G20 BRASIL 2024
BUILDING A JUST WORLD AND A SUSTAINABLE PLANET

Mapping the Development, Deployment and Adoption of AI for Enhanced Public Services in the G20 Members

Artificial Intelligence for Inclusive Sustainable Development and Inequalities Reduction

Digital Economy Working Group

Report prepared under the Brazilian Presidency of the G20

Knowledge partner

unesco

Mapping the Development, Deployment and Adoption of AI for Enhanced Public Services in the G20 Members

Artificial Intelligence for Inclusive Sustainable Development and Inequalities Reduction

Digital Economy Working Group

Report prepared under the Brazilian Presidency of the G20

MINISTRY OF SCIENCE, TECHNOLOGY AND INNOVATION

BRAZILIAN GOVERNMENT BRASIL UNITING AND REBUILDING

unesco

nic.br Brazilian Network information Center

cgi.br Brazilian Internet Steering Committee

August 2024

Acknowledgments

This report has been developed under the auspices of the Brazilian Presidency of the G20, by the Digital Economy Working Group, and coordinated by the Ministry of Science, Technology and Innovation (MCTI), with the participation of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the G20 Presidency's knowledge partner for priority Artificial Intelligence, and the Brazilian Network Information Center (NIC.br)/Brazilian Internet Steering Committee (CGI.br).

The report was elaborated by the MCTI, with contributions from Renata Vicentini Mielli, Henrique de Oliveira Miguel, Eliana Cardoso Emediato de Azambuja, Cristina Akemi Shimoda Uechi, André Rafael Costa e Silva, Daniel Silva Boson, Everton Goursand de Freitas, Fabio Manoel França Lobato, Adriana Cursino Thomé and Paulo Roberto Certo Fernandes Afonso. Thiago Guimarães Moraes and Fabiana Silva Pinto Faraco Cebrian from the Brazilian National Data Protection Authority (ANPD) also contributed to the report.

The report was also co-authored by UNESCO's Secretariat with contributions from Mariagrazia Squicciarini, Chief of Executive Office of the Social and Human Sciences Sector, and Elettra Ronchi, Senior Consultant, under the oversight of the Assistant Director General for Social and Human Sciences, Gabriela Ramos.

Research, technical assistance and data analysis was provided by Brazilian Network Information Center (NIC.br)/Brazilian Internet Steering Committee (CGI.br) with contributions from Alexandre F. Barbosa, Fabio Senne, Marcelo Pitta, Bernardo Ballardin, Luiza Carvalho, Leonardo Melo Lins, Manuella Maia Ribeiro, Rodrigo Brandão de Andrade e Silva, Thiago de Oliveira Meireles and Winston Oyadomari.

The authors also thank the members of the G20 DEWG for their inputs and guidance during the development of this report.

Executive Summary

As Artificial Intelligence (AI) permeates every facet of our societies and economies with the potential to transform a wide range of sectors, governments worldwide are progressively considering how best to leverage AI technologies to enhance the provision of public services. This includes not only traditional AI applications but also the latest advancements in generative AI.

In the public sector, a variety of AI applications offer unique opportunities to improve the type, quality, and quantity of services available to citizens. AI can reduce organizational costs; support user-centric service personalization, and make service delivery more efficient and effective. However, implementing AI for public services remains a challenge in most countries, for a number of reasons, including physical and human capital endowment, organizational setting, and infrastructures, among others. It further requires implementing proper guardrails to ensure that AI does not introduce new risks or inequalities nor exacerbate existing ones.

The report "Mapping AI Adoption for Enhanced Public Services in the G20 – Opportunities, Challenges, and Path Forward to Measuring its Adoption" contributes to this objective. It presents G20 members' experiences in the development, deployment, and use of AI for public services. It maps existing approaches and methodologies, including frameworks and indicators, used by G20 members to assess and facilitate AI adoption in and by the public sector.

This report was developed by the Brazilian Presidency of the G20 as a collaboration between the Ministry of Science, Technology and Innovation (MCTI); the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Brazilian Presidency's knowledge partner on artificial intelligence; and the Brazilian Network Information Center (NIC.br)/Brazilian Internet Steering Committee (CGI.br). It was made possible thanks to the provision of relevant information and the engagement of G20 Members and invited countries.

To inform this report, the Presidency developed and circulated a questionnaire to gather members' perspectives on the opportunities and challenges associated with AI in the public sector, to take stock of main trends, and to review existing and planned policy initiatives aimed at providing inclusive, equitable, representative, and ethical[1] AI in public services. The information

1. In line with UNESCO Recommendation on the Ethics of AI, with all G20 Members and invited countries being UNESCO Members.

collected through the questionnaire was complemented with quantitative data and indicators from international organizations such as UNESCO, OECD, and UN, and institutions such as Oxford Insights and Stanford University.

The overall picture that emerges can be synthesized as follows:

1. Many governments are already utilizing AI technologies, such as chatbots, virtual assistants, facial recognition, and machine learning algorithms. AI is leveraged for data analysis, to improve operational efficiency, to enhance responsiveness in service delivery, to reduce costs, and to increase citizen engagement. AI may also help personalize public services and support evidence-based decision-making.
2. Ensuring equity and non-discrimination emerges as a concern among G20 members, with countries emphasizing fairness and inclusiveness as fundamental values in the development, deployment, and use of AI systems and the need to address the risks of economic concentration and the creation of new inequalities between countries and people. Countries describe various mechanisms and approaches to promote inclusiveness in AI applications regardless of gender, race, religion, disability, age, or sexual orientation. To achieve fairness, AI systems should be safe, secure, trustworthy, transparent, and explainable, which needs regulatory mechanisms that enable an assessment to verify if these systems adhere to ethical principles.
3. Governments generally pursue two main strategies to tackle the development, deployment, and use of AI within the public sector.
    - The first strategy involves setting guidelines designed to the development, deployment, and use of AI systems in the public sector. These guidelines serve as frameworks that outline ethical standards, regulatory compliance, and operational protocols or standards to ensure responsible and accountable use of AI technologies.
    - The second strategy focuses on practical implementation through experimental approaches. This approach entails testing AI applications in controlled environments or pilot projects to evaluate their efficacy, reliability, and societal impact before broader deployment. By experimenting with AI technologies, governments can identify potential risks, refine algorithms, and assess the practical implications of integrating AI into public services.

Together, these strategies aim to balance innovation with regulatory oversight, fostering a climate where AI advancements can enhance public service delivery while safeguarding against risks such as bias, privacy violations, and inequitable outcomes.

4. Many initiatives are in place to analyze and mitigate AI's impact on marginalized groups and minorities, and to ensure that the benefits of AI are distributed equitably. These initiatives include fostering research and development on responsible and ethical AI; developing regulatory frameworks on fairness, transparency, privacy, and inclusiveness; and upskilling public servants.
5. Despite these proactive measures, the stage of development, deployment, and use of AI in public service between countries remains fundamentally uneven. Few countries have established comprehensive mechanisms to evaluate and mitigate the specific risks and challenges that AI may pose to marginalized and vulnerable groups and minorities. This gap underscores the need for enhanced attention and targeted strategies to ensure that AI technologies not only advance public service efficiency but also promote social equity and inclusivity.
6. A number of tools already exist that can help monitor and evaluate how AI is developed, deployed, and used in and by the public sector, to assist policymakers in understanding the opportunities, identifying gaps, and developing strategies to harness AI's potential to enhance government effectiveness and service delivery. On the other hand, most of the countries informed that they do not have a government body responsible for developing and monitoring the implementation of their respective national AI strategy for the public sector. This absence underscores a common challenge faced by governments striving to navigate the complexities of AI integration into public services. Without a coordinating or centralized effort to drive and monitor the implementation of AI strategies, coherence and coordination across different departments and agencies should remain limited.

Moving forward, establishing robust governance structures and dedicated bodies within governments can play a pivotal role. These entities would be tasked not only to develop comprehensive AI strategies tailored to the specific needs of the public sector, but also to monitor implementation, evaluate outcomes, and foster continuous improvement. Such initiatives appear crucial to ensure that AI technologies are leveraged in a safe, secure, responsible, transparent, effective, and ethical approach, leaving no one behind, to meet the evolving demands of modern governance and public service provision.

