

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[69] FAA Reauthorization Act of 2018, Pub. L. 115-254, § 548, 132 Stat. 3186, https://www.congress.gov/115/bills/hr302/BILLS-115hr302enr.pdf.

[70] Fixing America's Surface Transportation Act, Pub. L. 114-94, § 6004, 129 Stat. 1312, 1562 (2015), https://www.congress.gov/114/plaws/publ94/PLAW-114publ94.pdf.

[71] Request for Information, 83 Fed. Reg. 2719 (Jan. 18, 2018), https://www.gpo.gov/fdsys/pkg/FR-2018-01-18/pdf/2018-00784.pdf, *archived at* https://perma.cc/GC38-GY7H.

[72] Request for Comment, 83 Fed. Reg. 2607 (Jan. 18, 2018), https://www.gpo.gov/fdsys/pkg/FR-2018-01-18/pdf/2018-00671.pdf, *archived at* https://perma.cc/684F-U6M4.

[73] Bryant Walker Smith, *Autonomous Vehicles Are Probably Legal in the United States*, 1 TEX. A&M L. REV. 411, 501 (2014).

[74] NEV. REV. STAT. § 482A.025 (2010, 2016 Supp.), https://www.leg.state.nv.us/NRS/NRS-482A.html#NRS482ASec025 (last visited Nov. 23, 2018), *archived at* https://perma.cc/65GR-QPES.

[75] NEV. REV. STAT. §482A.070 (2010, 2016 Supp.), https://www.leg.state.nv.us/NRS/NRS-482A.html#NRS482ASec070 (last visited Nov. 23, 2018), *archived at* https://perma.cc/32U7-QP86.

[76] NEV. REV. STAT. § 482A.

In 2012, Florida adopted similar legislation providing for the testing and operation of autonomous vehicles.[77] California also adopted legislation on the subject in 2012.[78]

According to the National Conference of State Legislatures, roughly 60% of states have adopted some form of legislation concerning autonomous vehicles.[79]

In some states, provisions for testing autonomous vehicles have been adopted through executive order or administrative regulation. In Arizona, the governor issued executive orders directing state agencies to devise regulations for the testing of autonomous vehicles.[80] This order was modified in 2018 after a pedestrian was fatally injured by an autonomous vehicle.[81] In this incident the National Transportation Safety Board found that a combination of the disabling of the vehicle's automatic braking system and a failure to warn the on-board human operator of the presence of an unknown object led to the crash.[82]

Nevada began to issue regulations for the operation of autonomous vehicles in 2012.[83] California adopted regulations for the testing of autonomous vehicles in 2014.[84] The Division of Motor Vehicles adopted regulations for deployment of autonomous vehicles in 2018.[85]

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[77] FLA. STAT. § 316.85 (2019), http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=0300-0399/0316/Sections/0316.85.html (last visited Nov 23, 2018), *archived at* https://perma.cc/2J26-AUD7. This section references FLA. STAT. § 316.003(3) (2019) for a definition of "autonomous vehicle."

[78] CAL. VEH. § 38750 (West 2014), https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=VEH&sectionNum=38750 (last visited Nov. 23, 2018), *archived at* https://perma.cc/L77L-EE4E.

[79] *Autonomous Vehicle: Self-Driving Vehicles Enacted Legislation*, NATIONAL CONFERENCE OF STATE LEGISLATURES (Nov. 7, 2018), http://www.ncsl.org/research/transportation/autonomous-vehicles-self-driving-vehicles-enacted-legislation.aspx, *archived at* https://perma.cc/42XZ-GD6B.

[80] Exec. Order No. 2015-09, Aug. 25, 2015, 22 Ariz. Admin. Reg. 87 (Jan. 15, 2016), https://apps.azsos.gov/public_services/register/2016/3/26_governor_EO.pdf, *archived at* https://perma.cc/RQ7Z-FDNR.

[81] *See* Ryan Randazzo, *Arizona Governor Doug Ducey Suspends Testing of Uber Self-Driving Cars*, AZCENTRAL (Mar. 26, 2016), https://www.azcentral.com/story/news/local/tempe-breaking/2018/03/26/doug-ducey-uber-self-driving-cars-program-suspended-arizona/460915002/, *archived at* https://perma.cc/25GJ-XDY8.

[82] NATIONAL TRANSPORTATION SAFETY BOARD, PRELIMINARY REPORT: HIGHWAY HWY18MH010 (undated; released May 24, 2018), https://www.ntsb.gov/investigations/AccidentReports/Reports/HWY18MH010-prelim.pdf, *archived* at https://perma.cc/K7NL-R9SX.

[83] NAC 482A (rev. Dec. 2017), https://www.leg.state.nv.us/NAC/NAC-482A.html, *archived at* https://perma.cc/BB42-AFTN.

[84] CAL. CODE REGS. tit. 13, art. 3.7, https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=I2C7E6D928F844151A40CEAA8D7BC189E&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default), *archived at* https://perma.cc/BYH3-256R.

[85] CAL. CODE REGS. tit. 13, art. 3.8, https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=IC2F61D9B8C8742F78925B5494B4C57B1&originationContext=documenttoc&transitionType=Default&contextData=(sc.Default), *archived at* https://perma.cc/FT5M-3G32.

According to the National Conference of State Legislatures, as of April 2017, twenty-eight states had introduced some form of regulations for autonomous vehicles.[86]

III. Other Government Actions Related to AI

A. Government Reports

The following are high-level federal government reports related to AI prepared by the current and previous administrations:

- EXECUTIVE OFFICE OF THE PRESIDENT, NATIONAL SCIENCE AND TECHNOLOGY COUNCIL, COMMITTEE ON ARTIFICIAL INTELLIGENCE, PREPARING FOR THE FUTURE OF ARTIFICIAL INTELLIGENCE (2016), https://obamawhitehouse.archives.gov/sites/default/files/whitehouse_files/microsites/ostp/NSTC/preparing_for_the_future_of_ai.pdf, *archived at* https://perma.cc/4RCY-PUS4. This report summarizes the status of AI in American society, economy, and government. It looks at specific applications, such as transportation and war fighting, and makes nonbinding recommendations.

- WHITE HOUSE OFFICE OF SCIENCE AND TECHNOLOGY POLICY, SUMMARY OF THE WHITE HOUSE SUMMIT ON ARTIFICIAL INTELLIGENCE FOR AMERICAN INDUSTRY (2018), https://www.whitehouse.gov/wp-content/uploads/2018/05/Summary-Report-of-White-House-AI-Summit.pdf, *archived at* https://perma.cc/Z7N7-24JE. This report reviews the Trump administration's regulatory and policy approach to AI.

B. Position on Lethal Autonomous Weapons Systems

At the 2018 meeting of the GGE on LAWS, established under the Convention on Certain Conventional Weapons, the representatives of the United States argued that at this point it is too early for LAWS to be banned under the Convention. The delegation also presented its position that at this time it is not necessary to create a definition of LAWS, and that such systems should not be stigmatized, but instead their use should be viewed within the framework of the current laws of war.[87]

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[86] Ben Husch & Anne Teigen, *Regulating Autonomous Vehicles*, 25(13) LEGIS BRIEF (National Conference of State Legislatures, Apr. 2017), http://www.ncsl.org/research/transportation/regulating-autonomous-vehicles.aspx, *archived at* https://perma.cc/HR4Q-KVRC.

[87] United States Mission to International Organizations in Geneva, Statement by Shawn Steene to Meeting of the Group of Governmental Experts to the CCW on Lethal Autonomous Weapons Systems (LAWS) (Aug. 27, 2018), https://geneva.usmission.gov/2018/08/27/meeting-of-the-group-of-governmental-experts-of-the-high-contracting-parties-to-the-ccw-on-lethal-autonomous-weapons-systems/, *archived at* https://perma.cc/Y2Y4-XXBV. An extensive review of the positions presented by the US and UK delegations can be found in Hayley Evans, *Too Early for a Ban: The U.S. and U.K. Positions on Autonomous Weapons Systems*, LAWFARE (Apr. 13, 2018, 3:00 PM), https://www.lawfareblog.com/too-early-ban-us-and-uk-positions-lethal-autonomous-weapons-systems, *archived at* https://perma.cc/BS9H-XGPM.

East/South Asia and the Pacific

Australia

I. Use of Artificial Intelligence in Australia

According to a news article published in January 2018, a survey of Australian senior executives and IT decision-makers found that "almost nine in 10 business leaders at large Australian businesses having deployed artificial intelligence (AI) technologies within their organisations in some form," with "[f]ifty-one percent of Australian organisations . . . deploying AI in the context of machine learning, 48 percent . . . looking at automated reasoning, 47 percent at robotics, 44 percent at knowledge representation, and 39 percent Natural Language Processing."[1]

In terms of the public sector, the Australian government signed a deal with IBM in July 2018 for the company to "provide a $1 billion five-year technology service to accelerate the uptake of blockchain, artificial intelligence (AI) and quantum computing in the public sector."[2] The deal was led by the Digital Transformation Agency, which was formally established as a separate agency in October 2016 to "guide, oversee and drive the Government's ambitious digital and ICT agendas."[3] The federal government aims to be one of the top three digital governments in the world by 2025.[4]

II. Federal Government Investment and AI Framework Development

The 2018–19 Australian federal government budget included an AU$29.9 million (about US$21.7 million) funding package over four years "to develop the artificial intelligence and machine learning capabilities of Australian businesses and workers."[5] The package is comprised of four elements:[6] development of AI skills through the funding of postgraduate scholarships and the

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[1] Gina Baldassare, *Nine in 10 Large Australian Businesses Have Deployed Artificial Intelligence Tech, Survey Finds*, STARTUP DAILY (Jan. 28, 2018), http://www.startupdaily.net/2018/01/nine-10-large-australian-businesses-deployed-artificial-inteliigence-technology-report-finds/, *archived at* https://perma.cc/XW87-WRLR.

[2] Tom Burton, *Australian Government and IBM Sign $1 Billion Deal for Blockchain, AI Technologies*, SMART COMPANY (July 9, 2018), https://www.smartcompany.com.au/technology/emerging-technology/australian-government-ibm-1-billion-deal-blockchain-ai/, *archived at* https://perma.cc/US3W-4N6N. *See also* Press Release, Hon Michael Keenan MP, Big Benefits for Government in New IBM Deal (July 5, 2018), https://ministers.pmc.gov.au/keenan/2018/big-benefits-government-new-ibm-deal, *archived at* https://perma.cc/5SJV-NUKY.

[3] Press Release, Hon Angus Taylor MP, New Digital Agency Establishes Agenda (Oct. 28, 2016), https://ministers.pmc.gov.au/taylor/2016/new-digital-agency-establishes-agenda, *archived at* https://perma.cc/5LVL-SES8.

[4] *See* Speech Transcript, Hon Michael Keenan MP, Delivering Australia's Digital Future (Address to the Australian Information Industry Association, Canberra, June 13, 2018), https://ministers.pmc.gov.au/keenan/2018/delivering-australias-digital-future, *archived at* https://perma.cc/V2HX-YJF9.

[5] Press Release, Michaelia Cash, Budget 2018 – New Opportunities and Jobs for Australian Industry (May 8, 2018), https://www.minister.industry.gov.au/ministers/cash/media-releases/budget-2018-new-opportunities-and-jobs-australian-industry, *archived at* https://perma.cc/Y3HD-A8TP.

[6] *See* Commonwealth of Australia, Official Committee Hansard, Senate Economics Legislation Committee, Estimates Hearing (Narelle Luchetti), at 12–13 (May 31, 2018), https://parlinfo.aph.gov.au/parlInfo/download/committees/estimate/b8d34ed6-7783-4e86-b92b-cf2d2a8c30d2/toc_pdf/Economics%20Legislation%20Committee_

"development of online resources to engage students and support teachers to deliver AI content in the Australian curriculum";[7] development of a Technology Roadmap to "inform government investment in artificial intelligence by identifying global opportunities in both artificial intelligence and machine learning, and any barriers to adoption in Australia";[8] development of a national AI Ethics Framework and Standards Framework to address ethics for adopting such technologies in Australia;[9] and AU$25 million in funding for a Cooperative Research Centers Program project area, which will focus specifically on AI.[10]

In the area of ethics and human rights implications of AI, the Office of the Australian Information Commissioner published the *Guide to Data Analytics and the Australian Privacy Principles* in March 2018.[11] In addition, the Australian Human Rights Commission discussed AI in a July 2018 issues paper on human rights and technology[12] that asks "how Australian law should protect human rights in the development and use of new technologies."[13] The issues paper was published at the commencement of a major three-year project on this topic, which will see a discussion paper published in early 2019 and final recommendations delivered in late 2019. A website has been established in order to provide information on the project and engage the public through consultation processes.[14]

2018_05_31_6156_Official.pdf;fileType=application%2Fpdf#search=%22committees/estimate/b8d34ed6-7783-4e86-b92b-cf2d2a8c30d2/0001%22, *archived at* https://perma.cc/6GR3-WHGL.

[7] *Id.* at 12. *See also Support for Science, Technology, Engineering and Mathematics (STEM)*, DEPARTMENT OF EDUCATION AND TRAINING, https://www.education.gov.au/support-science-technology-engineering-and-mathematics (last updated Oct. 15, 2018), *archived at* https://perma.cc/Y5ZT-Z36Y.

[8] Senate Economics Legislation Committee, *supra* note 6, at 13.

[9] *Id. See also Industry 4.0*, DEPARTMENT OF INDUSTRY, INNOVATION AND SCIENCE, https://www.industry.gov.au/funding-and-incentives/manufacturing/industry-40 (last updated Aug. 14, 2018), *archived at* https://perma.cc/SGF5-A8UP.

[10] Senate Economics Legislation Committee, *supra* note 6, at 13. *See also* DEPARTMENT OF INDUSTRY, INNOVATION AND SCIENCE, FACTSHEET: ADDITIONAL FUNDING FOR CRC PROJECTS IN ARTIFICIAL INTELLIGENCE (undated), https://www.business.gov.au/-/media/Business/CRC/Cooperative-research-centres-projects-factsheet-artificial-intelligence-PDF.pdf?la=en&hash=087AD41AFC84DDA6AA8996C60E38C03F38491A67 (last visited Nov. 8, 2018), *archived at* https://perma.cc/P2R5-RF3J. *See generally Cooperative Research Centres (CRC) Program*, BUSINESS.GOV.AU, https://www.business.gov.au/assistance/cooperative-research-centres-programme (last updated Oct. 8, 2018), *archived at* https://perma.cc/M2ZA-HJ5T; *Cooperative Research Centres Projects (CRC-P) Grants*, BUSINESS.GOV.AU, https://www.business.gov.au/assistance/cooperative-research-centres-programme/cooperative-research-centres-projects-crc-ps (last updated Sept. 13, 2018), *archived at* https://perma.cc/HKA7-HPF3.

[11] *Guide to Data Analytics and the Australian Privacy Principles*, OFFICE OF THE AUSTRALIAN INFORMATION COMMISSIONER (Mar. 2018), https://www.oaic.gov.au/agencies-and-organisations/guides/guide-to-data-analytics-and-the-australian-privacy-principles, *archived at* https://perma.cc/KJ93-HQMF.

[12] AUSTRALIAN HUMAN RIGHTS COMMISSION, HUMAN RIGHTS AND TECHNOLOGY ISSUES PAPER (July 2018), https://www.humanrights.gov.au/sites/default/files/document/publication/AHRC-Human-Rights-Tech-IP.pdf, *archived at* https://perma.cc/4B8R-4CSA.

[13] *Protecting Human Rights in the Era of Artificial Intelligence*, AUSTRALIAN HUMAN RIGHTS COMMISSION (July 24, 2018), https://www.humanrights.gov.au/news/stories/protecting-human-rights-era-artificial-intelligence, *archived at* https://perma.cc/SVE7-YZ5L.

[14] *Homepage*, HUMAN RIGHTS AND TECHNOLOGY, https://tech.humanrights.gov.au/ (last visited Nov. 14, 2018), *archived at* https://perma.cc/T7VR-6PS8.

III. Government Actions in Particular Areas

A. Autonomous Vehicles

In May 2017, the National Transport Commission (NTC) published the *Guidelines for Trials of Automated Vehicles in Australia*.[15] It subsequently also developed national enforcement guidelines to clarify how the concepts, contained in the Australian Road Rules, of "control" and "proper control" should apply to vehicles with automated functions.[16]

To date, three Australian states have enacted legislation related to enabling trials of autonomous vehicles.[17] Although each of the laws differ in approach, they include approval processes and insurance requirements related to conducting trials, as well as covering safety management plans and data collection.[18] Other jurisdictions also have projects or initiatives associated with testing cooperative and automated vehicles.[19]

In May 2018, the NTC published a policy paper that recommended national legislative reform to

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[15] NATIONAL TRANSPORT COMMISSION (NTC), GUIDELINES FOR TRIALS OF AUTOMATED VEHICLES IN AUSTRALIA (2017), https://www.ntc.gov.au/Media/Reports/(00F4B0A0-55E9-17E7-BF15-D70F4725A938).pdf, *archived at* https://perma.cc/2UYY-4HFE.

[16] NTC, NATIONAL ENFORCEMENT GUIDELINES FOR AUTOMATED VEHICLES (Nov. 2017), https://www.ntc.gov.au/Media/Reports/(10EB8512-5852-575D-96E9-CA20497EB1FC).pdf, *archived at* https://perma.cc/AU3G-CKHB.

[17] Motor Vehicles (Trials of Automotive Technologies) Amendment Act 2016 (SA), https://www.legislation.sa.gov.au/LZ/V/A/2016/MOTOR VEHICLES (TRIALS OF NEW AUTOMOTIVE TECHNOLOGIES) AMENDMENT ACT 2016_10/2016.10.UN.PDF, *archived at* https://perma.cc/3BCM-82DN; Transport Legislation Amendment (Automated Vehicle Trials and Innovation) Act 2017 (NSW), https://legislation.nsw.gov.au/~/pdf/view/act/2017/41/whole, *archived at* https://perma.cc/4ZLT-CQM7; Road Safety (Automated Vehicles) Act 2018 (Vic), http://www.legislation.vic.gov.au/Domino/Web_Notes/LDMS/PubStatbook.nsf/51dea49770555ea6ca256da4001b90cd/6EADABCAD6531AB7CA2582410010E08A/$FILE/18-008aa%20authorised.pdf, *archived at* https://perma.cc/XD8V-6PBY.

[18] *See* Alex Maschmedt & Rebecca Searle, *Driverless Vehicle Trial Legislation – State-by-State*, KING & WOOD MALLESONS (Feb. 28, 2018), https://www.kwm.com/en/au/knowledge/insights/driverless-vehicle-trial-legislation-nsw-vic-sa-20180227, *archived at* https://perma.cc/G8KH-ALF7.

[19] *See The CAVI Project*, QUEENSLAND GOVERNMENT, https://www.qld.gov.au/transport/projects/cavi/cavi-project (last updated Aug. 10, 2017), *archived at* https://perma.cc/A5GA-NHWL; Press Release, Rita Saffioti & Dave Kelly, Perth One of Three Cities in the World to Trial New Driverless Cars (Nov. 29, 2017), https://www.mediastatements.wa.gov.au/Pages/McGowan/2017/11/Perth-one-of-three-cities-in-the-world-to-trial-new-driverless-cars.aspx, *archived at* https://perma.cc/KF6Z-ZJ2M; *CANdrive – Automated Vehicle Trial*, ACT GOVERNMENT, https://www.business.act.gov.au/resources_and_networks/candrive-automated-vehicle-trial (last updated July 30, 2018), *archived at* https://perma.cc/LUL2-TAZ5.

- provide clarity about the situations when an automated driving system (ADS), rather than a human driver, may drive a vehicle[;]
- ensure there is a legal entity that can be held responsible for the ADS when it is operating[; and]
- establish any new legal obligations that may be required for users of automated vehicles[.][20]

The reforms are part of a broader national reform program that "aims to put end-to-end regulation in place by 2020 to support the safe commercial deployment and operation of automated vehicles at all levels of automation."[21] As part of this work, in 2018 the NTC also published a Regulation Impact Statement (RIS) that "details the legislative options to underpin the safety assurance system to support the safe, commercial deployment and operation of automated vehicles at all levels of automation."[22] It has also released discussion papers on regulating government access to C-ITS (Cooperative Intelligent Transport Systems) and automated vehicle data, and on motor accident injury insurance and automated vehicles.[23]

B. Autonomous Weapons Systems

A 2015 inquiry by the Senate Foreign Affairs, Defence and Trade Committee on the potential use by the Australian Defence Force of unmanned air, maritime, and land platforms resulted in recommendations that included

> that the Australian Defence Force acquire armed unmanned platforms when the capability requirement exists and the Australian Government make a policy statement regarding their use. This policy statement will:
> - affirm that armed unmanned platforms will be used in accordance with international law;
> - commit that armed unmanned platforms will only be operated by the Australian Defence Force personnel; and
> - include appropriate transparency measures governing the use of armed unmanned platforms.[24]

[20] NTC, CHANGING DRIVING LAWS TO SUPPORT AUTOMATED VEHICLES: POLICY PAPER 1 (May 2018), https://www.ntc.gov.au/Media/Reports/(B77C6E3A-D085-F8B1-520D-E4F3DCDFFF6F).pdf, *archived at* https://perma.cc/3BU8-B4RC.

[21] *Id.*

[22] *Automated Vehicles in Australia*, NTC, https://www.ntc.gov.au/roads/technology/automated-vehicles-in-australia/ (last updated Nov. 15, 2018), *archived at* https://perma.cc/3Q4M-YGFT.

[23] *Id.*

[24] SENATE FOREIGN AFFAIRS, DEFENCE AND TRADE REFERENCES COMMITTEE, USE OF UNMANNED AIR, MARITIME AND LAND PLATFORMS BY THE AUSTRALIAN DEFENCE FORCE xi (June 2015), https://www.aph.gov.au/Parliamentary_Business/ Committees/Senate/Foreign_Affairs_Defence_and_Trade/Defence_Unmanned_Platform/~/media/Committees/fadt_ctte/Defence_Unmanned_Platform/report.pdf, *archived at* https://perma.cc/F8AZ-SFPS.

The government's response to this recommendation included a statement that,

> [i]f the Government decides to acquire armed unmanned systems, Defence will develop policy and doctrine concerning their use. All Australian Defence capabilities, including unmanned platforms, will continue to be operated in accordance with Australian domestic law and consistent with Australia's international legal obligations (in particular the provisions of the law of armed conflict).[25]

At the international level, Australia's statements at meetings of the GGE on LAWS have included the following:

> As a party to Additional Protocol I, Australia fully supports and adheres to the obligation to undertake a review of any new weapon, means or method of warfare to determine whether its employment would, in some or all circumstances, be prohibited by International Humanitarian Law or other international law by which Australia is bound.
>
> We recognise the potential complexity of reviewing weapons systems that include increasingly automated functions and look forward to discussing this further. The complexity of weapons reviews is destined to increase as artificial intelligence and machine learning evolves. However, Australia remains committed to the existing legal framework for reviewing new weapons under Article 36 of Additional Protocol I.[26] [November 2017]
>
> We recognise the potential value which autonomy brings to military and civilian technologies. Systems with advanced artificial intelligence and enhanced autonomous functions are becoming increasingly more prevalent in both contexts. In particular, we understand that militaries throughout the world are incorporating ever more automation into their systems. This is not new or surprising. We welcome discussions on how such technological advances in weapon systems will comply with International Humanitarian Law (IHL), increase precision, and support commanders fulfil their obligations to IHL on the battlefield.[27] [April 2018]

In March 2018, the Minister for Foreign Affairs, in a letter to a group of AI experts who had called on the government to take a "firm global stand" against LAWS that remove meaningful human control,[28] stated that the government "considers it would be premature to support a pre-emptive ban on autonomous weapons systems" and that it "will continue to develop its policies on artificial

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[25] Australian Government Response to the Senate Standing Committee on Foreign Affairs, Defence and Trade, Use of Unmanned Air, Maritime, and Land Platforms by the Australian Defence Force 1 (Mar. 2016), https://www.aph.gov.au/DocumentStore.ashx?id=874c22d0-55f8-4bc6-8c41-a4bd23061846, *archived at* https://perma.cc/CF57-7JLQ.

[26] Australian Statement – General Exchange of Views, LAWS GGE 13-17 November 2017, Australian Permanent Mission and Consulate General, Geneva, https://geneva.mission.gov.au/gene/Statement783.html, *archived at* https://perma.cc/U5XZ-48XR.

[27] Australian Statement – General Exchange of Views, LAWS GGE April 2018), Australian Permanent Mission and Consulate General, Geneva, https://geneva.mission.gov.au/gene/Statement798.html, *archived at* https://perma.cc/J7FQ-7YVB.

[28] George Nott, *Bishop Delivers Blow to Killer Robot Campaign*, COMPUTERWORLD (Mar. 29, 2018), https://www.computerworld.com.au/article/635515/bishop-delivers-blow-killer-robot-campaign/, *archived at* https://perma.cc/T5NT-APAN.

intelligence and LAWS within the framework of [its] international obligations, especially international law."[29]

China

I. National AI Strategies

A. Long-Term AI Development Plan

On July 20, 2017, China's State Council released the *Next Generation Artificial Intelligence Development Plan* (Development Plan).[30] The Development Plan sets forth long-term strategic goals for AI development in China, concluding in 2030. It contains "guarantee measures," such as developing a regulatory system and strengthening intellectual property protection, in promoting AI development.

The Development Plan is comprised of three stages, concluding in 2020, 2025, and 2030, respectively, and sets forth goals concerning building a regulatory framework and ethics framework for each stage, as follows:

- By 2020, China's overall technology and application of AI would catch up with the globally advanced levels. AI ethical norms, policies, and laws and regulations would be initially established in some areas.
- By 2025, China would achieve major breakthroughs in basic AI theories, and become world-leading in some technologies and applications. AI legal, ethical, and policy systems would be initially established, and AI security assessment and control capabilities would be achieved.
- By 2030, China's AI theories, technologies, and applications would achieve world-leading levels, making China the world's primary AI innovation center. AI legal, ethical, and policy systems would be further improved.[31]

The Development Plan proposes to "form an institutional arrangement to adapt to the development of AI, build an open and inclusive international environment, and reinforce the social foundation of AI development."[32] The specific guarantee measures in this regard include the following:

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[29] Letter, Julie Bishop, Minister for Foreign Affairs, to Toby Walsh, Scientia Professor of Artificial Intelligence, School of Computer Science and Engineering, University of New South Wales (Mar. 1, 2018), https://www.cse.unsw.edu.au/~tw/ciair/julie.pdf, *archived at* https://perma.cc/E63N-9DT2.

[30] State Council, Notice of Issuing New Generation Artificial Intelligence Development Plan (Guo Fa [2017] No. 35, July 8, 2017), http://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm (in Chinese), *archived at* https://perma.cc/57XZ-JLRW, English translation by Graham Webster et al., Aug. 1, 2017, *available at* https://www.newamerica.org/cybersecurity-initiative/digichina/blog/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/, *archived at* https://perma.cc/Q2LS-2547.

[31] *Id.* Part II, item (3).

[32] *Id.* Part V.

- Developing regulatory and ethical frameworks: This measure aims to strengthen research on legal, ethical, and social issues related to AI, and establish regulatory and ethical frameworks to ensure the healthy development of AI. Specifically, China would conduct research on legal issues related to AI applications, including confirmation of civil and criminal responsibility, protection of privacy and property, and information security utilization.[33]
- Providing tax incentives for AI enterprises: The aim of this key policy is to support the development of AI enterprises by providing tax incentives and research and development deductions to high-tech enterprises.[34]
- Formulating technical standards: This would see the formulation of technical standards concerning, for example, network security and privacy protection. Chinese AI enterprises would be encouraged to participate in or lead the development of international AI standards.[35]
- Strengthening the protection of intellectual property (IP): This would promote the IP protection of AI innovations and promote usage of new AI technology by establishing AI public patent pools.[36]
- Establishing the AI security supervision and evaluation system: the intent is to build an early warning mechanism of AI security monitoring and an open and transparent AI supervision system. China would promote self-discipline of the AI industry and enterprises, and increase punishments for data abuse, violations of personal privacy, and unethical activities in this regard.[37]

B. Three-Year Action Plan (2018–2020)

To implement the first stage of the Development Plan, in December 2017, China's Ministry of Industry and Information Technology (MIIT) issued the *Three-Year Action Plan for Promoting Development of a New Generation Artificial Intelligence Industry* (Action Plan).[38]

According to the Action Plan, China would focus on the following seven fields in the three years from 2018–2020:

- Intelligent network vehicles
- Intelligent service robots

[33] *Id.* Part V, item (1).

[34] *Id.* Part V, item (2).

[35] *Id.* Part V, item (3).

[36] *Id.*

[37] *Id.* Part V, item (4).

[38] Ministry of Industry and Information Technology, Three-Year Action Plan for Promoting Development of a New Generation Artificial Intelligence Industry (2018–2020) (Gong Xin Bu Ke [2017] No. 315, Dec. 14, 2017), http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757016/c5960820/content.html, *archived at* https://perma.cc/DU5D-DW47; English translation by Paul Triolo et al., Jan. 26, 2018, *available at* https://www.newamerica.org/cybersecurity-initiative/digichina/blog/translation-chinese-government-outlines-ai-ambitions-through-2020/, *archived at* https://perma.cc/68CA-G3HL.

- Intelligent unmanned aerial vehicles
- Medical imaging diagnosis systems
- Video image identification systems
- Intelligent voice interactive systems
- Intelligent translation systems[39]

The Action Plan also proposes carrying out research on AI-relevant policies, laws, and regulations as a method for creating a good environment for the healthy development of the AI industry, although it does not elaborate any specific measures.[40]

II. Autonomous Vehicles

On April 11, 2018, the MIIT, the Ministry of Public Security (MPS), and the Ministry of Transport (MOT) jointly issued a set of trial rules that pave the way for road testing of autonomous vehicles in China (National Rules).[41] The National Rules, which took effect on May 1, 2018, contain requirements for test vehicles and test drivers.[42] The Rules also specify the testing procedures. For example, a test driver must always sit in the driver's seat of the test vehicle during the test, monitor the status of the test vehicle and the driving environment, and get ready to take over the vehicle anytime.[43] Local authorities at the provincial level will formulate implementation rules applicable in their own areas.[44]

According to the National Rules, a temporary license plate is required for road testing of autonomous vehicles.[45] As of October 2018, at least eight cities, including Beijing, Shanghai, Shenzhen, and Chongqing, had published their local rules and started issuing temporary license plates for the road testing of autonomous vehicles in their areas.[46]

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[39] *Id.* Part II.

[40] *Id.* Part VI, item (5).

[41] Zhineng Wanglian Qiche Daolu Ceshi Guanli Guifan [Administrative Rules on Intelligent and Connected Vehicle Road Testing (Trial)] (MIIT, MPS & MOT, Apr. 11, 2018, effective May 1, 2018), http://www.miit.gov.cn/n1146295/n1652858/n1652930/n3757018/c6128243/content.html, *archived at* https://perma.cc/HQ3R-X79N.

[42] *Id.* arts. 6 & 7.

[43] *Id.* art. 18.

[44] *Id.* art. 4.

[45] *Id.* art. 13.

[46] Chen Xiaotong, *Zidong Jiashi Mingnian Kepao Gaosu, Beijing Zidong Jiashi Fazhan Lingpao Quanguo* [*Autonomous Vehicles Allowed on Highways from Next Year, Beijing Leading the Country in Autonomous Driving*], LEIPHONE (Oct. 23, 2018), https://www.leiphone.com/news/201810/PuctiHzojQTpjvoh.html, *archived at* https://perma.cc/23QC-28B2.

III. Lethal Autonomous Weapons Systems (LAWS)

On April 13, 2018, China's delegation to the UN GGE on LAWS reportedly announced China's desire to negotiate and conclude a new protocol for the Convention on Certain Conventional Weapons to ban the use of fully autonomous lethal weapons systems.[47]

China's latest position paper for the GGE, dated April 11, 2018, indicates China believes that, at present, LAWS still lacks a clear and agreed definition and many countries believe such weapon systems do not exist.[48] China therefore supports reaching an agreement on the specific definition of LAWS. It called on "all countries to exercise precaution, and to refrain, in particular, from any indiscriminate use against civilians."[49] The position paper also states that it is necessary, "when exploring LAWS-related legal issues, to have full consideration of the applicability of general legal norms to LAWS."[50] Concerning emerging technologies such as AI, China "believes that the impact of emerging technologies deserve objective, impartial and full discussion."[51] It states that "[u]ntil such discussions have been done, there should not be any pre-set premises or prejudged outcome which may impede the development of AI technology."[52]

IV. Facial Recognition

China is reportedly building a video surveillance system with cutting-edge technologies such as facial recognition. According to the 2018 annual report of the United States Congressional-Executive Commission on China, as of 2017, the system consisted of twenty million cameras with many having facial recognition capabilities. In addition to fighting crime, a primary function of the system is to maintain social stability, such as preventing protests and demonstrations.[53] The country aims to complete a nationwide facial recognition and surveillance network by 2020 with "100 percent surveillance and facial recognition coverage and total unification of its existing databases across the country."[54]

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[47] Elsa Kania, *China's Strategic Ambiguity and Shifting Approach to Lethal Autonomous Weapons Systems*, LAWFARE (Apr. 17, 2018), https://www.lawfareblog.com/chinas-strategic-ambiguity-and-shifting-approach-lethal-autonomous-weapons-systems, *archived at* https://perma.cc/GJF4-UNLU.

[48] Position Paper Submitted by China to the Group of Governmental Experts of the High Contracting Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects, CCW/GGE.1/2018/WP.7 (Apr. 11, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/E42AE83BDB3525D0C125826C0040B262/$file/CCW_GGE.1_2018_WP.7.pdf, *archived at* https://perma.cc/3L44-U7BT.

[49] *Id.*

[50] *Id.*

[51] *Id.*

[52] *Id.*

[53] CONGRESSIONAL-EXECUTIVE COMMISSION ON CHINA 2018 ANNUAL REPORT 229 (2018), https://www.cecc.gov/sites/chinacommission.house.gov/files/Annual%20Report%202018.pdf, *archived at* https://perma.cc/TR4L-YQAP.

[54] *Id.* at 11 (quoting *China Aims for Near-Total Surveillance, Including in People's Homes*, RADIO FREE ASIA (Apr. 30, 2018)).

During 2018, the MPS was reportedly developing a facial recognition database "with the power to identify any one of its 1.3 billion citizens within three seconds," in conjunction with a security company based in Shanghai.[55] According to the news report, the database can be connected to surveillance camera networks and will use cloud facilities to connect with data storage and processing centers distributed across the country.[56]

In cities such as Shenzhen, in Guangdong Province, the traffic police have introduced facial recognition technology and LED screens to shame and deter jaywalkers. Cameras on the streets capture images of people illegally crossing the road and the facial recognition software then identifies the citizens by comparing their images against a database. Photos of those people alongside their family names and part of their ID numbers are displayed on screens.[57] In addition, in early 2018 it was reported that police officers in Zhengzhou, Henan Province, were using glasses with facial-recognition software to help search for wanted criminals.[58]

India

I. Background

According to a report published by the Brookings Institution, the Indian AI industry "has seen growth in this period [2012–2017], with a total of $150 million invested in more than 400 companies over the past five years. Most of these investments have come in the last two years, when investment nearly doubled from $44 million in 2016 to $77 million in 2017."[59]

India currently has no laws or government-issued guidelines regulating AI. Instead, the government developed a number of national strategies or road maps related to AI in 2018.[60]

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[55] Stephen Chen, *China to Build Giant Facial Recognition Database to Identify Any Citizen Within Seconds*, SOUTH CHINA MORNING POST (Oct. 12, 2017; updated Sept. 24, 2018), https://www.scmp.com/news/china/society/article/2115094/china-build-giant-facial-recognition-database-identify-any, *archived at* https://perma.cc/TXQ6-RZRR.

[56] *Id.*

[57] Christina Zhao, *Jaywalking in China: Facial Recognition Surveillance Will Soon Fine Citizens via Text Message*, NEWSWEEK (Mar. 27, 2018), https://www.newsweek.com/jaywalking-china-facial-recognition-surveillance-will-soon-fine-citizens-text-861401, *archived at* https://perma.cc/S5BU-5KK6.

[58] Kinling Lo, *In China, These Facial-Recognition Glasses Are Helping Police to Catch Criminals*, SOUTH CHINA MORNING POST (Feb. 7, 2018), https://www.scmp.com/news/china/society/article/2132395/chinese-police-scan-suspects-using-facial-recognition-glasses, *archived at* https://perma.cc/7C6S-UNXP.

[59] Shamika Ravi & Puneeth Nagaraj, *Harnessing the Future of AI in India*, BROOKINGS (Oct. 18, 2018), https://www.brookings.edu/research/harnessing-the-future-of-ai-in-india/, *archived at* https://perma.cc/Z6EC-SYZ4.

[60] Amber Sinha et al., *AI in India: A Policy Agenda*, THE CENTRE FOR INTERNET AND SOCIETY (CIS) (Sept. 5, 2018), https://cis-india.org/internet-governance/blog/ai-in-india-a-policy-agenda, *archived at* https://perma.cc/XC62-PLNY.

II. National Initiatives

A. Report of the Artificial Intelligence Task Force

On August 24, 2017, the Ministry of Industry and Commerce constituted an eighteen-member Task Force on AI for India's Economic Transformation,[61] which is made up of experts, academics, and researchers/industry leaders, with the participation of governmental bodies/ministries (such as the National Institution for Transforming India (NITI Aayog), Ministry of Electronics and Information Technology, Department of Science and Technology, Unique Identification Authority of India, and Defence Research and Development Organization).[62] The task force completed its report in January 2018.[63]

The task force's report looked at the "use of AI along with its major challenges, and possible solutions for each sector."[64] It examined ten sectors, referred to as "domains of relevance to India." These sectors were: Manufacturing, FinTech, Agriculture, Healthcare, Technology for the Differently-abled, National Security, Environment, Public Utility Services, Retail and Customer Relationship, and Education.[65] The task force made several recommendations to the government:

> Noting that 'AI should be seen as a scalable problem solver in India rather than only as a booster of economic growth', the Task Force recommends: (a) the creation of an inter-ministerial National AI mission to coordinate AI-related activities in India; (b) enabling the setting up of digital data banks, marketplaces and exchanges to ensure availability of cross-industry data and information; (c) participating in the elaboration of operation standards for AI-based systems; (d) putting in place enabling policies to encourage and facilitate the development and deployment of AI-based products (such as data policies regarding ownership, sharing rights and usage, as well as tax incentives to support innovation); (e) elaborating an AI education strategy to develop human resources with necessary skills; (f) supporting reskilling of the current workforce; (g) participating in the international policy discussion on the governance of AI technologies; and (h) leveraging

[61] Press Release, Ministry of Commerce and Industry, Commerce and Industry Minister Sets Up Task Force on Artificial Intelligence for Economic Transformation (Aug. 25, 2017), http://pib.nic.in/newsite/PrintRelease.aspx?relid=170231, *archived at* https://perma.cc/M5EA-8X9H; *Homepage*, ARTIFICIAL INTELLIGENCE TASK FORCE, https://www.aitf.org.in/ (last visited Dec. 11, 2018), *archived at* https://perma.cc/36HQ-6E2L.

[62] NISHITH DESAI ASSOCIATES, THE FUTURE IS HERE: ARTIFICIAL INTELLIGENCE AND ROBOTICS 15 (May 2018), http://www.nishithdesai.com/fileadmin/user_upload/pdfs/Research_Papers/Artificial_Intelligence_and_Robotics.pdf, *archived at* https://perma.cc/87M5-UVGH.

[63] THE ARTIFICIAL INTELLIGENCE TASK FORCE, REPORT OF THE ARTIFICIAL INTELLIGENCE TASK FORCE (Mar. 21, 2018), http://dipp.nic.in/sites/default/files/Report_of_Task_Force_on_ArtificialIntelligence_20March2018_2.pdf, *archived at* https://perma.cc/7FS9-NYQX. *See also* Press Release, Ministry of Commerce and Industry, Finalisation of National Artificial Intelligence Mission (Aug. 25, 2017), http://pib.nic.in/newsite/PrintRelease.aspx?relid=181007, *archived at* https://perma.cc/XN9E-P453.

[64] Elonnai Hickok et al., *The AI Task Force Report – The First Steps Towards India's AI Framework*, CIS (June 27, 2018), https://cis-india.org/internet-governance/blog/the-ai-task-force-report-the-first-steps-towards-indias-ai-framework, *archived at* https://perma.cc/4R4D-GG3S.

[65] *Id.*

> bilateral partnership on the development of AI solutions for social and economic problems and for sharing best practices in regulation.[66]

B. NITI Aayog Discussion Paper on a National AI Strategy

On February 1, 2018, Finance Minister Arun Jaitley stated that the government think-tank NITI Aayog "would lead the national programme on AI" and that "[the government is set to support startups and centres of excellence with respect to AI training and research activities."[67]

The Committee of Secretaries held a meeting on February, 8, 2018, and tasked NITI Aayog with formulating a National Strategy Plan for AI "in consultation with Ministries and Departments concerned, academia and private sector."[68] On June 4, 2018, NITI Aayog published a discussion paper on a National Strategy on Artificial Intelligence.[69] The discussion paper states that "[t]he strategy should strive to leverage AI for economic growth, social development and inclusive growth."[70] It identified five sectors that could have the most social impact and which should be focused on: Healthcare, Agriculture, Education, Smart Cities/Infrastructure, Smart Mobility, and Transportation.[71] Experts have noted that the proposed strategy stands out due to its "focus on the social sector."[72]

The discussion paper provides over thirty policy recommendations, including to "invest in scientific research, encourage reskilling and training, accelerate the adoption of AI across the value chain, and promote ethics, privacy, and security in AI."[73] Tim Dutton, an AI policy researcher, provides a summary of some of these policy recommendations:

> Its flagship initiative is a two-tiered integrated strategy to boost research in AI. First, new Centres of Research Excellence in AI (COREs) will focus on fundamental research. Second, the COREs will act as technology feeders for the International Centres for Transformational AI (ICTAIs), which will focus on creating AI-based applications in domains of societal importance. In the report, NITI Aayong identifies healthcare, agriculture, education, smart cities, and smart mobility as the priority sectors that will

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[66] *India: Government-appointed Task Force Issues Recommendations on AI*, GIP DIGITAL WATCH (Mar. 30, 2018), https://dig.watch/updates/india-government-appointed-task-force-issues-recommendations-ai, *archived at* https://perma.cc/F2GU-R23E.

[67] *Why We Need to Have Regulation and Legislation on AI and Quick*, THE INDIAN EXPRESS (July 31, 2018), https://indianexpress.com/article/technology/opinion-technology/why-we-need-to-have-regulation-and-legislation-on-artificial-intelligence-quick-5151401/, *archived at* https://perma.cc/4DHU-9WJW.

[68] Press Release, Ministry of Commerce and Industry, *supra* note 61.

[69] NITI AAYOG, DISCUSSION PAPER: NATIONAL STRATEGY FOR ARTIFICIAL INTELLIGENCE (June 2018), http://niti.gov.in/writereaddata/files/document_publication/NationalStrategy-for-AI-Discussion-Paper.pdf, *archived at* https://perma.cc/N7UE-SBLP.

[70] *Id.* at 40.

[71] *Id.*

[72] Ravi & Nagaraj, *supra* note 59.

[73] Tim Dutton, *Artificial Intelligence Strategies*, MEDIUM (June 28, 2018), https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd, *archived at* https://perma.cc/5Z4W-45UB.

> benefit the most socially from applying AI. The report also recommends setting up a consortium of Ethics Councils at each CORE and ICTAI, developing sector specific guidelines on privacy, security, and ethics, creating a National AI Marketplace to increase market discovery and reduce time and cost of collecting data, and a number of initiatives to help the overall workforce acquire skills. Strategically, the government wants to establish India as an "AI Garage," meaning that if a company can deploy an AI in India, it will then be applicable to the rest of the developing world.[74]

C. Ministry of Electronics and Information Technology Committees

The Ministry of Electronics and Information Technology has established four committees to help encourage research in AI. They are headed by "directors of Indian Institutes of Technology (IITs), Nasscom and eminent researchers"[75] and include the following:

i. Committee on platforms and data for AI,
ii. Committee on leveraging AI for identifying National Missions in key sectors,
iii. Committee on mapping technological capabilities, key policy enablers, skilling, re-skilling and R&D
iv. Committee on cybersecurity, safety, legal and ethical issues.[76]

The four committees are "presently studying AI in context of citizen centric services; data platforms; skilling, reskilling and R&D; and legal, regulatory and cybersecurity perspectives."[77]

D. AI and Defense

In February 2018, the government of India established a multi-stakeholder task force ("comprising the Government, Services, Academia, Industry, Professionals and Start-ups") to study the strategic and national security implications of AI for India. The task force submitted its report to the Minister of Defense on June 30, 2018. The report is said to include

> recommendations relating to making India a significant power of AI in defence, specifically in the area of aviation, naval, land systems, cyber, nuclear and biological warfare including both defensive and offensive needs including counter AI needs; recommendations for policy and institutional interventions required to regulate and encourage robust AI based technologies for defence sector; working with start-

[74] *Id.*

[75] *Digital India: IT Ministry Set Up Four Committees to Encourage AI Research*, LIVEMINT (Feb. 10, 2018), https://www.livemint.com/Politics/h2NthxiA7u5VhiDJqfTjcM/Digital-India-IT-ministry-set-up-four-committees-to-encoura.html, *archived at* https://perma.cc/7VWU-HM6L.

[76] Press Release, Ministry of Commerce and Industry, *supra* note 61.

[77] Vidushi Marda, *Artificial Intelligence Policy in India: A Framework for Engaging the Limits of Data-driven Decision-making*, 376(2133) PHIL. TRANS. A (Royal Society Pub., Nov. 28, 2018), http://rsta.royalsocietypublishing.org/content/ roypta/376/2133/20180087.full.pdf, *archived at* https://perma.cc/VGN4-N9DE.

> ups/commercial industry and recommendations for appropriate strategies of working with start ups.[78]

Ambassador Amandeep Singh Gill of India was chair of both the 2017 and 2018 meetings of the GGE on LAWS. India's position on LAWS[79] is that the Convention on Certain Conventional Weapons is the "relevant forum to address the issue of the possible expansion of the autonomous dimension of lethal weapons systems,"[80] and it "advised for balancing the lethality of these weapons with military necessity—adopting a wait-and-watch approach to how the conversation evolves."[81]

III. Regulatory Framework and Proposed Changes

A. Privacy Challenges

India currently does not have a comprehensive legal framework for data protection. On July 27, 2018, the government of India's Committee of Experts (also known as the Justice B.N. Srikrishna Committee) released a Draft Protection of Personal Data Bill[82] along with an accompanying report titled *A Free and Fair Digital Economy Protecting Privacy, Empowering Indians*.[83] The Bill, like the EU's General Data Protection Regulation, establishes a set of rights but does not appear to include rights to protect against automated decision-making.[84] According to an analysis by the Centre for Internet and Society, "the Bill creates a framework to address harms arising out of AI, but does not empower the individual to decide how their data is processed and remains silent on

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[78] Press Release, Ministry of Defence, Artificial Intelligence (Aug. 1, 2018), http://pib.nic.in/newsite/PrintRelease.aspx?relid=181324, *archived at* https://perma.cc/R6W8-WBAJ; Press Release, Ministry of Defence, AI Task Force Hands Over Final Report to RM (June 30, 2018), http://pib.nic.in/newsite/PrintRelease.aspx?relid=180322, *archived at* https://perma.cc/5GCW-M3Q5.

[79] *See* R. SHASHANK REDDY, INDIA AND THE CHALLENGE OF AUTONOMOUS WEAPONS 7 (Carnegie Endowment for International Peace, June 2016), https://carnegieendowment.org/files/CEIP_CP275_Reddy_final.pdf, *archived at* https://perma.cc/4R3L-ANUX.

[80] *Statement by Commodore Nishant Kumar, Director (Military Affairs), Ministry of External Affairs, Government of India During the First Session of the Group of Governmental Experts (GGE) on Lethal Autonomous Weapons Systems (LAWS) Held in Geneva on April 9, 2018*, PERMANENT MISSION OF INDIA TO CONFERENCE ON DISARMAMENT, http://meaindia.nic.in/cdgeneva/?6850?003, *archived at* https://perma.cc/DPS9-QLW4.

[81] Bedavyasa Mohanty, *Amidst Calls for a Ban, India Leads the Debate on Lethal Autonomous Weapons*, OBSERVER RESEARCHER FOUNDATION (ORF) (Nov. 29, 2017), https://www.orfonline.org/research/amidst-calls-ban-india-leads-debate-lethal-autonomous-weapons/, *archived at* https://perma.cc/ND39-SG79.

[82] Personal Data Protection Bill, 2018, http://meity.gov.in/writereaddata/files/Personal_Data_Protection_Bill,2018.pdf, *archived at* https://perma.cc/GN5K-NJNG.

[83] COMMITTEE OF EXPERTS UNDER THE CHAIRMANSHIP OF JUSTICE B.N. SRIKRISHNA, A FREE AND FAIR DIGITAL ECONOMY PROTECTING PRIVACY, EMPOWERING INDIANS (2018), http://meity.gov.in/writereaddata/files/Data_Protection_Committee_Report.pdf, *archived at* https://perma.cc/URX5-YQF6.

[84] Amber Sinha & Elonnai Hickok, *The Srikrishna Committee Data Protection Bill and Artificial Intelligence in India*, CIS (Sept. 3, 2018), https://cis-india.org/internet-governance/blog/the-srikrishna-committee-data-protection-bill-and-artificial-intelligence-in-india, *archived at* https://perma.cc/Z88N-7VMS.

the issue of 'black box' algorithms" and is "focused on placing the responsibility on companies to prevent harm."[85]

The Committee's report states that

> [t]he second group of rights relate to the right to object to automated decision-making and to access the logic behind it. In our view, these rights, again a response by the EU to emerging challenges from Big Data and AI, have a legitimate rationale. They are aimed at curbing harms due to prejudice and discrimination in output data owing to evaluative determinations without human review. The solution provided by this right is to simply involve a step of human review, which is not per se immune from prejudice. This is a change pertaining to the operational structure of an organisation. Such a change may be necessitated, provided it is carefully tailored to specific organisations and the nature of their processing activity. This, in our view, is better achieved through an accountability framework which requires certain data fiduciaries, which may be making evaluative decisions through automated means, to set up processes that weed out discrimination. This is a constituent element of privacy by design which should be implemented by entities proactively, audited periodically and monitored by the DPA in case there are examples of unlawful processing. At the same time, such a model does not entirely denude the individual of agency. If discrimination has ensued as a result of per se lawful, yet discriminatory automated processing, individuals are always at liberty to go to courts for breach of fiduciary duties. Thus, the interests underlying such rights, can be more efficaciously achieved by an ex ante accountability model.[86]

B. Automated Vehicles

The Seventh Schedule of the Constitution of India lists legislative subjects that are in the exclusive or concurrent jurisdiction of the central government or state governments. The regulation of motor vehicles in India appears to be under the concurrent jurisdiction of both the central and state governments.[87] Motor vehicle road safety is regulated by the central level by the Motor Vehicles Act[88] and the Central Motor Vehicle Rules.[89] State governments have their own laws and policies. The current Motor Vehicle Act does not appear to allow for automated vehicles (AVs) or AV testing. However, amending legislation, which was passed in the Lok Sabha (lower house of Parliament) on April 10, 2017, but is still pending before the upper house chamber, the Rajya Sabha, includes an exemption that may allow testing of AVs:

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[85] *Id.*

[86] COMMITTEE OF EXPERTS UNDER THE CHAIRMANSHIP OF JUSTICE B.N. SRIKRISHNA, *supra* note at 83, at 74-5.

[87] Legislative subject no. 35, "Mechanically propelled vehicles," is on the concurrent list of the Constitution of India. (INDIA CONST. Seventh Sched., List III—Concurrent List, Item 35, https://www.india.gov.in/sites/upload_files/npi/files/coi-eng-schedules_1-12.pdf, *archived at* https://perma.cc/7LKA-PXMU.)

[88] Motor Vehicles Act, No. 59 of 1988, http://www.tn.gov.in/sta/Mvact1988.pdf, *archived at* https://perma.cc/ZZY9-EZJQ

[89] Central Motor Vehicles Rules, 1989, http://www.tn.gov.in/sta/Cmvr1989.pdf, *archived at* https://perma.cc/X9T3-LP8F.

> Notwithstanding anything contained in this Act and subject to such conditions as may be prescribed by the Central Government, in order to promote innovation and research and development in the fields of vehicular engineering, mechanically propelled vehicles and transportation in general, the Central Government may exempt certain types of mechanically propelled vehicles from the application of the provisions of this Act.[90]

At the end of July 2018, the Minister of Road Transport and Highways was reported to have said that "[w]e won't allow driverless cars in India. I am very clear on this. We won't allow any technology that takes away jobs. In a country where you have unemployment, you can't have a technology that ends up taking people's jobs."[91]

IV. AI and Facial Recognition

State police forces across India are working with private companies to deploy AI-assisted facial or image recognition algorithms and predictive policing tools to detect and prevent crimes.[92]

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[90] Motor Vehicles (Amendment) Bill, 2017, Bill No. 214-C of 2016, § 3 (inserting new § 2B), http://164.100.47.4/BillsTexts/LSBillTexts/PassedLoksabha/214C_2016_LS_Eng.pdf, *archived at* https://perma.cc/DTX8-B8NN.

[91] Moushumi Das Gupta, *Won't Allow Driverless Cars that Take Away Jobs: Nitin Gadkari*, HINDUSTAN TIMES (July 25, 2017), https://www.hindustantimes.com/india-news/won-t-allow-driverless-cars-that-take-away-jobs-says-union-minister-nitin-gadkari/story-JCDjBMoDQ4yzXrWv3ltxsK.html, *archived at* https://perma.cc/F3NC-D3L3.

[92] ARINDRAJIT BASU & ELONNAI HICKOK, CIS, ARTIFICIAL INTELLIGENCE IN THE GOVERNANCE SECTOR IN INDIA 3-7 (Working Draft), https://cis-india.org/internet-governance/ai-and-governance-case-study-pdf (last visited Nov. 21, 2018), *archived at* https://perma.cc/RZ35-PFCJ; Abhishek Baxi, *Law Enforcement Agencies in India Are Using Artificial Intelligence to Nab Criminals – Here's How*, FORBES (Sept. 28, 2018), https://www.forbes.com/sites/baxiabhishek/2018/09/28/law-enforcement-agencies-in-india-are-using-artificial-intelligence-to-nab-criminals-heres-how/#fce76d241d31, *archived at* https://perma.cc/93LW-TDEG; John R. Quain, *Crime-predicting A.I. Isn't Science Fiction. It's About to Roll Out in India*, DIGITAL TRENDS (Apr. 11, 2018), https://www.digitaltrends.com/cool-tech/could-ai-based-surveillance-predict-crime-before-it-happens/, *archived at* https://perma.cc/R76Z-AHPU; Smita Sinha, *How Staqu's AI-Powered Smart Glasses Can Help Cops Identify Criminals in a Crowd*, ANALYTICS INDIA MAGAZINE (May 31, 2018), https://www.analyticsindiamag.com/how-staqus-ai-powered-smart-glasses-can-help-cops-identify-criminals-in-a-crowd/, *archived at* https://perma.cc/B27C-XZHC.

Indonesia

Indonesian entities are reportedly leaders in the adoption of AI in the ASEAN region, with a recent survey showing that nearly 25% of organizations have done so.[93] In October 2018, Indonesia's first AI research center was launched.[94] The government itself is using AI, such as in its approach to combatting hoaxes and false information online.[95]

The government reportedly produced a digital strategy in 2017, with a focus on supporting small and medium enterprises to be "digitally empowered."[96]

In August 2018, the President of Indonesia stated that the country's automotive sector needed to take note of developments in the global automotive industry, including the challenges arising from the disruption of technology such as autonomous vehicles and online transportation applications. With reference to autonomous vehicles, he stated that "we might have to redefine a car."[97] There are currently no specific laws or regulations related to autonomous vehicles in Indonesia.[98]

Japan

The Strategic Council for AI Technology was established in April 2016 at the behest of Japanese Prime Minister Shinzō Abe, to develop research and development goals and a roadmap for the industrialization of AI. Comprised of representatives from academia, industry, and government,[99]

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[93] Ai Lei Tao, *Indonesia Leads ASEAN Region in AI Adoption*, COMPUTER WEEKLY (July 12, 2018), https://www.computerweekly.com/news/252444634/Indonesia-leads-ASEAN-region-in-AI-adoption, *archived at* https://perma.cc/D2WA-NAQU; Kesavan Loganthan, *Indonesia Welcomes AI as It Embraces Digital Disruption*, TECHINASIA (Oct. 19, 2018), https://www.techinasia.com/indonesia-ai-digital-disruption, *archived at* https://perma.cc/5G35-8K8V.

[94] *Joint Effort Drives Indonesia's First AI Research Center*, TEMPO.CO (Oct. 27, 2018), https://en.tempo.co/read/news/2018/10/27/310922922/Joint-Effort-Drives-Indonesias-First-AI-Research-Center, *archived at* https://perma.cc/Z24L-EB3S.

[95] *Government Deploys Artificial Intelligence to Combat Internet Hoaxes*, JAKARTA POST (Jan. 31, 2018), http://www.thejakartapost.com/news/2018/01/31/govt-deploys-artificial-intelligence-to-combat-internet-hoaxes.html, *archived at* https://perma.cc/4H8A-62R5.

[96] Lis Sutjiati, *Indonesia's Digital Economy Will Thrive as Small Business Come Online, Says Gov't*, TECHINASIA (Nov. 3, 2017), https://www.techinasia.com/indonesias-digital-economy-thrive-small-businesses-online-govt-plan, *archived at* https://perma.cc/4XHC-XTD2; *Transformation Towards Indonesia's Digital-Savvy MSMEs*, ASSOCIATION OF SOUTHEAST ASIAN NATIONS, https://asean.org/transformation-towards-indonesias-digital-savvy-msmes/ (last visited Nov. 19, 2018), *archived at* https://perma.cc/3HHS-NHCW.

[97] *We Must Follow the Development of Global Automotive Industry*, SEKRETARIAT KABINET REPUBLIC INDONESIA (Aug. 2, 2018), http://setkab.go.id/en/we-must-follow-the-development-of-global-automotive-industry/, *archived at* https://perma.cc/9V8P-787A.

[98] *See* BAKER MCKENZIE, GLOBAL DRIVERLESS VEHICLE SURVEY 2018, at 107–11 (Mar. 2018), https://www.bakermckenzie.com/-/media/files/insight/publications/2018/03/global-driverless-vehicle-survey-2018/mm_global_driverlessvehiclesurvey2018_mar2018.pdf, *archived at* https://perma.cc/SZA5-XU89.

[99] 人工知能技術戦略会議 [*Strategic Council for AI Technology*], CABINET OFFICE, http://www8.cao.go.jp/cstp/tyousakai/jinkochino/ (last visited Oct. 23, 2018), *archived at* https://perma.cc/3K6H-KG8Z.

the Strategic Council released its Artificial Intelligence Technology Strategy in March 2017.[100] According to the Strategy, the Council acts as a control tower and manages five national research and development institutions that are under the jurisdictions of the Ministry of Internal Affairs and Communications (MIC); the Ministry of Education, Culture, Sports, Science and Technology (MEXT); and the Ministry of Economy, Trade and Industry (METI) in order to promote research and development of AI technology. In addition to the three ministries, the Council coordinates with ministries that possess big data and have jurisdiction over industries that utilize AI, such as the Cross-ministerial Strategic Innovation Promotion Program of the Cabinet Office; the Ministry of Health, Labour and Welfare; the Ministry of Land, Infrastructure, Transport and Tourism; and the Ministry of Agriculture, Forestry and Fisheries, to promote the utilization and application of AI technology.[101] The Council has also formulated industrialization roadmaps for the three prioritized areas of "productivity," "health, medical care, and welfare," and "mobility."[102] The Strategy also states that national institutions would develop infrastructure technology, foster skilled human resources, maintain public data, and support start-ups.[103] In August 2018, the Council issued an implementation plan for the strategy.[104]

According to a news article, the government is drafting a comprehensive rule on medical devices that utilize AI. The rule would prescribe that the ultimate responsibility for diagnosis remains with medical doctors and set safety standards for approval by the government.[105]

As a reference for private businesses, METI has formulated Contract Guidance on Utilization of AI and Data to summarize the issues and factors to be considered when businesses draft a contract on the development and utilization of AI-based software.[106] The Guidance suggests a new contract model that recognizes the importance of AI-related developers' expertise and compensates them for it.[107]

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[100] STRATEGIC COUNCIL FOR AI TECHNOLOGY, ARTIFICIAL INTELLIGENCE TECHNOLOGY STRATEGY (Mar. 31, 2017), http://www.nedo.go.jp/content/100865202.pdf, *archived at* https://perma.cc/Z59H-ZR3M.

[101] *Id*. at 3.

[102] *Id*. at 4.

[103] *Id*. at 8.

[104] STRATEGIC COUNCIL FOR AI TECHNOLOGY, IMPLEMENTATION PLAN OF ARTIFICIAL INTELLIGENCE TECHNOLOGY STRATEGY (Aug. 17, 2018), http://www8.cao.go.jp/cstp/tyousakai/jinkochino/keikaku.pdf, *archived at* https://perma.cc/M8CZ-R29M.

[105] 政府、AI 医療に包括ルール　「医師に最終責任」規定へ [*Government, Comprehensive Rule for AI Healthcare, Prescribe "Medical Doctor Ultimately Responsible"*], NIKKEI (June 26, 2018), https://www.nikkei.com/article/DGXMZO32207330V20C18A6MM8000/ (registration required).

[106] Press Release, METI, METI Formulates "Contract Guidance on Utilization of AI and Data" (June 15, 2018), http://www.meti.go.jp/english/press/2018/0615_002.html, *archived at* https://perma.cc/JM9U-ENS9. The AI guidance is available at http://www.meti.go.jp/press/2018/06/20180615001/20180615001-3.pdf (in Japanese), *archived at* https://perma.cc/HZ9J-7QQA.

[107] *See Japan to Set Ground Rules for Sharing AI's Riches*, NIKKEI ASIAN REVIEW (Dec. 27, 2017), https://asia.nikkei. com/Politics/Japan-to-set-ground-rules-for-sharing-AI-s-riches2, *archived at* https://perma.cc/A4L7-W2DL.

Regarding the regulation of self-driving cars, the government has discussed changes to various laws to prepare for their utilization by 2020.[108] Testing of self-driving cars has been allowed in certain conditions.[109] In June 2017, the National Police Agency issued circular that allowed testing of remote control autonomous driving system upon permission.[110] The MLIT issued a report on an existing law concerning civil responsibility for traffic accidents involving self-driving cars in March 2018.[111]

Malaysia

In October 2017, the Malaysian government announced plans to develop a National AI Framework as an expansion of the existing National Big Data Analytics Framework.[112] The development of the framework will be led by the Malaysia Digital Economy Corporation. The government also stated that it would establish the Digital Transformation Acceleration Programme (D-TAP) and introduce a "Cloud First" strategy, in addition to its existing Malaysia Tech Entrepreneur Programme (M-TEP).[113]

In March 2018, the "Deputy Minister of International Trade and Industry (MITI) officiated the Towards Autonomous Technologies Conference 2018, a collaborative efforts [sic] between MIDA (Malaysian Investment Development Authority), CREST (Collaborative Research in Engineering, Science and Technology) and DRB-HICOM University held at the MIDA headquarters."[114] The Deputy Minister stated Malaysia has "notable local companies and universities that have initiated

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[108] STRATEGIC HEADQUARTERS FOR THE PROMOTION OF AN ADVANCED INFORMATION AND TELECOMMUNICATIONS NETWORK SOCIETY, 自動運転に係る制度整備大綱 [OUTLINE OF PREPARATION OF SYSTEM CONCERNING AUTOMATIC OPERATION] 12 (Apr. 17, 2018), https://www.kantei.go.jp/jp/singi/it2/kettei/pdf/20180413/auto_drive.pdf, *archived at* https://perma.cc/JG2T-3SP3.

[109] National Police Agency, 自動走行システムに関する公道実証実験のためのガイドライン [Guidelines for Testing for Automated Driving System on Public Roads] (May 2016), https://www.npa.go.jp/koutsuu/kikaku/gaideline.pdf, *archived at* https://perma.cc/RLP5-BJBA.

[110] National Police Agency, 遠隔型自動運転システムの公道実証実験に係る道路使用許可の申請に対する取扱いの基準 [Standards of Handling Application for Permission of Road Usage for Testing of Remote Control Autonomous Driving System on Public Roads] (June 2017), http://www.autonomous-car.pref.aichi.jp/application/files/6615/2179/2604/74390936afeef469e578a07d14ec99b5.pdf, *archived at* https://perma.cc/T7E5-UMK5.

[111] MLIT, 自動運転における損害賠償責任に関する研究会 に関する研究会報告書 [STUDY GROUP CONCERNING COMPENSATION FOR DAMAGES CAUSED BY SELF-DRIVING CARS REPORT (Mar. 2018), http://www.mlit.go.jp/common/001226365.pdf, *archived at* https://perma.cc/9TF6-ZR5W.

[112] Priyankar Bhunia, *Plans for Cloud-First Strategy and National AI Framework Revealed at 29th MSC Malaysia Implementation Council Meeting*, OPENGOV ASIA (Oct. 28, 2017), https://www.opengovasia.com/plans-for-cloud-first-strategy-and-national-ai-framework-revealed-at-29th-msc-malaysia-implementation-council-meeting/, *archived at* https://perma.cc/4T3J-MLJ7.

[113] Azura Abas, *Najib Unveils Malaysia's Digital 'To-Do-List' to Propel Digital Initiatives*, NEW STRAITS TIMES (Oct. 19, 2017), https://www.nst.com.my/news/nation/2017/10/292784/najib-unveils-malaysias-digital-do-list-propel-digital-initiatives, *archived at* https://perma.cc/VV7Q-HGHP.

[114] Press Release, Malaysian Investment Development Authority, Embracing Future Innovations: Companies Need to Align with the Dynamic Ecosystem of the Automotive Industry (Mar. 21, 2018), http://www.mida.gov.my/home/5977/news/embracing-future-innovations-/, *archived at* https://perma.cc/U92R-2D6N.

several development projects related to autonomous vehicles and its related technologies."[115] There are currently no specific laws or regulations related to autonomous vehicles in Malaysia.[116]

In November 2018, it was reported that the Malaysian government "will seek Japan's assistance on investment in the artificial intelligence (AI) industry in the quest to take its technologies to a more advanced level."[117]

New Zealand

I. Use of Artificial Intelligence in New Zealand

A number of businesses and other organizations in New Zealand are currently using and developing AI in different sectors, including agriculture,[118] legal services, and retail, according to one website that examines the use of artificial intelligence (AI) in the country.[119]

Within government, the Ministry of Primary Industries has worked with Customs New Zealand; the Inland Revenue Department; and the Ministry of Business, Innovation and Employment, as well as a private IT company, "to find out whether AI has the potential to make it easier for businesses to interact with government in a multi-agency context."[120] The AI Proof of Concept was partly inspired by the "opportunities presented by the Better Rules Initiative," which

> showcased "Human and Machine-consumable Rules" as a key component for the digital transformation of government. Better Rules worked across several government agencies to explore the ideas and practice of turning legislation into machine-consumable 'digital

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[115] *Id*.

[116] *See* BAKER MCKENZIE, GLOBAL DRIVERLESS VEHICLE SURVEY 2018, at 127–33 (Mar. 2018), https://www.bakermckenzie.com/-/media/files/insight/publications/2018/03/global-driverless-vehicle-survey-2018/mm_global_driverlessvehiclesurvey2018_mar2018.pdf, *archived at* https://perma.cc/SZA5-XU89.

[117] *Malaysia Hopes to Tap Japan's Expertise in AI Investment*, MALAY MAIL (Nov. 7, 2018), https://www.malaymail.com/s/1690988/malaysia-hopes-to-tap-japans-expertise-in-ai-investment, *archived at* https://perma.cc/XA5G-X6TD.

[118] For further information on developments in the agricultural sector, see, e.g., *Five Tech Trends Shaping Agriculture*, FONTERRA (Aug. 6, 2018), https://www.fonterra.com/nz/en/our-stories/articles/five-tech-trends-shaping-agriculture.html, *archived at* https://perma.cc/FR2B-97NP; Peter Wren-Hilton, *Global Thinking Sets up New Zealand Agtech Startups for Outsized Impact*, AGFUNDER NEWS (Feb. 15, 2018), https://agfundernews.com/global-thinking-new-zealand-agtech.html/, *archived at* https://perma.cc/RR8L-PG9F; *Showcasing NZ Agtech – Bringing Automation and Robotics to the Farm*, SILICON VALLEY ROBOTICS (Apr. 23, 2016), https://svrobo.org/showcasing-nz-agtech-bringing-automation-and-robotics-to-the-farm/, *archived at* https://perma.cc/N7LJ-YGUY.

[119] *Organisations Using Artificial Intelligence in New Zealand*, THOUGHT EXPERIMENT, https://thoughtexperiment.co.nz/thought-experiment-home-page/organisations-using-artificial-intelligence-in-new-zealand/ (last visited Nov. 14, 2018), *archived at* https://perma.cc/485J-3GP7.

[120] *Trialling Artificial Intelligence as a Way to Navigate Government Information*, MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT (MBIE) (Oct. 19, 2018), https://www.mbie.govt.nz/about/whats-happening/news/2018/trialling-artificial-intelligence-as-a-way-to-navigate-government-information, *archived at* https://perma.cc/JPY4-QGFD.

> rules'. This process found opportunities for government in machine consumable legislation to capture benefits from new technologies – such as artificial intelligence.[121]

The use of AI to assist digital navigation across government websites was demonstrated among other initiatives at a digital showcase in November 2018.[122]

II. Government Initiatives Related to AI

In 2013, the New Zealand government established Callaghan Innovation, a government entity that supports businesses through the provision of innovation and research and development services, and that seeks to "enhance the operation of New Zealand's innovation ecosystem."[123] In March 2018, it published a white paper on AI,[124] which "predicts how AI will affect [New Zealand's] agriculture, digital, energy and health sectors within the next few years. It details how different AI technologies will disrupt each sector in waves and showcases local examples of AI-powered businesses."[125]

Subsequently, in May 2018, a report commissioned by the AI Forum New Zealand was launched by the New Zealand government.[126] The report provides the "first current-state snapshot of New Zealand's AI landscape, touching on the emerging uses of AI."[127] Established in 2017, the AI Forum is a nonprofit, nongovernmental organization funded by its members that "brings together New Zealand's community of artificial intelligence technology innovators, end users, investor groups, regulators, researchers, educators, entrepreneurs and interested public to work together to find ways to use AI to help enable a prosperous, inclusive and thriving future for our nation."[128]

Upon launching the report, the government stated that it would develop an action plan and ethical framework regarding AI. As a first step, it would formalize the government's relationship with the interdisciplinary Centre for Law and Policy in Emerging Technologies, which is a collaboration

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[121] *Id.*

[122] *Seamless Services to Business and Citizens Thanks to Government Working Collaboratively*, MBIE (Nov. 13, 2018), https://www.mbie.govt.nz/about/whats-happening/news/2018/seamless-services-to-business-and-citizens-thanks-to-government-working-collaboratively, *archived at* https://perma.cc/EW2C-43JA.

[123] *About Us*, CALLAGHAN INNOVATION, https://www.callaghaninnovation.govt.nz/about-us (last updated Sept. 5, 2018), *archived at* https://perma.cc/C6Q7-SW6J.

[124] CALLAGHAN INNOVATION, THINKING AHEAD: INNOVATION THROUGH ARTIFICIAL INTELLIGENCE (Mar. 2018), https://www.callaghaninnovation.govt.nz/sites/all/files/ai-whitepaper.pdf, *archived at* https://perma.cc/4ENK-CHDR.

[125] *Waves of AI Disruption for Key New Zealand Business Sectors*, CALLAGHAN INNOVATION (Mar. 26, 2018), https://www.callaghaninnovation.govt.nz/news-and-events/ai-whitepaper, *archived at* https://perma.cc/U36J-QLLR.

[126] AI FORUM NEW ZEALAND, ARTIFICIAL INTELLIGENCE: SHAPING A FUTURE NEW ZEALAND (May 2018), https://aiforum.org.nz/wp-content/uploads/2018/07/AI-Report-2018_web-version.pdf, *archived at* https://perma.cc/B9PG-LVGA.

[127] Press Release, Clare Curran, Government Will Move Quickly on AI Action Plan (May 2, 2018), https://www.beehive.govt.nz/release/government-will-move-quickly-ai-action-plan, *archived at* https://perma.cc/T89U-U3ZE.

[128] *About*, AI FORUM NEW ZEALAND, https://aiforum.org.nz/about/ (last visited Nov. 14, 2018), *archived at* https://perma.cc/7G8G-BEDK.

between Otago University and the New Zealand Law Foundation.[129] In early 2017, the Centre commenced a three-year project "to evaluate legal and policy implications of artificial intelligence (AI) for New Zealand."[130] This project will investigate two key topics: predictive AI technologies in the criminal justice system and AI and employment.[131]

In the area of data analysis and technology, the government announced in May 2018 that it would undertake a project to "assess how government agencies use algorithms to analyse people's data, to ensure transparency and fairness in decisions that affect citizens."[132] It further stated that New Zealand "is leading the work with the UK, Israel, Estonia, South Korea, Canada and Uruguay working together to consider how digital technology impacts fundamental human rights and to share best practice about ways to tackle challenges."[133]

The government has also appointed and funded a Data Futures Partnership, which aims to "[c]reate a competitive advantage by positioning New Zealand as a high-value, strongly inclusive, high-trust, and high-control data-sharing ecosystem."[134] The group has published a draft document, *A Path to Social Licence: Guidelines for Trusted Data Use*,[135] as part of its "wider work programme to maximise the benefits of data for the public, companies, government agencies, and non-governmental organisations."[136]

Other initiatives include the *Principles for Safe and Effective Use of Data and Analytics*, published in 2018 by the Privacy Commissioner and Government Chief Data Steward (who is the chief executive of Stats NZ), which are "intended to help agencies, and guide our thinking to data analytics activities, including algorithmic decision-making."[137] Individual government agencies

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[129] *New Zealand Law Foundation Centre for Law and Emerging Technologies*, UNIVERSITY OF OTAGO, https://www.otago.ac.nz/law/research/emergingtechnologies/ (last visited Nov. 15, 2018), *archived at* https://perma.cc/6FSH-3GEX. *See also* John Gibb, *Chance to Lead Ethical Use of AI*, OTAGO DAILY TIMES (May 8, 2018), https://www.odt.co.nz/news/dunedin/campus/university-of-otago/chance-lead-ethical-use-ai, *archived at* https://perma.cc/YZB8-ZTFC.

[130] *Artificial Intelligence and Law in New Zealand*, UNIVERSITY OF OTAGO, http://www.cs.otago.ac.nz/research/ai/AI-Law/ (last visited Nov. 15, 2018), *archived at* https://perma.cc/FCF3-XFQF.

[131] *Id. See also Major New Otago Study to Tackle Artificial Intelligence Law and Policy*, UNIVERSITY OF OTAGO (Jan. 19, 2017), https://www.otago.ac.nz/news/news/otago633498.html, *archived at* https://perma.cc/3UMM-9H88.

[132] Press Release, Clare Curran & James Shaw, Government to Undertake Urgent Algorithm Stocktake (May 23, 2018), https://www.beehive.govt.nz/release/government-undertake-urgent-algorithm-stocktake, *archived at* https://perma.cc/N4WZ-NHCC. *See also* Claire Lord, *Algorithm Review Underway to Increase Transparency and Accountability*, Data.GOVT.NZ (July 18, 2018), https://www.data.govt.nz/blog/algorithm-review-underway-to-increase-transparency-and-accountability/.