Table of contents

Executive Summary **5**

Introduction **10**

Leveraging AI for public service provision: Overview of current practices **13**

Ethical concerns, equity, and inclusiveness for the provision of public services 13
Strategies for the development, deployment, and use of ai in public services 20
Fairness, transparency, privacy and inclusiveness of AI-based systems 24
Governance arrangements and multistakeholder engagement 27

AI applications in the public sector **30**

Efficiency of public sector – Internal operations 32
Responsiveness of public service delivery 33
Effectiveness of policymaking 34
Integrity of government 34
Efficiency of core government functions 35

Opportunities and challenges in AI adoption for public services **36**

Findings and closing remarks **43**

References **47**

Annex 1 – Compilation of measurement tools and frameworks **50**

UNESCO Recommendation on the Ethics of Artificial Intelligence 50
UNESCO Readiness Assessment Methodology 51
UNESCO Ethical Impact Assessment 54
OECD AI Principles 55
OECD's AI Policy Observatory 56
OECD Framework for Classifying AI Systems 58
OECD AI Incidents Monitor (AIM) 59
UN E-Government Development Index 60
Oxford Government AI Readiness Index 61
Stanford AI Index 64

Figures

Figure 1. National AI Strategies that encompass ethical, equity, and inequality considerations....14
Figure 2. AI and the public sector: National provisions related to AI development, deployment, and use....20
Figure 3. AI in the Public Sector: Ethical Concerns and Impact on Marginalized Groups....24
Figure 4. AI in the public sector: Public organizations responsible for the development and the monitoring of national ai strategies....28
Figure 5. Public service sectors where government has leveraged AI technologies....30
Figure 6. AI applications: Uses of AI by the public sector....31
Figure 7. AI applications: Key aims pursued....31
Figure 8. Capacity building: Training strategies for civil servants....39
Figure 9. Sectors in which the governments have leveraged AI technologies....44
Figure 10. UNESCO Recommendation on the Ethics of AI: Values and principles....51
Figure 11. UNESCO Recommendation on the Ethics of AI: Policy area....53
Figure 12. OECD AI Principles....56
Figure 13. AI initiatives in the public sector by territory....57
Figure 14. Number of AI incidents affecting the government per country (Peak month 2024/02)....59
Figure 15. E-Government development index (2022)....61
Figure 16. The pillars of the government AI readiness index....62
Figure 17. Government AI readiness index scoresoverall score (/100) and rank (/193)....63

Tables

Table 1. Opportunities and challenges in priority application areas....36

Introduction

Artificial Intelligence (AI) is being progressively developed, deployed, and used by governments worldwide, opening up a range of possibilities to improve functions of the governments at all levels, and the provision of public services.

Leveraging AI for public services delivery may help enhance the operational efficiency of governments and the responsiveness and timeliness of public services, including for improvement, enforcement, risk management, and response to disasters and emergencies. It can further help reduce the cost of core government functions (e.g., financing, management, communication, etc.) and increase citizens' engagement and participation in democratic processes. Moreover, AI has the potential to enhance accessibility to public services, personalize service delivery for citizens, and contribute relevant evidence in support of policy and decision-making.

To achieve this, transparency and accountability of AI-based solutions emerge as crucial requirements for the development, deployment, and use of ethical AI systems that respect fundamental rights and freedoms such as privacy, data protection, inclusion, and digital autonomy. This is consistent with the recent UN Resolution titled "Seizing the opportunities of safe, secure, and trustworthy artificial intelligence systems for sustainable development", which explicitly refers to the UNESCO Recommendation on the Ethics of Artificial Intelligence (henceforth, UNESCO Recommendation), among others.

While the prospective benefits of leveraging AI in and by the public sector are evident, a number of challenges need to be addressed for countries to be able to take advantage of such technologies to enhance their operations and service provision. Common challenges among G20 members emerge in this respect. These include cultural barriers; institutional settings (e.g., lengthy bureaucratic processes, siloed organizations, outdated legacy digital systems) that lead to high implementation and coordination costs; a lack of skilled professionals with relevant technical knowledge; difficulties in implementing and monitoring deployment and evaluating impact; and the need to ensure access to quality, representative and unbiased data while respecting security and privacy.

Low and middle-income countries face additional challenges such as comparatively higher development and implementation costs; the need for strategies to retain AI specialists and avoid brain drain; and balancing digital autonomy with international cooperation to access the necessary technological infrastructure and access the resources they lack.

Bearing the above in mind, as well as the need for individuals and societies to remain at the heart of AI development, deployment, and use in and by the public sector, the present analysis sheds light on G20 members' perspectives on the opportunities and challenges that governments face when leveraging AI-based solutions, monitoring their use in and by the public sector, and evaluating the outcomes. By leveraging countries' experiences and expertise, this report aims to foster the provision of more inclusive, equitable, representative, ethical AI-enhanced public services. This report also presents examples of current practices, use cases, and approaches employed by G20 members to monitor deployment and impact.

Approach and Main Components

The present analysis relies on G20 Members' responses to a questionnaire focusing on four key dimensions or areas:

1. Ethics and the possible challenges / negative impacts stemming from the development, deployment, and use of AI in the public sector;
2. Opportunities linked to AI use in and by the public sector;
3. AI applications and regulatory monitoring; and
4. Capacity building.

The present document was not aimed to describe the stage of development, deployment, and use of individual AI applications, nor their evaluation.

To enable a comprehensive assessment, each dimension includes a number of sub-categories, analyzed using available data and indicators from international organizations including UNESCO, OECD, UN, and institutions such as Oxford Insights and Stanford University, spanning the four dimensions related to AI in and by the public sector, in addition to qualitative responses gathered through a questionnaire administered to G20 members and guest countries by the Brazilian G20 Presidency.

The first section of this report provides an **overview of current practices**, outlining the development, deployment, and use of AI in and by the public sector across G20 members. The second section sheds light on the **main AI applications in the public sector**, exploring how AI can enhance public service delivery, improve efficiency, reduce costs, and foster innovation. The third section discusses **the opportunities and challenges governments face** when deploying and using AI for public services, such as cultural barriers, financial issues, and technical difficulties. The final section highlights the **main findings and closing remarks**. Finally, the Annex offers an overview of existing **monitoring and measurement Instruments** and **methodologies** aimed at assessing the development, deployment, and use of AI in and by the public sector across G20 members.

Leveraging AI for public service provision: Overview of current practices

The responses from twenty three countries (seventeen G20 members and six guest countries) clearly indicate that AI is now considered a key enabler of digital innovation and transformation of and in the public sector[2].

Ethical concerns, equity, and inclusiveness for the provision of public services

This section reports on the availability of the responding G20 members' national AI strategies. It examines whether these strategies or action plans (whether already available, or in the process of being adopted or updated) are considering issues related to ethical concerns such as equity, fairness, and the reduction of inequalities. Governments have a crucial role to play in paving the way, and many governments worldwide have adopted ethical principles and guidelines to ensure that AI development and deployment are rooted in fundamental rights.

To situate the context in which public solutions can be developed, in 2020[3], more than 50 countries have already established or were in the process of adopting national AI strategies. Four years later, several countries are actively updating their AI strategies. These initiatives become more relevant due to the advanced AI systems, such as generative AI, which emphasize the need for relevant guardrails ensuring that the development, deployment, and use of AI technologies align with ethical standards, including safety, security, and trustworthiness, and contribute to enabling societal welfare and well-being.

2. African Union, Argentina, Australia, Brazil, Canada, China, Denmark, France, Germany, Italy, Indonesia, Japan, Norway, Portugal, Republic of Korea, Russia, Saudi Arabia, Spain, Turkey, United Arab Emirates, United Kingdom, United States, Uruguay.

3. Information retrieved from the World Bank's survey on Artificial Intelligence in the Public Sector: Maximizing Opportunities, Managing Risks, available at: https://documents.worldbank.org/en/publication/documents-reports/documentdetail/809611616042736565/artificial-intelligence-in-the-public-sector-maximizing-opportunities-managing-risks [Accessed 03 Mar. 2024].

Figure 1. National AI Strategies that encompass ethical, equity, and inequality considerations

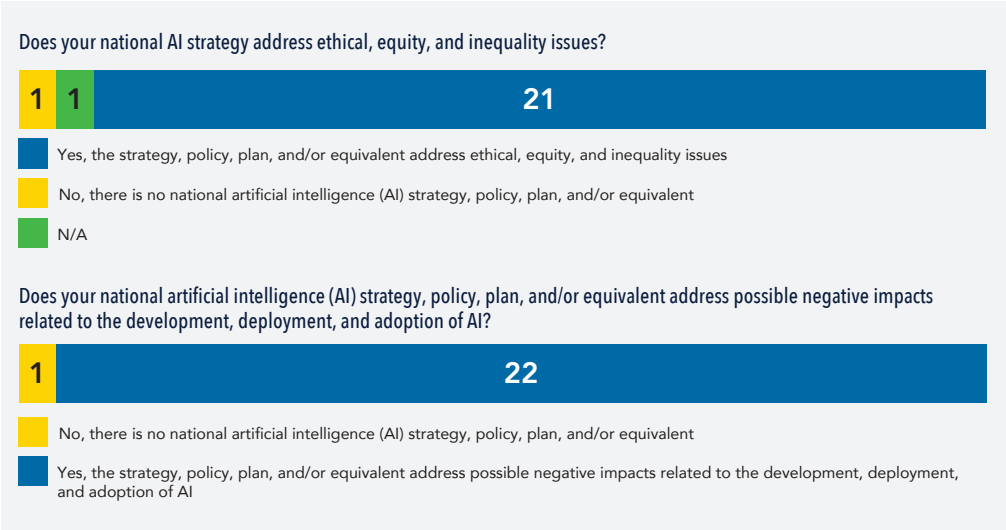


Figure 1 shows that nearly all responding G20 members have developed national AI strategies, policies, or action plans and that these strategies address the potential ethical implications of AI, including equity considerations and the reduction of inequalities. These strategies reflect countries' alignment with the UNESCO Recommendation and are consistent with the UN resolution on "Seizing the opportunities of safe, secure, and trustworthy artificial intelligence systems for sustainable development".