[133] Press Release, Government to Undertake Urgent Algorithm Stocktake, *supra* note 132.

[134] *Research*, TRUSTED DATA, https://trusteddata.co.nz/research/ (last visited Nov. 14, 2018), *archived at* https://perma.cc/2JCS-C5Q6.

[135] DATA FUTURES PARTNERSHIP, A PATH TO SOCIAL LICENCE: GUIDELINES FOR TRUSTED DATA USE (Aug. 2017), https://trusteddata.co.nz/wp-content/uploads/2017/08/Background-Trusted-Data.pdf, *archived at* https://perma.cc/V5B6-PDWF.

[136] *Research*, TRUSTED DATA, *supra* note 134.

[137] *Principles for the Safe and Effective Use of Data and Analytics*, OFFICE OF THE PRIVACY COMMISSIONER (May 16, 2018), https://www.privacy.org.nz/news-and-publications/guidance-resources/principles-for-the-safe-and-

have also developed, or are in the process of developing, resources and policies related to privacy, human rights, and ethical impacts of using personal information and digital data tools, including the Ministry of Social Development[138] and the Social Investment Agency.[139]

III. Government Statements on Particular Technologies

A. Autonomous Vehicles

The government has not received any formal requests to test autonomous vehicles on public roads; however it states that

> [t]here are no obvious legal barriers to the deployment of autonomous vehicles for testing in New Zealand. Unlike some countries, NZ law has no explicit requirement for a driver to be present. However, autonomous vehicles could raise issues about who is at fault if they were to crash.[140]

The government's *Intelligent Transport Systems Technology Action Plan 2014–18* includes the following action:

> The Ministry of Transport, in conjunction with the NZ Transport Agency, will review transport legislation to clarify the legality of testing driverless cars in New Zealand. This will specifically consider the issues of liability associated with testing, but will not consider liability for general use.[141]

It further states as follows:

> Internationally there is a great deal of thought being given to what laws will be necessary for the general operation of driverless vehicles. Their widespread operation will pose complex legal challenges, especially to determine liability in the event of any accident. It is not proposed that the New Zealand government will explicitly look at these legal issues at this time. Rather, the government will continue to monitor international developments

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effective-use-of-data-and-analytics-guidance/, *archived at* https://perma.cc/A3FU-CMKV?type=image. *See also Data Leadership*, STATS NZ (May 16, 2018), https://www.stats.govt.nz/about-us/data-leadership/, *archived at* https://perma.cc/2HW2-BPX3.

[138] *Using Personal Data Responsibly*, MINISTRY OF SOCIAL DEVELOPMENT, https://www.msd.govt.nz/about-msd-and-our-work/work-programmes/initiatives/phrae/index.html (last visited Nov. 14, 2018), *archived at* https://perma.cc/E4CR-KCG9.

[139] *Data Protection and Use*, SOCIAL INVESTMENT AGENCY, https://sia.govt.nz/our-work/yoursay/data-protection-and-use (last visited Nov. 14, 2018), *archived at* https://perma.cc/TNN6-BUVM.

[140] *Autonomous Including Driverless Vehicles*, MINISTRY OF TRANSPORT, https://www.transport.govt.nz/multi-modal/technology/specific-transport-technologies/road-vehicle/autonomous-vehicles/ (last updated Oct. 7, 2016), *archived at* https://perma.cc/FAM4-CQZ3.

[141] NEW ZEALAND GOVERNMENT, INTELLIGENT TRANSPORT SYSTEMS TECHNOLOGY ACTION PLAN 2014–18: TRANSPORT IN THE DIGITAL AGE 25 (May 2014), https://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/ITS-technology-action-plan-2014.pdf, *archived at* https://perma.cc/UXY4-CXCE.

> and draw on this knowledge once international thinking has developed further and it is clearer if or when these vehicles will be commercially available.[142]

B. Autonomous Weapons Systems

The New Zealand government participates in the GGE on LAWS, which was established in 2016 at a conference of High Contracting Parties to the Convention on Certain Conventional Weapons.[143] At the April 2018 meeting of the GGE, New Zealand made various statements, including that

> [i]n New Zealand's case, and in accordance with our AP1 [Additional Protocol (I) to the Geneva Conventions] obligations, each emerging capability will be reviewed by New Zealand Defence Force using a multi-disciplinary approach and a determination by the Director of Defence Legal Services to ensure it is compliant with IHL [international humanitarian law]. Meaningful human control will be a contextual part of that assessment, alongside the cardinal points of IHL. We are looking at our framework for weapons reviews through the lens of emerging technologies and are interested in similar work being undertaken by others.[144]

It further stated that, in its view,

> the ability to exercise human control is critical to whether a weapon would be able to comply with International Humanitarian Law as well as other requirements, such as Rules of Engagement. As articulated by the ICRC [International Committee of the Red Cross] and others, the challenge before us now is to determine the kind of human control that is considered necessary for partially autonomous weapons systems.[145]

Separate from the government, the AI Forum signed the Lethal Autonomous Weapons Pledge in mid-2018.[146] This Pledge calls "upon governments and government leaders to create a future with strong international norms, regulations and laws against lethal autonomous weapons" and states

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[142] *Id*.

[143] *See 2017 Group of Governmental Experts on Lethal Autonomous Weapons Systems (LAWS)*, UNITED NATIONS OFFICE AT GENEVA, https://unog.ch/80256EE600585943/(httpPages)/F027DAA4966EB9C7C12580CD0039D7B5?OpenDocument (last visited Nov. 14, 2018), *archived at* https://perma.cc/PY2C-XVMW; *2018 Group of Governmental Experts on Lethal Autonomous Weapons Systems (Laws)*, UNITED NATIONS OFFICE AT GENEVA, https://unog.ch/80256EE600585943/(httpPages)/7C335E71DFCB29D1C1258243003E8724?OpenDocument (last visited Nov. 14, 2018), *archived at* https://perma.cc/9NSH-AD77.

[144] GGE on LAWS, Agenda Item 6(d), Statement by Katy Donnelly, Deputy Permanent Representative (New Zealand) to the Conference on Disarmament, Geneva, at 2 (Apr. 13, 2018), https://unog.ch/80256EDD006B8954/(httpAssets)/1180CDB066905100C125827200586183/$file/2018_LAWS6d_New+Zealand.pdf, *archived at* https://perma.cc/XP5S-FCRR.

[145] GGE on LAWS, Agenda Item 6(b), Statement by Katy Donnelly, Deputy Permanent Representative (New Zealand) to the Conference on Disarmament, Geneva, at 1, Apr. 11, 2018, https://unog.ch/80256EDD006B8954/(httpAssets)/4A54EE38E2F8223AC12582720057E761/$file/2018_LAWS6b_New+Zealand.pdf, *archived at* https://perma.cc/4CUE-ZAS3.

[146] Ben Reid, *More National AI Strategies, Lethal Autonomous Weapons Pledge*, AI FORUM NEW ZEALAND (July 26, 2018), https://aiforum.org.nz/2018/07/26/more-national-ai-strategies-lethal-autonomous-weapons-pledge/, *archived at* https://perma.cc/K5PQ-29TY.

that signatories will not participate in or support the development, manufacture, trade, or use of such weapons.[147]

Pakistan

In April 2018, the government of Pakistan allocated 1.1 billion rupees (about US$7.9 million) for a period of three years for artificial intelligence projects in six universities, under the supervision of the Higher Education Commission (HEC).[148] According to one news report, "[s]ix public sector universities have been picked out for setting up nine labs to carry out research in the field of AI."[149]

During the 2017 and 2018 meetings of the GGE on LAWS, Pakistan was part of a group of countries that expressed their support for a "prohibition on the development, production, and use of AWS"[150] and for a "legally binding instrument on LAWS."[151] During the 2018 GGE meeting, Pakistan stated that, "[p]ending the negotiation and conclusion of a legally binding Protocol, the states currently developing such weapons should place a moratorium on their production."[152]

Singapore

I. AI Singapore Program

In May 2017, Singapore established a national AI program, "AI Singapore," with funding of SG$150 million (about US$109 million) to catalyze, synergize, and boost Singapore's AI capabilities. According to the website of AI Singapore,

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[147] *Lethal Autonomous Weapons Pledge*, FUTURE OF LIFE INSTITUTE, https://futureoflife.org/lethal-autonomous-weapons-pledge/ (last visited Nov. 14, 2018), *archived at* https://perma.cc/A6QX-B67V.

[148] Shazma Khan, *Govt Allocates Rs1.1bn for Artificial Intelligence Projects in Pakistan*, BUSINESS RECORDER (Apr. 23, 2018), https://www.brecorder.com/2018/04/23/413562/govt-allocates-rs1-1bn-for-artificial-intelligence-projects-in-pakistan/, *archived at* https://perma.cc/6UX3-L7BG

[149] *Id.*

[150] Ray Acheson, *Do Killer Robots Dream of Eating Sheep?*, 5(4) CCW REPORT (Nov. 16, 2017), http://www.reachingcriticalwill.org/disarmament-fora/ccw/2017/laws/ccwreport/12215-ccw-report-vol-5-no-4, *archived at* https://perma.cc/8L9M-BEY2; Statement by Pakistan, Second Session of the CCW GGE on LAWS (Apr. 9–13, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/8D3985AC41854006C1258272005837D9/$file/2018_LAWS6b_Pakistan.pdf, *archived at* https://perma.cc/DW3E-WA75.

[151] Hayley Evans, *Lethal Autonomous Weapons Systems at the First and Second U.N. GGE Meetings*, LAWFARE (Apr. 9, 2018), https://www.lawfareblog.com/lethal-autonomous-weapons-systems-first-and-second-un-gge-meetings, *archived at* https://perma.cc/PR4G-YLBS.

[152] Statement by Ambassador Farukh Amil, Permanent Representative of Pakistan, Second Session of the CCW GGE on LAWS (Aug. 27–31, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/F76B74E9D3B22E98C12582F80059906F/$file/2018_GGE+LAWS+2_6a_Pakistan.pdf, *archived at* https://perma.cc/K9FT-5WPH.

> AI Singapore will bring together all Singapore-based research institutions and the vibrant ecosystem of AI start-ups and companies developing AI products, to grow the knowledge, create the tools and develop the talent to power Singapore's AI efforts. It is driven by a government-wide partnership comprising National Research Foundation (NRF), the Smart Nation and Digital Government Office, the Economic Development Board, the Infocomm Media Development Authority, SGInnovate, and the Integrated Health Information Systems. NRF will invest up to $150 million over five years in AI Singapore.[153]

II. Discussion Paper on AI and Personal Data

On June 5, 2018, Singapore's Personal Data Protection Commission (PDPC) published the *Discussion Paper on Artificial Intelligence (AI) and Personal Data — Fostering Responsible Development and Adoption of AI* (Discussion Paper).[154] The Discussion Paper presents the PDPC's "preliminary analysis of some of the issues pertinent to the commercial development and adoption of AI solutions."[155] According to the PDPC, the objective of the Discussion Paper is to propose an accountability-based framework for discussing ethical, governance, and consumer-protection issues related to the commercial deployment of AI in a systematic and structured manner.[156]

The Discussion Paper sets forth the following two principles for responsible AI:

> (i) Decisions made by or with the assistance of AI should be explainable, transparent and fair so that affected individuals will have trust and confidence in these decisions.
> . . .
> (ii) AI systems, robots and decisions made using AI should be human-centric.[157]

The Discussion Paper is intended to spark discussion on promoting the responsible development and adoption of AI solutions and mitigating potential risks and negative impacts. The PDPC invited organizations in Singapore to adapt the document for their internal use, and encouraged trade associations and chambers, professional bodies and societies, and interest groups to adapt the proposed framework for their sectors in the form of voluntary codes of practice.[158]

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[153] *AI Singapore*, NATIONAL RESEARCH FOUNDATION, https://www.nrf.gov.sg/programmes/artificial-intelligence-r-d-programme (last updated Nov. 7, 2018), *archived at* https://perma.cc/BS78-E64C.

[154] PDPC, DISCUSSION PAPER ON ARTIFICIAL INTELLIGENCE (AI) AND PERSONAL DATA — FOSTERING RESPONSIBLE DEVELOPMENT AND ADOPTION OF AI (June 5, 2018), https://www.pdpc.gov.sg/-/media/Files/PDPC/PDF-Files/Resource-for-Organisation/AI/Discussion-Paper-on-AI-and-PD---050618.pdf, *archived at* https://perma.cc/7AML-2CT8.

[155] *Id.* at 2.

[156] *Id.*

[157] *Id.* at 5–6.

[158] *Id.* at 14.

III. Advisory Council on the Ethical Use of AI and Data

On August 30, 2018, Singapore announced the full composition of the Advisory Council on the Ethical Use of AI and Data, to advise and work with the relevant government authority on the responsible development and deployment of AI.[159]

The Advisory Council is comprised of eleven members from diverse backgrounds, including international leaders in AI such as Google, Microsoft, and Alibaba; advocates of social and consumer interests; and leaders of local companies who are keen to make use of AI.[160]

According to the official government statement on the composition of the Advisory Council, the Council will assist the Infocomm Media Development Authority (IMDA) in engaging the following stakeholders on issues that support the development of AI governance capabilities and frameworks:

- Ethics boards of commercial enterprises on ethical and related issues arising from private sector use of AI and data
- Consumer representatives on consumer expectations and acceptance of the use of AI
- Members of the private capital community on the need to incorporate ethical considerations in their investment decisions into businesses which develop or adopt AI[161]

The Advisory Council is tasked with assisting the government in developing ethics standards and reference governance frameworks, and publishing advisory guidelines, practical guides, and codes of practice for voluntary adoption by the industry.[162]

IV. Government-Funded Research Program on Governance of AI and Data Use

In June 2018, the Singaporean government awarded SG$4.5 million (about US$3.27 million) to the Singapore Management University (SMU) School of Law to set up a five-year research program on the governance of AI and data use. This program seeks to advance discourse in ethical, legal, policy, and governance issues arising from AI and data use.[163] According to the speech of Singapore's Minister for Communications and Information announcing the award, the research program

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[159] Press Release, Infocomm Media Development Authority, Composition of the Advisory Council on the Ethical Use of Artificial Intelligence ("AI") and Data (Aug. 30, 2018), https://www.imda.gov.sg/about/newsroom/media-releases/2018/composition-of-the-advisory-council-on-the-ethical-use-of-ai-and-data, *archived at* https://perma.cc/EH4A-2SNB.

[160] *Id.*

[161] *Id.*

[162] *Id.*

[163] Speech by Mr. S. Iswaran, Minister for Communications and Information, at Innovfest Unbound 2018 (June 5, 2018), https://www.mci.gov.sg/pressroom/news-and-stories/pressroom/2018/6/speech-by-mr-s-iswaran-at-the-innovfest-unbound-2018-on-5-june-2018, *archived at* https://perma.cc/ZC9B-QUEN.

> will enable Singapore to drive thought leadership on these issues and serve as a center for knowledge exchange with international experts. The program will adopt an international perspective and track international developments in these specific research areas.[164]

In September 2018, the SMU launched a new Centre for AI and Data Governance with the SG$4.5 million in funding.[165]

V. Autonomous Vehicles

To regulate trials of autonomous motor vehicles and pave the way for the development of automated vehicle technology in Singapore, an amendment to the Road Traffic Act was passed on February 7, 2017, and assented to by the President on March 13, 2017.[166]

The revised Road Traffic Act includes definitions of "automated vehicle technology," "autonomous motor vehicle," and "autonomous system," as follows:

> "automated vehicle technology" means any particular technology that —
>
> (a) relates to the design, construction or use of autonomous motor vehicles; or
>
> (b) otherwise relates to advances in the design or construction of autonomous motor vehicles;
>
> "autonomous motor vehicle" means a motor vehicle equipped wholly or substantially with an autonomous system (also commonly known as a driverless vehicle), and includes a trailer drawn by such a motor vehicle;
>
> "autonomous system", for a motor vehicle, means a system that enables the operation of the motor vehicle without the active physical control of, or monitoring by, a human operator[.][167]

The revised Act confers powers on the Minister for Transport to make rules concerning trials and use of autonomous vehicles.[168] Among other things, persons authorized to undertake such trials or carry out such use will be required to obtain liability insurance for the entire duration of the trial or use, or to deposit a security with the Land Transport Authority.[169] Such persons will also be

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[164] *Id.*

[165] *SMU Leverages Multi-Disciplinary Expertise, Launches Centre for AI and Data Governance*, SMU (Sept. 24, 2018), https://law.smu.edu.sg/news/2018/09/24/smu-leverages-multi-disciplinary-expertise-launches-centre-ai-and-data-governance, *archived at* https://perma.cc/NR68-39AA.

[166] Road Traffic Act (Cap. 276) (Ordinance 26 of 1961, revised Dec. 31, 2004, version in force Aug. 31, 2018), https://sso.agc.gov.sg/Act/RTA1961?ValidDate=20180831&ViewType=Pdf&_=20181012232618, *archived at* https://perma.cc/QAA3-PC83. *See* Max Ng & Amira Nabila Budiyano, *New Regulations to Address Automated Vehicle Technology*, LEXOLOGY (Apr. 10, 2017), https://www.lexology.com/library/detail.aspx?g=64a38d35-6b97-48a5-91ff-9a59817ac955, *archived at* https://perma.cc/E8HG-4536.

[167] Road Traffic Act (Cap. 276) s 2(1).

[168] *Id.* s 6C(1)(a).

[169] *Id.* s 6C(1)(b).

required to publish a notice about the trial or use, before the trial or use starts, in a manner that will secure adequate publicity.[170]

Under the Road Traffic (Autonomous Motor Vehicles) Rules 2017, in granting an authorization for trials or use of autonomous vehicles, the Land Transport Authority may impose conditions as it thinks fit, including requiring a qualified safety driver to be seated in an autonomous motor vehicle to monitor the operation of the vehicle and to take over operation of the vehicle if necessary.[171]

South Korea

South Korea has an advanced robotics industry. In 2008, the National Assembly enacted the Intelligent Robot Development and Promotion Act to establish and promote a policy on the sustainable development of the intelligent robot industry.[172] An intelligent robot is defined by the Act as "a mechanical device that perceives the external environment for itself, discerns circumstances, and moves voluntarily."[173] The government formulated national plans for the development and distribution of intelligent robots in 2009 and 2014 based on the law.[174]

The Act states that the government "may enact and promulgate the charter on intelligent robot ethics."[175] The Act defines the "charter on intelligent robot ethics" as

> a code of conduct established for persons involved in the development, manufacture, and use of intelligent robots in order to prevent various kinds of harmful or adverse effects, such as destruction of social order, that may arise from the development of functions and intelligence of intelligent robots, and to ensure intelligent robots contribute to enhancing the quality of life of human beings.[176]

It appears that the code has not yet been enacted.[177]

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[170] *Id.* s 6C(1)(c).

[171] Road Traffic (Autonomous Motor Vehicles) Rules 2017 (in force from Aug. 24, 2017) r 9(2)(*b*), https://sso.agc.gov.sg/SL/RTA1961-S464-2017?DocDate=20170823&ViewType=Pdf&_=20181121124123, *archived at* https://perma.cc/S3JC-K2TL.

[172] Intelligent Robots Development and Promotion Act, Act No. 9014, Mar. 28, 2008, *as amended by* Act No. 13744, Jan. 6, 2016, art. 1, http://elaw.klri.re.kr/eng_service/lawView.do?hseq=39153&lang=ENG, *archived at* https://perma.cc/77RC-WBMN.

[173] *Id*. art. 2(1).

[174] *Id*. art. 5; *see also* Sang-mo Kim, *Policy Directions for S. Korea's Robot Industry*, BUSINESS KOREA (Aug. 17, 2018), http://www.businesskorea.co.kr/news/articleView.html?idxno=24394, *archived at* https://perma.cc/ME5Z-3YN7.

[175] Intelligent Robots Development and Promotion Act art. 18(1).

[176] *Id*. art. 2(2).

[177] Myung-hyon Noh, *[비즈워치포럼] 비윤리적 로봇, 책임은 누가?* [*[Bizwatch Forum] Unethical Robots, Who Is Responsible?*], BUSINESS WATCH (July 30, 2018), http://news.bizwatch.co.kr/article/industry/2018/07/24/0029 (in Korean), *archived at* https://perma.cc/4396-DFGT.

I. Robotics and AI

In 2016, the South Korean government planned to put 500 billion won (US$440 million) toward expanding the country's robotics industry,[178] including the promotion of research and development into autonomous vehicles and social robots for healthcare.[179]

In February 2018, the government released a new development strategy for the intelligent robot industry along with four action plans. The action plans call for accelerating market expansion with collaborative robots and service robots while enhancing the industry's supply and demand capabilities. The government provides a training program for postgraduate-level AI and robot convergence experts in cooperation with colleges.[180]

II. AI Promotion Policy

The South Korean governments funds many efforts toward the development of the AI industry. In 2016, the MSIP released a report titled *Mid- to Long-term Plan in Preparation for the Intelligent Information Society*.[181] The plan called for large-scale government investment to strengthen the country's research and development in AI and for legal and ethical reforms for the intelligent information society, among other things.[182]

In January 2018, the South Korean government issued a report prepared jointly by six governmental entities outlining policies to promote technological development. AI is one of the targeted areas in the report. According to the report, the government plans to support early commercialization of self-driving vehicles and intelligent robots, among other things.[183]

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[178] Alex Beall, *Competition in South Korea's Collaborative Robots Industry Heats Up*, ROBOT REPORT (Sept. 22, 2017), https://www.therobotreport.com/competition-south-koreas-collaborative-robots-industry-heats/, *archived at* https://perma.cc/4BU8-ZP36.

[179] John Edwards, *South Korea Robots Sector Gets a Government Boost*, RBR (Nov. 28, 2016), https://www.robotics businessreview.com/manufacturing/south-korea-robots-sector-gets-government-boost/, *archived at* https://perma.cc/8GWA-RPYZ.

[180] Sang-mo Kim, *Policy Directions for S. Korea's Robot Industry*, BUSINESS KOREA (Aug. 17, 2018), http://www.businesskorea.co.kr/news/articleView.html?idxno=24394, *archived at* https://perma.cc/545Y-NVVH; Jin-young Cho, *S. Korea to Promote Collaborative Robotics for Manufacturing Field*, BUSINESS KOREA (Feb. 8, 2018), http://www.businesskorea.co.kr/news/articleView.html?idxno=20497, *archived at* https://perma.cc/473R-24FR.

[181] MSIP, MID- TO LONG-TERM MASTER PLAN IN PREPARATION FOR THE INTELLIGENT INFORMATION SOCIETY: MANAGING THE FOURTH INDUSTRIAL REVOLUTION (2016), http://english.msip.go.kr/cms/english/pl/policies2/__icsFiles/afieldfile/2017/07/20/Master Plan for the intelligent information society.pdf, *archived at* https://perma.cc/93VV-6P74.

[182] *Id*. at 56.

[183] Hee Woong Yoon et al., *South Korean Government Launches a New Strategy to Promote Innovative Growth*, LUS LABORIS (Feb. 12, 2018), https://theword.iuslaboris.com/hrlaw/insights/south-korean-government-launches-a-new-strategy-to-promote-innovative-growth/, *archived at* https://perma.cc/SRR7-WHUR.

On May 15, 2018, the Presidential Committee on the Fourth Industrial Revolution (PCFIR)[184] finalized a research and development strategy to support the plan to invest 2.2 trillion won (about US$1.95 billion) in public-sector AI projects over the next five years, to develop AI technology and nurture 5,000 AI specialists.[185]

III. Autonomous Car Development

South Korea has developed K-City, an unpopulated city for autonomous vehicle testing based on 5G mobile networks. Testing of autonomous vehicles has been conducted at K-City.[186]

Taiwan

I. Taiwan AI Action Plan

On January 18, 2018, Taiwan announced a four-year "Taiwan AI Action Plan" (2018–2021).[187] Under the Plan, Taiwan's Executive Yuan will allocate an annual budget of up to 10 billion New Taiwan dollar (about US$324 million) to develop Taiwan's AI industry.[188]

The Plan outlines five initiatives: cultivating talent, developing Taiwan's niche AI, incubating local AI start-ups, reconciling laws for AI development, and introducing AI technologies to industries.[189] Aiming to allow more flexibility for AI development in Taiwan, legislation encouraging innovation in financial technology and easing employment restrictions on foreign skilled workers has been passed, and more bills are under consideration, including on information security and government procurement.[190]

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[184] *About PCFIR*, PCFIR, https://www.4th-ir.go.kr/home/en (last visited Nov. 20, 2018), *archived at* https://perma.cc/79BE-5KRU.

[185] Won-changYoun, *Korean Gov. to Invest 2.2 Tril. Won in AI by 2022*, BUSINESS KOREA (May 16, 2018), http://www.businesskorea.co.kr/news/articleView.html?idxno=22291, *archived at* https://perma.cc/B9WM-MPFE.

[186] Juan Pedro Tomás, *South Korea Completes Works in K-City Autonomous Driving Testing Zone*, ENTERPRISE IOT INSIGHTS (Dec. 12, 2018), https://enterpriseiotinsights.com/20181212/connected-cars-2/south-korea-completes-works-kcity-autonomous-driving-testing-zone, *archived at* https://perma.cc/73MB-LSZL.

[187] Press Release, Executive Yuan, Xingzhengyuan Tongguo "Taiwan AI Xingdong Jihua," Taiwan Maixiang Jianduan Zhihui Guojia [Executive Yuan Passed "AI Taiwan Action Plan," Taiwan Moves to Cutting-Edge Smart Country] (Jan. 18, 2018), https://www.ey.gov.tw/File/52E248317FCF71AD?A=C, *archived at* https://perma.cc/SH8N-4329.

[188] *Id.*; *Cabinet Plans to Develop the Nation's AI Industry*, AI TAIWAN, https://ai.taiwan.gov.tw/news/cabinet-plans-to-develop-the-nations-ai-industry/ (last visited Nov. 30, 2018), *archived at* https://perma.cc/M2N8-BKNA.

[189] *Id.*

[190] *Test Fields and Regulatory Co-creation*, AI TAIWAN, https://ai.taiwan.gov.tw/actionplan/test-fields-and-regulatory-co-creation/ (last visited Nov. 30, 2018), *archived at* https://perma.cc/9BCY-4FU9.

II. Autonomous Vehicles

On November 30, 2018, the Legislative Yuan passed the Act for Unmanned Vehicle Technology Innovative Experiments, which was enacted by the President on December 19, 2018.[191] The Act has not yet entered into force; the date of enforcement will be decided by the Executive Yuan.[192]

The Act exempts developers from certain legal restrictions when testing unmanned vehicles for a prescribed period of time. "Unmanned vehicles" governed by the Act include land vehicles, aircraft, ships, or any combination thereof, that are remotely controlled or capable of autonomous operations by surveying their surroundings, determining their position, and determining the best route.[193]

[191] Wuren Zaiju Chuanxin Shiyan Tiaoli [Act for Unmanned Vehicle Technology Innovative Experiments] (promulgated Dec. 19, 2018), https://law.moj.gov.tw/LawClass/LawAll.aspx?pcode=J0030147, *archived at* https://perma.cc/BUN9-VBMY.

[192] *Id.* art. 24.

[193] *Id.*

Europe and Central Asia

European Union

I. General Data Protection Regulation

On May 25, 2018, the EU's General Data Protection Regulation (GDPR) took effect.[1] It applies directly in all EU Member States without any implementing legislation needed.[2] Among other rights, the GDPR guarantees individuals the right to have a decision based solely on automated processing (an algorithm) be made or reviewed by a natural person instead of a computer.[3]

II. European Parliament's Resolution on Civil Law Rules on Robotics

On February 16, 2017, the European Parliament adopted a legislative initiative resolution in which it recommended a range of legislative and nonlegislative initiatives in the field of robotics and AI to the European Commission.[4] Among other things, it called on the European Commission to adopt a proposal for a legislative instrument providing civil law rules on the liability of robots and AI, "to propose common Union definitions of cyber physical systems, autonomous systems, smart autonomous robots and their subcategories," establish criteria for the classification of robots that would need to be registered, establish a designated EU Agency for Robotics and Artificial Intelligence, and propose a charter consisting of a code of conduct for robotics engineers, a code for research ethics committees when reviewing robotics protocols, and model licenses for designers.[5] It also asked the Commission to consider "creating a specific legal status for robots in the long run, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons responsible for making good any damage they may cause, and possibly applying electronic personality to cases where robots make autonomous decisions or otherwise interact with third parties independently."[6]

The European Commission in its follow-up to the resolution agreed that it was necessary to "examine whether and how to adapt civil law liability rules to the needs of the digital economy"

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[1] Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation) (GDPR), 2016 O.J. (L 119) 1, http://eur-lex. europa eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679&from=EN, *archived at* http://perma.cc/UWW3-KFMH.

[2] Consolidated Version of the Treaty on the Functioning of the European Union (TFEU), art. 288, para. 2, 2016 O.J. (C 202) 1, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12016E/TXT&from=EN, *archived at* http://perma.cc/HAV7-5CT5.

[3] GDPR, art. 22.

[4] European Parliament Resolution of 16 February 2017 with Recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL), doc. no. P8_TA(2017)0051, http://www.europarl.europa.eu/sides/getDoc.do?type=TA&reference=P8-TA-2017-0051&language=EN&ring=A8-2017-0005, *archived at* http://perma.cc/VEG4-GZGR.

[5] *Id*.

[6] *Id*. para. 59.

and stated that it intended to work with the European Parliament and the EU Member States on an EU response.[7] Among other things, it plans to evaluate the Product Liability Directive[8] and explore risk-based liability regimes.[9] It stated that more examination is necessary in order to decide whether and what kind of definitions are needed for regulatory purposes.[10] It rejected the recommendation by the European Parliament to establish a new European Agency for Robotics and AI and proposed expert group discussions with EU Member States, industry, and standardizers instead.[11]

III. European Commission Actions

In April 2018, the European Commission published its communication "Artificial Intelligence for Europe" (Communication) in which it outlined the EU's approach to taking advantage of the opportunities offered by AI and addressing the challenges posed by it.[12] From 2014–2017, the EU invested €1.1 billion (about US$1.26 billion) in AI-related research and innovation under the Horizon 2020 research and innovation program.[13] Among other things, the Communication emphasizes that the EU has to ensure that no one is left behind in the digital transformation and that AI is developed and applied based on the EU's values and fundamental rights.[14] It is also reviewing existing rules on safety and civil law liability.[15] The Commission published a follow-up communication and a coordinated plan that built on the original Communication in December 2018.[16]

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[7] Follow up to the European Parliament Resolution of 16 February 2017 on Civil Law Rules on Robotics, at 2, http://www.europarl.europa.eu/meetdocs/2014_2019/plmrep/COMMITTEES/JURI/DV/2017/11-20/A8-0005-2017_EN.pdf, *archived at* http://perma.cc/GF5J-45DA.

[8] Council Directive 85/374/EEC of 25 July 1985 on the Approximation of the Laws, Regulations and Administrative Provisions of the Member States Concerning Liability for Defective Products, 1985 O.J. (L 210) 29, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31985L0374&from=EN, *archived at* http://perma.cc/VT8M-RUCK.

[9] Follow up to the European Parliament Resolution of 16 February 2017 on Civil Law Rules on Robotics, *supra* note 7, at 2.

[10] *Id*. at 3.

[11] *Id*. at 8.

[12] *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Artificial Intelligence for Europe*, COM (2018) 237 final (Apr. 25, 2018), at 3, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0237&from=EN, *archived at* http://perma.cc/FB52-HPK3.

[13] *Id*. at 6.

[14] *Id*. at 4.

[15] *Id*. at 16.

[16] *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Coordinated Plan on Artificial Intelligence*, COM (2018) 795 final (Dec. 7, 2018), https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=56018, *archived at* http://perma.cc/NT7P-NTJ3; *Annex to the Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Coordinated Plan on Artificial Intelligence*, COM (2018) 795 final (Dec. 7, 2018), https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=56017, *archived at* http://perma.cc/9TE3-7HEQ.

On December 18, 2018, the High-Level Expert Group on Artificial Intelligence (AI HLEG)—fifty-two experts from academia, civil society, and industry appointed by the Commission[17]—released draft AI ethics guidelines, which set out a framework for designing trustworthy AI.[18] According to the guidelines, trustworthy AI must "respect fundamental rights, applicable regulation and core principles and values, ensuring an "ethical purpose," and "be technically robust and reliable since, even with good intentions, a lack of technological mastery can cause unintentional harm."[19] Stakeholders were allowed to submit comments until January 18, 2019.[20] A final version is slated to be published in March 2019.[21]

The AI HLEG also proposed an updated definition of AI,[22] defining it as follows:

> Artificial intelligence (AI) refers to systems designed by humans that, given a complex goal, act in the physical or digital world by perceiving their environment, interpreting the collected structured or unstructured data, reasoning on the knowledge derived from this data and deciding the best action(s) to take (according to pre-defined parameters) to achieve the given goal. AI systems can also be designed to learn to adapt their behaviour by analysing how the environment is affected by their previous actions.
>
> As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber-physical systems).[23]

Furthermore, the European Commission established a Robotics and Artificial Intelligence Unit whose mission is the

> development of a competitive industry in robotics and Artificial Intelligence in Europe including industrial and service robots as well as the growing field of autonomous systems spanning from drones and driverless vehicles to cognitive vision and computing. The Unit

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[17] *High-Level Expert Group on Artificial Intelligence*, EUROPEAN COMMISSION, https://ec.europa.eu/digital-single-market/en/high-level-expert-group-artificial-intelligence (last updated Oct. 29, 2018), *archived at* http://perma.cc/4RHT-N4A7.

[18] HIGH-LEVEL EXPERT GROUP ON ARTIFICIAL INTELLIGENCE [AI HLEG], DRAFT ETHICS GUIDELINES FOR TRUSTWORTHY AI (Dec. 18, 2018), https://ec.europa.eu/futurium/en/system/files/ged/ai_hleg_draft_ethics_guidelines_18_december.pdf, *archived at* http://perma.cc/DYK4-7E5S.

[19] *Id*. at i.

[20] *Have Your Say: European Expert Group Seeks Feedback on Draft Ethics Guidelines for Trustworthy Artificial Intelligence*, EUROPEAN COMMISSION, https://ec.europa.eu/digital-single-market/en/news/have-your-say-european-expert-group-seeks-feedback-draft-ethics-guidelines-trustworthy (last visited Dec. 18, 2018), *archived at* http://perma.cc/E2RQ-ND4M.

[21] DRAFT ETHICS GUIDELINES FOR TRUSTWORTHY AI, *supra* note 18, at i.

[22] AI HLEG, A DEFINITION OF AI: MAIN CAPABILITIES AND SCIENTIFIC DISCIPLINES (Dec. 18, 2018), https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=56341, *archived at* http://perma.cc/8VUQ-AWAJ.

[23] *Id*. at 4.

> supports also the wide uptake and best use of robotics and Artificial Intelligence in all industrial and societal fields.[24]

Furthermore, it "follows the Ethical and Legal issues related to robots and autonomous systems such as liability and . . . the aspects related to the impact of automation and robotics on jobs and work environment."[25]

On June 18, 2018, the European Economic and Social Committee (EESC) and the European Commission held a stakeholder summit on AI with a wide range of participants.[26] They discussed legal and ethical challenges, the socioeconomic impact, and the industrial competitiveness of AI.

IV. Declaration of Cooperation on Artificial Intelligence

On April 10, 2018, twenty-four EU Member States[27] and Norway signed the Declaration of Cooperation on Artificial Intelligence to develop a European approach to AI.[28] Romania, Greece, and Cyprus joined the initiative in May 2018, and Croatia in July 2018.[29] In the Declaration, the signatories agreed to cooperate on

- [b]oosting Europe's technology and industrial capacity in AI and its uptake, including better access to public sector data; these are essential conditions to influence AI development, fuelling innovative business models and creating economic growth and new qualified jobs;
- [a]ddressing socio-economic challenges, such as the transformation of the labour markets and modernising Europe's education and training systems, including upskilling & reskilling EU citizens; [and]
- [e]nsuring an adequate legal and ethical framework, building on EU fundamental rights and values, including privacy and protection of personal data, as well as principles such as transparency and accountability.[30]

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[24] *Robotics and Artificial Intelligence (Unit A.1)*, EUROPEAN COMMISSION, https://ec.europa.eu/digital-single-market/en/content/robotics-and-artificial-intelligence-unit-a1 (last visited Nov. 19, 2018), *archived at* http://perma.cc/JJ3D-VNGK.

[25] *Id.*

[26] *AI Europe / Stakeholder Summit*, EESC (June 18, 2018), https://www.eesc.europa.eu/en/agenda/our-events/events/ ai-europe-stakeholder-summit?_cldee=Y2NqbXVsbGVyQGtwbm1haWwubmw%3d&recipientid=contact-418703e1eed3e511bb64005056a05070-be6e28a0f92045fd8a0c34cea92a9638&esid=f7a166c8-965d-e811-8113-005056a043ea&urlid=4, *archived at* http://perma.cc/T6JC-XXWU.

[27] The countries are Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

[28] Declaration: Cooperation on AI, Apr. 10, 2018, https://ec.europa.eu/jrc/communities/sites/jrccties/files/2018aideclarationatdigitaldaydocxpdf.pdf, *archived at* http://perma.cc/F6U4-NV4C.

[29] *EU Member States Sign Up to Cooperate on Artificial Intelligence*, EUROPEAN COMMISSION (Apr. 10, 2018), https://ec.europa.eu/digital-single-market/en/news/eu-member-states-sign-cooperate-artificial-intelligence, *archived at* http://perma.cc/VZ7X-RTS7.

[30] Declaration: Cooperation on AI, *supra* note 28.

V. European Supervisory Authorities' Report

On September 5, 2018, the European Supervisory Authorities (ESAs)[31] published a joint report on the results of the monitoring exercise on "automation in financial advice."[32] The report concluded that no immediate action is necessary, because there are currently only a limited number of firms involved in automation in financial advice and the identified risks have not materialized. The ESAs plan to carry out a new monitoring exercise if development of the market and market risks warrant it.[33]

VI. Connected and Automated Vehicles

In 2016, the European Commission published a communication on intelligent transport systems.[34] It proposed, inter alia, the adoption of a legal framework at the EU level by 2018 developed through learning by experience.[35] In 2018, the Commission published another communication that outlined the EU strategy to enable the EU and its Member States to "be a leader in delivering safe, efficient, socially responsible and environmentally friendly driverless mobility for EU citizens."[36] The 2018 Communication is accompanied by two legislative proposals to implement that objective, one for a revision of the General Safety Regulation,[37] and one for a proposal for amendments to the directive on road infrastructure safety.[38] With regard to intelligent transport

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[31] The ESAs consist of the European Securities and Markets Authority (ESMA), the European Banking Authority (EBA), and the European Insurance and Occupational Pension Authority (EIOPA).

[32] JOINT COMMITTEE OF THE EUROPEAN SUPERVISORY AUTHORITIES, JOINT COMMITTEE REPORT ON THE RESULTS OF THE MONITORING EXERCISE ON 'AUTOMATION IN FINANCIAL ADVICE', JC 2018-29 (Sept. 5, 2018), https://esas-joint-committee.europa.eu/Publications/Reports/JC 2018 29 - JC Report on automation in financial advice.pdf, *archived at* http://perma.cc/4NDF-4J5T.

[33] *Id.* at 4, para. 5.

[34] *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. A European Strategy on Cooperative Intelligent Transport Systems, a Milestone Towards Cooperative, Connected and Automated Mobility*, COM (2016) 766 final (Nov. 30, 2016), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0766&from=EN, *archived at* http://perma.cc/6HY6-4SST.

[35] *Id*. at 11, para. 3.7.

[36] *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions. Europe on the Move. Sustainable Mobility for Europe: Safe, Connected, and Clean*, COM (2018) 293 final (May 17, 2018), at 17, https://eur-lex.europa.eu/resource.html?uri=cellar:0e8b694e-59b5-11e8-ab41-01aa75ed71a1.0003.02/DOC_1&format=PDF, *archived* at http://perma.cc/QBZ9-EMPD.

[37] *Proposal for a Regulation of the European Parliament and of the Council on Type-Approval Requirements for Motor Vehicles and Their Trailers, and Systems, Components and Separate Technical Units Intended for Such Vehicles, as Regards Their General Safety and the Protection of Vehicle Occupants and Vulnerable Road Users, Amending Regulation (EU) 2018/… and Repealing Regulations (EC) No 78/2009, (EC) No 79/2009 and (EC) No 661/2009 (General Safety Regulation)*, COM (2018) 286 final (May 17, 2018), https://eur-lex.europa.eu/resource.html?uri=cellar:f7e29905-59b7-11e8-ab41-01aa75ed71a1.0003.02/DOC_1&format=PDF, *archived at* http://perma.cc/6UX7-T2RV.

[38] *Id*. at 2; *Proposal for a Directive of the European Parliament and of the Council Amending Directive 2008/96/EC on Road Infrastructure Safety Management*, COM (2018) 274 final, https://eur-

systems, the Commission published a decision in December 2018 which sets out an updated working program to achieve the objectives of the 2010 Directive on Intelligent Transport Systems.[39]

VII. Lethal Autonomous Weapons Systems

In the August 2018 meeting of the GGE LAWS, the EU stated that it "considers it worthwhile to review more regularly and systematically the fast-paced developments in the area of emerging technologies, including artificial intelligence (AI), providing an opportunity to technical experts to share information on autonomous technologies relevant for our work."[40] The EU emphasized that it is necessary that "humans remain in control of the development, deployment and use with regard to possible military applications of emerging technologies, including AI, and prevent the creation and use of harmful applications."[41]

Austria

I. Government Statements and Actions

The Austrian government in its 2017–2022 government program stated that "new digital technologies like AI, robotics, and blockchain will have unforeseeable effects on our society."[42] It envisages the use of AI in public administration and therefore wants to establish a legal framework in order to "use innovative, new business models and technologies for the development of society while simultaneously safeguarding the data autonomy/sovereignty of citizens and consumers."[43]

In 2017, the Austrian Federal Ministry for Transport, Innovation, and Technology (BMVIT) established the Austrian Council for Robotics and Artificial Intelligence (Österreichischer Rat für

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lex.europa.eu/resource.html?uri=cellar:cc6ab6e7-59d2-11e8-ab41-01aa75ed71a1.0003.02/DOC_1&format=PDF, *archived at* http://perma.cc/8F7T-UWFC.

[39] *Commission Decision Updating the Working Programme in Relation to the Actions under Article 6(3) of Directive 2010/40/EU*, C (2018) 8264 final (Dec. 11, 2018), https://ec.europa.eu/transport/sites/transport/files/legislation/c20188264_en.pdf, *archived at* http://perma.cc/H7S5-6HNE; Directive 2010/40/EU on the Framework for the Deployment of Intelligent Transport Systems, 2010 O.J. (L 207) 1, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32010L0040&from=EN, *archived at* http://perma.cc/Q6XT-X4YP.

[40] European External Action Service (EEAS), Convention on Certain Conventional Weapons – Group of Governmental Experts – Lethal Autonomous Weapons Systems. EU Statement Group of Governmental Experts Lethal Autonomous Weapons Systems Convention on Certain Conventional Weapons Geneva, 27–31 August 2018, https://eeas.europa.eu/headquarters/headquarters-homepage/49763/convention-certain-conventional-weapons-group-governmental-experts-lethal-autonomous-weapons_en, *archived at* http://perma.cc/H7FL-W7DZ.

[41] *Id*.

[42] Zusammen. Für unser Österreich. Regierungsprogramm 2017–2022 [Together. For Our Austria. Government Program 2017–2022], at 75, https://www.bundeskanzleramt.gv.at/documents/131008/569203/Regierungsprogramm_2017–2022.pdf/b2fe3f65-5a04-47b6-913d-2fe512ff4ce6, *archived at* http://perma.cc/K8AQ-VM4Z (translation by author).

[43] *Id*. at 81 (translation by author).

Robotik und künstliche Intelligenz).[44] The Council consists of nine experts from research, academia, and business. The inaugural meeting took place on October 24, 2017. Its primary mandate is to assist the BMVIT in developing an AI and robotics strategy, but it is also authorized to independently address essential technological, economic, social, and legal questions in this area, and issue recommendations.[45] The process for developing a federal AI strategy under the auspices of the BMVIT with participation from the Federal Ministry for Digital and Economic Affairs (BMDW) is slated to be concluded in the third quarter of 2019.[46] The full strategy will be based on the White Paper published by the Austrian Council for Robotics and Artificial Intelligence[47] and the Artificial Intelligence Mission Austria 2030.[48]

II. Autonomous Vehicles

In 2016, Austria amended its Motor Vehicles Act to allow the use of automated or networked vehicle systems.[49] These systems may be used if they are either permitted or fulfill certain conditions established by regulation for test purposes. However, the law provides that the driver must remain responsible to take over the driving functions if necessary.[50] Autonomous vehicles

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[44] *Österreichischer Rat für Robotik und künstliche Intelligenz* [*Austrian Council for Robotics and Artificial Intelligence*], Bundesministeriums für Verkehr, Innovation und Technologie [BMVIT] [Austrian Federal Ministry for Transport, Innovation, and Technology], https://www.bmvit.gv.at/innovation/forschungspolitik/robotikrat.html (last visited Nov. 15, 2018), *archived at* http://perma.cc/7YXD-49V9.

[45] *Id*.

[46] Anfragebeantwortung durch den Bundesminister für Verkehr, Innovation und Technologie Ing. Norbert Hofer zu der schriftlichen Anfrage (1101/J) der Abgeordneten Stephanie Cox, BA, Kolleginnen und Kollegen an den Bundesminister für Verkehr, Innovation und Technologie betreffend „AI Strategie und neue Datenpolitik für Österreich" [Answer from the Federal Minister for Transport, Innovation, and Technology Engineer Nobert Hofer to the Written Request (1101/J) of the Representative Stephanie COX, BA, Colleagues to the Federal Minister for Transport, Innovation, and Technology re "AI Strategy and New Data Policy for Austria"], no. 1087/AB (Aug. 21, 2018), at 4, https://www.parlament.gv.at/PAKT/VHG/XXVI/AB/AB_01087/imfname_707510.pdf, *archived at* http://perma.cc/T6SJ-AFCE.

[47] ÖSTERREICHISCHER RAT FÜR ROBOTIK UND KÜNSTLICHE INTELLIGENZ [AUSTRIAN COUNCIL FOR ROBOTICS AND ARTIFICIAL INTELLIGENCE], DIE ZUKUNFT ÖSTERREICHS MIT ROBOTIK UND KÜNSTLICHER INTELLIGENZ POSITIV GESTALTEN. WHITE PAPER DES ÖSTERREICHISCHEN RATS FÜR ROBOTIK UND KÜNSTLICHE INTELLIGENZ [CREATING A POSITIVE FUTURE FOR AUSTRIA WITH ROBOTICS AND ARTIFICIAL INTELLIGENCE. WHITE PAPER OF THE [AUSTRIAN COUNCIL FOR ROBOTICS AND ARTIFICIAL INTELLIGENCE (Nov. 2018), https://www.acrai.at/images/download/ACRAI_whitebook_online_2018.pdf, *archived at* http://perma.cc/TF56-NX38.

[48] BMVIT & BMDV, AIM AT 2030. ARTIFICIAL INTELLIGENCE MISSION AUSTRIA 2030, https://www.bmvit.gv.at/innovation/publikationen/ikt/downloads/aimat_ua.pdf, *archived at* http://perma.cc/LJ45-YCF6.

[49] Bundesgesetz über das Kraftfahrwesen [Kraftfahrgesetz 1967] [KFG 1967] [Motor Vehicles Act 1967], June 23, 1967, BUNDESGESETZBLATT [BGBL.] [FEDERAL LAW GAZETTE] 1968, no. 267, as amended, § 102, paras. 3a, 3b, http://www.ris.bka.gv.at/GeltendeFassung/Bundesnormen/20009740/AutomatFahrV, Fassung vom 09.11.2018.pdf *archived at* http://perma.cc/2FRR-4RMD; Verordnung des Bundesministers für Verkehr, Innovation und Technologie über Rahmenbedingungen für automatisiertes Fahren [Automatisiertes Fahren Verordnung] [AutomatFahrV] [Regulation on Automated Driving], BGBL. II 2016, No. 402, as amended, https://www.ris.bka.gv.at/GeltendeFassung/Bundesnormen/20009740/AutomatFahrV, Fassung vom 09.11.2018.pdf, *archived at* http://perma.cc/8JWZ-FNL6.

[50] Motor Vehicles Act 1967, § 102, para. 3b, sentence 2.

may only be tested on the road if they have car insurance and transmit certain data to the BMVIT.[51] Test drives on public roads may only be conducted after the vehicles have been tested sufficiently in advance.[52] The results of the tests must be transmitted to the BMVIT after the end of the trial period.[53] Information on critical situations, accidents, and their causes must be reported without undue delay.[54] In addition, all test vehicles with automated or networked systems must be equipped with an accident data recorder that must be activated during all test drives.[55]

III. Lethal Autonomous Weapon Systems

At the April 2018 meeting of the GGE of the High Contracting Parties to the Convention on Conventional Weapons (CCW), Austria stated it believes that LAWS require a clear regulation and that it is in favor of "establishing a legally binding instrument in order to prohibit lethal autonomous weapon systems that are not under meaningful human control."[56] Austria emphasized that "meaningful human control over critical functions" of LAWS must be maintained.[57]

In August 2018, Austria, together with Brazil and Chile, submitted a proposal to the GGE for a new CCW mandate to "negotiate a legally-binding instrument to ensure meaningful human control over the critical functions" of weapons systems.[58]

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[51] Regulation on Automated Driving, § 1, para. 3.

[52] *Id*. § 1, para. 4.

[53] *Id*. § 1, para. 6.

[54] *Id*.

[55] *Id*. § 5.

[56] Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects. Group of Governmental Experts on Lethal Autonomous Weapon Systems. General Exchange of Views. Statement Austria. Ambassador Thomas Hajnocz (Apr. 9–13, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/AA0367088499C566C1258278004D54CD/$file/2018_LAWSGeneralExchang_Austria.pdf, *archived at* http://perma.cc/AN5U-KLU5.

[57] *Id*.

[58] Proposal for a Mandate to Negotiate a Legally-binding Instrument that Addresses the Legal, Humanitarian and Ethical Concerns Posed by Emerging Technologies in the Area of Lethal Autonomous Weapons Systems (LAWS). Submitted by Austria, Brazil and Chile, U.N. Doc. CCW/GGE.2/2018/WP.7 (Aug. 30, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/3BDD5F681113EECEC12582FE0038B22F/$file/2018_GGE+LAWS_August_Working+paper_Austria_Brazil_Chile.pdf, *archived at* http://perma.cc/VES9-GUSM.

Belarus

I. High Technologies Park

The government of Belarus has adopted the State Program for the Development of the Digital Economy and the Information Society for 2016–2020.[59] The goal of the program is to "improve conditions that facilitate the transformation of human activities under the influence of ICT, including the formation of a digital economy, the development of an information society and the improvement of e-government." In line with the priorities of the Program, the President issued a Decree on the Development of the Digital Economy—the main legislation governing AI in Belarus.[60] The Decree specifies the functions and the areas of activities for the High Technologies Park (HTP). In particular, point 1 of the Decree specifies that the Park must conduct activities in the area of AI and engage in the creation of autonomous vehicles.

The HTP was established by the government of Belarus to stimulate development of high-tech, IT-intensive technologies. The Park operates under special tax and legal regimes, and allows foreign entities to be registered in Belarus in order to obtain tax benefits. Since 2015, HTP-resident companies have been allowed to become involved in new science-intensive activities. Presently, any company engaged in IT and related industries (micro-, opto- and nanoelectronics; mechatronics; telecommunications; radar ranging; radio navigation; and wireless communication), information protection, and establishment of data processing centers may apply for residency within the HTP and benefit from the tax incentives and other advantages it provides. HTP-resident companies may work and provide services in the field of information system analysis, designing, and software development (IT consulting, audit, national information networks maintenance, database development, and corporate information systems implementation and support).[61]

II. Autonomous Vehicles

According to the state news agency Belarusian Telegraph Agency, President Lukashenko has expressed his support for the development of driverless vehicles in Belarus. [62] On February 2018

[59] Postanovlenije Soveta Ministrov Respubliki Belarus ob Utverzhdenii Gosudarstvennoj Programi Razvitija Ekonomiki I Tsifrofogo Obshestva na 2016-2020 Godi [Resolution of the Council of Ministers of the Republic of Belarus on Approval of the State Program for the Development of the Digital Economy and the Information Society for 2016–2020], No. 235, Mar. 23, 2016, http://www.pravo.by/document/?guid=3871&p0=C21600235, *archived at* https://perma.cc/9G3U-5U5F.

[60] Dekret Presidenta Belarus ot 27 Dekabrja 2017 goda or Razvitii Tsifrovoj Ekonomiki [Decree of the President of Belarus of 27 December 2017 concerning Development of the Digital Economy], http://pravo.by/document/?guid=12551&p0=Pd1700008&p1=1&p5=0, *archived at* https://perma.cc/V8LJ-B3LK.

[61] *Obshhaja Informacija o HTP* [*General Information about HTP*], HTP BELARUS, http://www.park.by/topic-about_htp/ (last visited Dec. 11, 2018), *archived at* https://perma.cc/HUT3-5LVN.

[62] *Lukashenko Supports Idea of Creating Conditions for Driverless Vehicles in Belarus*, BELARUSIAN TELEGRAPH AGENCY, BELTA (Mar. 13, 2017), https://eng.belta.by/president/view/lukashenko-supports-idea-of-creating-conditions-for-driverless-vehicles-in-belarus-99412-2017/, *archived at* https://perma.cc/NR5D-LQPT.

it was announced that a high-tech company, a resident of the HTP, will set a site for autonomous vehicle test driving on the territory of the Park.[63]

Belgium

I. Introduction

Overall, with the exception of autonomous vehicles and lethal autonomous weapons systems, the Belgian government has not been very active on issues related to AI so far. This may change in the near future, however, as both chambers of the Belgian Parliament currently have working groups studying AI questions. Members of the Chamber of Representatives proposed the creation of an "inclusive and sustainable robo-digital agenda" in July 2017,[64] and the working group to design this agenda started meeting in January 2018.[65] Similarly, the Senate created a working group to write a report on "the fallout, opportunities, potentialities and risks of a digital 'intelligent society'."[66] This working group has been meeting and conducting hearings since July 2018.[67]

Additionally, Belgium is an observing member of the International Organization for Standardization's technical committee on AI.[68]

II. Autonomous Vehicles

The Belgian government has adopted policies to encourage the development of autonomous vehicles. In 2016, it published a "Code of Good Practices" to guide companies and institutions

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[63] *Belarus' Hi-Tech Park New Resident Company to Set Up Self-driving Vehicle Test Site*, BELARUS (Feb. 16, 2018), https://www.belarus.by/en/business/business-news/belarus-hi-tech-park-new-resident-company-to-set-up-self-driving-vehicle-test-site_i_0000074788.html, *archived at* https://perma.cc/79FF-532K.

[64] Chambre des représentants de Belgique [Belgian Chamber of Representatives], Proposition de resolution relative à la création d'un agenda robonumérique inclusif et durable [Proposal for a Resolution Regarding the Creation of an Inclusive and Sustainable Robo-Digital Agenda] (July 27, 2017), http://www.lachambre.be/doc/flwb/pdf/54/2643/54k2643001.pdf, *archived at* https://perma.cc/E98J-R4NA.

[65] Gilles Vanden Burre, *Première réunion du groupe de travail sur l'agenda robonumérique au Parlement* [*First Meeting of the Working Group on a Robo-Digital Agenda in Parliament*], GILLESVANDENBURRE.BE (Jan. 18, 2018), https://gillesvandenburre.be/2018/01/18/premiere-reunion-groupe-de-travail-lagenda-robonumerique-parlement/, *archived at* https://perma.cc/H4JQ-CA6R.

[66] Sénat de Belgique [Belgian Senate], Demande d'établissement d'un rapport d'information relatif à la necessaire collaboration entre l'État fédéral et les entités fédérées en ce qui concerne les retombées, les opportunités, les potentialités et les risques de la « société intelligente » numérique [Request for the Drafting of an Information Report on the Necessary Collaboration Between the Federal Government and the Federated Entities With Regards to the Fallout, Opportunities, Potentialities and Risks of a Digital "Intelligent Society"], S. 6-413, May 24, 2018, https://www.senate.be/www/webdriver?MItabObj=pdf&MIcolObj=pdf&MInamObj=pdfid&MItypeObj=application/pdf&MIvalObj=100663911, *archived at* https://perma.cc/VJ62-PZYV.

[67] Sénat de Belgique [Belgian Senate], Fiche du Dossier [Case File], S. 6-413, http://www.senate.be/www/?MIval=/dossier&LEG=6&NR=413&LANG=fr (last visited Nov. 21, 2018), *archived at* https://perma.cc/RZ38-3ZVB.

[68] *Participation: ISO/IEC JTC 1/SC 42 Artificial Intelligence*, INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, https://www.iso.org/committee/6794475.html?view=participation (last visited Nov. 23, 2018), *archived at* https://perma.cc/4W7M-SZDY.

that wish to test autonomous vehicles in Belgium, particularly with respect to security standards.[69] This document was directly inspired by the British document, *The Pathway to Driverless Cars: A Code of Practice for Testing*, published the previous year.[70] In March 2018, the Traffic Code was amended to allow autonomous vehicles to be tested on Belgian roads, subject to government approval.[71]

III. Lethal Autonomous Weapons Systems

In July 2018, the Belgian Parliament adopted a resolution to prohibit the use of LAWS by Belgian armed forces.[72] This measure was criticized by some opposition parties as not going far enough, as it allows Belgium to continue research into LAWS.[73] At the international level, Belgium has expressed opposition to the idea of creating a new international treaty on LAWS.[74]

Czech Republic

The Czech Republic introduced amendments to the Act on Surface Communication aimed at the regulation of autonomous vehicles. According to the amendments autonomous vehicles will be allowed on the roads of Czech Republic provided a capable driver is present in the car.[75] The draft bill enhanced the definition of "driver" to include a stand-by driver in an autonomous vehicle and also introduced safety standards for operating autonomous vehicles.[76]

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[69] SERVICE PUBLIC FÉDÉRAL MOBILITÉ ET TRANSPORTS [FEDERAL PUBLIC SERVICE FOR MOBILITY AND TRANSPORTATION], VÉHICULES AUTONOMES: CODE DE BONNES PRATIQUES D'EXPÉRIMENTATION EN BELGIQUE [AUTONOMOUS VEHICLES: CODE OF GOOD PRACTICES FOR EXPERIMENTING IN BELGIUM] (Sept. 2016), https://mobilit.belgium.be/sites/default/files/resources/files/code_of_practice_fr_2016_09.pdf, *archived at* https://perma.cc/9B7C-Z7CE.

[70] *Id.* at 2.

[71] Arrêté royal du 18 mars 2018 relatif aux essais avec des véhicules automatisés [Royal Order of 18 March 2018 Regarding Tests of Automatized Vehicles], http://www.ejustice.just.fgov.be/cgi/article_body.pl?language=fr&caller=summary&pub_date=18-04-19&numac=2018011160, *archived at* https://perma.cc/BP5U-EB4S.

[72] Chambre des représentants de Belgique [Belgian Chamber of Representatives], Résolution visant à interdire l'utilisation, par la Défense belge, de robots tueurs et de drones armés [Resolution for the Purpose of Prohibiting the Use, by the Belgian Defense, of Killer Robots and Armed Drones], July 19, 2018, http://www.lachambre.be/FLWB/pdf/54/3203/54K3203005.pdf, *archived at* https://perma.cc/N77D-SVMF.

[73] *La Défense ne pourra pas utiliser de robots-tueurs* [*The Defense Department Will Not be Able to Use Killer Robots*], LA LIBRE (July 4, 2018), http://www.lalibre.be/actu/belgique/la-defense-ne-pourra-pas-utiliser-de-robots-tueurs-5b3c96bc5532692547e326b4, *archived at* https://perma.cc/5HYT-SQ6S.

[74] CAMPAIGN TO STOP KILLER ROBOTS, REPORT ON ACTIVITIES – CONVENTION ON CONVENTIONAL WEAPONS GROUP OF GOVERNMENTAL EXPERTS MEETING ON LETHAL AUTONOMOUS WEAPONS SYSTEMS 8 (June 28, 2018), https://www.stopkillerrobots.org/wp-content/uploads/2018/06/KRC_ReportCCWX_Apr2018_UPLOADED.pdf, *archived at* https://perma.cc/2M7K-SLGD.

[75] *Mezi Poslance Míří První Zákon, Který Řeší Provoz Samořiditelných Aut* [*Among the MPs, the First Law, Which Deals With the Operation of Self-Driving Cars Is Introduced*], ZDOPRAVY.CZ, https://zdopravy.cz/mezi-poslance-miri-prvni-zakon-ktery-resi-provoz-samoriditelnych-aut-12269/, *archived at* https://perma.cc/YMP2-2HUF

[76] *Id.*

Denmark

I. National Strategy

Denmark announced a digital strategy in 2018.[77] It includes spending on a National Center for Research in Digital Technologies (Nationalt Center for Forskning i Digitale Teknologier).[78] The following six areas were specifically mentioned as priorities:

1. Digital hub for a strengthened growing environment,
2. Digital lift for small and medium sized businesses
3. Digital fluency for all [focusing on primary education]
4. Data that drives growth of the businesses
5. Agile regulation of businesses
6. Increased IT-security for business[79]

Denmark invested DKK 750 million (about US$115 million) in 2018, and will invest DKK 125 million (about US$19 million) annually until 2025 to fund initiatives connected to these goals.[80] The initial sum includes an extra start-up amount, aimed at establishing a number of new initiatives.[81] Possible initiatives include changed tax provisions to allow for greater deductions for investment in technology.[82] Examples of changes to regulations include rules that enable new business models.[83] According to the government the purpose behind the new business models is to test new areas, as is done today in the fields of driverless transport and within FinTech.[84] The success of the initiatives also relies on other factors such as increased spending on small businesses in general, enabled by the guarantee agreement with the European Investment Fund and Vækstfonden (Danish Growth Fund) of DKK 1.6 million (about US$245,000).[85] In addition Denmark is increasing its spending on research. In 2018 it will spend DKK 80 million (about US$12 million) on "digital technologies such as artificial intelligence (AI), big data, Internet of Things, IT-security, etc."[86] Danish efforts to use AI in the welfare sector—for example, in

[77] ERHVERVSMINISTERIET, STRATEGI FOR DANMARKS DIGITALE VÆKST [STRATEGY FOR DIGITAL GROWTH] (Jan. 2018), https://em.dk/media/9127/strategi-for-danmarks-digitale-vaekst_online.pdf, *archived at* https://perma.cc/6T5C-577P; *Ny strategi skal gøre Danmark til digital frontløber* (Jan. 30, 2018), ERHVERVSMINISTERIET, https://em.dk/nyhedsarkiv/2018/januar/ny-strategi-skal-goere-danmark-til-digital-frontloeber/, *archived at* https://perma.cc/9USR-3WYE.

[78] ERHVERVSMINISTERIET, STRATEGI FOR DANMARKS DIGITALE VÆKST, *supra* note 77.

[79] *Id*. at 7 (translation by author).

[80] *Id*. at 10.

[81] *Id*.

[82] *Id*. at 26.

[83] *Id*. at 10.

[84] *Id*.

[85] *Id*. at 30.

[86] Press Release, Uddannelses og Forskningsministeriet, Forskning i nye teknologiske muligheder og kunstig intelligens (Oct. 11, 2018), https://ufm.dk/aktuelt/pressemeddelelser/2018/filer/notat-forskning-i-nye-teknologiske-muligheder-og-kunstig-intelligens.pdf, *archived at* https://perma.cc/GE63-3TBG.

targeting child welfare benefits fraud—has been criticized as potentially threatening to privacy and other important values.[87]

The Nordic countries have also joined together in a number of collaborative responses to AI, including together with the Baltic States.[88]

II. Autonomous Vehicles

Danish law provides for testing of driverless cars.[89] The current trial term is from 2017 to 2020.[90] The Vejdirektoratet (Danish Road Directorate) has issued a binding Guide on driverless cars.[91] Applications for testing are determined by the Færdselsstyrelsen (Danish Road Safety Agency).[92] Denmark has also tested driverless buses.[93] Denmark has tested autonomous vehicles in perfect weather and in rainy weather.[94] While the results were positive for operation in clear weather, the autonomous vehicles tested in rainy weather had a success rate of 69–92%.[95] A majority of Danes believe autonomous vehicles will be driving on the roads by 2030.[96]

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[87] Jacob Mchangama & Hin-Yan Liu, *The Welfare State Is Committing Suicide by Artificial Intelligence*, FOREIGN POLICY (Dec. 25, 2018), https://foreignpolicy.com/2018/12/25/the-welfare-state-is-committing-suicide-by-artificial-intelligence/, *archived at* https://perma.cc/2LZP-EPSS.

[88] Declaration, Nordic Council of Ministers & Government of Sweden, AI in the Nordic-Baltic Region, May 14, 2018, https://www.regeringen.se/49a602/globalassets/regeringen/dokument/naringsdepartementet/20180514_nmr_deklaration-slutlig-webb.pdf, *archived at* https://perma.cc/RT92-BWN7; Declaration, Nordic Council of Ministers for Digitalization, The Nordic-Baltic Region: A Digital Frontrunner (Apr. 25, 2017), https://www.norden.org/en/declaration/nordic-baltic-region-digital-frontrunner, *archived at* https://perma.cc/SUL2-XZT4; Press Release, Regeringskansliet, Sverige ska leda AI-samarbete i Norden och Baltikum (May 14, 2018), https://www.regeringen.se/pressmeddelanden/2018/05/sverige-ska-leda-ai-samarbete-i-norden-och-baltikum/, *archived at* https://perma.cc/6FPK-DSSB.

[89] § 92f BEKENDTGØRELSE AF FÆRDSELSLOVEN [VEHICLES ACT] (LBK nr 1324 af 21/11/2018), https://www.retsinformation.dk/forms/R0710.aspx?id=204976, *archived at* https://perma.cc/2DDJ-2BAT; BEKENDTGØRELSE OM ASSESSORER I FORBINDELSE MED FORSØG MED SELVKØRENDE MOTORKØRETØJER (BEK 789 af 16/06/2017), https://www.retsinformation.dk/Forms/R0710.aspx?id=192104, *archived at* https://perma.cc/9A2H-F5NM.

[90] *Id*.

[91] Vejdirektoratet, Vejledning til ansøgning om forsøg med selvkørende motorkøretøjer [Guidelines for Application for Testing of Self-driving Vehicles] (June 29, 2017), http://www.vejdirektoratet.dk/DA/viden_og_data/temaer/Selvkoerendebiler/Documents/Vejledning til ansøgning om forsøg med selvkørende biler.pdf, *archived at* https://perma.cc/SZ9F-HET6.

[92] *Id*. at 2.

[93] *Danmarks første førerløse bus i rute var en passagersucces*, MOVIA (Oct. 15, 2018), https://www.moviatrafik.dk/presse/presse-og-nyheder/danmarks-foerste-foererloese-bus-i-rute-var-en-passagersucces, *archived at* https://perma.cc/HR8B-RVTY.

[94] *Selvkørende biler*, VEJDIREKTORATET (Aug. 15, 2018), http://www.vejdirektoratet.dk/DA/viden_og_data/temaer/Selvkoerendebiler/Sider/default.aspx, *archived at* https://perma.cc/26MR-8LG5.

[95] *Id*.

[96] *Id*.

III. Lethal Autonomous Weapons Systems

Denmark has not passed any legislation banning LAWS. The Danish Defense has published a report that addresses the issues connected to autonomous weapons and international law.[97] It concluded that current developments have increased the demand for lawyers within the military.[98]

Denmark participated in the United Nations Office at Geneva meetings on LAWS in 2015.[99] The Danish Ambassador for Disarmament announced at the meeting that "all use of force—including lethal autonomous weapons systems—must be in compliance with international humanitarian law, i.e. the fundamental rules of distinction, proportionality, and precaution in attack. And all use of force must remain under 'meaningful human control'."[100] Human Rights Watch has criticized Denmark for not doing more on the issue.[101]

Estonia

I. AI Strategy

On March 27, 2018, the government of Estonia announced its intention to formulate an AI strategy.[102] It stated that it would assemble a cross-sectoral group of experts to develop the strategy. The group would also prepare a bill that will allow the use of "kratts," i.e., fully autonomous information systems, in all areas of life and ensure legal clarity as well as the required supervision. It is expected that the bill will be ready to be presented in Parliament during 2019. The following challenging legal issues with respect to AI are among the questions being considered by the group of experts:

- The cause and effect relations with regard to algorithms. Marten Kaevats, Adviser of the Strategy Unit of the Government Office, stated, "[f]rom a legal perspective, this is a

[97] FORSVARET, INTRODUKTION TIL FOLKERET [INTRODUCTION TO INTERNATIONAL LAW] (Heidi Güntelberg ed., 2014), http://www.fak.dk/publikationer/Documents/Introduktion-til-folkeret.pdf, *archived at* https://perma.cc/X48P-HLMN.

[98] *Id*. at 214.

[99] General Statement by Susanne Rumohr Haekkerup, Ambassador for Disarmament, Non-proliferation and Arms Control, Convention on Certain Conventional Weapons, Informal Meetings of Experts on Lethal Autonomous Weapons Systems, 13–17 April 2015, Denmark, https://www.unog.ch/80256EDD006B8954/(httpAssets)/C5B8B0A4AD379822C1257E26005D7D20/$file/2015_LAWS_MX_Denmark.pdf (last visited Dec. 21, 2018), *archived at* https://perma.cc/Z58Z-9HVX.

[100] *Id*.

[101] Mary Wareham, *'Stop Killer Robots'-kampagne: Danmark var savnet ved mødet om 'dræber-robotter'*, HUMAN RIGHTS WATCH (Dec. 5, 2017), https://www.hrw.org/da/news/2017/12/05/312359, *archived at* https://perma.cc/DK8R-UBVW.

[102] Press Release, Government Office, Republic of Estonia, Estonia will Have an Artificial Intelligence Strategy (Mar. 27, 2018), https://www.riigikantselei.ee/en/news/estonia-will-have-artificial-intelligence-strategy, *archived at* https://perma.cc/7H6F-UQ9Q.

complicated area, as the algorithms of an AI act as a 'black box'—even the creator of the artificial intelligence is not always sure why the algorithm made a certain decision."[103]

- Responsibilities and liabilities in the implementation of the systems without human interference. In a more recent article, Kaevats stated, "[a] year into the public debate over algorithmic-liability law (a.k.a. the Kratt law), opinion leans toward avoiding sector-based regulation, opting for general algorithmic liability instead. The biggest conversation starter is the idea of giving algorithms a separate legal status, similar to companies."[104]

In addition to the ethical, moral, and philosophical debate over AI liability, the group of experts is also working on enforcement issues.[105]

II. Autonomous Vehicles

On August 16, 2016, the government of Estonia created an expert group on self-driving vehicles aiming at developing policies, studies, and a legal framework for autonomous vehicles. In February 2017 the group recommended test driving of autonomous vehicles on Estonian roads.

On March 2, 2017, the Ministry of Economic Affairs and Communications announced that testing of autonomous vehicles is allowed on the roads of Estonia, provided the driver is present in the car to take control of the vehicle if needed. The testing right for Estonia's public roads applies to self-driving vehicles classified as level SAE 2 or SAE 3 vehicles according to the classification of the International Society of Automotive Engineers. The main requirement regarding these vehicles is that they should have either a driver present in the car or controlling the car remotely. The expert group is working towards developing liability, insurance, privacy, and ethics regulations concerning autonomous vehicles. It is also envisaged that the government will allow testing of vehicles with a higher degree of autonomy (SAE 4 or SAE 5) in the near future.[106]

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[103] *Id.*

[104] Marten Kaevats, *AI and the Kratt Momentum*, INVEST IN ESTONIA (Sept. 2018), https://investinestonia.com/ai-and-the-kratt-momentum/ (footnote in original omitted), *archived at* https://perma.cc/XQ4A-ZA68.

[105] *Id.*

[106] Press Release, Republic of Estonia Ministry of Economic Affairs and Communication, Estonia Allowing a Number of Self-Driving Cars on the Streets Starting Today (Mar. 3, 2017), https://www.mkm.ee/en/news/estonia-allowing-number-self-driving-cars-streets-starting-today, *archived at* https://perma.cc/763D-4XQT.

Finland

I. National Agenda

Finland wants to become a leading country in AI.[107] To that end the Ministry of Economic Affairs and Employment has declared that "[l]egislation should naturally also support the change."[108]

Finland has yet to adopt ethical rules on the use of AI. Finnish Kela (the Finnish Insurance System) is involved in creating ethical rules for AI based on the ethics challenge of Finland's AI program.[109] Ethical guidelines are part of the national program for AI.[110] AI Finland also provides a draft ethical guideline on its webpage.[111] In addition, Kela is taking part in Institute of Electrical and Electronics Engineers (IEEE) Standards Association's Ethics Certification Program for Autonomous and Intelligent Systems (ECPAIS).[112]

As noted above, the Nordic countries have also joined together in a number of collaborative responses to AI, including together with the Baltic States.[113]

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[107] Press Release, Arbets- och näringsministeriet, Minister Lintilä: Finland ska bli ett ledande land inom tillämpning av artificiell intelligens (May 18, 2017), https://tem.fi/sv/artikel/-/asset_publisher/ministeri-lintila-suomesta-tekoalyn-soveltamisen-karkimaa, *archived at* https://perma.cc/XUA7-234P.

[108] MINISTRY OF ECONOMIC AFFAIRS AND EMPLOYMENT, FINLAND'S AGE OF ARTIFICIAL INTELLIGENCE, No. 47/2017, at 17, http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/160391/TEMrap_47_2017_verkkojulkaisu.pdf, *archived at* https://perma.cc/TL4M-S8QQ.

[109] Press Release, Kela, Ethical Principles for AI are Being Defined, with Kela in Central Role (Nov. 30, 2018), https://www.kela.fi/web/en/press-releases/-/asset_publisher/LgL2IQBbkg98/content/ethical-principles-for-ai-are-being-defined-with-kela-in-central-role, *archived at* https://perma.cc/82YB-AMCS.

[110] *Id.*; *see also Ethics Challenge*, AI FINLAND, https://www.tekoalyaika.fi/en/background/ethics/ (last visited Dec. 18, 2018), *archived at* https://perma.cc/S5QZ-LYRX.

[111] AI FINLAND, EXAMPLES OF THE ETHICAL PRINCIPLES OF ARTIFICIAL INTELLIGENCE, https://www.tekoalyaika.fi/wp-content/uploads/2018/09/esimerkkeja_tekoalyn_eettisista_periaatteista_en-1.pdf (last visited Dec. 18, 2018), *archived at* https://perma.cc/NT9T-HHC6.

[112] *Id.*; *see also* Press Release, IEEE, IEEE Launches Ethics Certification Program for Autonomous and Intelligent Systems (Oct. 2, 2018), https://standards.ieee.org/news/2018/ieee-launches-ecpais.html, *archived at* https://perma.cc/3WBR-VJ6U.

[113] Declaration, Nordic Council of Ministers & Government of Sweden, AI in the Nordic-Baltic Region, May 14, 2018, https://www.regeringen.se/49a602/globalassets/regeringen/dokument/naringsdepartementet/20180514_nmr_deklaration-slutlig-webb.pdf, *archived at* https://perma.cc/RT92-BWN7; Declaration, Nordic Council of Ministers for Digitalization, The Nordic-Baltic Region: A Digital Frontrunner (Apr. 25, 2017), https://www.norden.org/en/declaration/nordic-baltic-region-digital-frontrunner, *archived at* https://perma.cc/SUL2-XZT4; Press Release, Regeringskansliet, Sverige ska leda AI-samarbete i Norden och Baltikum (May 14, 2018), https://www.regeringen.se/pressmeddelanden/2018/05/sverige-ska-leda-ai-samarbete-i-norden-och-baltikum/, *archived at* https://perma.cc/6FPK-DSSB.