Justice and non-discrimination emerge among the most pressing ethical considerations, with countries stressing equity as a fundamental value guiding the development, deployment, and use of AI systems. This requires countries to implement measures to eliminate any form of prejudice, discrimination, or stigmatization that may arise from issues such as data quality, representativeness concerns, and the design and use of algorithms. The mechanisms and approaches described by countries highlight the importance of inclusiveness and representation of diverse segments of society, as well as the need to promote fairness in AI applications, ensuring equitable treatment regardless of gender, race, religion, disability, age, or sexual orientation. These efforts underscore a commitment to creating AI systems that reflect the values of diversity and equity, ensuring that the benefits of AI are accessible to all and that no one is marginalized or disadvantaged.

Responding countries further emphasized that AI systems need to be transparent and explainable to achieve fairness. Transparency is crucial to enabling the full engagement of citizens and public officials in leveraging AI-based solutions. Regulatory mechanisms could enable an assessment of compliance with ethical and regulatory principles, and lead to responsible AI-powered services, under an effective governance of AI systems.

Countries also consider the need to have clear and comprehensive accountability mechanisms related to the entire chain of AI-powered public service provision. These views are particularly pronounced in some countries where the private sector plays a leading role in providing essential digital services, and enabling or assisting public service delivery.

Countries' highlights

China has been promoting public awareness of AI ethics by fostering Research and Development (R&D) focused on the implementation of responsible AI. In 2019, the National Governance Committee for New Generation Artificial Intelligence produced the "Governance Principles for the New Generation AI: Developing Responsible AI" which emphasizes the need for responsible AI. These governance principles were followed by the "Ethical Norms for New Generation AI" introduced in 2021[4].

Brazil's strategy is leveraging R&D, with the Brazilian government encouraging the production of ethical AI by funding R&D projects that aim to implement ethical solutions, especially in the areas of fairness (equity and non-discrimination), responsibility, accountability, and transparency, known as the FAT matrix[5]. These ethical solutions may also support state transformation and technological development.

The **United Kingdom** mainly adheres to the 2019 OECD's AI principles[6] (updated in 2024), which promote responsible AI that upholds human rights and democratic values. The UK's AI Whitepaper puts forward guidelines based on five pillars: safety, security, and robustness; appropriate transparency and explainability; fairness; accountability and governance; and contestability

4. Information provided by the Chinese Government.

5. Information provided by the Brazilian Government.

6. Information retrieved from the OECD, Recommendation of the Council on Artificial Intelligence, OECD/LEGAL/0449: https://legalinstruments.oecd.org/en/instruments/oecd-legal-0449. [Accessed 03 Mar. 2024]. The OECD's document highlights issues related to: i) inclusive growth, sustainable development, and well-being; ii) respect for the rule of law, human rights, and democratic values, including fairness and privacy; iii) transparency and explainability; iv) robustness, security, and safety; and v) accountability.

and redress[7]. The last pillar also aligns with the UNESCO Recommendation on the Ethics of Artificial Intelligence, underscoring the need to provide mechanisms to halt and redress harmful decisions or outcomes generated by AI. This ensures the ability to audit, challenge, and reverse decisions that may violate ethical principles.

Saudi Arabia adheres to the principles of fairness, which *"requires taking necessary actions to eliminate bias, discrimination or stigmatization of individuals, communities, or groups in the design, data, development, deployment, and use of AI systems"*[8].

Italy aligns with the EU AI Act and the "Ethics Guidelines for Trustworthy AI" from the High-Level Expert Group on AI, to ensure the ethical governance of AI applications[9].

Canada has put forward a risk management approach through its "Artificial Intelligence and Data Act" (AIDA) plan, which aligns with international standards such as the EU AI Act and is integrated into the country's existing legal frameworks, to enable interoperable governance. What is "*proposed in the AIDA is the first step towards a new regulatory system designed to guide AI innovation in a positive direction, and to encourage the responsible adoption of AI technologies*"[10]. AIDA puts forward a risk-based approach, especially related to health, safety, and human rights risks, and foresees updates as technology evolves. It also proposes the creation of a new office of the AI Commissioner, which will work on a wide range of topics (from education and AI literacy to compliance), reinforcing the Minister of Innovation, Science and Industry. Businesses will be held accountable for high-impact AI systems at every stage, including documenting and mitigating risks, ensuring transparency, and maintaining oversight. High-impact AI systems will need to adhere to Canadian safety and human rights standards[11].

The **United States** reported two instruments addressing ethical, equity, and inequality issues. First, the "Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence" (henceforth "Executive Order"), which "*advances equity and civil rights by directing the*

7. Information provided by the United Kingdom Government.

8. Information provided by the Saudi Arabia Government.

9. Information provided by the Italian Government.

10. Information retrieved from the Artificial Intelligence and Data Act (AIDA) – Companion document, available at: https://ised-isde.canada.ca/site/innovation-better-canada/en/artificial-intelligence-and-data-act-aida-companion-document [Accessed 03 Mar. 2024].

11. Information provided by the Canada Government.

development of guidance for landlords, administrators of Federal benefits programs, and Federal contractors to prevent AI algorithms from being used to discriminate, and developing guidance of the use of AI in the criminal justice system and policing"[12]. The second is the White House Office of Management and Budget (OMB) Policy on Advancing Governance, Innovation, and Risk Management for Agency Use of Artificial Intelligence, which "*establishes new Federal agency requirements and guidance for AI governance, innovation, and risk management. The policy establishes safeguards for AI that impacts rights and safety, requiring Federal agencies to reliably assess, test, and monitor AI's impacts on the public and mitigate the risks of algorithmic discrimination"*[13].

Turkey states that "Regulating to Accelerate Socioeconomic Adaptation" is among its priorities. **Turkey**'s Strategy has four main objectives and outlines several measures to implement them efficiently. The objectives are: "*Objective 4.1. An agile and inclusive legal harmonization process will be implemented so that ethical and legal scenarios can be tested and discussed. Objective 4.2. In order to support reliability in AI studies, a governance mechanism that will facilitate fairness, data privacy and ethical values control and algorithmic accountability will be implemented. Objective 4.3. Scientific research and awareness on the effects and risks of AI technologies and systems on the socioeconomic structure will be increased. Objective 4.4. Data capacity will be improved in order to evaluate the impact of developments in the field of AI on the socioeconomic structure"*[14].

The **Republic of Korea** has structured its strategy around three main components: supporting voluntary commitments from the private sector to uphold AI ethics; establishing technological foundations and frameworks ensuring AI ethics and trust; and enhancing public awareness of responsible AI. The latter encourages communication and social consensus among stakeholders[15].

Japan reported the AI Guidelines for Business[16], which is intended for all AI business actors, including public institutions who develop, provide, or use

---

12. Information retrieved from the Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence, available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/?utm_source=link [Accessed 03 Mar. 2024].

13. Information provided by the United States Government.

14. Information provided by the Turkey Government.

15. Information provided by the Republic of Korea Government.

16. Information retrieved from AI Guidelines for Business Ver1.0 (April 19, 2024), available at: https://www.meti.go.jp/shingikai/mono_info_service/ai_shakai_jisso/pdf/20240419_9.pdf [Accessed 29 Jun. 2024].

AI in their operations. The guidelines aim to ensure the respect of the rule of law, human rights, democracy, and diversity, promoting a fair and just society[17].

Indonesia released a "Circular Letter of the Minister of Communications and Informatics Number 9 in 2023 concerning Ethics on AI", covering aspects such as inclusivity, security and personal data protection, accessibility, transparency, and accountability. Moreover, the draft of the updated version of the Indonesian National Strategy on Artificial Intelligence addresses issues of equity, digital literacy, and assessment impact of AI deployment[18].

Germany recognizes the importance of policies and regulatory frameworks to foster the responsible and public-good-oriented development and use of AI, as well as to address associated risks. It reports that the "*National AI strategy reflects the German Federal Government's commitment to the responsible and human-centric development, deployment and use of AI technologies that serve the good of society*"[19].

France reported that its strategy relies heavily on experimentation. It aims to involve experts in assessing the impact of AI on jobs and labor, on inclusion (including people with disabilities), and to mitigate cultural biases that could lead to inequalities by e.g. contributing to the replication of stereotypes.