II. Autonomous Vehicles

Finland allows for testing of driverless cars. Scania is testing semi-autonomous technology in its trucks in Finland with a driver in the car.[114] Finland is part of the Artic Challenge testing of driverless cars under wintery conditions.[115] The Political Party SFP in Finland has proposed the adoption of policies that would make Finland the first country in the world not only to welcome autonomous cars, but also to forbid nonautonomous cars.[116]

III. Lethal Autonomous Weapons Systems

Finland has not issued an official position on lethal autonomous weapons. Finland took part in the 2015 UNOG expert panel on LAWS, where they welcomed more work on whether LAWS is compatible with the Convention on Certain Conventional Weapons framework.[117]

France

I. Introduction

According to technology commentators, France has some of the world's best mathematics and engineering schools, and some of the world's leading data scientists and AI researchers come from the country.[118] While many of these French-trained researchers and engineers go on to work in the United States and elsewhere, France is nevertheless said to have one of the strongest AI ecosystems in Europe, alongside Germany and the United Kingdom.[119] Indeed, "AI companies from these top three countries make up more than half of the European AI company total."[120]

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[114] *Scania testar självkörande lastbilar i Finland*, NYTEKNIK (Mar. 7, 2018), https://www.nyteknik.se/fordon/scania-testar-sjalvkorande-lastbilar-i-finland-6902896, *archived at* https://perma.cc/C36W-5L2U.

[115] *Hur hålls en förarlös bil på en snöig väg? De första mellanresultaten från projektet som undersöker automatiseringen av vägtrafiken i vinterförhållanden*, LIIKENNEVIRASTO/TRAFIKVERKET (Oct. 9, 2018), https://www.liikennevirasto.fi/web/sv/-/hur-halls-en-forarlos-bil-pa-en-snoig-vag-de-forsta-mellanresultaten-fran-projektet-som-undersoker-automatiseringen-av-vagtrafiken-i-vinterforhallande, *archived at* https://perma.cc/FA9U-DVSJ.

[116] *Motion 19 – Automatiserad trafik och självkörande bilar*, SFP (Nov. 27, 2018), https://sfp.fi/politik/beslut-politiska-program/partidagsbeslut/partidagen-2016-i-abo/motion-19-automatiserad-trafik-och-sjalvkorande-bilar/, *archived at* https://perma.cc/5XTR-4BSW.

[117] Statement by Finland at the Meeting of the High Contracting Parties to the Convention on Certain Conventional Weapons 2 (Nov. 12, 2015), https://www.unog.ch/80256EDD006B8954/(httpAssets)/43811AA71321CDF9C1257F0F00383E96/$file/finland.pdf, *archived at* https://perma.cc/BN6R-HD2A.

[118] Romain Dillet, *France Wants to Become an Artificial Intelligence Hub*, TECHCRUNCH (Mar. 29, 2018), https://techcrunch.com/2018/03/29/france-wants-to-become-an-artificial-intelligence-hub/, *archived at* https://perma.cc/GV9J-DEHE.

[119] *Id.*

[120] *Artificial Intelligence in France*, EXPORT.GOV (Apr. 3, 2018), https://www.export.gov/article?id=Artificial-Intelligence-in-France, *archived at* https://perma.cc/NR98-GQVH.

French President Emmanuel Macron has made it one of his government's priorities to build on these assets and make France a world leader in AI. In this spirit, he has promised to allocate €1.5 billion (approximately US$1.7 billion) in public funding to AI by 2022 "in a bid to reverse a brain drain and catch up with the dominant US and Chinese tech giants."[121] In parallel, the French government has deployed some efforts towards anticipating the regulatory challenges related to AI.

Additionally, the French government has been experimenting with using AI for certain aspects of governance. In particular, the Courts of Appeals of Rennes and Douai tested predictive justice software on various appeals cases in 2017.[122]
France is a participating member of the International Organization for Standardization's technical committee on AI.[123]

II. CNIL Report

A 2016 law tasked the Commission Nationale de l'Informatique et des Libertés (National Commission on Computer Technology and Civil Liberties, CNIL) with studying the societal and ethical stakes related to new digital technologies.[124] As part of this mission, the CNIL produced a report on "the ethical stakes of algorithms and artificial intelligence" in December 2017.[125] This report points to six broad ethical issues surrounding AI:

- Will human free-will and responsibility be eroded if decision-making is increasingly delegated to machines and software?
- The voluntary or accidental inclusion of bias and discrimination in AI.
- As AI fosters the segmentation of solutions (customized for each unique individual profiles), how does that affect the collective logic of certain essential features of our society, such as democratic pluralism and the idea of risk mutualization?

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[121] Mathien Rosemain & Michel Rose, *France to Spend $1.8 Billion on AI to Compete with U.S., China*, REUTERS (Mar. 29, 2018), https://www.reuters.com/article/us-france-tech/france-to-spend-1-8-billion-on-ai-to-compete-with-u-s-china-idUSKBN1H51XP, *archived at* https://perma.cc/5VNR-KE5D.

[122] CEPEJ, EUROPEAN ETHICAL CHARTER ON THE USE OF ARTIFICIAL INTELLIGENCE IN JUDICIAL SYSTEMS AND THEIR ENVIRONMENT 34 (CEPEJ(2018)14, Dec. 3, 2018), https://rm.coe.int/ethical-charter-en-for-publication-4-december-2018/16808f699c, *archived at* https://perma.cc/7XP4-SWK6; Philippe Rozec & Louise Thiebaut, *Intelligence artificielle : les limites de la justice predictive* [*Artificial Intelligence: The Limits of Predictive Justice*], LES ECHOS (Nov. 2, 2017), https://www.lesechos.fr/idees-debats/cercle/030810043202-intelligence-artificielle-les-limites-de-la-justice-predictive-2126908.php, *archived at* https://perma.cc/K2WM-3399.

[123] *Participation: ISO/IEC JTC 1/SC 42 Artificial Intelligence*, INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, https://www.iso.org/committee/6794475.html?view=participation (last visited Nov. 23, 2018), *archived at* https://perma.cc/4W7M-SZDY.

[124] Loi No. 2016-1321 du 7 octobre 2016 pour une République numérique [Law No. 2016-1321 of 7 October 2016 for a Digital Republic], art. 59, https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000033202746&dateTexte=&categorieLien=id, *archived at* https://perma.cc/A82Q-2M7W.

[125] COMMISSION NATIONALE DE L'INFORMATIQUE ET DES LIBERTÉS (CNIL), COMMENT PERMETTRE À L'HOMME DE GARDER LA MAIN? [HOW TO KEEP MANKIND IN CONTROL?] (Dec. 2017), https://www.cnil.fr/sites/default/files/atoms/files/cnil_rapport_garder_la_main_web.pdf, *archived at* https://perma.cc/B3KD-63B5.

- How to balance the benefits of big data with the necessity of protecting individual privacy.
- How to select the data used to feed AI machine learning, balancing quality, quantity, and pertinence to the purpose being pursued.
- How the development of autonomous AI, as well as the blurring of the line between humans and machines, put into question the very meaning of human identity.[126]

To deal with these challenges, the CNIL report suggests two general principles and six concrete recommendations. The two principles are that of loyalty (*loyauté*, which can also be translated as "faithfulness") and vigilance/reflexivity.[127] The first principle refers to the idea that algorithms should not betray the interests of its users—not just as consumers but more broadly as citizens and members of communities or other groups whose interests may be affected by the algorithm.[128] The second principle refers to the idea that the constant evolution and unpredictability of AI requires methodical, deliberative, and regular re-examination by all stakeholders.[129] The CNIL's six concrete recommendations include the following:

- The ethical education of all involved in the development and use of AI
- Further efforts to make algorithms understandable by their users
- To design algorithms to serve human freedom and to counteract the "black box" effect
- To create a national body to audit algorithms
- To encourage research on ethical AI and launch great national research project geared towards the general interest
- To reinforce ethics compliance bodies within corporations[130]

III. Other Government Reports

In 2017, the government established a task force to develop strategies to boost France's leadership in the field of AI, including two working groups on how to manage the economic, social, ethical, national sovereignty, and national security implications of AI.[131] The resulting report covered several themes, including the importance of AI serving "autonomous individual development, necessary for a functioning democratic society," improving transparency, and giving individuals more control over their private data.[132]

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[126] *Id.* at 5, 26–42.

[127] *Id.* at 5.

[128] *Id.* at 48-50.

[129] *Id.* at 50.

[130] *Id.* at 54-60.

[131] FRANCE I.A. [FRANCE A.I.], RAPPORT DE SYNTHÈSE [SYNTHESIS REPORT] (Mar. 21, 2017), http://cache.media.enseignementsup-recherche.gouv.fr/file/Actus/86/1/Conclusions_Groupes_Travail_ France_IA_738861.pdf, *archived at* https://perma.cc/2YEU-JRUZ.

[132] *Id.* at 254-55.

Another government mission, commissioned by the French prime minister and led by member of Parliament and mathematician Cédric Villani, worked from September 2017 to March 2018 to study policy options for AI in France. This mission presented its findings in a March 2018 conference entitled "AI for Humanity," which was held at the Collège de France, one of France's premier research institutions.[133] President Macron made a speech during this conference, in which he outlined France's ambition and strategy with regard to AI.[134] The President's speech, and the Villani Mission's report, included considerations on aspects of AI that may need a legislative or regulatory framework. Among other considerations, the Villani Mission's report discussed the necessity of "opening the Black Box" (better understanding why an algorithm comes to a certain conclusion), implementing ethics by design, considering collective rights to data, continued human control over AI, promoting equality, and ensuring that everyone can benefit from AI.[135]

At the international level, France recently joined Canada to create an expert International Panel on Artificial Intelligence to "support and guide the responsible adoption of artificial intelligence, centered on the respect for human rights, inclusion, diversity, innovation and economic growth."[136]

IV. Autonomous Vehicles

France has expressed the ambition of taking a major role in the development of autonomous vehicles, with an emphasis on safety. According to a policy paper published in May 2018, the French government's strategy includes a progressive approach to experimenting with autonomous vehicles, special attention to road security and cybersecurity risks, close cooperation between public authorities and the car industry to develop a regulatory framework, and European cooperation.[137] In the spirit of the latter point, France entered into a joint endeavor with Germany and Luxembourg to create a cross-border, digital test bed for automated and connected driving.[138]

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[133] *Artificial Intelligence: "Making France a Leader"*, GOUVERNEMENT.FR (Mar. 30, 2018), https://www.gouvernement.fr/en/artificial-intelligence-making-france-a-leader, *archived at* https://perma.cc/B8UT-VY3K.

[134] *Id.*; Speech, Emmanuel Macron, AI for Humanity (College of France, Paris, Mar. 29, 2018), http://www.elysee.fr/declarations/article/transcription-du-discours-du-president-de-la-republique-emmanuel-macron-sur-l-intelligence-artificielle/ (in French), *archived at* https://perma.cc/T2B9-YPMA. *See also* CÉDRIC VILLANI, DONNER UN SENS À L'INTELLIGENCE ARTIFICIELLE [FOR A MEANINGFUL ARTIFICIAL INTELLIGENCE] (Mar. 2018), https://www.aiforhumanity.fr/pdfs/9782111457089_Rapport_Villani_accessible.pdf, *archived at* https://perma.cc/QTC5-DPW6, English version *available at* https://www.aiforhumanity.fr/pdfs/MissionVillani_Report_ENG-VF.pdf, *archived at* https://perma.cc/G9YS-DCXH.

[135] VILLANI, *supra* note 134, at 15–17 & 112–147.

[136] *France and Canada Create New Expert International Panel on Artificial Intelligence*, GOUVERNEMENT.FR (French government website) (Dec. 7, 2018), https://www.gouvernement.fr/en/france-and-canada-create-new-expert-international-panel-on-artificial-intelligence, *archived at* https://perma.cc/J95F-C9PR.

[137] RÉPUBLIQUE FRANÇAISE [FRENCH REPUBLIC], DÉVELOPPEMENT DES VÉHICULES AUTONOMES, ORIENTATIONS STRATÉGIQUES POUR L'ACTION PUBLIQUE [DEVELOPMENT OF AUTONOMOUS VEHICLES, STRATEGIC ORIENTATIONS FOR PUBLIC ACTION] 8 (May 2018), https://www.ecologique-solidaire.gouv.fr/sites/default/files/90p%20VDEF.pdf, *archived at* https://perma.cc/8GHC-6TCZ.

[138] FRANCO-GERMAN-LUXEMBURGISH COOPERATION ON AUTOMATED AND CONNECTED DRIVING: CONCEPT FOR THE CROSS-BORDER DIGITAL TEST BED (May 8, 2018), https://www.ecologique-solidaire.gouv.fr/sites/default/files/2018-05-08 Concept Digital Test Bed GER FRA LUX.pdf, *archived at* https://perma.cc/BK6Y-9HQT.

Furthermore, beginning January 1, 2019, the French government has been able to authorize level 4 autonomous vehicles on public roads for testing purposes.[139]

V. Lethal Autonomous Weapons Systems

A 2013 French initiative has led to annual international discussions on LAWS within the framework of the Convention on Certain Conventional Weapons.[140] President Macron declared in an interview that he is "dead against" the deployment of LAWS.[141] However, the French government has only proposed the adoption of a nonbinding declaration to curtail LAWS, and is opposed to the idea of a new international treaty on the issue.[142]

Germany

The German Federal Government aims to make Germany "a leading centre for AI . . . through pursuit of a speedy and comprehensive transfer of research findings to applications and the modernisation of administration," and aspires to make "AI made in Germany" a globally recognized quality mark.[143] Its priorities are to expand AI research, transfer research findings and AI methods to businesses, support innovation competitions, create incentives for start-ups, develop international and European frameworks for AI in the labor market, fund and attract international scientists and talent, use AI in public administration, make data available and usable, revise the regulatory framework to ensure legal certainty if necessary, set standards, network on a national and international level, and engage in dialogue with different stakeholders.

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[139] Décret n° 2018-211 du 28 mars 2018 relatif à l'expérimentation de véhicules à délégation de conduite sur les voies publiques [Decree No. 2018-211 of 28 March 2018 Regarding Experimentation of Delegated Driving Vehicles on Public Roads], art. 9, https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000036750342&dateTexte=&categorieLien=id, *archived at* https://perma.cc/JF4J-4U3A.

[140] *Presentation and Position of France*, MISSION PERMANENTE DE LA FRANCE AUPRÈS DE LA CONFÉRENCE DU DÉSARMEMENT À GENÈVE [PERMANENT REPRESENTATION OF FRANCE TO THE CONFERENCE ON DISARMAMENT IN GENEVA] (Aug. 3, 2016), https://cd-geneve.delegfrance.org/Presentation-and-position-of-France-1160, *archived at* https://perma.cc/6XD3-U82R.

[141] Nicholas Thompson, *Emmanuel Macron Talks to Wired About France's AI Strategy*, WIRED.COM (Mar. 31, 2018), https://www.wired.com/story/emmanuel-macron-talks-to-wired-about-frances-ai-strategy/, *archived at* https://perma.cc/DA6U-J2F8.

[142] *Armes : Il faut négocier un traité d'interdiction des armes létales autonomes* [*Weapons: We Must Negotiate a Treaty to Ban Lethal Autonomous Weapons*], HUMAN RIGHTS WATCH (Aug. 27, 2018), https://www.hrw.org/fr/news/2018/08/27/armes-il-faut-negocier-un-traite-dinterdiction-des-armes-letales-autonomes, *archived at* https://perma.cc/JC23-3BFB; CAMPAIGN TO STOP KILLER ROBOTS, REPORT ON ACTIVITIES, *supra* note 74, at 8.

[143] Bundesregierung [Federal Government], Eckpunkte der Bundesregierung für eine Strategie Künstliche Intelligenz [Key Points for a Federal Government Strategy on Artificial Intelligence] (July 18, 2018), at 1, no. 1a, https://www. bmbf.de/files/180718 Eckpunkte_KI-Strategie final Layout.pdf, *archived at* http://perma.cc/8PFK-HP2Z, English translation available *at* https://www.bmwi.de/Redaktion/EN/Downloads/E/key-points-for-federal-government-strategy-on-artificial-intelligence.pdf?__blob=publicationFile&v=4, *archived at* http://perma.cc/5MSP-5NPF.

I. National Agendas and Strategies

In August 2014 and 2016 respectively, the German government published its Digital Agenda 2014–2017, which sets out guiding principles for its digital policy and highlights a number of key fields of action, and the Digital Strategy 2025.[144] Among other things, two big data competence centers were established. In the implementation report, the government points out that artificial intelligence (AI) and machine learning provide the essential tools to deal with big data.[145]

Since 2016, Germany has organized an annual digital summit, which brings together representatives from business, academia, and society and serves as a "central platform for cooperation on shaping a forward-looking policy framework for the digital transformation."[146] The Digital Summit 2018 will focus on AI as one of the "hot topics" of digitalization. According to the website, the Digital Summit 2018 aims to "help Germany to take advantage of the great opportunities offered by artificial intelligence whilst correctly assessing the risks and helping to ensure that human beings stay at the heart of a technically and legally secure and ethically responsible use of AI."[147]

In July 2018, the German government published key points for an Artificial Intelligence Strategy (AI Strategy) (Strategie Künstliche Intelligenz).[148] The complete AI Strategy was published at the end of November 2018 and publicly presented at the Digital Summit 2018 in December.[149] It forms part of the overall digital strategy and the digital agenda. The AI Strategy states that AI technology must be build "upon the basis of European values, such as the inviolability of human dignity, respect for privacy and the principle of equality."[150] Among other things, the government strives to "raise awareness among developers and users of AI technology about the ethical and legal limits

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[144] BUNDESREGIERUNG [FEDERAL GOVERNMENT], DIGITALE AGENDA 2014–2017 [DIGITAL AGENDA 2014–2017] (Aug. 2014), https://www.bmwi.de/Redaktion/DE/Publikationen/Digitale-Welt/digitale-agenda.pdf?__blob=publicationFile&v=3, *archived at* http://perma.cc/6ZAA-DDM3; FEDERAL MINISTRY FOR ECONOMIC AFFAIRS AND ENERGY, DIGITAL STRATEGY 2025 (Apr. 2016), https://www.de.digital/DIGITAL/Redaktion/EN/Publikation/digital-strategy-2025.pdf?__blob=publicationFile&v=9, *archived at* http://perma.cc/93XR-GZJJ.

[145] Bundesregierung [Federal Government], Legislaturbericht. Digitale Agenda 2014–2017 [Legislative Report. Digital Agenda 2014–2017] at 32 (May 2017), http://www.bmi.bund.de/SharedDocs/downloads/DE/publikationen/themen/moderne-verwaltung/legislaturbericht-digitale-agenda-2014-2017.pdf?__blob=publicationFile&v=4, *archived at* http://perma.cc/EQD9-XLJW.

[146] *Digital Summit: Shaping the Digital Transformation Together*, BUNDESMINISTERIUM FÜR WIRTSCHAFT UND ENERGIE [FEDERAL MINISTRY FOR ECONOMIC AFFAIRS AND ENERGY], https://www.de.digital/DIGITAL/Navigation/EN/Digital-Summit/digital-summit.html (last visited Nov. 15, 2018), *archived at* http://perma.cc/A8SG-EBUV.

[147] *Id*.

[148] Key Points for a Federal Government Strategy on Artificial Intelligence, *supra* note 143.

[149] Bundesregierung [Federal Government], Strategie Künstliche Intelligenz der Bundesregierung [AI Strategy of the Federal Government] (Nov. 2018), https://www.ki-strategie-deutschland.de/home.html?file=files/downloads/Nationale_KI-Strategie.pdf (in German), *archived at* http://perma.cc/4WVT-U652.

[150] Key Points for a Federal Government Strategy on Artificial Intelligence, *supra* note 143, no. 1b.

of the use of artificial intelligence and to examine whether the regulatory framework needs to be further developed in order for it to guarantee a high level of legal certainty."[151]

II. Data Ethics Commission

On September 5, 2018, the newly created German Data Ethics Commission held its inaugural meeting.[152] The Data Ethics Commission is composed of sixteen experts from the fields of medicine, law, computer science, statistics, economics, theology, ethics, and journalism. It is independent, but receives organizational support from the Federal Ministry of the Interior, Building and Community (BMI) and the Federal Ministry of Justice and Consumer Protection (BMJV). The Commission is tasked with proposing ethical guidelines for data policy, algorithms, artificial intelligence, and digital innovation, and providing recommendations and regulatory proposals to the German government.[153]

With regard to the German government's AI Strategy, the Data Ethics Commission recommended adding one additional objective and one additional area of action.[154] It suggested including "upholding the ethical and legal principles based on our liberal democracy throughout the entire process of developing and applying artificial intelligence" and "promoting the ability of individuals and society as a whole to understand and reflect critically in the information society."[155]

III. Autonomous Vehicles

On December 13, 2016, an act implementing an amendment to the Vienna Convention on Road Traffic, an international treaty, entered into force in Germany, which allowed the transfer of driving tasks to vehicles themselves.[156] This amendment to the Vienna Convention concerns technical requirements for automated driving systems. Furthermore, in June 2017, Germany amended its Road Traffic Act to allow drivers to transfer control of the vehicle to highly or fully

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[151] *Id.* no. 1l.

[152] Press Release, Federal Ministry of the Interior, Building, and Community [BMI], Data Ethics Commission Goes to Work (Sept. 5, 2018), https://www.bmi.bund.de/SharedDocs/pressemitteilungen/EN/2018/data-ethics-commission. html, *archived at* http://perma.cc/P9ZJ-MNNM.

[153] BMI & BMJV, THE FEDERAL GOVERNMENT'S KEY QUESTIONS TO THE DATA ETHICS COMMISSION (June 5, 2018), https://www.bmi.bund.de/SharedDocs/downloads/EN/themen/it-digital-policy/key-questions-Data-Ethics-commission.pdf?__blob=publicationFile&v=4, *archived at* http://perma.cc/H97L-G7BB.

[154] Data Ethics Commission, Recommendations of the Data Ethics Commission for the Federal Government's Strategy on Artificial Intelligence (Oct. 9, 2018), https://www.bmi.bund.de/SharedDocs/downloads/EN/themen/it-digital-policy/recommendations-data-ethics-commission.pdf?__blob=publicationFile&v=3, *archived at* http://perma.cc/7J6U-KARU.

[155] *Id.* at 3 & 4.

[156] Gesetz zur Änderung der Artikel 8 und 39 des Übereinkommens vom 8. November 1968 über den Straßenverkehr [Act to Amend Articles 8 and 39 of the Convention on Road Traffic of November 8, 1968], Dec. 7, 2016, BUNDESGESETZBLATT [BGBL.] [FEDERAL LAW GAZETTE] II at 1306, http://www.bgbl.de/xaver/bgbl/start.xav? startbk=Bundesanzeiger_BGBl&jumpTo=bgbl216s1306.pdf, *archived at* http://perma.cc/Y6GG-TY4S; Convention on Road Traffic, Nov. 8, 1968, 1042 U.N.T.S. 15705, https://www.unece.org/fileadmin/DAM/trans/conventn/Conv_road_traffic_EN.pdf, *archived at* http://perma.cc/E9U8-PSKB.

automated driving systems and for those vehicles to be used on public roads.[157] The driver remains obligated to take over the driving functions from the automated driving system without undue delay if the driving system tells him to do so or if the driver realizes or should have realized that the conditions for using an automated driving system are no longer fulfilled.[158] In addition, a "black box" in the car must record whether the vehicle is controlled by the driver or by the driving system.[159] The amendment also raised the maximum amount that a victim is allowed to recover for driving accidents involving such automated driving systems to €10 million (about US$11.3 million) for personal injury or death and to €2 million (about US$2.3 million) for property damage.[160]

In addition, an Ethics Commission on Automated and Connected Driving was set up by the German Federal Minister of Transport and Digital Infrastructure.[161] The Ethics Commission is made up of fourteen academics and experts from ethics, law, and technology. In August 2017, it published its report, which sets out twenty ethical guidelines for the programming of automated driving systems with a focus on safety, human dignity, personal freedom of choice, and data autonomy.[162] Guideline number 4, for example, states that

> [t]he purpose of all governmental and political regulatory decisions is thus to promote the free development and the protection of individuals. In a free society, the way in which technology is statutorily fleshed out is such that a balance is struck between maximum personal freedom of choice in a general regime of development and the freedom of others and their safety.[163]

IV. Lethal Autonomous Weapon Systems

The German government in its coalition agreement stated that it "rejects autonomous weapon systems devoid of human control" and called for a global ban.[164] At the meeting of the GGE on

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[157] Achtes Gesetz zur Änderung des Straßenverkehrsgesetzes [Eighth Act to Amend the Road Traffic Act], June 16, 2017, BGBL. I at 1648, http://www.bgbl.de/xaver/bgbl/start.xav?startbk=Bundesanzeiger_BGBl&jumpTo=bgbl117s1648.pdf, *archived at* http://perma.cc/4DJK-SKMU; Straßenverkehrsgesetz [StVG] [Road Traffic Act], Mar. 5, 2003, BGBL. I at 310, 919, as amended, § 1a, http://www.gesetze-im-internet.de/stvg/StVG.pdf, *archived at* http://perma.cc/25XG-7BYQ.

[158] Road Traffic Act, § 1b.

[159] *Id*. § 63a.

[160] *Id*. § 12, para. 1.

[161] Press Release, Federal Ministry of Transport and Digital Infrastructure [BMVI], Ethics Commission on Automated Driving Presents Report (Aug. 28, 2017), https://www.bmvi.de/SharedDocs/EN/PressRelease/2017/084-ethic-commission-report-automated-driving.html, *archived at* http://perma.cc/RLQ8-EWLL.

[162] BMVI, ETHICS COMMISSION. AUTOMATED AND CONNECTED DRIVING. REPORT (June 2017), https://www.bmvi.de/SharedDocs/EN/publications/report-ethics-commission.pdf?__blob=publicationFile, *archived at* http://perma.cc/C3BK-R5BA.

[163] *Id*. at 10.

[164] Ein neuer Aufbruch für Europa. Eine neue Dynamik für Deutschland. Ein neuer Zusammenhalt für unser Land. Koalitionsvertrag zwischen CDU, CSU und SPD. 19. Legislaturperiode [A New Departure for Europe. A New Dynamic for Germany. A New Solidarity for Our Country. Coalition Agreement between CDU, CSU, and SPD.

LAWS it proposed, together with France, to adopt a political declaration to "affirm that State parties share the conviction that humans should continue to be able to make ultimate decisions with regard to the use of lethal force and should continue to exert sufficient control over lethal weapons systems they use."[165]

Hungary

I. AI Coalition

The Hungary Ministry of Information and Technology announced the establishment of the Artificial Intelligence Coalition on October 9, 2018.[166] The Coalition is comprised of seventy members—representatives of Hungarian and international companies, universities, scientific workshops, and professional and administrative organizations. The goals of the coalition are to

- create the framework for cooperation in the AI area;
- serve as a reference point for the international AI community; and
- define the directions and the framework for AI-based development.[167]

The Coalition also aims to contribute to the development of an AI strategy, including assessing the socioeconomic impacts of AI.[168]

Hungary has not yet enacted any AI-related regulations.

II. Autonomous Vehicles

On October 31, 2018, Hungary's Minister of Transportation announced that Hungary was a leader in research and development of infrastructure for autonomous driving cars in Europe. The Minister also mentioned that Hungary is developing a "globally unique" test environment, which includes a self-driving vehicle test track in Zalaegerszeg, in western Hungary.[169]

19th Legislative Period], at 147, https://www.cdu.de/system/tdf/media/dokumente/koalitionsvertrag_2018.pdf?file=1, *archived at* http://perma.cc/WB46-7KXU.

[165] Meeting of the Group of Governmental Experts on Lethal Autonomous Weapons Systems. Statement by France and Germany (under Agenda Item "General Exchange of Views") (Apr. 9–13, 2018), https://www.unog.ch/80256EDD006B8954/(httpAssets)/895931D082ECE219C12582720056F12F/$file/2018_LAWSGeneralExchange_Germany-France.pdf, *archived at* http://perma.cc/2FQB-W8FX.

[166] Press Release, Ministry of Information and Technology, Megalakult a Mesterséges Intelligencia Koalíció [The Artificial Intelligence Coalition was Formed] (Oct. 9, 2018), http://www.kormany.hu/hu/innovacios-es-technologiai-miniszterium/hirek/megalakult-a-mesterseges-intelligencia-koalicio, *archived at* https://perma.cc/4D3E-HEZJ.

[167] *Id.*

[168] *Id.*

[169] *Hungary Is a European Hub for R&D of Self-driving Cars*, ABOUT HUNGARY (Oct. 31, 2018), http://aboutHungary.hu/news-in-brief/hungary-is-a-european-hub-for-rd-of-self-driving-cars/, *archived at* https://perma.cc/L6BG-KG93.

Iceland

I. General

The Icelandic Prime Minister addressed the issue of AI at the Global Positive Forum in 2018, stating that it is important that AI serve all and not just the few.[170] Iceland is also the home to an independent institute that focuses on AI, the Icelandic Institute for Intelligent Machines (IIIM/Vitvélastofnun Íslands).[171] The Institute has issued a recommended ethics policy to be used when conducting research and development on AI.[172]

As noted above, the Nordic countries have also joined together in a number of collaborative responses to AI, including together with the Baltic States.[173]

II. Autonomous Vehicles

In 2016, the Icelandic Road and Coastal Administration (Vegagerðin) issued a report on self-driving cars in Iceland.[174] It concluded that the greatest variable risk in connection with self-driving cars in Iceland is the Icelandic weather.[175] At the time of publication there had been no convincing technological solutions to the risks associated with the weather.[176] Iceland's readiness to adopt autonomous vehicles has also been reviewed by the European Commission,[177] which concluded that Icelandic weather was a problem and that the Icelandic infrastructure might need

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[170] Prime Minister's Address at Global Positive Forum "Iceland: A Positive Model in Action," GOVERNMENT OFFICES OF ICELAND (Nov. 20, 2018), https://www.government.is/news/article/2018/11/20/Prime-Ministers-address-at-Global-Positive-Forum-Iceland-a-positive-model-in-action-/, *archived at* https://perma.cc/XY9H-N39H.

[171] IIIM, http://www.iiim.is/, *archived at* https://perma.cc/5WY8-J3W6.

[172] IIIM Ethics Policy, ICELANDIC INSTITUTE FOR INTELLIGENT MACHINES, http://www.iiim.is/ethics-policy/3/ (last visited Dec. 21, 2018), *archived at* https://perma.cc/9XHQ-P4EA.

[173] Declaration, Nordic Council of Ministers & Government of Sweden, AI in the Nordic-Baltic Region, May 14, 2018, https://www.regeringen.se/49a602/globalassets/regeringen/dokument/naringsdepartementet/20180514_nmr_deklaration-slutlig-webb.pdf, *archived at* https://perma.cc/RT92-BWN7; Declaration, Nordic Council of Ministers for Digitalization, The Nordic-Baltic Region: A Digital Frontrunner (Apr. 25, 2017), https://www.norden.org/en/declaration/nordic-baltic-region-digital-frontrunner, *archived at* https://perma.cc/SUL2-XZT4; Press Release, Regeringskansliet, Sverige ska leda AI-samarbete i Norden och Baltikum (May 14, 2018), https://www.regeringen.se/pressmeddelanden/2018/05/sverige-ska-leda-ai-samarbete-i-norden-och-baltikum/, *archived at* https://perma.cc/6FPK-DSSB.

[174] SJÁLFAKANDI BÍLAR, RÝNI AÐSTÆÐNA Á ÍSLANDI, VEGAGERÐIN (Jan. 2016), https://trimis.ec.europa.eu/sites/default/files/project/documents/Sj%C3%A1lfakandi%20b%C3%ADlar.pdf, *archived at* https://perma.cc/7S5S-HXQV.

[175] *Id*. at ¶ 5.2.

[176] *Id*.

[177] *Readiness Assessment for Autonomous Vehicles in Iceland*, EUROPEAN COMMISSION, https://trimis.ec.europa.eu/project/readiness-assessment-autonomous-vehicles-iceland (last visited Dec. 18, 2018), *archived at* https://perma.cc/X98F-LYPG.

to be altered to accommodate autonomous vehicles.[178] It was further suggested that autonomous testing by Volvo conducted in Gothenburg should be followed closely.[179]

III. Lethal Autonomous Weapons Systems

Iceland does not have an active military. The Icelandic Parliament passed a resolution in 2016 to work towards the ban of LAWS.[180]

Ireland

Ireland has been referred to multiple times in news reports as the "AI Island."[181] The emergence of Ireland as a hub for the development of AI technology appears to be a natural evolution of the booming technology industry that is already established in the country, where several major technology businesses have their headquarters. Reports have noted that "much of Ireland's prowess in AI in recent years is down to the maturing and upskilling of tech companies in Ireland,"[182] rather than to the development of a strategy aiming to encourage the development of the AI industry.

Ireland signed the EU Declaration on Artificial Intelligence on April 10, 2018. While there is currently no strategy solely dedicated to AI, Ireland notes that the Enterprise Strategy will cover developments in AI, and it revised its ICT Research Priority Areas for the period 2018–2023 to include AI.[183]

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[178] *Id*. (under the "Results" tab).

[179] *Id*.

[180] Þingsályktun um stuðning Íslands við að koma á alþjóðlegu banni við framleiðslu og beitingu sjálfvirkra og sjálfstýrðra vígvéla [] (Þingskjal 1486 — 68. mál. Nr. 45/145), https://www.althingi.is/altext/145/s/1486.html, *archived at* https://perma.cc/GTG7-EZR8; *see also* Arnhildur Hálfdánardóttir, *Ísland beiti sér gegn drápsvélum*, RUV (2015), http://www.ruv.is/frett/island-beiti-ser-gegn-drapsvelum, *archived at* https://perma.cc/AHK4-LDQS.

[181] John Kennedy, *Why Ireland is the AI Island*, SILICON REPUBLIC (Oct. 3, 2017), https://www.siliconrepublic.com/machines/ai-island-ireland-ida-infographic, *archived at* https://perma.cc/L3VW-QCEQ.

[182] *Id*. *See also* Chris Horn, *Ireland Needs a National Strategy for Artificial Intelligence*, THE IRISH TIMES (June 28, 2018), https://www.irishtimes.com/business/innovation/ireland-needs-a-national-strategy-for-artificial-intelligence-1.3545739, *archived at* https://perma.cc/N9YP-UX7E.

[183] *Minister Breen to Sign EU Declaration on Artificial Intelligence Aimed at Harnessing Opportunities for Ireland in the Sector*, DEPARTMENT OF BUSINESS, ENTERPRISE AND INNOVATION (Apr. 10, 2018), https://dbei.gov.ie/en/News-And-Events/Department-News/2018/April/10042018.html, *archived at* https://perma.cc/9TR3-S26N.

Italy

I. AI in Italy

While other developed countries have a large number of startups exploring AI projects (e.g. as of April 2018, the US had 1,393, EU 769, China 383, and Israel 362), Italy reportedly has only twenty-two such initiatives.[184] At the EU level, AI projects are being developed in the energy, automotive, construction, agriculture, public administration, and infrastructure areas, among others. In this context, AI experts in Italy have highlighted the need for the country to deepen its commitment to pan-European AI initiatives by creating or diversifying government, social, and investment programs that would allow access to the larger EU market for Italy-based AI projects.[185] Also, experts note that Italy should put into place stronger conditions to attract foreign AI researchers and entrepreneurs.[186]

In July 2018, a group of higher education institutions created the Artificial Intelligence and Intelligent Systems Lab, with the aim of strengthening the country's "basic and applied research in AI, support the country's ICT industry by promoting technology transfer from research to entrepreneurship, and promote the adoption of AI solutions in the public administration."[187]

In addition, the Italian Association for Artificial Intelligence, established in 1988, has about nine hundred members from academia, the government, and private companies, and holds an annual conference.[188] The Association's areas of work are knowledge representation and reasoning, machine learning, deep learning, optimization, planning, ontologies, robotics, natural language processing, and multi-agent systems.[189] In particular, the Association has favored projects aimed at

- promoting innovative procurement to integrate AI solutions in public services,
- creating pilot projects for the use of AI in the public sector,
- fostering research and education, and
- creating synergies with research institutions to promote the development of AI solutions for the public administration.[190]

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[184] Netti Enrico, *Intelligenza Artificiale, Europa Indietro* [*Artificial Intelligence, Europe Back*], IL SOLE 24 ORE (July 10, 2018), https://www.ilsole24ore.com/art/tecnologie/2018-07-10/intelligenza-artificiale-europa-indietro-112436.shtml, *archived at* https://perma.cc/A4JJ-883M.

[185] *Id*.

[186] *Id*.

[187] Tim Dutton, *An Overview of National AI Strategies*, MEDIUM (July 13, 2018), https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd, *archived at* https://perma.cc/56DX-7CGD.

[188] EUROPEAN COMMISSION, THE EUROPEAN ARTIFICIAL INTELLIGENCE LANDSCAPE (Apr. 18, 2018), https://ec.europa.eu/digital-single-market/en/news/european-artificial-intelligence-landscape, *archived at* https://perma.cc/WPE4-U8MH.

[189] *Id.* at 3.

[190] *Id.* at 17.