The **African Union** has just adopted the "Continental Artificial Intelligence (AI) Strategy and African Digital Compact policy", which aims to ensure, among others, that AI is developed, deployed, and used ethically and equitably, and enables equal opportunities for all [20].

Spain pointed out that its national AI strategy covers ethical aspects of the use of AI in and by public services, which is supervised by the Spanish Agency for the Supervision of Artificial Intelligence (AESIA), responsible for ensuring that safe, responsible, and ethical artificial intelligence systems are deployed in Spain. The strategy mentions directly an initiative called "Plan for the protection of vulnerable groups". The strategy also covers technologies such as language models and industrial and cybersecurity applications[21].

17. Information provided by the Japan Government.

18. Information provided by the Indonesia Government.

19. Information provided by the Germany Government.

20. Information provided by the African Union, and updated following the adoption of the Continental Artificial Intelligence (AI) Strategy and African Digital Compact on 17 June, https://au.int/en/pressreleases/20240617/african-ministers-adopt-landmark-continental-artificial-intelligence-strategy [Accessed 20 Jul. 2024].

21. Information provided by the Spanish Government.

Norway has reported that its ethical principles are in line with those established by the European Union. The document states that AI developed and used in Norway should be based on ethical principles and respect human rights and democracy and also stimulates public debate on the ethical use of AI[22].

Uruguay also has a national strategy whose principles are based on the ethical and responsible use of artificial intelligence, but not mentioning directly its application in the public sector. The document broadly states that if AI-based solutions face ethical dilemmas, they should be solved by humans, reinforcing the concept of the human in the loop. This document is under review to address the impacts of AI in the public sector[23].

United Arab Emirates is reviewing its national policies in light of the latest international best practices and the global risks posed by AI technologies. United Arab Emirates mentioned the launch of an AI Ethics framework that emphasizes fairness and human-centered AI. These principles are designed to mitigate risks related to the exacerbation of social and economic disparities, particularly those influenced by demographic characteristics such as gender or ethnicity[24].

Portugal has a national artificial intelligence strategy (AI Portugal 2030), published in 2019 and revised in 2023, with an ethical focus on research, qualification, education, and inclusion. The Strategy for the Digital Transformation of Public Administration 2021-2026 includes a "Data Valorization" axis intending to promote a data economy that adds value without creating, excluding, or discriminating against population segments, also providing a guideline with a set of recommendations for the adoption of ethical, responsible and transparent AI in the public administration. The country is adapting its tools to meet new challenges posed by Generative AI and General-Purpose Models[25].

In **Denmark**, the first objective set out in the national AI strategy states that Denmark should have a common ethical and human-centered basis for artificial intelligence[26].

---

22. Information provided by the Norway Government, and updated following the National Strategy for Artificial Intelligence, available at: https://www.regjeringen.no/en/dokumenter/nasjonal-strategi-for-kunstig-intelligens/id2685594/?ch=7#id0048 [Accessed 20 Jul. 2024].

23. Information provided by the Uruguayan Government.

24. Information provided by the Government of United Arab Emirates.

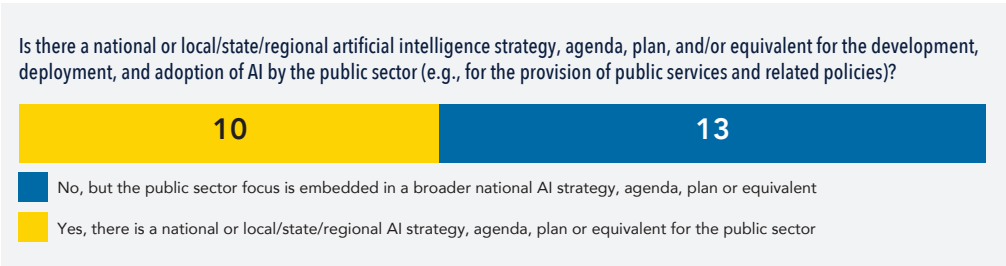
25. Information provided by the Portuguese Government.

26. Information provided by the Danish Government.

Strategies for the development, deployment, and use of AI in public services

Ten out of twenty-three responding G20 members indicated they had specific provisions related to AI in the public sector.

Figure 2. AI and the public sector: National provisions related to AI development, deployment, and use



Establishing provisions specifically aimed at promoting the ethical development, deployment, and use of AI technologies within the public sector mirrors a growing recognition among G20 members that AI applications in government operations uphold ethical standards and serve public interests effectively. These provisions often include guidelines for data governance, algorithmic transparency, and accountability frameworks, to mitigate risks and promote responsible AI innovation.

For instance, **the United Kingdom** recognizes the need for a specific plan to support AI adoption in the public sector to maximize the opportunities and mitigate the risks of AI in providing public services[27].

Additionally, the 2024 G7 Ministerial Declaration on Industry, Technology, and Digital stated that *the development, deployment and use of AI systems cannot ignore ethical considerations and has to respect the democratic values of G7 members, as well as the protection of human rights and fundamental freedoms, while preventing and mitigating possible misuse and abuse*[28].

27. Use of artificial intelligence in government. Information retrieved from: https://www.nao.org.uk/reports/use-of-artificial-intelligence-in-government/ [Accessed 03 Mar. 2024].

28. Information retrieved from the G7 Ministerial Declaration, available at: https://assets.innovazione.gov.it/1710505409-final-version_declaration.pdf [Accessed 03 Mar. 2024].

This risk-based approach represents a convergence point between the **EU**'s AI Act (the "Act"), **Canada**'s AIDA, and the **US** Executive Order [29]. Other countries are adopting this approach as well, including **Brazil**, which is currently working on Bill No. 2,338 of 2023, also known as the Artificial Intelligence Law. This bill aims to establish standards for the development, deployment, and use of responsible AI systems in the country. More recently, Brazil launched the Brazilian Plan of AI, focused on the "AI for the good of all", which determines a set of practical actions to foster the use of AI in the country. One of the five axes is focused on use of AI to enhance public services, which includes improvement of data governance and specific promotion of AI.

Countries' highlights

Two main strategies were highlighted to govern the development, deployment, and use of AI within the public sector. The first strategy involves setting guidelines to the development, deployment, and use of AI systems for public services. The second strategy focuses on practical implementation, also through experimental approaches.

Saudi Arabia, the Republic of Korea, the United States, the United Arab Emirates and Canada seem to rely on the first strategy.

In **Saudi Arabia**, the Data and AI Strategy, overseen by the Saudi Data & AI Authority (SDAIA) prioritizes adapting Data & AI in government to create smarter and more effective public services. Moreover, SDAIA has launched GenAI Guidelines for government employees, providing guidelines about the adoption and use of generative AI systems, which also include examples based on common scenarios that entities may need to address, challenges, considerations, principles for responsible use, and recommended practices[30].

The **Republic of Korea** released in April 2024 the "People-Industry-Public Project Promotion Plan to Spread AI in Daily Life". The plan "*includes policies to internalize AI in disaster prevention and public administration services to enhance response capacity to fires and floods, thereby improving the quality of public services and reducing the volume of administrative work*". Other pertinent documents are: the "Guidelines on Adopting Hyperscale AI in the Public Sector"; the "Personal Information Protection Commission (PIPC) – Policy

29. Information retrieved from the Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence, available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/?utm_source=link [Accessed 03 Mar. 2024].

30. Information provided by the Saudi Arabia Government.

Direction for Safe Handling of Personal Data in the Era of Artificial Intelligence", and, the "Practical Guide to Adopting AI in the Public Sector" - the latter distributed through internal system[31].

The **United States** responded that the Executive Order "*contains a range of actions to establish new standards for AI safety and security, protect Americans' privacy, advance equity and civil rights, stand up for consumers and workers, ensure effective government use of AI, promote innovation and competition, and more". And the "OMB's policy on Advancing Governance, Innovation and Risk Management for Agency Use of Artificial Intelligence contains mandatory risk management practices for AI that impacts rights or safety."*[32]

Canada highlighted four key documents that contain guiding principles and best practices, primarily aimed at empowering staff to deliver better services, design ethical services and collaborate widely. These documents are: "Policy on Service and Digital", "Directive on Automated Decision Making", "Algorithmic Impact Assessment Tool" and "Guide on the use of Generative AI"[33].

United Arab Emirates indicated that the Council for Artificial Intelligence oversees the AI integration in government departments and education sector[34]. The council also propose policies to create an AI-Friendly ecosystem and promote the collaboration between the public and private sector. Furthermore, the United Arab Emirates published the "AI Adoption Guideline in Government Services" that also provides an National AI Framework[35].

France and **Brazil** have adopted a different strategy and rely mainly on practical deployment and experimentation. In **France**, for example, the tax department is experimenting the use of computer vision to detect undeclared swimming pools through satellite images. Additionally, progressive experimentation with generative AI has been underway since last year, with applications expected to be implemented widely by the end of 2024[36]. **Brazil** recently created an AI Center with the participation of several public agencies and companies, whose objective is to prospect and structure strategic AI projects, carry out practical experiments, and provide a platform for common use for the entire government.