II. White Book on AI

In March 2018, the Agency for Digital Italy published a White Book on Artificial Intelligence that describes the current status of AI in Italy, calls on all stakeholders to improve access to AI in Europe and Italy, proposes a new common culture for innovation in public services, and sets forth challenges related to AI for the Three-Year Plan for Information Technology in the Public Administration, published in 2017.[191] These challenges include

- potential areas of application of AI initiatives;
- ethical and technological challenges;
- AI competency of government agencies;
- data storage and sharing;
- development of an appropriate legal framework for AI; and
- promotion of key principles for advancing AI initiatives, including human dignity and equality.[192]

In particular, the White Book states the government's interest in facilitating the adoption of AI strategies and approaches at public agencies in order to provide the general public with faster and more efficient services in, among others, the areas of public health, education, the judicial system, and public security.[193]

The White Book recognizes the need to update the legal and regulatory framework for AI in Italy, balancing public and private interests, as well as abiding by the principle of transparency of administrative acts, protection of privacy and copyright, fostering accountability, and establishing an effective system of social control for the protection of the fundamental rights of the person.[194]

The White Book includes ten recommendations for consideration by the government, including the creation of a "National Competence Center and a Trans-disciplinary Center on AI," a national platform to promote the collection of annotated data, and measures to disseminate AI-related skills through the public administration.[195]

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[191] AGENZIA PER L'ITALIA DIGITALE [AGENCY FOR DIGITAL ITALY], LIBRO BIANCO SULL'INTELLIGENZA ARTIFICIALE AL SERVIZIO DEL CITTADINO [WHITE BOOK ON ARTIFICIAL INTELLIGENCE AT THE SERVICE OF THE CITIZEN] (Mar. 2018), https://ia.italia.it/assets/librobianco.pdf, *archived at* https://perma.cc/R8HM-LABV.

[192] *Id.*

[193] *Id.* at 9.

[194] *Id.* at 11.

[195] Dutton, *supra* note 187. *See also* LIBRO BIANCO SULL'INTELLIGENZA ARTIFICIALE AL SERVIZIO DEL CITTADINO *supra* note 191, at 72–74.

III. Development of a National AI Strategy

On September 13, 2018, the Italian government published a call for expressions of interest to become part of a group of high-level experts that will prepare a National Strategy on AI (the Group).[196] The Group will be entrusted with the preparation of the National Strategy, with the aim of "developing policies and tools on the various issues related to the development and adoption of IA [AI] systems," focusing on the following objectives:

- Improving research and coordination in the field of AI
- Encouraging public and private investment in AI
- Attracting talent and entrepreneurial initiatives in the field of AI
- Encouraging the development of the data-economy, with particular focus on the circulation of non-personal data according to the highest standards of interoperability and cybersecurity
- Reviewing the existing legislative and regulatory framework applicable to products and services related to AI
- Analyzing and evaluating the socioeconomic impacts likely to be caused by the widespread adoption of AI-based systems, and elaborating on the tools to mitigate these impacts[197]

The call for expressions of interest in becoming a member of the Group states that the National Strategy will be the subject of public consultation.[198]

IV. Autonomous Vehicles

Concerning self-driving cars in Italy, a Ministerial Decree of 2018[199] provides that the experimentation or testing of autonomous vehicles on a protected site or public streets must be performed by a human driver (supervisor) possessing certain specific qualifications, including among others, having possessed a driver's license for at least five years concerning the specific vehicle under testing, and other requirements related to accreditation in another EU country and

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[196] Press Release, Ministero dello Sviluppo Economico [Ministry for Economic Development], Intelligenza Artificiale: Call per Esperti [Artificial Intelligence: Call for Experts] (Sept. 13, 2018), https://www.sviluppoeconomico.gov.it/index.php/it/intelligenza-artificiale-call, *archived at* https://perma.cc/N6V6-TVLK.

[197] *Id*.

[198] Ministero dello Sviluppo Economico, Avviso Pubblico per la Manifestazione d'Interesse per la Selezione di 30 Componenti del Gruppo di Esperti di Alto Livello per l'Elaborazione della Strategia Nazionale sull'Intelligenza Artificiale [Public Call for the Expression of Interest for the Selection of 30 Members of the Group of High-Level Experts for the Preparation of the National Strategy of Artificial Intelligence] (Sept. 13, 2018), http://www.sviluppoeconomico.gov.it/images/stories/documenti/Avviso-manifestazione-interesse-ia-2018-ultima-versione.pdf, *archived at* https://perma.cc/H4WF-NEFZ.

[199] Decreto 28 Febbraio 2018 Ministero delle Infrastrutture e dei Trasporti, Modalita' Attuative e Strumenti Operativi della Sperimentazione su Strada delle Soluzioni di Smart Road e di Guida Connessa e Automatica [Decree of February 28, 2018, Ministry of Infrastructure and Transportation, Implementing Modalities and Operative Tools of Road Testing of Solutions on Smart Road and of Connected and Automatic Guide], GAZZETTA UFFICIALE [G.U.] [OFFICIAL GAZETTE] No. 90 (Apr. 18, 2018), http://www.gazzettaufficiale.it/eli/id/2018/04/18/18A02619/sg, *archived at* https://perma.cc/GZ7H-7GEQ.

training in a third country where such vehicles operate for a specified minimum number of miles.[200] In particular, the regulations require that the human driver be in a condition to promptly switch between the automatic and manual operation of the vehicle, and vice versa.[201]

Jersey

The government of Jersey has stated that AI poses both a threat and opportunity to its jurisdiction, particularly with regard to its significant financial sector. Responsibility for digital matters lies with the Economic Development Minister, and the government has stated that it is "providing increased focus on the tech industry."[202]

Jersey has not issued a large volume of reports regarding the use of AI within its boundaries. The Strategic Review by Jersey Finance considered the use of AI within the financial services sector, but did not cover developments in depth.[203]

Kazakhstan

On January 31, 2017, the President of Kazakhstan announced five priority points for the third stage of the country's modernization.[204] The first point of the program envisages accelerated technological modernization. The following steps are planned under this point:

- Cultivate new industries created with the use of digital technologies and develop the country's prospective sectors such as 3D-printing, e-commerce, mobile banking, and digital services
- Significantly increase the productivity of labor through widespread introduction of automation, robotics, AI, and exchange of "big data"[205]

The realization of this agenda will be aided by the implementation of the following projects in the AI sector:

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[200] *Id*. art. 10(1).

[201] *Id*. art. 10(2).

[202] *Political Responsibility for Digital Industry*, GOV.JE (Sept. 18, 2018), https://www.gov.je/news/2018/pages/politicaldigital.aspx, *archived at* https://perma.cc/2S9D-V9CQ.

[203] JERSEY FINANCE, FOCUSING ON THE FUTURE: STRATEGIC REVIEW REFRESH 2017 (2017), https://www.jerseyfinance.je/media/PDF-Publications/Jersey-Finance-Strategic-Review.pdf, *archived at* https://perma.cc/66TN-AT2F. *See also* Written Question to the Chief Minister by Deputy M.R. Higgins of St. Helier, July 18, 2017, https://statesassembly.gov.je/assemblyquestions/2017/(437)dep higgins to cm re studies into the impact of artificial intelligence and fintech on employment in financial services.pdf, *archived at* https://perma.cc/EM4R-53UY.

[204] Speech, President Nursultan Nazarbayev, State of the Nation Address, Third Modernization of Kazakhstan: Global Competitiveness (Jan. 31, 2017), http://www.akorda.kz/en/addresses/addresses_of_president/the-president-of-kazakhstan-nursultan-nazarbayevs-address-to-the-nation-of-kazakhstan-january-31-2017, *archived at* https://perma.cc/L8ZB-5R6W.

[205] *Id*.

- Creation of an international technopark of IT start-ups (Astana Hub)
- Creation of model factories based on Industry 4.0 technologies
- Development of open platforms (Open API), Big Data, and AI
- Development of telecommunications infrastructure, including broadband internet access
- Implementation of Smart City components[206]

It is envisaged that the following IT and research centers will be the flagships for the development of AI in Kazakhstan:

- Nazarbayev University
- Astana International Financial Centre
- Astana International Technology Park of IT Startups

Additionally, Alatau Park of Innovative Technologies will undergo substantial reforms.[207]

Latvia

Following the successful implementation of an AI-powered virtual assistant pilot project by the Latvian Enterprise Register, in June 2018 the government of Latvia announced plans to enhance the integration of AI in the e-services provided by government agencies. According to the Ministry of Environment and Regional Development, the government intends to develop a uniform AI platform for the provision of e-services in the public administration sector.[208]

Lithuania

I. Innovation Program

Lithuania does not have stand-alone AI strategy or legislation. However, some of the elements of AI can be found in the Resolution of the Government of 2013 on the Lithuanian Innovation Development Program for 2014–2020.[209] The goal of the Program is to "[mobilize] the state

[206] *Digital Kazakhstan: Current State of Affairs and Prospects for Future*, PRIME MINISTER OF KAZAKHSTAN (Mar. 10, 2018), https://primeminister.kz/en/news/all/tsifrovoi-kazahstan-realii-i-perspektivi-16155, *archived at* https://perma.cc/Z89U-2UWU.

[207] *Id.*

[208] *EUR 990,000 to be Spent on Integration of AI in Public e-Services in Latvia*, THE BALTIC COURSE (June 14, 2018), http://www.baltic-course.com/eng/good_for_business/?doc=140741, *archived at* https://perma.cc/YM65-UAC4.

[209] THE LITHUANIAN INNOVATION DEVELOPMENT PROGRAMME 2014–2020, Approved by Resolution of of the Government of the Republic of Lithuania on December 18, 2013, http://eimin.lrv.lt/uploads/eimin/documents/files/Lietuvos inovacijų plėtros programa_patvirtinta 2013 12 18_EN.pdf, *archived at* https://perma.cc/PC43-7H9Q.

resources for the improvement of Lithuania's innovativeness and development of competitive economy based on high level knowledge, high technologies, qualified human resources and smart specialisation."

II. Autonomous Vehicles

On December 7, 2017, Lithuania adopted a law that allows operation of self-driving cars without a driver being present. According to the Minister of Economy, "[t]he main goal of the law is to allow such a vehicle to come to Lithuania and be tested in Lithuania."[210]

Luxembourg

Luxembourg aims to fully participate in the development of AI, as illustrated by the Grand Duchy's cooperation with France and Germany for testing autonomous vehicles,[211] and its partnership with the technology firm Nvidia for training and education in AI.[212] Luxembourg also participates in the International Organization for Standardization's technical committee on AI.[213]

Malta

Malta recently established a task force to create a national strategy for AI, aiming to push Malta forward as a leading nation in the development of this technology. According to the Maltese Parliamentary Secretary for Financial Services, Digital Economy and Innovation, the country's objectives are

> to dialogue with stakeholders, to build awareness of the key topics and issues that will inform a national AI Framework, consult on a policy that considers for ethically aligned, transparent and socially responsible AI, identify regulatory and fiscal measures to

[210] *The Lithuanian Parliament on Thursday Opened Up the Country's Roads to Driverless Autonomous Vehicles*, DELFI (Dec. 8, 2017), https://en.delfi.lt/lithuania/politics/parliament-opens-lithuanias-roads-to-driverless-autonomous-vehicles.d?id=76583023, *archived at* https://perma.cc/NV4F-NZFZ.

[211] FRANCO-GERMAN-LUXEMBURGISH COOPERATION ON AUTOMATED AND CONNECTED DRIVING: CONCEPT FOR THE CROSS-BORDER DIGITAL TEST BED (May 8, 2018), https://www.ecologique-solidaire.gouv.fr/sites/default/files/2018-05-08 Concept Digital Test Bed GER FRA LUX.pdf, *archived at* https://perma.cc/BK6Y-9HQT.

[212] Jonas Mercier, *Le Luxembourg s'allie à Nvidia autour de l'IA* [*Luxembourg Allies Itself with Nvidia on AI*], PAPERJAM (July 4, 2018), http://paperjam.lu/news/le-luxembourg-sallie-a-nvidia-autour-de-lia, *archived at* https://perma.cc/G5J7-4833.

[213] *Le Luxembourg rejoint la communauté internationale des experts en intelligence artificielle* [*Luxembourg Joins the International Community of Experts on Artificial Intelligence*], PORTAIL-QUALITE.LU (Jan. 11, 2018), https://portail-qualite.public.lu/fr/actualites/normes-normalisation/2018/lux-experts-intelligence-artificielle.html, *archived at* https://perma.cc/SWX8-QCDN; *Participation: ISO/IEC JTC 1/SC 42 Artificial Intelligence*, INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, https://www.iso.org/committee/6794475.html?view=participation (last visited Nov. 23, 2018), *archived at* https://perma.cc/4W7M-SZDY.

> strengthen Malta's appeal as a hub for foreign investment in this sector, and identify the underlying skill base and infrastructure needed to support AI.[214]

The task force is under the responsibility of the Malta Digital Innovation Authority. In addition to developing a national strategy, the task force will also draft regulations to govern the development of AI, and is establishing a pilot program to consider a citizenship test for robots.[215]

Netherlands[216]

I. Government Statements and Actions

Following proposals from several ministers, the Dutch government decided to "commission more research into the societal effects of technological developments and to establish an inter-ministerial working group to study this issue."[217] Dutch Minister of the Interior and Kingdom Relations Kajsa Ollongren has also requested a legal study into how the use of algorithms may affect human rights.[218] A group of experts will evaluate the results and propose possible solutions. Furthermore, the Dutch government plans to study decision-making algorithms in general and how existing legal frameworks apply to them.[219]

The Dutch government also plans to request an advisory opinion from the Scientific Council for Government Policy (WRR) on the impact of AI on public values.[220] Finally, the Council for Public Administration (ROB) was instructed to "investigate the opportunities and threats presented by digitalization for the functioning of modern democratic societies and to set out a framework for action for public administration."[221]

II. Dutch Financial Market Authority

On March 15, 2018, the Dutch Financial Market Authority (*Autoriteit Financiële Markten*, AFM) released two publications, one on automated advisory services for various financial products

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[214] Press Release, Parliamentary Secretariat for Financial Services, Digital Economy and Innovation, Launch of Malta.ai – the Maltese Government's Vision on Artificial Intelligence (Nov. 1, 2018), https://www.gov.mt/en/Government/Press%20Releases/Pages/2018/November/01/PR182351en.aspx, *archived at* https://perma.cc/457C-EUKB.

[215] *Homepage*, MALTA.AI, https://malta.ai/ (last visited Nov. 14, 2018), *archived at* https://perma.cc/8PWK-FKQJ.

[216] At present there are no Law Library of Congress research staff members versed in Dutch. This survey of the law of the Netherlands has been prepared by the author's reliance on practiced legal research methods and on the basis of relevant legal resources, chiefly in English, currently available in the Law Library and online.

[217] Press Release, Government of the Netherlands, Cabinet to Investigate Societal Impact of New Technologies (Mar. 9, 2018), https://www.government.nl/latest/news/2018/03/09/cabinet-to-investigate-societal-impact-of-new-technologies, *archived at* http://perma.cc/HFP4-HJ22.

[218] *Id*.

[219] *Id*.

[220] *Id*.

[221] *Id*.

("robo advice")[222] and the other on automated and semi-automated portfolio management.[223] The two publications clarify how current financial laws and regulations apply to these fields. They point out that the laws do not make a distinction between automated and human financial advice/portfolio management and that the same duty of care standards apply; they are technology neutral. However, the publications highlight a few points that need special attention, in particular the areas of data protection and privacy laws. The AFM also supervises the degree of process, IT control, and quality of the algorithms.[224] Algorithms must be designed in a way to prevent personal preferences and take the client's interests into account.[225] Systems must be tested and monitored on a regular basis.[226]

III. Dutch Police

In August 2018, the police of the East Netherlands announced that it was developing a chatbot named "Wout" to offer people more possibilities to report cases to the police.[227] At the beginning, Wout will only be available on Facebook Messenger and later expand to all kinds of social media services. The chatbot will start out with a selected set of questions and answers, but will be trained to learn from conversations and handle any type of question in the future. It is slated to be launched in the third quarter of 2019.[228]

IV. Autonomous Vehicles

In October 2018, an amendment to the Dutch Road Traffic Act was published in the Official Gazette that allows the experimental use of self-driving vehicles without a human driver present in the car on public roads.[229] Companies must apply for a permit with the Dutch Vehicle Authority (Dienst Wegverkeer, RDW). A permit is issued for three years.[230]

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[222] AFM, THE AFM'S VIEW ON ROBO ADVICE. OPPORTUNITIES, DUTY OF CARE AND POINTS OF ATTENTION (Mar. 15, 2018), https://www.afm.nl/~/profmedia/files/onderwerpen/roboadvies-sav/view-robo-advice.pdf, *archived at* http://perma.cc/23T9-HCP5.

[223] AFM, GUIDANCE ON THE DUTY OF CARE IN (SEMI)AUTOMATED PORTFOLIO MANAGEMENT (Mar. 15, 2018), https://www.afm.nl/~/profmedia/files/onderwerpen/roboadvies-sav/guidance-duty-care.pdf, *archived at* http://perma.cc/L5X8-HY2X.

[224] AFM, THE AFM'S VIEW ON ROBO ADVICE, *supra* note 222, at 23, para. 5.2.

[225] AFM, GUIDANCE, *supra* note 223, at 12, para. 2.1.1.

[226] *Id.* at 13, paras. 2.1.3, 2.1.4.

[227] Pim Lindemann, *Politie Oost-Nederland krijgt hulp van chat-robot Wout* [*The East-Netherlands Police Are Getting Help From Chatbot Wout*], DE GELDERLANDER (Aug. 4, 2018), https://www.gelderlander.nl/home/politie-oost-nederland-krijgt-hulp-van-chat-robot-wout~a3de02a5/, *archived at* http://perma.cc/3TWM-Z7MM.

[228] *Id*.

[229] Wet tot wijziging van de Wegenverkeerswet 1994 in verband met mogelijk maken van experimenten met geautomatiseerde systemen in motorrijtuigen [Act to Amend the Road Traffic Act 1994 in Connection With Making the Experimental Use of Automated Motor Vehicle Systems Possible], Sept. 26, 2018, STAATSBLAD VAN HET KONINKRIJK DER NEDERLANDEN [STB.] [OFFICIAL GAZETTE OF THE KINGDOM OF THE NETHERLANDS] 2018, no. 347, https://zoek.officielebekendmakingen.nl/stb-2018-347.html, *archived at* http://perma.cc/7DT5-B4J9. The Road Traffic Act has not yet been updated.

[230] *Id*. art. 149ab, para. 1.

V. Lethal Autonomous Weapon Systems

In April 2015, the Dutch Ministers of Foreign Affairs and Defense requested an advisory report on legal, ethical, and policy issues with regard to LAWS from the Advisory Council on International Affairs (AIV) and the Advisory Committee on Issues of Public International Law (CAVV).[231] The report, which was published in October 2015, concluded that meaningful human control is required in the deployment of autonomous weapon systems. The Dutch government concurs with this view.[232] It therefore proposed, among other things, to establish a GGE at the 2015 annual meeting of the Convention on Certain Conventional Weapons (CCW) to study this issue.[233] The Dutch government emphasizes that it rejects the development of fully autonomous weapon systems without any human control.[234]

Norway

I. National Agenda

Norway has adopted a national digital agenda, which includes a focus on AI investments.[235] In the agenda the government presents how Norway can best utilize the possibilities of AI and modern technology.[236] In addition Norway signed onto the EU collaboration on AI as part of Digital Day 2018.[237] Norwegian government agencies also use AI in their operations.[238]

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[231] AIV & CAVV, Autonomous Weapon Systems: The Need for Meaningful Human Control (AIV Report No. 97, CAVV Report No. 26, Oct. 2015), https://aiv-advies.nl/download/606cb3b1-a800-4f8a-936f-af61ac991dd0.pdf, *archived at* http://perma.cc/55UL-PKXX.

[232] *Government Response to AIV/CAVV Advisory Report No. 97, Autonomous Weapon Systems: The Need for Meaningful Human Control*, AIV (Mar. 2, 2016), https://aiv-advies.nl/8gr/publications/advisory-reports/autonomous-weapon-systems-the-need-for-meaningful-human-control#government-responses, *archived at* http://perma.cc/J37M-UQ33.

[233] *Id*.

[234] *Id*.

[235] Meldinger til Stortignet [Meld. St.] 27 (2015–2016) Digital Agenda for Norge — IKT for en enklere hverdag og økt produktivitet (Report from Government to Parliament), https://www.regjeringen.no/contentassets/fe3e34b866034b82b9c623c5cec39823/no/pdfs/stm201520160027000dddpdfs.pdf, *archived at* https://perma.cc/6S55-72GZ; *see also* the Norwegian Board of Technology's (Parliamentary Advisor) report on AI and its possible uses in Norway, TEKNOLOGIRÅDET, KUNSTIG INTELLIGENS – MULIGHETER, UTFODRINGER O GEN PLAN FOR NORGE (Sept. 2018), https://teknologiradet.no/wp-content/uploads/sites/105/2018/09/Rapport-Kunstig-intelligens-og-maskinlaering-til-nett.pdf, *archived at* https://perma.cc/6DMR-HT93.

[236] Meld. St. 27 (2015–2016) Digital Agenda for Norge — IKT for en enklere hverdag og økt produktivitet, *supra* note 235, at 11.

[237] Randi Bjørhei, *Europeisk erklæring om kunstig intelligens*, LOVDATA (Apr. 11, 2018), https://lovdata.no/artikkel/europeisk_erklaering_om_kunstig_intelligens/2117, *archived at* https://perma.cc/XSN4-GFPX.

[238] Proposjon til Stortinget [Prop.] 1 S (2018–2019) [Budget Bill for Fiscal Year 2019], https://www.regjeringen.no/contentassets/e166b6e0a392456a9f0e84eecea2472f/no/pdfs/prp201820190001hoddddpdfs.pdf, *archived at* https://perma.cc/E6V4-G3QS.

As noted above, the Nordic countries have also joined together in a number of collaborative responses to AI, including together with the Baltic States.[239]

II. Autonomous Vehicles

The testing of self-driving cars in Norway is regulated by law.[240] The purpose of the law is to enable the testing of self-driving technology while also factoring in traffic safety and privacy protection.[241]

III. Lethal Autonomous Weapons System

Norway has issued a number of statements on LAWS, but has yet to adopt an outright policy.[242] Speaking more generally on LAWS at the Convention on Certain Conventional Weapons meeting in 2016, the Norwegian representative declared that it "is necessary to ensure that the basic rules and principles of international law are upheld."[243]

Poland

I. AI Strategy

Poland's Ministry of Infrastructure and Transport has presented the Operational Program for Digital Poland 2014–2020. [244]The aim of the Program is to strengthen digital foundations for national development, including common "access to a high-speed Internet, effective and user-friendly public e-services and a continuously rising level of digital competences of the society."[245] The Polish government initiated the development of an AI strategy in 2018 in line with the priorities outlined in the Operational Program for Digital Poland. In addition, a roundtable

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[239] Declaration, Nordic Council of Ministers & Government of Sweden, AI in the Nordic-Baltic Region, May 14, 2018, https://www.regeringen.se/49a602/globalassets/regeringen/dokument/naringsdepartementet/20180514_nmr_deklaration-slutlig-webb.pdf, *archived at* https://perma.cc/RT92-BWN7; Declaration, Nordic Council of Ministers for Digitalization, The Nordic-Baltic Region: A Digital Frontrunner (Apr. 25, 2017), https://www.norden.org/en/declaration/nordic-baltic-region-digital-frontrunner, *archived at* https://perma.cc/SUL2-XZT4; Press Release, Regeringskansliet, Sverige ska leda AI-samarbete i Norden och Baltikum (May 14, 2018), https://www.regeringen.se/pressmeddelanden/2018/05/sverige-ska-leda-ai-samarbete-i-norden-och-baltikum/, *archived at* https://perma.cc/6FPK-DSSB.

[240] LOV OM UTPRØVING AV SELVKJØRENDE KJØRETØY [ACT ON TESTING OF SELF-DRIVING VEHICLES] (LOV 2017-12-15-112), https://lovdata.no/dokument/NL/lov/2017-12-15-112, *archived at* https://perma.cc/8CB3-LYBZ.

[241] *Id*. 1 §.

[242] UNOG, CCW Meeting of Experts on Lethal Autonomous Weapons, 13–16 May 2014, General Statement by Norway, http://www.unog.ch/80256EDD006B8954/(httpAssets)/D47349EE647EB6BBC1257CD7005DA52D/$file/Norway_MX_LAWS_2014.pdf (last visited Dec. 21, 2018), *archived at* https://perma.cc/TP8W-UYTT.

[243] *Id*. at 2.

[244] OPERATIONAL PROGRAMME, DIGITAL POLAND 2014–2020, https://www.polskacyfrowa.gov.pl/media/10410/POPC_eng_1632015.pdf, *archived at* https://perma.cc/Y56B-ZFJ5.

[245] *Id*.

discussion regarding AI and the strategy was held with the participation of the Vice-President of the Council of Ministers, the Minister of Science and Higher Education, the Deputy Minister of Digital Affairs, and representatives of the scientific community and supporting institutions, including the director of the National Center for Research and Development.[246] It is anticipated that once the strategy is developed, Polish businesses will be better placed to obtain state and EU funding.[247]

Poland has not yet developed specific legislation to address AI.

II. Autonomous Vehicles

On January 11, 2018, the Polish Sejm adopted the Law on Electromobility and Alternative Fuels.[248] Article 65K of the Law defines autonomous vehicle as "a vehicle, equipped with systems that control the movement of the vehicle and enables its motion without driver intervention, which can take control of the vehicle at any time"[249] The Law also stipulates that conducting research of autonomous vehicles for transit of transportation purposes is allowed, provided that the safety conditions are met and mandatory permits are obtained. [250] A designated stand-by driver must be present in the vehicle during the test drive.[251]

Portugal

I. New General Regulation on Data Protection

As noted in the European Union survey, the European Parliament and the Council of the European Union approved a new general regulation on the protection of individuals with regard to the processing of personal data and on the free movement of such data on April 27, 2016.[252] The regulation was created to protect citizens from the processing of personal data on a large scale by

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[246] Krzysztof Suwar, *Rewolucyjny Plan dla Polski. Powstaje Pierwsza w Kraju Strategia Rozwoju Sztucznej Inteligencji* [*A Revolutionary Plan for Poland. The First Strategy of the Development of Artificial Intelligence is Being Created in Poland*], MONEY.PL (May 21, 2018), https://www.money.pl/gospodarka/wiadomosci/artykul/rewolucyjny-plan-dla-polski-powstaje,205,0,2406605.html, *archived at* https://perma.cc/6PCT-LPEL.

[247] *Poland to Invest in Artificial Intelligence*, POLAND IN (Sept. 6, 2018), https://polandin.com/38866891/poland-to-invest-in-artificial-intelligence, *archived at* https://perma.cc/P7V6-WKZJ.

[248] Ustawa z Dnia 11 Stycznia 2018 r. o Elektromobilności i Paliwach Alternatywnych [Law on Electromobility and Alternative Fuels], http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20180000317/T/D20180317L.pdf, *archived at* https://perma.cc/98YP-3WJU.

[249] *Id*. art. 65K.

[250] *Id*. art. 651.1, 651.2.

[251] *Id*. art. 65n.

[252] Regulation 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation) (GDPR), 2016 O.J. (L 119) 1, http://eur-lex.europa eu/legal-content/EN/TXT/PDF/?uri=CELEX:32016R0679&from=EN, *archived at* https://perma.cc/3BV7-SSER.

large companies and information society services.[253] It entered into force in the European Union on May 25, 2018.[254] Portugal has yet to transpose the new regulation into its domestic legal system.[255]

Portuguese news sources have noted that the new rules should boost consumer and business confidence.[256] With the new general regulation, it becomes possible to ask a company to reveal all the data it has about a person, erase this data, and review some decisions made by software.[257]

Concerns over the protection of digital data and the impact of AI on workers are among the main concerns of several Portuguese companies who would otherwise invest in the area.[258]

II. AI and the Law

Portugal is taking the first steps to use AI in the area of justice.[259] A legal assistance tool adapted to the Portuguese reality that conducts research on the requests made and learns from them will soon be launched in the country.[260] Some have speculated that, in the future, with the use of the same technology, it will be possible to launch a tool that predicts the probability of success of a judicial process with the use of AI for the analysis of a repository of judgments issued by the EU with more than three hundred thousand decisions of the Portuguese High Courts.[261]

III. Health, Urban Mobility, Education, and Land Use

Portugal is using more AI in several projects to analyze data from the public administration in order to find hidden information and create solutions in the areas of health, education, urban mobility, and land use and planning.[262] All initiatives result from cooperation between scientific

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[253] Regulameto Geral de Proteção de Dados – O que Precisa de Saber, PPLWARE (May 25, 2018), https://pplware.sapo.pt/informacao/regulamento-geral-de-protecao-de-dados-o-que-precisa-de-saber/, *archived at* https://perma.cc/4JSL-UFWZ.

[254] *Id.*

[255] *Perguntas Frequentes* (FAQs), COMISSÃO NACIONAL DE PROTECÇÃO DE DADOS, https://www.cnpd.pt/bin/faqs/faqs.htm.

[256] *Id.*

[257] Karla Pequenino, *Investigadores Receiam Impacto de Regras de Privacidade na Inteligência Artificial*, PÚBLICO (May 24, 2018), https://www.publico.pt/2018/05/24/tecnologia/noticia/academicos-receiam-que-novas-regras-de-privacidade-europeias-atrasem-a-inteligencia-artificial-1830138, *archived at* https://perma.cc/FWC2-2WRY.

[258] Karla Pequenino, *Protecção de Dados Preocupa Empresas Portuguesas a Investir em Inteligência Artificial*, PÚBLICO (Oct. 9, 2018), https://www.publico.pt/2018/10/09/tecnologia/noticia/portugal-relatorio-inteligencia-artificial-abaixo-media-europeia-1846720, *archived at* https://perma.cc/CZ87-WQAB.

[259] Mariana Oliveira, *Como a Tecnologia Está a Revolucionar o Mundo do Direito*, PÚBLICO (Nov. 1, 2018), https://www.publico.pt/2018/11/01/sociedade/noticia/justica-artificial-tecnologia-revolucionar-mundo-direito-1849618, *archived at* https://perma.cc/447S-WX6K.

[260] *Id.*

[261] *Id.*

[262] Karla Pequenino, *Governo Financia Inteligência Artificial na Saúde, Mobilidade e Educação*, PÚBLICO (Oct. 24, 2018), https://www.publico.pt/2018/10/24/tecnologia/noticia/governo-inteligencia-artificial-dados-administracao-publica-1848718, *archived at* https://perma.cc/Q2J6-GXEQ.

institutions and entities of the public administration that are being developed under the innovation axis of the National Digital Competencies Initiative, which the government established in 2017 to increase digital skills in the country.[263]

Russia

In 2017, President Putin expressed his opinion that the country that masters AI first will become the "ruler of the world."[264] Russia's efforts in the development of AI infrastructure focus on upgrading the country's capabilities in the area of defense.

I. Action Plan

In March 2018, the Russian Ministry of Defense, Ministry of Education and Science and Russian Academy of Sciences hosted a conference titled Artificial Intelligence—Problems and Their Solutions. The outcome of the conference was a ten-point action plan for the development of AI technologies in Russia[265] that included the following:

1. Establishing a Big Data Consortium with the aim of unifying the efforts of leading scientific, educational, and industrial organizations in creating and implementing AI technologies.

2. Gaining automation expertise: The Academy of Sciences, in conjunction with the Ministry of Defense, Ministry of Education and Science, and the Ministry of Industry and Trade, "should intensify efforts to establish a Fund for Analytical Algorithms and Programs to provide expertise on automated systems" for different purposes.[266]

3. Creating a state system for AI training and education: The Ministry of Education and Science, jointly with the Academy of Sciences and Ministry of Defense, should prepare proposals for the creation of a state system of education and re-education of specialists in the area of AI.

4. Building an AI laboratory at the Era science, technology, and research campus: The Ministry of Defense, jointly with the Federal Agency for Scientific Organizations, Moscow State University, and the Informatics and Development research center, should create a laboratory for AI advanced software and technical solutions at the Era campus in the City of Anapa, where the "military and the private sector can work together on breakthrough technologies such as

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[263] *Id.*

[264] *'Whoever Leads in AI Will Rule the World': Putin to Russian Children on Knowledge Day*, RUSSIA TODAY (Sept. 1, 2017), https://www.rt.com/news/401731-ai-rule-world-putin/, *archived at* https://perma.cc/2ST6-YHDL.

[265] *Konferentsia "Iskusstvenij Intellect: Problemi I Puti Ikh Reshenia" – 2018"* [*Conference: "Artificial Intelligence: Problems and Their Solutions" – 2018*], MINISTRY OF DEFENSE OF RUSSIA, http://mil.ru/conferences/is-intellekt.htm (last visited Nov. 9, 2018), *archived at* https://perma.cc/5BSH-JHFX.

[266] Samuel Bendett, *Here's How the Russian Military Is Organizing to Develop AI*, DEFENSE ONE (July 20, 2018), https://www.defenseone.com/ideas/2018/07/russian-militarys-ai-development-roadmap/149900/, *archived at* https://perma.cc/GEN4-E7RV.

AI, robotics, automation and other fields."[267] The campus is scheduled to be completed in 2020. The Russian military is already sending personnel from its science and technology detachments to start work there.[268]

5. Establishing a National Center for Artificial Intelligence: The Academy of Sciences, jointly with the Foundation for Advanced Research, should prepare a proposal for the creation of the National Center for Artificial Intelligence. The Center would assist in the development of scientific potential, development of innovative infrastructure in the area of AI technologies, and realization of the results of theoretical research and feasible projects in the area of AI.

6. Monitoring global AI development: The Ministry of Defense, jointly with the Ministry of Education and Science, should monitor and assess recent developments and engage in all-encompassing studies in the area of AI.

7. Holding AI war games: The Ministry of Defense should organize and carry out a series of war games with a broad spectrum of scenarios, defining the influence of AI models on the changing character of military operations at different levels—tactical, operational, and strategic.

8. Checking for AI Compliance: The Foundation for Advanced Research, jointly with the Academy of Science, Ministry of Defense, and Federal Agency of Scientific Organizations, should prepare a proposal for creating on the territory of the Russian Federation a system for evaluating the compliance of AI technologies with standards.

9. Discussing AI proposals at domestic military forums: The above-mentioned proposals should be considered by "interested federal executive bodies" during the international military-technical forum "Army—2018" and National Security Week, held in August 2018.

10. Holding an annual AI conference: The Academy of Sciences, Ministry of Defense, and Ministry of Education and Science should hold an annual AI conference.[269]

II. Institutional Arrangements

The Russian Federation has not yet enacted legislation or regulations governing AI. At present, the Ministry of Defense is the main government agency coordinating or setting policy priorities for issues concerning AI. Other relevant government agencies are the Ministry of Education and Science and the Ministry of Industry and Trade. The Academy of Sciences and Moscow State University are the institutional partners of the government in the development of AI technologies.

In 2012, the government enacted a law that created the Foundation for Advanced Research,[270] with the aim of promoting the development and creation of innovative technologies and producing high-

[267] *Id.*

[268] *Id.*

[269] *Id.*

[270] FEDERALJNIJ ZAKON OT 16 OKTJABRJA 2012G, N174-FZ O FONDE PERSPEKTIVNIX ISSLEDOVANIJ [FEDERAL LAW AS OF OCTOBER 16, 2012 N174-RF ABOUT THE FOUNDATION FOR ADVANCED RESEARCH], https://fpi.gov.ru/

tech military products for special and dual use. The Foundation operates under the auspices of the Russian Military-Industrial Commission, which is overseen by the President of the Russian Federation.[271] According the Action Plan, the Foundation acts as a clearing and incubation house for innovative technologies, including those relating to AI.

III. Lethal Autonomous Weapons Systems

In line with the government's approach of strengthening the military through the development of AI technologies, Russia expressed an ambition to develop lethal autonomous weapons. The Head of General Staff of the Russian Army has stated, "[c]ertainly, every military conflict has its own distinctive features. The main features of future conflicts will be the widespread use of high-precision and other types of weapons, including robotic ones. The objects of the economy and the government system of the enemy will be destroyed first."[272] Additionally, Russia, along with the United States, blocked a proposed treaty banning LAWS at a meeting of parties to the Convention on Certain Conventional Weapons.[273] Russia has previously expressed in a written statement its opinion that the following grounds support not having such a ban:

- There is currently no clear definition of LAWS, and "the lack of working samples of such weapons systems remains the main problem in the discussion on LAWS."[274]
- The difficulty of making a clear distinction between civilian and military developments of autonomous systems based on the same technologies.[275]

Consequently, Russia sees the future discussions being focused on harmonization of the basic principles of LAWS along with defining certain concepts with regard to LAWS: "Further work on key aspects of such weapons which relate to the notions of 'autonomy,' 'critical functions,' 'meaningful human control,' 'predictability,' etc., will depend on the definition of LAWS."[276]

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about/documents/federalyniy_zakon_ot_16_oktyabrya_2012_g_n_174_fz_o_fonde_perspektivnih_issledovaniy, *archived at* https://perma.cc/RW7B-EXY8.

[271] *Osnovnaja Informacija* [*General Information*], FOND PERSPECITVNIX ISSLEDOVANIJ [FOUNDATION FOR ADVANCED RESEARCH], https://fpi.gov.ru/about/obshtaya_informatsiya (last visited Dec. 11, 2018), *archived at* https://perma.cc/NX5F-7KNH.

[272] *Ispol'zovanie Robotov i Shirokoe Primenenie Vysokotochnogo Oruzhija Stanut Osnovnymi Osobennostjami Vojn Budushhego – Nachal'nik Genshtaba Rossijskoj Armii* [*The Use of Robots and the Widespread Use of Precision Weapons Will Be the Main Features of Future Wars – Chief of the General Staff of the Russian Army*], INTERFAKS, ABN, AGENSTVO BOENNIX NOVOSTEJ [INTERFAX, MNA, MILITARY NEWS AGENCY] (Mar. 24, 2018), http://www.militarynews.ru/ story.asp?rid=1&nid=476975, *archived at* https://perma.cc/B2VZ-D5EE.

[273] *Handful of Countries – Including the US and Russia – Hamper Discussions to Ban Killer Robots at UN*, FUTURE OF LIFE INSTITUTE (Nov. 26, 2018), https://futureoflife.org/2018/11/26/handful-of-countries-including-the-us-and-russia-hamper-discussions-to-ban-killer-robots-at-un/, *archived at* https://perma.cc/4X4A-JVLD.