---

31. Information provided by the Republic of Korea Government.

32. Information provided by the United States Government.

33. Information provided by the Canadian Government.

34. Information provided by the Government of United Arab Emirates.

35. Information retrieved from the AI Adoption Guideline in Government Services, available at: https://u.ae/-/media/AI-publications/AI-Adoption-Guideline-in-Government-Services-Eng.pdf [Accessed 16 Ago. 2024].

36. Information provided by the French Government.

In addition, Russia and Indonesia provided information on broader strategies. **Russia**'s strategy is outlined in the National Strategy for the Development of Artificial Intelligence, updated in February 2024, which sets a comprehensive framework for AI development and deployment until 2030[37]. **Indonesia** has been working on a national AI strategy that encompasses various sectors, emphasizing ethical AI development, capacity building, and international collaboration[38].

Norway recognizes the vast potential for the public sector to rationalize and create better services through digitalization, especially with AI, and aims that public sector organizations facilitate experimenting with artificial intelligence to gain knowledge about and experience in the technology[39].

In **Spain**, the updated version of the National Strategy highlights the importance of AI to improve public service quality, with applications on response time and quality improvement, public services personalization, and AI usage on decision-making for public policy development[40].

Uruguay states in its strategy that the application of AI in Public Administration opens up a series of potentialities that can radically change the way we relate to the state, design and implement public policies, measure results, and make decisions[41].

In **Portugal**, an action plan dedicated to public services aims to promote the use and combination of public sector data with data from other sources to better inform public policies and decision-making processes[42].

Among G20 members that do not have a specific AI policy for the public sector but have developed guidelines as part of a broader agenda, two provided information about how they steer the development, deployment, and use of AI in their governments.

Italy has recently introduced a bill that regulates the use of AI in the public sector, aiming to ensure the smooth running and efficiency of administrative activities. This legislation emphasizes the principles of self-determination and human responsibility, aligning closely with the guiding principles and provisions of the EU AI Act[43].

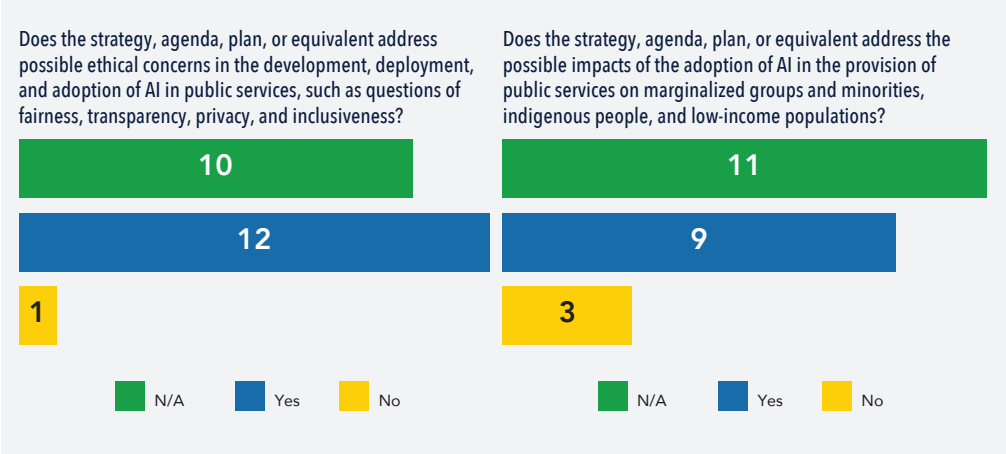
37. Information provided by the Russian Government.
38. Information provided by the Indonesian Government.
39. Information provided by the Norwegian Government.
40. Information provided by the Spanish Government.
41. Information provided by the Uruguayan Government.
42. Information provided by the Portuguese Government.
43. Information provided by the Italian Government.

The **United Kingdom**'s National AI Strategy establishes that the UK public sector should lead by example in the safe and ethical deployment of AI, demonstrating best practices through its own use of the technology. Additionally, the UK government is in the process of developing a strategy for the adoption of AI in the public sector, which is due for publication by the end of 2024[44].

Fairness, transparency, privacy and inclusiveness of AI-based systems

Twelve responding G20 members reported specific provisions for the development, deployment, and use of AI in the public sector, indicating that they do address possible ethical concerns. Only nine of these countries also address the impacts of AI adoption in the provision of public services on marginalized groups and minorities, Indigenous people, and low-income populations.

Figure 3. AI in the Public Sector: Ethical Concerns and Impact on Marginalized Groups



44. Information provided by the United Kingdom Government.

Three main approaches to address AI ethical concerns have emerged:

- Establishing a dedicated agency or commission tasked with regulation, monitoring, or enforcing mandatory policies;
- Developing AI ethical guidelines; and
- Fostering research and development to raise awareness about ethical considerations.

Ethical considerations regarding representativeness, self-determination, and inclusiveness are crucial to ensure that AI technologies do not perpetuate existing biases nor create new ones or infringe on human rights. Being aware of and accounting for diversity is essential not only to avoid discrimination and foster inclusiveness, but also to develop AI systems reflecting different mindsets and approaches. Integrating different cultures, languages, and explicitly focusing on groups such as indigenous peoples, or vulnerable populations or groups can help address existing inequalities and divides.

Countries' highlights

The United States, France, Russia, Canada and Spain are the countries that have adopted the first approach. In the **United States**, the Office of Management and Budget established new federal agency requirements and guidance for AI governance, innovation, and risk management. Mandatory risk management practices generally include performing AI impact assessments; testing the performance of AI in real-world contexts; identifying and assessing AI's impact on equity and fairness; mitigating algorithmic discrimination, if needed; monitoring deployed AI in case of poor performance and harms to safety and rights; training AI users on appropriate use and limitations; providing public notice, consultation, and documentation for the AI use; allowing individuals to opt-out from the use of AI; and providing opportunities for appeal and remedy in case of harm.[45]

In **France**, the French National Privacy Agency (CNIL) has legal experts monitoring transparency issues[46]. **Russia** created a Commission to implement the Artificial Intelligence Code of Ethics[47]. In **Spain**, the Agency for the Supervision of Artificial Intelligence (AESIA) ensures that safe, responsible, and

45. Information provided by the United States Government.
46. Information provided by the French Government.
47. Information provided by the Russian Government.

ethical artificial intelligence systems are deployed in Spain, focused on defining high levels of transparency and reliability of AI models and systems through evaluation and review processes[48]. **Canada** leveraged a mandatory policy, the Directive on Automated Decision-Making, which sets requirements for federal institutions to ensure that automated decision-making systems are used in a manner consistent with core administrative law principles, and established the "Guide on the Use of Generative Artificial Intelligence", which provides principles and best practices on the use of generative AI by federal institutions[49].

In the second group, most countries consider ethical aspects as AI Principles. Similarly to **Canada**, **Saudi Arabia** also has guidelines on GenAI for public applications[50]. **Uruguay** highlights the value-added principle, in which AI-based solutions should be used only when they add value to a process[51]. The **United Arab Emirates**[52] mentioned initiatives for ensuring accessibility of government services for senior citizens and vulnerable groups.

The **Republic of Korea** established in December 2020 the National Guidelines for AI Ethics, aligned with the OECD Principles and the UNESCO Recommendation on AI. Moreover, the "Practical Guide to Adopting AI in the Public Sector" provides a self-assessment checklist for the planning stage of an AI project to help ensure that personal data protection, fairness, transparency, and liability are addressed[53].

Brazil promotes ethical AI through financing research projects aimed at applying ethical solutions, mainly focused on equity/non-discrimination, responsibility/accountability, and transparency, known as the FAT matrix. The Government establishes multisectoral spaces for the discussion and definition of ethical principles to be observed in AI research, development, and use. Additionally, it encourages transparency and the responsible disclosure of actions regarding the use of AI systems and promotes compliance by AI systems with human rights, democratic values, and diversity[54].

The **United States**, the **Republic of Korea**, **Canada**, **Norway** and **Brazil** explicitly stated their concerns to vulnerable populations, with initiatives to

48. Information provided by the Spanish Government.
49. Information provided by the Canadian Government.
50. Information provided by the Government of Saudi Arabia.
51. Information provided by the Uruguayan Government.
52. Information provided by the Government of United Arab Emirates.
53. Information provided by the Republic of Korea Government.
54. Information provided by Republic of Korea Government.

evaluate and mitigate potential risks for underserved communities. In the case of Brazil, effort is supported by digital literacy programs implemented across all educational areas and levels[55]. **Norway** calls particular attention to vulnerable persons or groups, such as children and counts on a guidance on AI equality and anti-discrimination[56].

The **Republic of Korea** analyzes the impact of AI on vulnerable populations in sectors that actively use AI[57].

The **United States** established a policy on "Advancing Governance, Innovation and Risk Management for Agency Use of Artificial Intelligence" which mandates that agencies assess the potential risks of using AI, with a special focus on the potential risks for underserved communities[58].

Canada specifically mentions gender equity in its Directive on Automated Decision-Making. It requires completing a Gender-based Analysis Plus (GBA Plus) when developing or modifying an automated decision system. The Algorithmic Impact Assessment tool, which supports the Directive, also includes a question about whether users are particularly vulnerable[59].

Governance arrangements and multistakeholder engagement

Establishing robust governance structures and dedicated bodies within governments can play a pivotal role. These entities can be tasked not only with developing comprehensive AI strategies tailored to the specific needs of the public sector, but also with monitoring implementation, evaluating outcomes, and fostering continuous improvement. Additionally, effective multistakeholder engagement and fostering interoperability across sectors contribute significantly to the development, deployment, and use of public services enhanced by AI.

Collaborative partnerships and cooperation between government and diverse stakeholders can go a long way to establishing and supporting governance frameworks for leveraging ethical, safe, secure, and trustworthy artificial intelligence systems, particularly within the public sector.

55. Information provided by the Brazilian Government.
56. Information provided by the Norwegian Government.
57. Information provided by the Republic of Korea Government.
58. Information provided by the United States Government.
59. Information provided by the Canadian Government.

Figure 4. AI in the public sector: Public organizations responsible for the development and the monitoring of national ai strategies

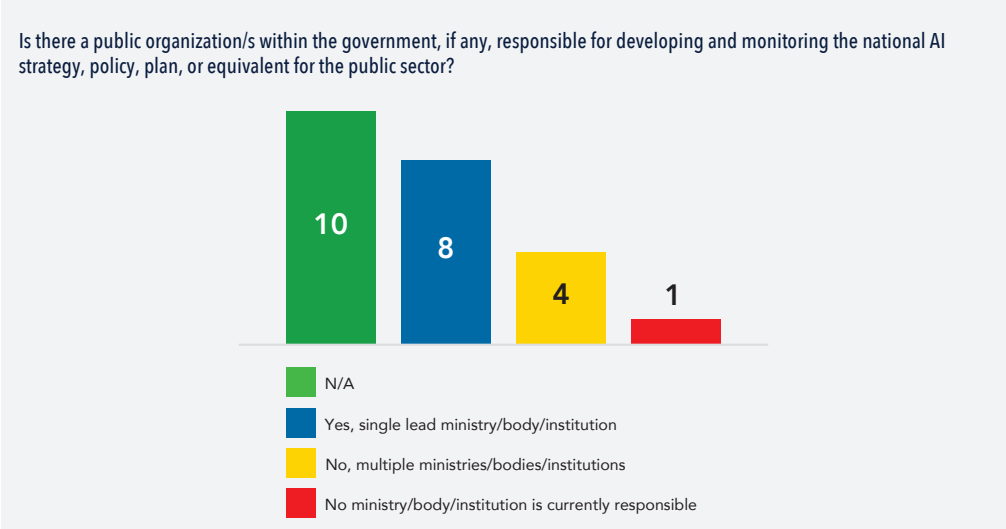


Figure 4 presents how G20 members pursue different institutional arrangements to govern the development and use of AI in the public sector. Although broadly categorized as adopting a multi-institutional or a single-lead institutional governance, countries' institutional arrangements vary significantly in structure and functions. Each arrangement depends on the country's existing institutional structures and culture and may involve different entities and a range of coordination mechanisms and responsibilities across leading institutions.

Countries' highlights

In **Canada,** AI governance is centralized under the Treasury Board, with the Treasury Board's Secretariat (TBS) and the Office of the Chief Information Officer (OCIO) overseeing its implementation. The TBS provides administrative leadership, establishes common policies, and sets standards across the government. The OCIO provides strategic direction and leadership in IT-related areas[60].

In **France**, a similar role is accomplished by the "Interministerial Digital Directorate" (DINUM), under the "Ministère de la transformation et de la

60. Information provided by the Canadian Government.

fonction publiques"[61]. In **Saudi Arabia**, it is under the Saudi Data & AI Authority (SDAIA)[62]. In **Spain**, under the Ministry for Digital Transformation and Civil Service, with the Agency for the Supervision of Artificial Intelligence (AESIA) acting as a supervision body[63]. **Norway** also has a single lead body, the Ministry of Digitalisation and Public Governance. In **Denmark**, the Ministry of Digital Government and Gender Equality is responsible for AI governance[64]. In **Uruguay**, the Agency for the Development of Electronic Management Government and Information and Knowledge Society (AGESIC) is the competent body[65].

In the **United States**, the Executive Order has established two key councils to oversee AI initiatives across federal agencies: an interagency council to coordinate the integration of AI into programs and operations (excluding those involving national security systems); and an executive-level council, comprising Cabinet members or their appointees, to coordinate agency activities throughout the federal government[66].

In the **United Kingdom,** the Central Digital and Data Office (CDDO) plans to manage the work plan to support AI adoption in the public sector via existing cross-government digital and data governance arrangements[67].

In the **Republic of Korea,** governance involves the Ministry of Science and ICT, the Presidential Committee on the Digital Platform Government, the Ministry of Interior and Safety, and the Personal Information Protection Commission (PIPC)[68]. **Russia** mentioned two ministries involved, working together with the AI Research Centre[69]: the Ministry of Digital Development, Communications and Mass Media, and the Ministry of Economic Development. **Brazil**, the main bodies involved in developing and monitoring the national AI strategy for the public sector are the Ministry of Management and Innovation in Public Services, the Ministry of Science, Technology, and Innovation, and the Civil House of the Presidency of the Republic[70].

---

61. Information provided by the French Government.

62. Information provided by the Government of Saudi Arabia.

63. Information provided by the Spanish Government.

64. Information provided by the Norwegian Government.

65. Information provided by the Uruguayan Government.

66. Information provided by the United States Government.

67. Information retrieved from the Use of artificial intelligence in government, available at: https://www.nao.org.uk/reports/use-of-artificial-intelligence-in-government [Accessed 03 Mar. 2024].

68. Information provided by the Republic of Korea Government.

69. Information provided by the Russian Government.

70. Information provided by the Brazilian Government.

AI applications in the public sector

This section reports on countries' experiences from AI use for public services deliver, on current applications, successful use cases, and the involved AI technologies. Almost all G20 members respondents indicated that they are already using technologies based on AI technologies (only the African Union did not reported AI usage), underscoring the widespread adoption of AI in the public sector. Figure 5 presents the main public sectors that have been leveraged by AI applications, while Figure 6 shows the AI technical strategies to enhance them.