[274] Submission of the Russian Federation to the GGE of the High Contracting Parties to the CCW, *Examination of Various Dimensions of Emerging Technologies in the Area of Lethal Autonomous Weapons Systems, in the Context of the Objectives and Purposes of the Convention*, UN Doc No. CCW/GGE.1/2017/WP.8 (Nov. 10, 2017), *available at* https://admin.govexec.com/media/ russia.pdf, *archived at* https://perma.cc/B9WW-2DYW.

[275] *Id*.

[276] *Id*.

IV. Autonomous Vehicles

Driverless cars have been produced in Russia since 2016 by the largest national internet company Yandex and several startups. State-owned car manufacturers, known for the poor quality of their cars, are practically absent from the autonomous vehicle market. Major foreign car manufacturers, such as Scania, Volvo, Toyota, and Audi, have expressed interest in testing their autonomous vehicles in traditionally difficult Russian driving conditions.[277]

Industry experts predict that by the year 2025 there will be around 20,000 driverless cars on Russian roads.[278] However, the production and use of autonomous vehicles is not regulated. The State Duma (Russian legislature) did not include laws regulating driverless cars in its legislative agenda, and in September 2018 one of the Duma leaders stated that parliamentarians are going to legislate on "other problems of the transportation infrastructure and highway construction, which are more important."[279]

The first nationwide regulation in this field was issued by the Cabinet of Ministers of the Russian Federation in November 2018 and only addresses testing.[280] Specifically, the regulation requires experiments in the test use of highly automated vehicles on public roads in two Russian regions between December 1, 2018, and March 1, 2022. The government has designated a national research laboratory to review test applications from the owners of driverless cars and coordinate testing. Reports for the government summarizing the test results and proposing further developments, including recommendations for technical requirements and standards for the practical use of autonomous vehicles, must be submitted by March 2020 and again in 2022.[281]

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[277] *New Legislation Set to Regulate Russia's Burgeoning Driverless Car Market*, THE BELL (Nov. 10, 2018), https://thebell.io/en/new-legislation-set-to-regulate-russia-s-burgeoning-driverless-car-market/, *archived at* https://perma.cc/PE62-TRZ9.

[278] Elena Botoroeva, *There Will Be 11 Million Driverless Cars in Russia in 25 Years*, PARLAMENTSKAIA GAZETA (Nov. 12, 2018), https://www.pnp.ru/social/v-rossii-cherez-25-let-budet-11-mln-bespilotnykh-avto-schitayut-v-rosstandarte.html (in Russian), *archived at* https://perma.cc/5WUQ-N2ZQ.

[279] Ivan Buranov, *Transportation Ministry Proposes Amendments to the Vienna Convention*, KOMMERSANT.RU (Sept. 8, 2018), https://www.kommersant.ru/doc/3736763?from=doc_vrez (in Russian), *archived at* https://perma.cc/6CT2-W3DY.

[280] Government of the Russian Federation, Regulation No. 1415 of Nov. 26, 2018, on Conducting an Experiment in the Test Use of Highly Automated Vehicles on Public Roads, http://government.ru/docs/34831/ (in Russian), *archived at* https://perma.cc/T89Q-LQF2.

[281] *Id*.

Slovenia

Some of the elements of an AI development strategy and priorities can be found in *Digital Transformation of Slovenia*, a report prepared by the Ministry of Public Administration.[282] The report proposes the creation of a machine-readable National Open Data Portal, which would be a clearinghouse for government data.[283]

In the Digital Transformation report, the government also indicated its support for connected automated driving (CAD) and stated that it has started preparatory activities relating to cooperative systems.[284] *C-Roads Slovenia* is a pilot project involving the introduction of cooperative systems to transfer vehicle-to-vehicle, vehicle-to-infrastructure, and infrastructure-to-vehicle information in real time. According to the government, these systems can significantly improve the efficiency of the transportation system, the safety of all road users, and the comfort of mobility.

In early October 2016, the C-Roads platform became operational. The platform integrates state institutions and road operators from eleven EU Member States. The platform coordinates activities for the implementation of cooperative intelligent transport systems (C-ITS) in Europe.[285]

Spain

I. Artificial Intelligence Activities

Spain has a number of AI research organizations, hosted in computer science programs run by universities and other academic institutions.[286] Leading AI research entities include the Asociación Espanola de Inteligencia Artificial (Spanish AI Association, AEPIA) and the Instituto de Investigación en Inteligencia Artificial (Artificial Intelligence Research Institute, IIIA) hosted in the Autonomous University of Barcelona (Universitat Autònoma de Barcelona). These entities are active participants in both national and international efforts to support and promote research and development in AI.[287]

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[282] MINISTRY OF PUBLIC ADMINISTRATION OF SLOVENIA, REPUBLIC OF SLOVENIA, DIGITAL TRANSFORMATION OF SLOVENIA (Jan. 2018), http://www.mju.gov.si/fileadmin/mju.gov.si/pageuploads/SOJ/2017/digitalna_preobrazba_brosura/Slovenian_Digital_Transformation_January_2018.pdf, *archived at* https://perma.cc/2X3A-GP8P.

[283] *Id.* at 21.

[284] *Id.*

[285] *Id.*

[286] EUROPEAN COMMISSION, THE EUROPEAN AI LANDSCAPE: WORKSHOP REPORT 22–23 (Apr. 18, 2018), https://ec.europa.eu/digital-single-market/en/news/european-artificial-intelligence-landscape, *archived at* https://perma.cc/56V7-WKDV.

[287] *Id.* at 23. *See generally* ASOCIACIÓN ESPANOLA DE INTELIGENCIA ARTIFICIAL (AEPIA) [SPANISH AI ASSOCIATION], http://www.aepia.org/aepia/, *archived at* https://perma.cc/UJ74-JV7X, *and* INSTITUTO DE INVESTIGACIÓN EN INTELIGENCIA ARTIFICIAL (IIIA) [ARTIFICIAL INTELLIGENCE RESEARCH INSTITUTE], https://www.iiia.csic.es/es, *archived at* https://perma.cc/38B7-3KF6.

II. Government Initiatives

As part of the Digital Strategy for a Smart Spain 2025, in November 2017 the Secretary of State for the Information Technology Society and the Digital Agenda created a working group of experts to develop official guidelines on AI. [288] The group includes businesspeople, professors, and government officials who are reputable and well-known experts in their respective areas of knowledge.[289]

The findings of the working group will be published in the *Libro Blanco de Inteligencia Artificial* (*White Book on Artificial Intelligence*, WBAI), which is aimed at addressing the social, legal, and ethical implications of the use of AI and big data in the private and public sectors as well as the Spanish society in general.[290]

The WBAI working group was expected to have a draft completed by May 2018.[291] The WBAI recommendations will be the basis for a code of ethics and a legal framework on the use of AI data in the public administration as well as a related code of good practices for companies, to be prepared by the government.[292]

In August 2018, the working group submitted a draft of the WBAI to the new Spanish government headed by Pedro Sanchez.[293] Although the working group, created by the previous Spanish government, has not been dissolved, the deadline for the WBAI publication is not clear, as there has been no official announcement in this regard.[294]

In addition, Spain signed the EU Cooperation Agreement on Artificial Intelligence on April 10, 2018.[295] The agreement aims to promote Europe's technology and industrial capacity in AI, address the challenge that AI poses to the labor market and education and training systems in the

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[288] *Grupo de Sabios Creara Libro Blanco de Inteligencia Artificial y Big Data* [*Experts Group Will Create a White Book on AI and Big Data*], DIARIO PERSPECTIVA (Nov. 14, 2017), https://diarioperspectiva.com/grupo-sabios-creara-libro-blanco-la-inteligencia-artificial-big-data-espana/, *archived at* https://perma.cc/N9R2-AFZH.

[289] *Id.*

[290] *Id.*

[291] *Id.*

[292] *Id.*

[293] *El Gobierno de Sanchez Retrasa Estrategia Espanola de Inteligencia Artificial* [*The Government of Sanchez Delays the Spanish Strategy on AI*], EL ESPANOL (Oct. 25, 2018), https://www.elespanol.com/economia/20181025/gobierno-sanchez-retrasa-estrategia-espanola-inteligencia-artificial/347966537_0.html, *archived at* https://perma.cc/9CBA-HMEC.

[294] *Id.*

[295] *Espana Firma un Acuerdo de Cooperación en Inteligencia Artificial Junto a Otros 24 Estados de la Unión Europea* [*Spain Signs a Cooperation Agreement on AI with Other 24 European Union Countries*], ESMARTCITY.ES (Apr. 11, 2018), https://www.esmartcity.es/2018/04/11/espana-acuerdo-cooperacion-inteligencia-artificial-junto-24-estados-union-europea, *archived at* https://perma.cc/R65K-2ALK.

EU, and devise the appropriate AI legal and ethical framework, taking into consideration the EU fundamental rights of privacy and the protection of personal data.[296]

III. Autonomous Vehicles

Although Spain has not enacted any legislation or regulations on autonomous vehicles, the General Directorate of Traffic has authorized the testing of autonomous vehicles since 2015.[297]

IV. Lethal Autonomous Weapons Systems

The government of Spain has declared that its armed forces do not have and are not planning to develop LAWS or weapons based on AI.[298] The Spanish government is not financing any research project on LAWS. It shares the concerns of other countries about the development of robotic weapons that would operate without human intervention.[299] This concern is mainly based on the consequences to human rights and international humanitarian laws. The government further supports the adoption of a general international legal framework aimed at preventing an arms race with respect to LAWS.[300] The Spanish government supports the issuance of the Political Declaration and politically binding Code of Conduct that would include transparency measures to monitor this process as well as the establishment of a Committee of Experts who will be responsible of the evaluation of new developments in the technology involving these weapons.[301]

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[296] European Declaration on Cooperation in Artificial Intelligence, Apr. 10, 2018, https://ec.europa.eu/jrc/communities/community/digitranscope-digital-transformation-and-governance-human-society/document/eu-declaration, *archived at* https://perma.cc/3G7K-SGZG.

[297] DIRECCIÓN NACIONAL DE TRÁFICO, MINISTERIO DEL INTERIOR TRÁFICO ESTABLECE EL MARCO PARA LA REALIZACIÓN DE PRUEBAS CON VEHÍCULOS DE CONDUCCIÓN AUTOMATIZADA EN VÍAS ABIERTAS A LA CIRCULACIÓN, NOTA DE PRENSA [TRAFFIC ESTABLISHES THE FRAMEWORK FOR CONDUCTING TESTS OF AUTOMATED VEHICLES ON OPEN TRACKS] (Nov. 16, 2015), http://www.dgt.es/Galerias/prensa/2015/11/NP-pruebas-vehiculos-conduccion-automatizada.pdf, *archived at* https://perma.cc/LDH9-27QT.

[298] *Las Fuerzas Armadas Españolas No Tendrán Su Propio «Robot Asesino»* [*The Spanish Armed Forces Will Not Have Their Own Killer Robot*], ABC (Aug. 31, 2015), https://www.abc.es/espana/20150831/abci-robots-asesinos-espana-201508301912.html, *archived at* https://perma.cc/AAQ7-2SJL.

[299] Respuesta del Gobierno [Government Answer], Pregunta Escrita Senado [Written Question Senate] 684/77289, June 17, 2015, http://www.senado.es/web/expedientdocblobservlet?legis=10&id=190036, *archived at* https://perma.cc/Z4UU-N92H.

[300] *Id.*

[301] Convención sobre Ciertas Armas Convencionales, Grupo de Expertos Gubernamentales sobre Sistemas de Armas Autónomas Letales, Intervención del Embajador de Espana, Julio Herraiz, Delegado ante la Conferencia de Desarme, Geneva, Apr. 9, 2018 [Convention on Certain Conventional Weapons, Group of Government Experts on LAWS, Statement by the Spanish Ambassador, Julio Herraiz, Delegate to the Disarmament Conference, Apr. 9, 2018], https://www.unog.ch/80256EDD006B8954/(httpAssets)/072ED40378F79CFBC125827200575723/$file/2018_LAWSGeneralExchange_Spain.pdf, *archived at* https://perma.cc/FF6P-DPF6.

Sweden

I. General

Sweden is a member of the European Union and therefore the General Data Protection Regulation (GDPR) on privacy has applied directly since May 2018.[302] Regulation of AI has also been viewed as a task for the entire EU to address jointly, which is why Sweden has supported a position that the European Commission should consider this.[303] Sweden has also signed on to the Declaration on Cooperation on AI as part of Digital Day in 2018.[304] Despite arguing for an EU approach to AI, the Swedish government and Swedish universities as well as philanthropist are investing in AI.[305]

II. National Strategy

Sweden has developed a National Strategy for Artificial Intelligence.[306] The goal is to become a leader in new digital opportunities.[307] This means creating "the enabling conditions" for such digital advances to aid Swedish competitiveness and welfare.[308] According to the government, as presented in the National Strategy, this includes investing in research and higher education.[309] The government also recommends joint projects between the private and public sectors.[310] Moreover, a number of Swedish agencies are looking to use AI to advance their missions. For example, the Swedish Bolagsverket (Swedish Companies Registration Office) wants to use AI to focus on companies that are more likely to be used for criminal activities.[311]

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[302] *See* EU survey in this report.

[303] *See* Regeringskansliet, Faktapromemoria 2017/18:FPM96, Meddelande om artificiell intelligens för Europa (May 30, 2018), http://www.riksdagen.se/sv/dokument-lagar/dokument/fakta-pm-om-eu-forslag/meddelande-om-artificiell-intelligens-for-europa_H506FPM96, *archived at* https://perma.cc/MH7K-2GG7.

[304] Press Release, European Commission, EU Member States Sign Up to Cooperate on Artificial Intelligence (Apr. 10, 2018), https://ec.europa.eu/digital-single-market/en/news/eu-member-states-sign-cooperate-artificial-intelligence, *archived at* https://perma.cc/TY4B-4AJ8.

[305] *See* Parliamentary Minutes referencing Wallenberg Investment, Riksdagens Protokoll 2017/18:47, Dec 11, 2017, http://www.riksdagen.se/sv/dokument-lagar/dokument/protokoll/protokoll-20171847-mandagen-den-11-december_H50947, *archived at* https://perma.cc/2U49-VXHZ.

[306] GOVERNMENT OFFICES OF SWEDEN, NATIONAL APPROACH TO ARTIFICIAL INTELLIGENCE (2018), https://www.regeringen.se/4aa638/contentassets/a6488ccebc6f418e9ada18bae40bb71f/national-approach-to-artificial-intelligence.pdf, *archived at* https://perma.cc/4Q6E-VU78.

[307] *Id*. at 1.

[308] *Id*. at 4.

[309] *Id*. at 6.

[310] *Id*. at 7.

[311] BOLAGSVERKET, AD 212/2018 SLUTRAPPORT EKOBROTTSUPPDRAG 7 (Dec. 14, 2018), http://bolagsverket.se/polopoly_fs/1.17813!/bolagsverket-slutrapport-ekobrott.pdf, *archived at* https://perma.cc/9KN8-XT6C.

As noted above, the Nordic countries have also joined together in a number of collaborative responses to AI, including together with the Baltic States.[312]

III. Local Authorities' Use of Artificial Intelligence

A number of local authorities are looking to use AI to advance their missions. Sveriges Kommuner och Landsting (SKL) (the Swedish municipality and county council agency) has issued a report on the potential use of AI in health and well care settings.[313] Other examples of AI use include its use in educational settings[314] and in digital sobriety tests by Kontigocare.[315] SKL also predicts that the use of robots and AI technology could be helpful for the county councils and regions in their goal to provide their residents with *välfärd* services (collective name for health services, public transportation, education, elder care, child care, water, roads, and other public utilities) in the near future.[316] Studies have also been completed to review the usefulness of AI technology in Swedish industry and enterprise.[317]

IV. Self-driving Vehicles

The Swedish government has issued a government report on self-driving cars in order to "analyze what rule changes are needed for an introduction of driver-supported technology and wholly or

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[312] Declaration, Nordic Council of Ministers & Government of Sweden, AI in the Nordic-Baltic Region, May 14, 2018, https://www.regeringen.se/49a602/globalassets/regeringen/dokument/naringsdepartementet/20180514_nmr_deklaration-slutlig-webb.pdf, *archived at* https://perma.cc/RT92-BWN7; Declaration, Nordic Council of Ministers for Digitalization, The Nordic-Baltic Region: A Digital Frontrunner (Apr. 25, 2017), https://www.norden.org/en/declaration/nordic-baltic-region-digital-frontrunner, *archived at* https://perma.cc/SUL2-XZT4; Press Release, Regeringskansliet, Sverige ska leda AI-samarbete i Norden och Baltikum (May 14, 2018), https://www.regeringen.se/pressmeddelanden/2018/05/sverige-ska-leda-ai-samarbete-i-norden-och-baltikum/, *archived at* https://perma.cc/6FPK-DSSB.

[313] SVERIGES KOMMUNER OCH LANDSTING, ARTIFICIELL INTELLIGENS: MÖJLIGHETER FÖR VÄLFÄRDEN (2017), https://skl.se/download/18.1284479015a26d3e16d5373/1486739509125/Artificiell+intelligens.pdf, *archived at* https://perma.cc/JJ3Y-LRBC.

[314] Mark Scott, *Sweden Tries to Make Digital Lightning Strike Twice*, POLITICO (Oct. 9, 2018), https://www.politico.eu/article/sweden-education-system-digital-revamp-coding-stockholm-school/, *archived at* https://perma.cc/9RZP-VSWN.

[315] KONTIGOCARE, https://www.kontigocare.com/ (last visited Jan. 7, 2019), *archived at* https://perma.cc/3EYP-CRXK.

[316] *Automation, robotar och AI i välfärden*, SVERIGES KOMMUNER OCH LANDSTING, https://skl.se/naringslivarbetedigitalisering/digitalisering/nationellsamverkanstyrning/automationrobotarochartificiellintelligensai.15924.html (last visited Jan. 7, 2019), *archived at* https://perma.cc/SLL5-DGJ4; SVERIGES KOMMUNER OCH LANDSTING, AUTOMATISERING AV ARBETE – MÖJLIGHETER OCH UTMANINGAR FÖR KOMMUNCER, LANDSTING, OCH REGIONER (June 2018), https://webbutik.skl.se/bilder/artiklar/pdf/5408.pdf?issuusl=ignore, *archived at* https://perma.cc/Y64S-VZCS.

[317] VINNOVA , ARTIFICIELL INTELLIGENS I SVENSKT NÄRINGSLIV OCH SAMHÄLLE – ANALYS AV UTVECKLING OCH POTENTIAL (VR 2018:08) (May 2018), https://www.vinnova.se/contentassets/55b18cf1169a4a4f8340a5960b32fa82/vr_18_08.pdf, *archived at* https://perma.cc/K4ZR-KMWD.

partially self-driving vehicles on the road."[318] One of the issues will be for producers of autonomous vehicles to prove how safe the technology is to justify putting it on the roads.[319] Current legislation allows for the testing of self-driving cars following a permission system.[320] A physical driver must be present inside or outside the car.[321] Permits are awarded by the Transportstyrelsen (Swedish Transport Agency).[322] In addition, Transportstyrelsen has issued its own rules.[323] The rules include the information that must be contained in an application.[324] It also provides that the results of the test must be reported to the Transportstyrelsen when completed.[325] In addition, if tests are run for more than a year, annual reports must be submitted.[326] According to media reports, a total of three companies have been approved to test self-driving technology in Sweden: Nobina Technology AB, Amobility AB, and Volvo Cars.[327] An additional four companies have applications pending.[328]

V. Lethal Autonomous Weapons Systems

Sweden has not publicly called for a ban on the use of LAWS. However, it addressed the issue in the United Nations both in 2016 and 2018.[329] Swedish-based think tank Sipri published a report

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[318] Statens Offentliga Utredningar [SOU] 2 [Government Report] 018:16 Vägen till självkörande bilar, at 1, https://data.riksdagen.se/fil/DC763114-69A0-4899-B027-2DFD936C5D38, *archived at* https://perma.cc/5D5U-7254 (translation by author).

[319] *Id*. at 155.

[320] 4 § Förordning om försöksverksamhet med självkörande fordon [Regulation on Trial Activity with Autonomous Vehicles] (2017:309), https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/forordning-2017309-om-forsoksverksamhet-med_sfs-2017-309, *archived at* https://perma.cc/ZWC4-BJZE.

[321] *Id*. at § 7.

[322] *Id*. 5 §.

[323] Transportstyrelsens föreskrifter och allmänna råd om tillstånd att bedriva försök med självkörande fordon [Regulations and Public Advisory on Permits to Commit Trials with Autnomous Vehicles] (TSFS 2017:92), https://www.transportstyrelsen.se/sv/Regler/ts-foreskrifter-i-nummerordning/2017/?RuleNumber=2017:92&RulePrefix=TSFS, *archived at* https://perma.cc/AVL5-FNAH.

[324] *Id*. 4 §.

[325] *Id*. 9 §.

[326] *Id*.

[327] Julia Brzezinska, *Här är företagen som testar självkörande bilar i Sverige*, AUTO MOTOR & SPORT (Nov. 14, 2018), https://www.mestmotor.se/automotorsport/artiklar/artiklar/20181114/har-ar-foretagen-som-testar-sjalvkorande-bilar-i-sverige/, *archived at* https://perma.cc/VM5A-RWBV.

[328] *Id*.

[329] General Statement by Sweden at the 2016 CCW Meeting of Experts on LAWS, UNOG, https://www.unog.ch/80256EDD006B8954/(httpAssets)/1E243D02F4D06BEEC1257F9400420DA0/$file/2016_LAWS+MX_General Exchange_Statements_Sweden.pdf, *archived at* https://perma.cc/S2CE-TXXV; General Statement by Sweden at the CCW GGE on LAWS, UNOG, https://www.unog.ch/80256EDD006B8954/(httpAssets)/12706C2B73502F13C125827400536FA9/$file/2018_LAWSGeneralExchange_Sweden.pdf (last visited Dec. 21, 2018), *archived at* https://perma.cc/AE32-9EVJ.

on LAWS, which found that Sweden uses Active Protection Systems (APSs) technology, including on armored vehicles.[330]

Members of Parliament have also presented motions (the first effort in passing a parliamentary bill) against LAWS and the military use of AI.[331]

Switzerland

I. Strategy Digital Switzerland

In September 2018, Switzerland published its "Strategy Digital Switzerland," which sets out goals for the coming two years.[332] With regard to artificial intelligence (AI), the Federal Council, the Swiss government, plans to support initiatives in the cantons, cities, and municipalities in relation to smart cities[333] and establish a working group on the subject of AI.[334] The working group will facilitate knowledge and opinion sharing and represent Switzerland in international bodies. Furthermore, it is tasked with developing "recommendations for a transparent and responsible use of AI" by the middle of 2019.[335]

II. Parliamentary Interpellations and Motions

In Switzerland, several parliamentarians have submitted interpellations (formal requests) to the government to inquire what actions have been taken in the area of AI or to propose new initiatives. Among other things, they have requested the establishment of a Competence Center for AI in the Department of the Interior[336] to develop a framework to use AI for public administration and have asked if the government was considering formulating a catalog of values for the digital world

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[330] VINCENT BOULANI & MAAIKE VERBRUGGEN, SIPRI, MAPPING THE DEVELOPMENT OF AUTONOMY IN WEAPON SYSTEMS 42, 125 & 128 (Nov. 2017), https://www.sipri.org/sites/default/files/2017-11/siprireport_mapping_the_development_of_autonomy_in_weapon_systems_1117_1.pdf, *archived at* https://perma.cc/7A2U-3E5C.

[331] Förbjud autonoma dödliga vapensystem och reglera utvecklingen av artificiell intelligens, Motion 2017/18:2655 av Carl Schlyter (MP) (Oct. 13, 2017), http://www.riksdagen.se/sv/dokument-lagar/dokument/motion/forbjud-autonoma-dodliga-vapensystem-och-reglera_H5022655, *archived at* https://perma.cc/Y5MW-HTSR.

[332] Bundesamt für Kommunikation [BAKOM] [Federal Office of Communications] [OFCOM], Strategie Digitale Schweiz [Strategy Digital Switzerland] (Sept. 2018), https://www.bakom.admin.ch/dam/bakom/de/bilder/bakom/digitale_schweiz_und_internet/strategie_digitale_schweiz/strategie/Strategie digitale Schweiz.pdf.download.pdf/Strategie_DS_Digital_2-DE.pdf, *archived at* http://perma.cc/YG3K-Q3L7.

[333] *Id*. at 28.

[334] Schweizerische Eidgenossenschaft [Swiss Confederation], Aktionsplan Digitale Schweiz [Action Plan Digital Switzerland], Sept. 5, 2018, at 26, para. 7.5, https://www.bakom.admin.ch/dam/bakom/de/dokumente/informationsgesellschaft/strategie2018/AktionsplanDigitaleSchweiz.pdf.download.pdf/AktionsplanDigitaleSchweiz_DE.pdf, *archived at* http://perma.cc/CS26-A6KH. The Action Plans lists various measures to implement the Strategy Digital Switzerland.

[335] *Id*.

[336] Interpellation no. 18.4037, Kompetenzzentrum für künstliche Intelligenz in der Bundesverwaltung [Competence Center for AI Within the Federal Administration], Sept. 28, 2018, https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20184037, *archived at* http://perma.cc/ZMX2-NJ7H.

(goodwill, tolerance, patience, balance, discretion, community spirit, willingness to help, and nondiscrimination), and if Switzerland was participating in international regulatory efforts of the digital world.[337]

Several other interpellations and motions have raised the issue of autonomous vehicles and liability, asking when Switzerland would amend its laws to allow their use. Three of the motions were adopted by the Swiss Federal Council.[338] The revision of the Road Traffic Act is currently ongoing and the proposal is expected to be submitted to the Federal Council in the spring of 2019.[339]

III. Lethal Autonomous Weapon Systems

At the meeting of the GGE on LAWS in April 2018, Switzerland proposed to adopt a political declaration to develop a shared understanding of the challenges posed by LAWS.[340] Switzerland sees such a political declaration as a middle ground and proposes to address the following issues:

- the applicability and the centrality of ensuring respect for IHL [international humanitarian law] under all circumstances;
- states remain responsible for wrongful acts and that individual responsibility must be guaranteed;
- capture the emerging consensus around the fact that no weapon should be used without appropriate human control; and

[337] Interpellation no. 16.4131. Wie kann die Schweiz an der Forschung zu künstlicher Intelligenz teilnehmen, damit universelle moralische Werte in der digitalen Welt gut vertreten sind? [How Can Switzerland Participate in AI Research in Order to Have Universal Moral Values Represented in the Digital World?], Dec. 16, 2016, https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20164131, *archived at* http://perma.cc/8Y9C-25HM.

[338] Motion no. 17.3049. Digitalisierung. Weg frei für automatisierte und selbstfahrende Fahrzeuge [Digitalization. Pave the Way for Automated and Self-driving Vehicles], Mar. 2, 2017, https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20173049, *archived at* http://perma.cc/NDV5-L7QC; Motion no. 17.3191. Automatisierte Fahrzeuge. Möglichst schnell den rechtlichen Rahmen festlegen [Automated Vehicles. Establish a Legal Framework Fast], Mar. 16, 2017, https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20173191, *archived at* http://perma.cc/FDB8-PCB3; Motion no. 17.4039. Gesetzliche Hürden zur Einführung von autonomen Fahrzeugen abschaffen [Abolish the Legal Obstacles to the Introduction of Autonomous Vehicles], Dec. 7, 2017, https://www.parlament.ch/de/ratsbetrieb/suche-curia-vista/geschaeft?AffairId=20174039, *archived at* http://perma.cc/H9NM-APZK.

[339] 17.4039. Motion grünliberale Fraktion. Gesetzliche Hürden zur Einführung von autonomen Fahrzeugen abschaffen [17.4039. Motion of the Green-liberal Parliamentary Group. Abolish Legal Obstacles to the Introduction of Autonomous Vehicles], Sept. 27, 2018, AMTLICHES BULLETIN [AB] [OFFICIAL BULLETIN] 2018 at 783, https://www.parlament.ch/de/ratsbetrieb/amtliches-bulletin/amtliches-bulletin-die-verhandlungen?SubjectId=44422, *archived at* http://perma.cc/4YTJ-9XFX.

[340] Swiss Confederation, GGE on LAWS 2018, Convention on Certain Conventional Weapons, Exchange of General Views, Apr. 9, 2018, at 2, https://www.unog.ch/80256EDD006B8954/(httpAssets)/CDA07B933C0B0143C125827200572F23/$file/2018_LAWSGeneralExchange_Switzerland+(EN).pdf, *archived at* http://perma.cc/M3TP-FYNT.

- spell out a number of measures such as transparency, legal reviews, best practices, technical standards or other policy measures.[341]

United Kingdom

I. Introduction

The government of the United Kingdom has stated that the country is "currently in the foothills of a new technological revolution. Artificial intelligence has the potential to be as transformative in our lifetimes as the steam-powered economy of the 19th century."[342] The government has described AI as "a set of advanced general purpose digital technologies that enable machines to do highly complex tasks effectively."[343] The government has actively been encouraging, and funding, the development of the AI industry, and has produced a number of reports that consider the application and development of this technology. The discussion that follows provides a high-level overview of some of the developments the UK is consulting on, and providing funding to, that involve AI.

In early 2017, Prime Minister Theresa May launched a consultation for the "Modern Industrial Strategy,"[344] which lead to the publication of a White Paper detailing the government's policy on developing AI, including investments in science, research, and innovation in AI and robotics as one of its four grand challenges.[345] The White Paper also announced an "Artificial Intelligence Sector Deal to boost the UK's global position as a leader in developing AI technologies."[346] The government hopes to be able to capitalize on predictions that the GDP of the UK will increase by 10.3%, the equivalent of £232 billion (approximately US$300 billion), as a result of the

[341] Swiss Confederation, Agenda Item 6d) Possible Options for Addressing the Humanitarian and International Security Challenges Posed by Emerging Technologies in the Area of Lethal Autonomous Weapons Systems in the Context of the Objectives and Purposes of the Convention Without Prejudging Policy Outcomes and Taking Into Account Past, Present and Future Proposals, at 2, https://www.unog.ch/80256EDD006B8954/(httpAssets)/1C584CEA107C0F9DC12582FE003992CA/$file/2018_GGE+LAWS+2_6d_Switzerland.pdf, *archived at* http://perma.cc/NJG3-YXFK.

[342] GOVERNMENT OFFICE FOR SCIENCE, ARTIFICIAL INTELLIGENCE: OPPORTUNITIES AND IMPLICATIONS FOR THE FUTURE OF DECISION MAKING (2015), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/566075/gs-16-19-artificial-intelligence-ai-report.pdf, *archived at* https://perma.cc/HU7T-Y544.

[343] WENDY HALL & JÉRÔME PESENTI, GROWING THE ARTIFICIAL INTELLIGENCE INDUSTRY IN THE UK (Oct. 2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/652097/Growing_the_artificial_intelligence_industry_in_the_UK.pdf, *archived at* https://perma.cc/LYW8-G9A8.

[344] Press Release, Prime Minister's Office, PM Unveils Plans for a Modern Industrial Strategy Fit for Global Britain (Jan. 22, 2017), https://www.gov.uk/government/news/pm-unveils-plans-for-a-modern-industrial-strategy-fit-for-global-britain, *archived at* https://perma.cc/77T7-X9B5.

[345] HM GOVERNMENT, INDUSTRIAL STRATEGY: BUILDING A BRITAIN FIT FOR THE FUTURE (Cm. 9528, Nov. 2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/730048/industrial-strategy-white-paper-web-ready-a4-version.pdf, *archived at* https://perma.cc/PQW7-2EKP.

[346] *Id*. at 199.

development of AI.[347] The 2017 budget provided funding to "industries of the future," and included £75 million (approximately US$96 million) for AI.[348]

The Department for Digital, Culture, Media and Sports is the lead government department for the development of AI policy, with the Department for Business, Enterprise and Industrial Strategy also playing a significant role. In June 2017, the House of Lords established a select committee "to consider the economic, ethical and social implications of advances in artificial intelligence,"[349] and shortly afterwards, in November 2017, the House of Commons conducted an inquiry to consider the use of algorithms in public business and decision making.[350] The report concluded, and the government agreed, that the use of algorithms in decision making is a significant opportunity, but that the impact of such technology must be carefully monitored.[351]

II. Current Application of Artificial Intelligence

The UK is currently embracing the use of AI across public services in a variety of ways. It recently enacted laws to extend compulsory vehicle insurance to cover vehicles operated in automatic mode, making the insurer liable for any accidents caused by the vehicle when operated in this mode. It also enables the Secretary of State to make regulations to provide a uniform method to access electrical vehicle charging points.[352] While enacted, the law has not yet been brought into force.

The following list is a highlight of certain areas where AI is currently being used, or where its development is underway:

- Google DeepMind is currently collaborating with the National Health Service (NHS), the universal health service provider in the UK, on the development of tools to analyze eye scans.[353]

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[347] BERTIE MÜLLER, THE AI LANDSCAPE IN THE UNITED KINGDOM 9 (undated), http://ec.europa.eu/newsroom/dae/document.cfm?doc_id=50824 (last visited Dec. 3, 2018), *archived at* https://perma.cc/EK9F-HH68.

[348] *Autumn Budget 2017*, HM TREASURY (Nov. 22, 2017), https://www.gov.uk/government/publications/autumn-budget-2017-documents/autumn-budget-2017, *archived at* https://perma.cc/UE5R-ECUY.

[349] 783 PARL. DEB. H.L. (5th ser.) (2017) 562, https://hansard.parliament.uk/Lords/2017-06-29/debates/09a72b2f-9261-4ab4-82e8-92f1c0758a87/LordsChamber, *archived at* https://perma.cc/7NMC-TXQN.

[350] House of Commons Science and Technology Committee, Algorithms in Decision-Making (HC 351, May 2018), https://publications.parliament.uk/pa/cm201719/cmselect/cmsctech/351/351.pdf, *archived at* https://perma.cc/A3JZ-5VAX.

[351] House of Commons Science and Technology Committee, Algorithms in Decision-Making: Government Response to the Committee's Fourth Report 2 (HC 1544, Sept. 2018), https://publications.parliament.uk/pa/cm201719/ cmselect/cmsctech/1544/1544.pdf, *archived at* https://perma.cc/UY27-Q9QU.

[352] Automated and Electric Vehicles Act 2018, https://www.legislation.gov.uk/ukpga/2018/18, *archived at* https://perma.cc/UP44-NFPK.

[353] Laurie Points & Ed Potton, Artificial Intelligence and Automation in the UK 7 (House of Commons Library Briefing Paper No. 8152, Dec. 21, 2017), http://researchbriefings.files.parliament.uk/documents/CBP-8152/CBP-8152.pdf, *archived at* https://perma.cc/8MFP-JFM4. *See also Moorfields Announces Research Partnership*,

- Development of military equipment that uses AI to scan the battlefield for enemy movements and flag dangers to soldiers.[354]
- Smart traffic lights are being used in some towns to aid in traffic management.[355]
- £30 million (approximately US$38 million) of funding has been allocated to test the use of AI in online digital skills courses.[356]
- Monetary grants have been provided to further education in the area of AI.[357]
- £84 million (approximately US$108 million) will be invested over the next four years in developments to make industry and public services safer and more productive.[358]

The government has created and funded the Centre for Data Ethics and Innovation as an advisory body to work with the government, regulators, and industry to lay the ethical foundations for the adoption of AI across the UK,[359] and "secure a framework which facilitates and encourages innovation but which also maintains vital public trust and confidence."[360] The government is also specifically reviewing the regulatory structure to allow driverless vehicles on the road by 2021.[361]

MOORFIELDS EYE HOSPITAL (July 3, 2016), https://www.moorfields.nhs.uk/news/moorfields-announces-research-partnership, *archived at* https://perma.cc/3PA7-E8ZZ.

[354] Victoria Ward, *Artificial Intelligence Weaponry Successfully Trialed on Mock Urban Battlefield*, THE TELEGRAPH (Sept. 24, 2018), https://www.telegraph.co.uk/news/2018/09/24/artificial-intelligence-weaponry-successfully-trialled-mock/, *archived at* https://perma.cc/S7SG-NWKS.

[355] Cara McGoogan, *AI Traffic Lights to End Rush Hour Jams in Milton Keynes*, THE TELEGRAPH (May 2017), https://www.telegraph.co.uk/technology/2017/05/15/ai-traffic-lights-end-rush-hour-jams-milton-keynes/, *archived at* https://perma.cc/8KNM-YTWF.

[356] HM TREASURY, AUTUMN BUDGET 2017 ¶ 4.22(HC 587, Nov. 2017), https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/661583/autumn_budget_2017_print.pdf, *archived at* https://perma.cc/G67G-R78W.

[357] Points & Potton, *supra* note 353, at 13.

[358] Press Release, UK Space Agency et al., Funding for £84 Million for Artificial Intelligence and Robotics Research and Smart Energy Innovation Announced (Nov. 8, 2017), https://www.gov.uk/government/news/funding-for-84-million-for-artificial-intelligence-and-robotics-research-and-smart-energy-innovation-announced, *archived at* https://perma.cc/C6UE-JANU.

[359] *Centre for Data Ethics and Innovation Consultation, Consultation Outcome*, DEPARTMENT FOR DIGITAL, CULTURE, MEDIA & SPORT (Nov. 20, 2018), https://www.gov.uk/government/consultations/consultation-on-the-centre-for-data-ethics-and-innovation/centre-for-data-ethics-and-innovation-consultation, *archived at* https://perma.cc/Y43E-2UER.

[360] House of Commons Science and Technology Committee, Algorithms in Decision-Making, *supra* note 350.

[361] *Autumn Budget 2017*, *supra* note 348. *See also* LAW COMMISSION & SCOTTISH LAW COMMISSION, AUTOMATED VEHICLES: A JOINT PRELIMINARY CONSULTATION PAPER (Nov. 2018), https://s3-eu-west-2.amazonaws.com/lawcom-prod-storage-11jsxou24uy7q/uploads/2018/11/6.5066_LC_AV-Consultation-Paper-5-November_061118_WEB-1.pdf, *archived at* https://perma.cc/9GB4-CXL6.