Figure 5. Public service sectors where government has leveraged AI technologies

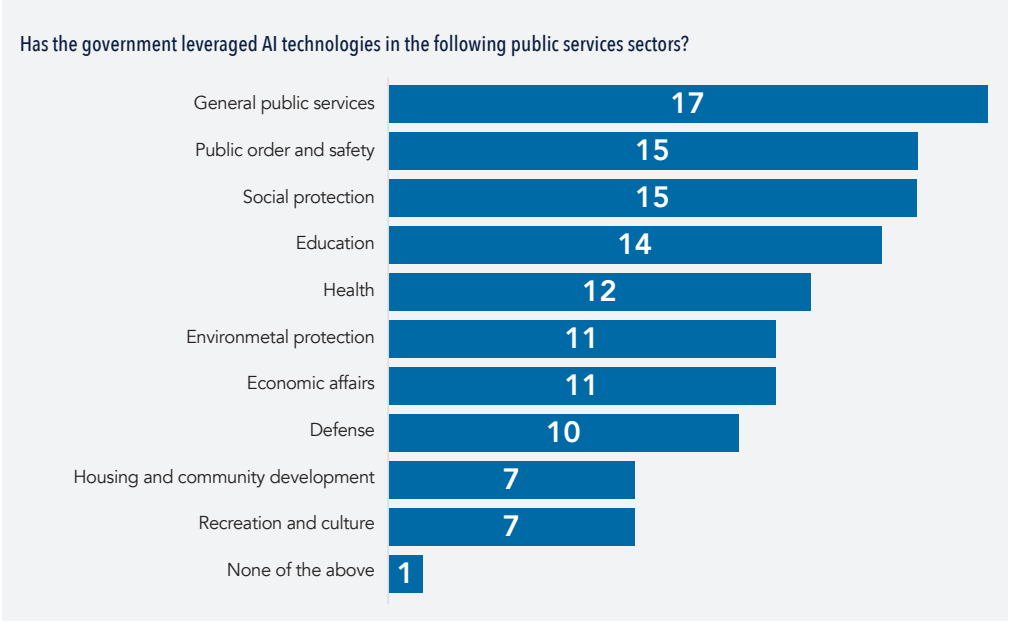


Figure 6. AI applications: Uses of AI by the public sector

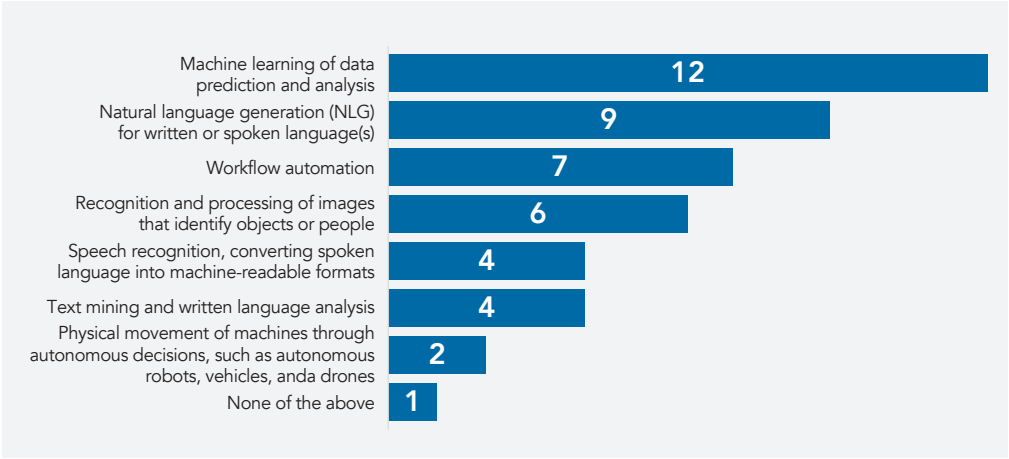


Figure 7 presents the key aims pursued by the use of AI in the public sector, primarily focused on enhancing the efficiency of public sector internal operations and the responsiveness of public service delivery.

Figure 7. AI applications: Key aims pursued

In the subsection 2.1, 2.2, 2.3, 2.4 and 2.5, some examples of use cases for AI applications are presented, grouped by the categories shown in Figure 7. It is worth noting that the list is non-exhaustive and aims to represent different functions and roles of AI in the public sector.

Efficiency of public sector – Internal operations

In **France**, the "*Large Language Models for Summarization of French Legislative Proposals - LLaMandement"* uses generative AI to prepare internal parliamentary notes.[71]

In **Canada,** the "*Employment Insurance Machine Learning Workload*" aims to reduce the time spent by officers on claim reviews by identifying cases where an appeal will not result in any change [72]. The project "*Record of Employments (ROE) Comments Assessment*" provides a classification model for reducing manual review of text comments[73].

The **United Kingdom** aims to make the process of analyzing public responses to government consultations faster and fairer. The "*i.AI Consultation Analyser*" uses AI and data science techniques to automatically extract patterns and themes from responses, to turn them into dashboards for policy makers. The goal is for computers to find patterns and analyze large amounts of data so officers can have more time to understand those patterns. Another project, called "*Redbox Copilot*", leverages AI to search through thousands of state documents dating back to the mid-19th century, interrogate them, and summarize them into tailored briefings[74].

Brazil's "*ChatTCU*" is a project whereby the Federal Court of Accounts (TCU) is adopting a customized artificial intelligence model based on natural language processing[75], to improve the efficiency of the court's teams and optimize the time needed for the production of texts, adaptations to plain language, translations and analyses related to external control actions [76].

The **Republic of Korea** is planning to establish an "*Exclusive Public AI Assistant Service*" to assist civil servants in summarizing and drafting documents and searching laws and guidelines, as a confidential, specialized-service tool for public administration. Another application, the "*Proactive AI-based Procurement Request Support System*", is a smart procurement support system

---

71. Information provided by the French Government.

72. Information retrieved from the Algorithmic Impact Assessment - Employment Insurance Machine Learning Workload, available at: https://open.canada.ca/data/en/dataset/6b429c8e-ee5b-451a-883f-b6180ada9286 [Accessed 03 Mar. 2024].

73. Information retrieved from the Algorithmic Impact Assessment – Record of Employments (ROE) Comments Assessment, available at: https://open.canada.ca/data/en/dataset/daa9ca66-566f-4c2e-a285-d2e217c2a00f [Accessed 03 Mar. 2024].

74. Information provided by the United Kingdom Government.

75. Information provided by the Brazilian Government.

76. Information retrieved from the *TCU adota modelo personalizado de assistente de redação baseado em inteligência artificial*, available at: https://portal.tcu.gov.br/imprensa/noticias/tcu-adota-modelo-personalizado-de-assistente-de-redacao-baseado-em-inteligencia-artificial.htm [Accessed 03 Mar. 2024].

that recommends Requests for Proposal (RFPs) of similar projects or detects "toxic clauses" to improve the efficiency of procurement management and reduce the order processing period[77].

Spain mentioned the GovTechLab project, which focused on bringing innovative companies' solutions closer to the administration. Moreover, the Spanish government is incorporating AI into its operations to improve efficiency and eliminate administrative bottlenecks[78]. **Uruguay** has recently launched the Observatory of AI government use cases. This mechanism is under the AGESIC and aims to implement an open space for connecting different players; generate recommendations, criteria, and principles for the usage of AI in the Government; and aggregate use cases of AI usage in the government[79].

Responsiveness of public service delivery

Countries have indicated their initiatives to improve citizen´s touchpoints to interact and communicate with public bodies. In **France**, "*Je donne mon avis*" leveraged AI to reply faster to citizens[80].

In **Turkey**, the "*AI-Powered Chatbots for Citizen Support*" involves several Ministries and organizations. These government bodies leverage AI-powered chatbots on their websites to provide real-time responses to citizen inquiries including about healthcare services and appointment scheduling[81].

In the same line, **Saudi Arabia** developed the "*Allam*" app to respond inquiries in Arabic, providing updated summaries and suggestions on various topics, thus offering information on a wide array of fields[82].

Russia shared information about the "*Gosuslugi Portal*", a portal to provide citizens, entrepreneurs and legal entities with information on state and municipal institutions and the available electronic services provided[83]. In **Brazil**, the "*GovBR Portal*" uses AI in the public services recommendation system.

77. Information provided by the Republic of Korea Government.
78. Information provided by the Spanish Government.
79. Information provided by the Uruguayan Government.
80. Information provided by the French Government.
81. Information provided by the Turkey Government.
82. Information provided by the Saudi Arabia Government.
83. Information provided by Russia Government.

Effectiveness of policymaking

In **Saudi Arabia**, the "*Estishraf*" project aims to support the formulation of decisions, policy design, and to help simulate the impact of various economic, social, and demographic changes[84].

Germany is applying AI to improve occupational safety and health prevention. It is focused on identifying businesses with elevated guidance needs, to help inspectors plan their visits more efficiently to prevent accidents[85].

Portugal is fostering AI to improve policymaking effectiveness through the Public Administration Planning, Policy and Foresight Competence Center[86]. This project aims to investigate the usage of AI algorithms to support regulatory impact assessment[87].

Integrity of government

This category includes AI sollutions for fraud prevention, internal control, external oversight.

One of the modules of the project "*IT-based Audit Oversight System*" of the Korea Electric Power Corporation (KEPCO) in the **Republic of Korea** is the "Anti-corruption Monitoring System" for automated detection of signs of corruption using pre-made scenarios; and the "Routine Audit Implementation Inspection System" for automated inspection of whether routine audit is properly implemented[88].

The **United States** reported a list of initiatives, including one under the category "Integrity of government", by the US Treasury Department, related to a new AI-based mitigation technique to stop check frauds. The tool uses near real-time abilities, to strengthen and speed up recovery of potentially fraudulent payments from financial institutions[89].

---

84. Information provided by the Saudi Arabia Government.

85. Information provided by the German Government.

86. Information provided by the Portuguese Government.

87. Information retrieved from the Artificial Intelligence for Better Regulation in the European Union – AI4AI@EU, available at: https://www.planapp.gov.pt/project/artificial-intelligence-for-better-regulation/ [Accessed 21 Ago. 2024].

88. Information provided by the Republic of Korea Government.

89. Information provided by the United States Government.

Indonesia also reported projects related to the integrity of government category, covering aspects such as fraud prevention, especially regarding national cyber and crypto agencies[90].

Finally, **Norway** mentioned AI ongoing projects related to the integrity of government, in experimental phase[91].

Efficiency of core government functions

Italy is developing a generative AI model, named "*Prompt*", for the production of summary reports on economic and financial data to enhance the efficiency of financial management in core government functions[92].

In the Anhui province, **China**, the development and deployment of the "*Quality Inspection+Training*" platform achieved remarkable results in improving the quality and efficiency of agent services, reducing training costs, addressing business scenarios related to employment, unemployment, human resources, and providing a number of manual solutions to general problems[93].

90. Information provided by the Indonesia Government.
91. Information provided by the Norwegian Government.
92. Information provided by the Italy Government.
93. Information provided by the Chinese Government.