III. Lethal Autonomous Weapons Systems

The Ministry of Defence has stated that

> the UK does not possess armed autonomous aircraft systems and it has no intention to develop them. The UK Government's policy is clear that the operation of UK weapons will always be under human control as an absolute guarantee of human oversight, authority and accountability. Whilst weapon systems may operate in automatic modes there is always a person involved in setting appropriate parameters.[362]

While the policy statement makes it clear that the UK does not possess such systems, nor intends to develop these systems, concerns have been raised about the UK's definition of "lethal automated weapons."[363] A House of Lords report on AI noted that,

> [w]ithout agreed definitions we could easily find ourselves stumbling through a semantic haze into dangerous territory. The Government's definition of an autonomous system used by the military as one where it "is capable of understanding higher-level intent and direction" is clearly out of step with the definitions used by most other governments. This position limits both the extent to which the UK can meaningfully participate in international debates on autonomous weapons and its ability to take an active role as a moral and ethical leader on the global stage in this area. Fundamentally, it also hamstrings attempts to arrive at an internationally agreed definition.[364]

The committee recommended that the government realign the definition of autonomous weapons to a similar form as used by the rest of the world.[365] The government considered the recommendation, but stated that the Ministry of Defence has no plans to change the definition.[366]

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[362] MINISTRY OF DEFENCE, DEVELOPMENT, CONCEPTS AND DOCTRINE CENTRE, UNMANNED AIRCRAFT SYSTEMS ¶ 4.18, (Joint Doctrine Publication 0-32.2, Aug. 2017), https://assets.publishing.service.gov.uk/ government/uploads/system/uploads/attachment_data/file/673940/doctrine_uk_uas_jdp_0_30_2.pdf, *archived at* https://perma.cc/699E-7ZLC.

[363] The UK defines an Autonomous System as: "capable of understanding higher-level intent and direction. From this understanding and its perception of its environment, such a system is able to take appropriate action to bring about a desired state. It is capable of deciding a course of action, from a number of alternatives, without depending on human oversight and control, although these may still be present. Although the overall activity of an autonomous unmanned aircraft will be predictable, individual actions may not be." *Id.* table 2.3.

[364] HOUSE OF LORDS SELECT COMMITTEE ON ARTIFICIAL INTELLIGENCE, AI IN THE UK: READY, WILLING AND ABLE? ¶ 345 (HL Paper 100, Apr. 2018), https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf, *archived at* https://perma.cc/253K-UBGG.

[365] *Id.* ¶ 61.

[366] GOVERNMENT RESPONSE TO HOUSE OF LORDS ARTIFICIAL INTELLIGENCE SELECT COMMITTEE'S REPORT ON AI IN THE UK: READY, WILLING AND ABLE? ¶ 99 (CM 9645, June 2018), https://www.parliament.uk/documents/lords-committees/Artificial-Intelligence/AI-Government-Response2.pdf, *archived at* https://perma.cc/RBK2-9H2K.

A UK newspaper has recently reported that "the MoD and defence contractors are funding dozens of artificial intelligence programmes for use in conflict."[367] The Ministry of Defence responded to the report with a denial of the accusations: "There is no intent within the MOD to develop weapon systems that operate entirely without human input. Our weapons will always be under human control as an absolute guarantee of oversight, authority and accountability."[368]

At the international level, the UK's interpretation of what constitutes lethal automated weapons does not align with the definition of many other western nations and does not support a pre-emptive ban on such weapons systems. Instead, the UK wishes for further discussions on the development of these systems, and emphasizes that any such development requires the need for a human element to be present in its operation.[369]

[367] Jamie Doward, *Britain Funds Research into Drones that Decide Who They Kill, Says Report*, THE GUARDIAN (Nov. 10, 2018), https://www.theguardian.com/world/2018/nov/10/autonomous-drones-that-decide-who-they-kill-britain-funds-research, *archived at* https://perma.cc/Z9NF-G2RJ.

[368] Anthony Cuthbertson, *UK Government Developing Flying "Killer Robots", Investigation Reveals*, INDEPENDENT (Nov. 13, 2018), https://www.independent.co.uk/life-style/gadgets-and-tech/news/drones-robots-uk-autonomous-artificial-intelligence-ministry-defence-a8631211.html, *archived at* https://perma.cc/B2V8-URS7.

[369] Foreign and Commonwealth Office, Statement for the General Exchange of Views at the Meeting of the Group of Government Experts on Lethal Autonomous Weapons Systems, April 9, 2018, ¶ 9, https://www.unog.ch/80256EDD006B8954/(httpAssets)/271A66FCD9412E18C125827A003454CF/$file/2018_LAWSGeneralExchange_UK.pdf, *archived at* https://perma.cc/SHQ9-RTHF.

Middle East and North Africa

Bahrain

In October 2018, Microsoft Bahrain noted how vital AI is in the establishment of smart societies, mirroring the ambitions exhibited in the country's planning document, *Bahrain Vision 2030*, at an event held in the Kingdom. Bahrain's Information and Government Authority (IGA) organized the two-day event. The IGA operates under the patronage of Shaikh Mohammed bin Mubarak Al Khalifa, who is both the Deputy Prime Minister and Chairperson of the Supreme Committee for Information and Communication Technology.[1]

Egypt

In May 2018, the Egyptian National Telecom Authority hosted a forum exploring the potential interconnectivity of AI technologies with the Internet of Things (IoT).[2] In December 2017, the Egyptian Authority of Financial Control announced that it would regulate the use of the AI technology to control financial transactions.[3]

Israel

I. Civilian Use of AI Technologies

A. Technology Development

According to a global study released in May 2018 by Asgard, a Berlin-based venture capital firm focused on AI, by far the country with the largest AI industry is the US (40%), followed by China (11%), Israel (11%), and the UK (7%).[4] Described as a "startup nation" with more start-up companies on a per capita basis than leading economies in the world,[5] Israel's AI economy has been rapidly developing.

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[1] *Microsoft Demonstrates Power of AI at Bahrain Forum*, TRADE ARABIA (Oct. 8, 2018), http://www.tradearabia.com/news/IT_346027.html, *archived at* https://perma.cc/2JN6-5XPR.

[2] Press Release, Ministry of Communication and Information Technology, Egypt Hosts Forum on Exploring Potential of Artificial Intelligence and Internet of Things (May 6, 2018), http://www.mcit.gov.eg/Media_Center/Latest_News/News/13868, *archived at* https://perma.cc/T6CZ-CHMN.

[3] *Egypt Sought to Use AI in the Field of Financial Control*, AL-AIN (Dec. 18, 2017), https://al-ain.com/article/egypt-employs-artificial-intelligence (in Arabic), *archived at* https://perma.cc/5GR8-BNK2.

[4] *Artificial Intelligence – A Strategy for European Startups, Recommendations for Policymakers*, ASGARD (2018), https://asgard.vc/wp-content/uploads/2018/05/Artificial-Intelligence-Strategy-for-Europe-2018.pdf, *archived at* https://perma.cc/KG2U-R3XX.

[5] DANIEL SENOR & SAUL SINGER, COUNCIL ON FOREIGN RELATIONS, START-UP NATION: THE STORY OF ISRAEL'S ECONOMIC MIRACLE (2009), https://www.cfr.org/book/start-nation, *archived at* https://perma.cc/K4MG-9J7H.

According to the founder of one Israeli AI startup,

> Israel's Artificial Intelligence (AI) startup ecosystem has raised over $7.5 billion cumulatively and is undergoing explosive growth, characterized by a major influx of establishments and talent, forming what could be considered the global leader of AI over the next five years. Notwithstanding their absent national agenda and budget, Israel has already earmarked the largest AI exit to date (Mobileye—15.3B) and boasts a substantial and growing cluster of startups utilizing and developing AI technologies.[6]

B. Policy Considerations

The preparedness of the Israeli government for AI was the subject of a June 2018 hearing before the Knesset (Israel's parliament) Science Committee. Summarizing the views expressed at the hearing, Committee Chairman and Knesset Member (KM) Uri Maklev called upon the government to start reviewing various regulatory aspects of AI, including privacy and legal liability. He also urged the government to set deadlines for the development and use of AI systems in government offices to improve public service. Warning that without careful preparation Israel might face increased unemployment, he proposed that the government should develop educational training to enable more people to engage in the new technology.[7]

Possible AI technology applications in areas such as education, review of trademarks, reduction of vehicle accidents, etc., were further discussed at a November 2018 conference organized by the Knesset Parliamentary Oversight Coordination Unit.[8]

C. Autonomous Vehicles

Israeli law has not yet adopted a comprehensive regulation of autonomous vehicles. It has been suggested that such regulation might require extensive legislative changes in multiple areas of law, including safety requirements, licensing, payment to victims of car accidents, etc.[9]

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[6] Daniel Singer, *Israel's Artificial Intelligence Landscape 2018*, HACKER NOON (Aug. 29, 2018), https://hackernoon.com/israels-artificial-intelligence-landscape-2018-83cdd4f04281, *archived at* https://perma.cc/2YBJ-6FSJ.

[7] Press Release, Knesset Science Committee, First Hearing on the Preparedness of the Government to AI (June 4, 2008), https://m.knesset.gov.il/news/pressreleases/pages/press04.06.18ec.aspx# (in Hebrew), *archived at* https://perma.cc/P2JM-VFDY.

[8] Parliamentary Oversight Coordination Unit, Conference on Policy Implementation in the Era of Big Data (Nov. 6, 2018), https://main.knesset.gov.il/Activity/Oversight/Pages/oversightdayworkplans2.aspx (in Hebrew), *archived at* https://perma.cc/S9JF-GP7B.

[9] *See* Sigalit Ben Sason, *The Way for Autonomous Vehicle Requires Legislative Changes*, 40 ORECH HADIN [THE LAWYER] 88-89, http://www.israelbar.org.il/magazine/OrechHadin40/88/.

The Ministry of Transportation, however, has expressed its support for

> [a]dvancing new technologies and development of vehicle systems based on strategic vision for advancement of the Israeli industry and its transformation to a global development center and an object of attraction to entrepreneurs from all over the world.[10]

The Ministry specifically noted that,

> [it] sees also importance in development of technologies and systems that are designed for autonomous vehicles in view of the great potential they [might] offer for improvement of road safety and minimizing casualties.[11]

The Ministry's 2017 directive regulates licensing of experiments in:

> [v]ehicles Systems and features to be installed in vehicles that may interfere or influence on vehicle systems and performance with respect to control, safety, fuel consumption and air pollution including a form of connection to the communication interfaces of the vehicles.[12]

A flowchart[13] included in the directive illustrates the steps required to obtain a license for experimentation in autonomous vehicle in Israel, which includes examination of companies applications by a professional committee established for this purpose by the Ministry.[14]

A regulation issued in May 2018 by the Ministry of Transport and Road Safety further authorizes the National Traffic Controller to grant an exemption from requirements that apply to drivers under the Transportation Regulations[15] for purpose of conducting an experiment in new technologies. A decision to grant an exemption from the regulations, accordingly, requires consultation with the licensing authority and with a police officer. It further requires evaluation of

> the possible effects of the experiment on traffic, including the following considerations:
>
> (1) ensuring the safety of users on the way during the experiment, including experiment participants;

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[10] Ministry of Transportation, Approval of Experiments in Vehicles for Research and Development, Automated Technological Systems § 1(1) (Directive No. H-02-2017, Nov. 1, 2017), http://rishuy.mot.gov.il/he/vehicle/maintenance/rules-gv (click on H-02-2017), *archived at* https://perma.cc/RFQ2-8ZJF.

[11] *Id.* § 1(2).

[12] *Id.*§ 4(1).

[13] *Id.* at 5.

[14] *Id.* § 5(2).

[15] Transportation Regulations, 5761-1961, KOVETZ HATAKANOT [KT] [SUBSIDIARY LEGISLATION] 5761, No. 1128, p. 1425.

(2) reducing the disturbance to the flow of traffic in ways that may be caused as a result of the experiment;

(3) responding to emergency events that may occur during the course of the experiment.[16]

Media reports indicate that authorization for experimenting autonomous cars has been granted to the Israeli company Mobileye and to the Russian company Yandex.[17]

II. Lethal Autonomous Weapons Systems

Israel is reportedly one of several countries, including the US, China, South Korea, Russia, and the UK, that currently use and develop LAWS with decreasing levels of human control.[18]

Israel has developed and utilized various AI technologies for LAWS. Its Iron Dome defensive system has been successfully used in intercepting "incoming missiles or torpedoes faster than a human could react."[19]

Israel has further developed a fully autonomous loitering munition (suicide drone) called the Harop, "which can dive-bomb radar signals without human direction . . . with lethal results on the battlefield."[20]

A statement submitted by the Israeli mission to the GGE on LAWS of the Convention on Certain Conventional Weapons (CCW) on July 29, 2018, clarifies the Israeli position. Israel supports further in-depth discussions in consideration of any possible regulation of LAWS. Such

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[16] Transportation (Amendment No. 12) Regulations, 5778-2018, KT 5778, No. 8011, p. 2067.

[17] *See* Dubi Ben Gedalia, *View: Mobileye Automated Vehicle at a Test Drive in Jerusalem*, GLOBES (May 17, 2018), https://www.globes.co.il/news/article.aspx?did=1001236680, *archived at* https://perma.cc/J3HF-TATS; *see also* Meir Urbach, *Yandex Received Approval to Conduct Autonomous Vehicle Experimentation in Israel*, CALCALIST (Dec. 25, 2018), https://www.calcalist.co.il/internet/articles/0,7340,L-3752816,00.html, *archived at* https://perma.cc/6LXB-PTQX.

[18] Campaign to Stop Killer Robots, Briefing Note for the Convention on Conventional Weapons Group of Governmental Experts Meeting on Lethal Autonomous Weapons Systems, *Retaining Human Control of Weapons Systems* (Apr. 9–13, 2018), https://www.stopkillerrobots.org/wp-content/uploads/2018/03/KRC_Briefing_CCWApr2018.pdf, *archived at* https://perma.cc/RCZ2-3UCC.

[19] Ted Piccone, *How Can International Law Regulate Autonomous Weapons?*, BROOKINGS (Apr. 10, 2018), https://www.brookings.edu/blog/order-from-chaos/2018/04/10/how-can-international-law-regulate-autonomous-weapons/, *archived at* https://perma.cc/4JMG-PTKE; *see also Iron Dome Weapon System*, RAYTHEON, https://www.raytheon.com/capabilities/products/irondome (last visited Nov. 19, 2018), *archived at* https://perma.cc/S8BG-VVNR; *Iron Dome Air Defence Missile System*, ARMY TECHNOLOGY, https://www.army-technology.com/projects/irondomeairdefencemi/ (last visited Nov. 19, 2018), *archived at* https://perma.cc/D868-PEL5.

[20] Billy Perrigo, *A Global Arms Race for Killer Robots Is Transforming the Battlefield*, TIME (updated Apr. 9, 2018), http://time.com/5230567/killer-robots/, *archived at* https://perma.cc/Y5TH-YFHV; *see also Harop Loitering Munitions UCAV System*, AIR FORCE TECHNOLOGY, https://www.airforce-technology.com/projects/harop loiteringmuniti/ (last visited Nov. 19, 2018), *archived at* https://perma.cc/AA2X-BLLA.

discussions, according to the statement, should not hamper progress in civilian research, development and use of autonomous technologies.[21]

The statement acknowledges that there are differences of opinion on the "definition or characterization of LAWS . . . and the appropriate type and level of human judgment throughout the various phases of the weapon's life cycle, as well as the suitable terminology."[22] Such differences, it suggests, may stem from "[t]he futuristic nature of the subject and its broad scope—at this stage more is unknown than known and a prudent approach is necessary."[23]

The statement calls for recognizing LAWS' potential military and humanitarian advantages, including "better precision of targeting which would minimize collateral damage and reduce risk to combatants and non-combatants."[24]

Clarifying the Israeli position that human judgment will always be an integral part of any process regarding LAWS throughout their life cycle, the statement also referenced Israel's domestic process for legal review of new weapons. The statement called for further in-depth discussions, specifically on the various phases of human-machine interaction.[25]

Oman

According to a December 2017 news report, the Omani Information Technology Authority announced that it had hosted a forum on AI and its impact on Omani society.[26] In August 2018, the Authority organized a second forum on methods to develop, integrate, and regulate AI technology. The forum was sponsored by the Ministry of Transport and Communication.[27]

Qatar

In May 2018, Qatar Computing Research Institute (QCRI), part of Hamad Bin Khalifa University, launched the QCRI Center for Artificial Intelligence. The Center's main responsibility is to

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[21] Statement by Ofer Moreno Director, Arms Control Department, Strategic Affairs Division, Ministry of Foreign Affairs, p. 2, at UN GGE Meeting on LAWS, Convention on Certain Conventional Weapons, Aug. 29, 2018, https://www.unog.ch/80256EDD006B8954/(httpAssets)/7A0E18215E16382DC125830400334DF6/$file/2018_GGE+LAWS+2_6d_Israel.pdf, *archived at* https://perma.cc/JCW5-9HT8.

[22] *Id.*

[23] *Id.*

[24] *Id.*

[25] *Id.* at 2–3.

[26] *Tech Talk Session Focuses on Artificial Intelligence*, MUSCATDAILY.COM (Dec. 5, 2017), https://www.muscatdaily.com/Archive/Oman/Tech-Talk-session-focuses-on-Artificial-Intelligence-55ir, *archived at* https://perma.cc/F5BF-KR5G.

[27] *Forum Discusses Sustainability and Future of Artificial Intelligence*, MUSCATDAILY.COM (Aug. 13, 2018), https://www.muscatdaily.com/Archive/Oman/Forum-discusses-sustainability-and-future-of-Artificial-Intelligence-5ajb, *archived at* https://perma.cc/KTU7-8QK6.

integrate AI technology into all fields. The Center will also develop policy guidelines and regulations for the citizens of Qatar to use AI in a manner consistent with local cultural norms.[28]

In addition, a 2017 news report indicated that a French corporation, Navya, has joined the Smart Transport Company located in Doha, Qatar to introduce driverless electric vehicles for commercial use.[29]

Saudi Arabia

I. Official Strategy

The Kingdom of Saudi Arabia has no official AI strategy. However, it has announced that AI will be employed in efforts to achieve the goals outlined in *KSA Vision 2030*,[30] the Kingdom's strategic planning document.[31]

II. AI Potential Investment

In October 2017, the Public Investment Fund (PIF) announced that the Kingdom would invest US$100 billion in the field of AI; it also sponsored a conference on Artificial Intelligence and Robotics. Sophia, a "sentient" robot developed by Hanson Robotics of Hong Kong, attended the conference where she demonstrated her ability to track and recognize faces, and hold natural conversations with humans.[32] In October 2017, a former advisor of the Saudi Royal Court announced on his Twitter account that Sophia was being granted Saudi Arabian citizenship[33] as "a symbolic gesture" to celebrate the beginning of work on NEOM, a US$500 billion "smart city" industrial zone sponsored by Crown Prince Mohamed bin Salaman.[34]

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[28] Press Release, Qatar Foundation, QCRI to Launch Center for Artificial Intelligence (May 14, 2018), https://www.qf.org.qa/news/qcri-to-launch-center-for-artificial-intelligence, *archived at* https://perma.cc/L647-HATM.

[29] *Driverless Electric Vehicles Set to Hit Qatar Roads This Year*, QATAR TRIBUNE (Mar. 9, 2017), http://www.qatar-tribune.com/news-details/id/53290, *archived at* https://perma.cc/7F5H-J2ZR.

[30] *Why the UAE and Saudi See Artificial Intelligence as an Investment in the Future*, ARABIAN BUSINESS (Feb. 8, 2018), https://www.arabianbusiness.com/technology/389533-why-the-uae-saudi-see-artificial-intelligence-as-an-investment-in-the-future, *archived at* https://perma.cc/3HCL-8FTR.

[31] *Vision 2030*, KINGDOM OF SAUDI ARABIA, https://vision2030.gov.sa/en (last visited Nov. 20, 2018), *archived at* https://perma.cc/KB2L-94D5.

[32] Press Release, Saudi Press Agency, The Future Investment Initiative Will Drive Global Thinking on the Future of Technology, Robotics and Artificial Intelligence (Oct. 3, 2017), https://www.spa.gov.sa/viewstory.php?lang=en&newsid=1673447, *archived at* https://perma.cc/3TT3-DN3D.

[33] National Center for Communication of the Kingdom of Saudi Arabia (@CICSaudi), TWITTER (Oct. 25, 2017, 8:38 AM), https://twitter.com/CICSaudi/status/923212096552218624/photo/1, *archived at* https://perma.cc/W452-AYSU.

[34] *Id.*; *Saud al Qhtani Announces that the AI Robot Has Acquired Saudi Citizenship*, MAAAL (Oct. 25, 2017), https://www.maaal.com/archives/20171025/98413 (in Arabic), *archived at* https://perma.cc/3JVB-5743.

The Kingdom of Saudi Arabia is currently cooperating with foreign companies that specialize in the field of AI. During his visit to Riyadh, SAP CEO Bill McDermott welcomed the Kingdom's plans to use AI to achieve *Saudi Vision 2030* national development goals. He noted that the government of Saudi Arabia will use AI as a foundation for NEOM, the new industrial city project. In collaboration with SAP, the Kingdom announced that it would invest 285 million Saudi Riyal (about US$76 million) to develop modern technologies in the field of AI.[35]

III. Practical Implementation of AI: Religious Rituals

In an attempt to use AI in different fields, including religious rituals, the Saudi Ministry of Haj and Umrah has published on its YouTube channel a video giving an insight into how pilgrims to Mecca will use AI in 2030. According to the Ministry, Muslims from around the world who intend to undertake Haj (the pilgrimage to Mecca) will have to apply through a mobile application, and within a few days, they will receive a box that contains an electronic card, a bracelet, and an earphone.[36]

Tunisia

In April 2018, in collaboration with UNESCO, the Tunisian government convened a workshop titled "National AI Strategy: Unlocking Tunisia's Capabilities."[37] During the event, the Tunisian Minister of Higher Education and Scientific Research announced the creation of a task force to develop a national AI strategy. The strategy is scheduled to be launched during the first quarter of 2019.[38]

According to news reports the Tunisian representative at UNESCO has declared that the goal of the national AI strategy is to integrate AI into multiple industries and introduce AI in the services field as well. He added that an array of Tunisian scientists would contribute to the development of the national strategy. Furthermore, Tunisian investors and ministries will fund and facilitate the process.[39]

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[35] *SAP CEO: Artificial Intelligence to Hasten Saudi Vision 2030*, SAUDI GAZETTE (Feb. 14, 2018), http://saudigazette.com.sa/article/528442/BUSINESS/SAP-CEO-Artificial-Intelligence-to-hasten-Saudi-Vision-2030, *archived at* https://perma.cc/6UWQ-5Q5M.

[36] *Artificial Intelligence to Change the Haj We Know*, GULF NEWS (July 16, 2018), https://gulfnews.com/news/gulf/saudi-arabia/artificial-intelligence-to-change-the-haj-we-know-1.2252269 (in Arabic), *archived at* https://perma.cc/XW6S-2RSB.

[37] *National AI Strategy: Unlocking Tunisia's Capabilities Potential*, MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH, http://www.anpr.tn/national-ai-strategy-unlocking-tunisias-capabilities-potential/ (last visited Dec. 14, 2018), *archived at* https://perma.cc/YV6L-UWAN.

[38] *See* Tim Dutton, *An Overview of National AI Strategies*, MEDIUM (June 28, 2018), https://medium.com/politics-ai/an-overview-of-national-ai-strategies-2a70ec6edfd, *archived at* https://perma.cc/C8TQ-N6T8.

[39] *Launching the Development of a National AI Strategy*, AL-SABAH (Apr. 20, 2018), https://www.turess.com/assabahnews/180819, *archived at* https://perma.cc/WC86-9HH7.

The Minister of Higher Education and Scientific Research stated that AI will play a vital part in the future of Tunisia and will be integrated into the field of information technology. He asserted the commitment of the Ministry of Higher Education and Scientific Research to fund and support projects related to AI, including the development of the national strategy. He also stated that the development of the strategy would facilitate the establishment of new labs for AI.[40]

In November 2018, the Tunisian Ministry of Higher Education and Scientific Research announced that it would collaborate with the Moroccan Ministry of Scientific Research to launch a joint scientific research lab. The lab will conduct scientific research in various areas, including AI, and will begin working in June 2019. Both governments stated that they would allocate the appropriate funding for the lab to operate for four years.[41]

United Arab Emirates

I. Official Strategy

In October 2017, the government of the United Arab Emirates (UAE) established the UAE Strategy for Artificial Intelligence. Such strategy is the first of its kind among Arab countries. It encompasses the following objectives: (1) enhance government performance at all levels by employing a smart digital system that can overcome challenges; and (2) make the UAE the first country to use AI in the fields of transportation, health, renewable energy, water, education, the environment, and traffic.[42]

II. Establishment of a Ministry

The UAE has also created a new ministry in the Cabinet called the Ministry for Artificial Intelligence. In October 2017, the President of the Union selected Omar bin Sultan Al-Olama as the first Minister of State for Artificial Intelligence. Al-Olama is in charge of using the latest AI technologies to enhance governmental performance. The cabinet has also established the Council of Artificial Intelligence, which will oversee the integration of AI into various governmental departments. The Council includes representatives from all nine emirates.[43]

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[40] *Id.*

[41] *Ministry of Higher Education: Towards the Establishment a Joint Tunisian/Moroccan Scientific Lab*, AL CHOUROUK (Nov. 8, 2018), https://www.turess.com/alchourouk/2025999, *archived at* https://perma.cc/S9VZ-7ZFX.

[42] *Mohamed Bin Rashid Launches UAE Artificial Intelligence Strategy*, GULF NEWS (Oct. 16, 2017), https://gulfnews.com/news/uae/government/mohammad-bin-rashid-launches-uae-artificial-intelligence-strategy-1.2106998, *archived at* https://perma.cc/4MXE-ZL9W.

[43] Anna Zacharias, *UAE Cabinet Forms Artificial Intelligence Council*, THE NATIONAL (Mar. 5, 2018), https://www.thenational.ae/uae/uae-cabinet-forms-artificial-intelligence-council-1.710376, *archived at* https://perma.cc/7MDV-MJSK.

III. National Council of AI

In March 2018, the Council of Artificial Intelligence met for the first time. The meeting focused on the best methods to integrate AI systems into the daily tasks of government. One of the main responsibilities of the Council is to promote the exchange of knowledge and experience related to AI with other countries as well as promote public awareness about AI. Additionally, the Council's members discussed seven main objectives to achieve the UAE's AI Strategy. Those objectives include the following:

- Transforming the UAE into a leading global destination for AI
- Developing AI technology in both the private and government sectors
- Attracting prominent international AI scientists to work in the UAE
- Creating the appropriate infrastructure to transform the UAE into a global AI laboratory
- Forming policies and legislation for AI-based technologies and innovations[44]

IV. Practical Implementations of AI

A. Traffic

In its effort to implement AI technology in a variety of fields, including traffic and security, the Roads and Transport Authority (RTA) of the Emirate of Dubai announced that it would begin using an autonomous vehicle system by February 2018. The system will be operated in the Al Qudra Road District. Such an initiative is the first step to support the government of the Emirate of Dubai's strategy to convert 25% of public transportation to driverless by 2030.[45] In August 2018, the Federal Authority for Standardization and Metrology announced that it would begin drafting safety regulations for the country's autonomous vehicle system.[46] The UAE recently embarked on Phase 4 of the Driverless Vehicles Project within the Sustainable City at Dubailand over a track extending 1250m, according to the Sustainable City's website.[47] The *Khaleej Times* has reported that the RTA of Dubai will examine an electric driverless taxi at a residential area in

[44] Adelle Geronimo, *UAE AI Council Talks Future Vision and Strategy*, TAHAWULTECH (Mar. 18, 2018), https://www.tahawultech.com/news/uae-ai-council-talks-strategy-and/, *archived at* https://perma.cc/76DZ-9GF4.

[45] Mariam M. Al Serkal, *Driverless Vehicles Will Start in This Area of Dubai*, GULF NEWS (Jan. 22, 2018), https://gulfnews.com/news/uae/transport/driverless-vehicles-will-start-in-this-area-of-dubai-1.2160927, *archived at* https://perma.cc/76QH-3MRY.

[46] *UAE to Introduce Regulations for Self-driving Vehicles*, THE NATIONAL (Aug. 12, 2017), https://www.thenational.ae/uae/transport/uae-to-introduce-regulations-for-self-driving-vehicles-1.619081, *archived at* https://perma.cc/XG4H-9TLE.

[47] *RTA Operates a 'Driverless Vehicle' in Sustainable City*, THE SUSTAINABLE CITY (Sept. 5, 2018), https://www.thesustainablecity.ae/2018/09/05/rta-operates-a-driverless-vehicle-in-sustainable-city/, *archived at* https://perma.cc/2Q7G-NL67.

the Dubai Silicon Oasis in December 2018. After a three-month trial phase, the RTA will decide in what areas such driverless taxis may operate.[48]

B. Security

In addition, the Dubai Police Department has announced that a new system to identify wanted suspects was powered by the AI technology being used by the Department. The spokesperson for the Department stated that the new system assisted in catching 550 suspects in 2018.[49]

[48] Angel Tesorero, *Driverless Taxis Will Be Running on Dubai Roads in December*, KHALEEJ TIMES (Oct. 14, 2018), https://www.khaleejtimes.com/nation/dubai/Driverless-taxis-will-be-running-on-Dubai-roads-next-month, *archived at* https://perma.cc/E8N8-79WH.

[49] *Artificial Intelligence Helps Dubai Police Arrest 550 Criminals*, KHALEEJ TIMES (Oct. 6, 2018), https://www.khaleejtimes.com/nation/dubai/artificial-intelligence-helps-dubai-police-arrest-550-criminals, *archived at* https://perma.cc/T4A2-H9SM.

Sub-Saharan Africa

Ghana

During the April 2018 meeting of the UN Convention on Certain Conventional Weapons (CCW) GGE on LAWS, Ghana reportedly expressed "a desire to negotiate a new international law—a new treaty or CCW protocol—to address concerns over" LAWS.[1] Ghana is also in favor of a ban on fully autonomous weapons.[2] It expressed this view at the 2015 CCW meeting, stating as follows:

> Ghana is very much concerned about the possible use of lethal autonomous weapon systems at any time in the future, for the many reasons and fears that these Systems present to us by their very nature. It is obvious that proponents of these systems believe that they will not be the victims but others will.
>
> We need to avoid moving in this direction of self perfection to the promotion and preservation of human dignity for humanity as a whole. History confirms that today's victim can become tomorrow's perpetrator, especially, when we take into consideration the ever increasing development and spread of technology. Won't we be heading towards a potential quagmire in the near future.
>
> In our view fully automated lethal systems must be proscribed before they are fully developed because of the concerns aforesaid and shared by a larger number of delegations represented here in this meeting.[3]

Kenya

In February 2018, the Kenya government announced that it had formed an eleven-member blockchain and AI task force, comprised of representatives from academia, research institutions, and the local technology sector, and directly accountable to the Cabinet Secretary for Information, Communications and Technology.[4] The task force "will provide the roadmap to contextualize on the application of these emerging technologies in the areas of financial inclusion, cybersecurity, land tilting [sic], election process, single digital identity and overall public service delivery."[5] The immediate goal of the task force is to "make recommendations on how the government can

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[1] CAMPAIGN TO STOP KILLER ROBOTS, REPORT ON ACTIVITIES: CONVENTION ON CONVENTIONAL WEAPONS GROUP OF GOVERNMENTAL EXPERTS MEETING ON LETHAL AUTONOMOUS WEAPONS SYSTEMS 7 (Apr. 2018), https://www.stopkillerrobots.org/wp-content/uploads/2018/06/KRC_ReportCCWX_Apr2018_UPLOADED.pdf, *archived at* https://perma.cc/59HM-Y2ZZ.

[2] *Id*. at 8

[3] *Id*. at 9.

[4] *Kenya Govt Unveils 11 Member Blockchain & AI Taskforce Headed by Bitange Ndemo*, THE KENYAN WALL STREET (Feb. 28, 2018), https://kenyanwallstreet.com/kenya-govt-unveils-11-member-blockchain-ai-taskforce-headed-by-bitange-ndemo/, *archived at* https://perma.cc/6NTP-C36M.

[5] *Id*.

leverage on the emerging technologies in the next five years, with other key milestones in 2027 and 2032."[6]

Nigeria

Nigeria reportedly approved a robotics and AI agency in August 2018.[7] Sources at the country's Ministry of Science and Technology stated that the new agency "would leverage collaborations with international research bodies on robotics and AI" and enable "research and teachings in more complex technology skills to thousands of young people."[8] During the official inauguration of an inter-ministerial committee tasked with the establishment of the agency, Christopher Ogbonnaya Onu, the Minister of Science and Technology, noted that "there is no way Nigeria can achieve effective industrialization without investment in Robotics and Artificial Intelligence because it is critical to manufacturing, health care delivery and transportation."[9] A source from the office of the country's president stated that "[t]he ultimate goal is to have an agency mandated solely on advancing our knowledge and usability of robots and AI across sectors in Nigeria. The idea is to leapfrog our growth."[10]

Recent reporting indicates that investment in AI will be directed through the National Agency for Science and Engineering Infrastructure (NASENI), an organization whose mission is to "establish and nurture appropriate and dynamic Science and Engineering Infrastructure-base for achieving home-initiated and home-sustained industrialization through the development of relevant processes, capital goods and equipment necessary for job creation, national economic well-being and progress."[11]

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[6] *Id*.

[7] Nwakaego Alajemba & Chinedu James, *Nigeria to Set up New Agency for Robotics and Artificial Intelligence*, TEDGE NEWS (Aug. 6, 2018), https://itedgenews.ng/2018/08/06/nigeria-set-new-agency-robotics-artificial-intelligence/, *archived at* https://perma.cc/H2MF-GS4B.

[8] *Id*.

[9] Olusegun Shogbola, *FG to Establish Two New Agencies*, FEDERAL MINISTRY OF SCIENCE AND TECHNOLOGY (Aug. 1, 2018), http://scienceandtech.gov.ng/2018/08/01/fg-to-establish-two-new-agencies/, *archived at* https://perma.cc/79WG-GH33.

[10] Alajemba & James, *supra* note 7.

[11] Olusegun Shogbola, *Nigeria, UAE to Cooperate on Solar Energy, Artificial Intelligence*, FEDERAL MINISTRY OF SCIENCE AND TECHNOLOGY (Oct. 24, 2018), http://scienceandtech.gov.ng/2018/10/24/nigeria-uae-to-cooperate-on-solar-energy-artificial-intelligence/, *archived at* https://perma.cc/GN67-8M8R; *About Us*, NATIONAL AGENCY FOR SCIENCE AND ENGINEERING INFRASTRUCTURE, http://www.naseni.org/who-we-are.html (last visited Nov. 29, 2018), *archived at* https://perma.cc/D4FH-T4A9.

Sierra Leone

During the April 2018 meeting of the UN Convention on Certain Conventional Weapons (CCW) GGE on LAWS, Sierra Leone was reportedly among thirty-two countries that expressed "a desire to negotiate a new international law—a new treaty or CCW protocol—to address concerns over" LAWS.[12]

South Africa

South Africa was one of thirty-two countries that expressed interest in negotiating a treaty to address concerns regarding LAWS during the April 2018 meeting of the UN CCW GGE on LAWS.[13]

Uganda

As it indicated during the April 2018 meeting of the UN CCW GGE on LAWS), Uganda is interested in negotiating a treaty on and in favor of an absolute ban on LAWS.[14]

Zambia

Zambia is in favor of negotiating "a new international law—a new treaty or CCW protocol—to address concerns over" LAWS.[15]

Zimbabwe

Zimbabwe supports negotiating "a new international law—a new treaty or CCW protocol—to address concerns over" LAWS and is in favor of banning LAWS.[16]

The government of Zimbabwe reportedly recently signed a strategic partnership framework agreement with a Chinese company, CloudWalk (with the agreement backed by the Chinese government's Belt and Road Initiative), to deploy facial recognition software in the capital Harrare, and to build a national facial database.[17] The benefits sought by China and Zimbabwe

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[12] *Id*. at 7.

[13] *Id*.

[14] *Id*. at 8 & 9.

[15] *Id*. at 8.

[16] *Id*. at 8 & 9.

[17] Shan Jie, *China Exports Facial ID Technology to Zimbabwe*, GLOBAL TIMES (Apr. 12, 2018), http://www.globaltimes.cn/content/1097747.shtml, *archived at* https://perma.cc/M2UZ-WHN2; Arthur Gwagwa, *Exporting Repression: China's Artificial Intelligence Push into Africa*, COUNCIL ON FOREIGN RELATIONS (Dec. 18, 2018),

from this deal were characterized by one source as follows: "Chinese AI companies get to train their algorithms on Africans to diversify their datasets and Zimbabwe gets to use cutting edge tech to monitor its population."[18] Yao Zhiqiang, CloudWalk's CEO, explained the importance of places like Zimbabwe for the improvement of his company's products as follows: "The differences between technologies tailored to an Asian face and those to a black one are relatively large, not only in terms of color, but also facial bones and features . . . . The machine learning needed to expand the technology's capability would require sufficient data."[19]

https://www.cfr.org/blog/exporting-repression-chinas-artificial-intelligence-push-africa, *archived at* https://perma.cc/9PSA-B85M; Lynsey Chutel, *China is Exporting Facial Recognition Software to Africa, Expanding its Vast Database*, QUARTEZ AFRICA (May 25, 2018), https://qz.com/africa/1287675/china-is-exporting-facial-recognition-to-africa-ensuring-ai-dominance-through-diversity/, *archived at* https://perma.cc/AAR6-CSGK.

[18] Gwagwa, *supra* note 17.

[19] Chutel, *supra* note 17.