Opportunities and challenges in AI adoption for public services

This section reports on G20 members' perspectives regarding the main opportunities and challenges associated with adopting AI in the public sector. Table 1 illustrates the opportunities and challenges reported by countries, to identify where AI can potentially bring significant benefits, as well as where targeted efforts are needed to overcome implementation barriers and maximize the potential of AI-driven solutions in government operations.

Table 1. Opportunities and challenges in priority application areas

Application Categories	Opportunities	Challenges
Efficiency of public sector internal operations	Increased efficiency in internal processes Cost reduction related to service derogation or coordination/delivery	Internal cultural barriers Interoperability with existing infrastructure within the government Technical expertise in AI, skilled AI professionals within government, capacity-building and training
Responsiveness of public service delivery	Stimulating citizen engagement and feedback Enhanced accessibility to public services Personalization of service delivery for citizens	Public Trust and Perception Risks not mapped and incapacity to recognize failures in time
Efficiency of core government functions	Partnership with the private sector and other relevant stakeholders (e.g. civil society, think tanks) Enhanced risk management and emergency response	Interoperability with existing infrastructure within the government Costs and financing models for implementation Retention strategies to maintain a competitive edge in government AI capabilities Institutional capacities, institutional setting, and AI governance

CONTINUES ▶

Application Categories	Opportunities	Challenges
Effectiveness of policymaking	Evidence-based decision-making for public policy Partnership with the private sector and other relevant stakeholders (e.g. civil society, think tanks) Promotion of innovation within the public sector through AI applications/systems and the development/deployment of regulatory sandboxes, innovation hubs or other approaches/ instruments/tools	Complex design related to ensuring respect of privacy, personal data protection, non-discrimination, and ethical concerns Security and sovereignty concerns
Integrity of government	Foster the ethical development, deployment, and use of AI through approaches that consider, by design, principles related to privacy, data protection, non-discrimination, and other ethical issues Transparency and accountability of AI-based solutions to the public International collaboration	Replication of human errors / bias Security and sovereignty concerns Retention strategies to maintain a competitive edge in government AI capabilities

Addressing organizational culture barriers can be effectively mitigated through targeted training and awareness programs specifically conceived for civil servants. Successfully overcoming challenges related to interoperability and the broader digitization efforts of public services hinges on having professionals skilled in digital and AI, both from technical and managerial perspectives. Therefore, comprehensive training programs are crucial to ensure that governments and related agencies can succeed in enhancing their operational efficiency and service delivery through the strategic adoption of AI technologies. These initiatives not only foster a culture of innovation but also empower public sector employees to leverage AI ethically and effectively in their daily operations, ultimately driving improvements in service delivery and responsiveness.

Two critical challenges stand out in this respect: the erosion of public trust and perception, and the inability to swiftly identify risks and failures. Tackling these challenges demands proactive measures and robust strategies aimed at

rebuilding trust and bolstering risk management capabilities. Therefore, fostering citizen engagement and feedback, enhancing access to public services, and enabling personalized service delivery emerge as crucial, and a a much-needed element of a systemic approach to building citizens' engagement and trust as well as effective and efficient public services. These efforts not only promote transparency and accountability but also strengthen the bond between government agencies and the public they serve, fostering a more responsive, ethical, and trusted governance framework.

Additionally, implementing ethical, safe, secure, and trustworthy AI models featuring explainability, accountability modules, and security mechanisms that enable immediate redressal in case of unforeseen significant risks, can also help address these challenges. Fostering a pro-AI organizational culture with policies that ensure representativeness, self-determination, and inclusiveness in the development, deployment, and use of AI, is essential to ensuring that AI technologies do not perpetuate existing biases or introduce new ones and to avoid any infringement on human rights that could impact citizens' trust in AI technologies.

Ensuring the efficiency of core government functions necessitates partnerships with the private sector and other relevant stakeholders to address challenges such as high implementation costs, financing models, lack of suitably skilled human resources, and interoperability with existing infrastructure. Investing in this sector also enhances national-level risk management and emergency response capabilities. However, challenges like brain drain underscore the need for talent retention strategies to maintain competitive government AI capabilities, alongside building institutional capacities and AI governance mechanisms

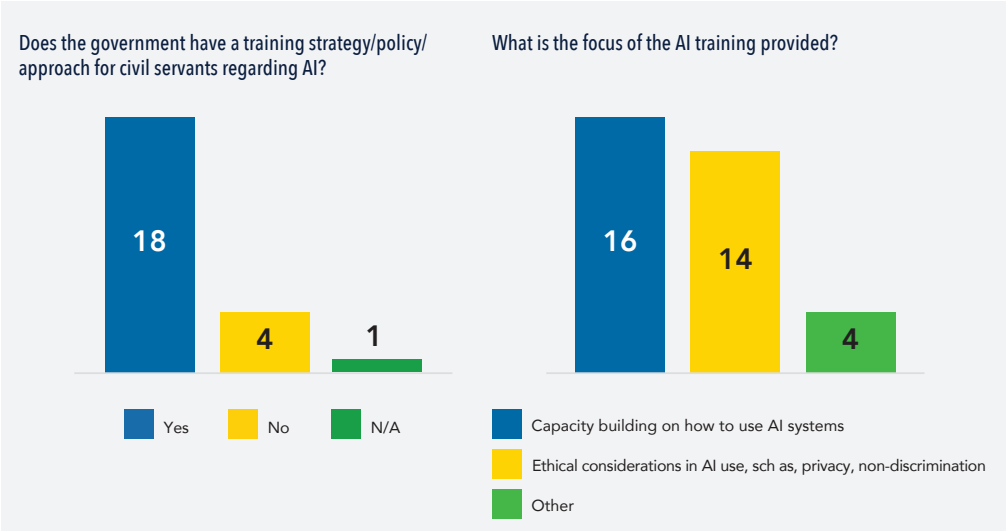
Based on insights from responses, G20 members agree that the widespread use of machine learning for prediction and analysis significantly enhances policymaking effectiveness. This presents opportunities for evidence-based decision-making in public policy and can help foster innovation through AI applications within the public sector. On the other hand, countries also mention a number of risks associated with AI autonomy, i.e., the capability of machines to operate independently (or almost so) of human intervention and oversight, which is perceived as a challenge to the integrity of government. Addressing AI autonomy is crucial to preserve the integrity of government, as it involves ensuring that AI systems operate within ethical and legal boundaries, aligned with each country's societal values and norms[94].

94. The need for human oversight is one of the key principles contained in the UNESCO Recommendation on the Ethics of Artificial Intelligence. Paragraph 35 reads "Member States should ensure that it is always possible to attribute ethical and legal responsibility for any stage of the life cycle of AI systems, as well as in cases of remedy related to AI systems, to physical persons or to existing legal entities. Human oversight refers thus not only to individual human oversight, but to inclusive public oversight, as appropriate."

AI systems must therefore be designed to uphold accountability and responsibility. It is essential to integrate ethical considerations such as fairness, transparency, privacy, and non-discrimination into the design and deployment of AI systems to prevent harm and ensure equitable outcomes. International collaboration can go a long way in helping to promote the interoperability of systems and solutions and the ethical development, deployment, and use of AI, integrating principles like privacy, data protection, non-discrimination, and other ethical considerations by design.

In terms of capacity building, as digital literacy and AI training of civil servants emerge to be of utmost importance, it comes as an opportunity for cooperation among G20 members. Most of the G20 respondents have training initiatives for civil servants (Figure 8), ranging from digital literacy building to complete academic programs to upskilling across various domains. The importance of tackling ethical issues, such as privacy and non-discrimination solutions, is also highlighted by the G20 members' respondents.

Figure 8. Capacity building: Training strategies for civil servants



Argentina provides courses to disseminate basic general and technical concepts related to AI[95]. **Brazil** encourages companies and public bodies to implement continuous training programs for their workforce focused on new technologies and to engage in awareness campaigns about the importance of preparing for AI's development and ethical use[96]. Moreover, Brazil has initiatives led by the National School of Public Administration to train and upskill public servants are worth mentioning. A non-exhaustive list includes the MBA in Data Science and Applied AI and training tracks on data science conducted with the Digital Government Secretariat. **Indonesia** offers a Digital Literacy course, in addition to other AI-related initiatives to train civil servants described in the Indonesia National Strategy on Artificial Intelligence[97].

Turkey raises awareness and provides basic training sessions to familiarize civil servants with AI concepts and applications. Specialized courses and workshops are also being offered to develop technical skills in areas such as data analysis, machine learning, and AI programming. This is done by leveraging online material, webinars, and partnerships with academic institutions delivering training programs[98].

In 2021, the National Cyberspace Administration of **China** issued an "Action Outline for Improving Digital Literacy and Skills for All", which proposes to improve the digital capabilities of civil servants, including by providing relevant training[99].

The **United States** emphasizes the relevance of AI training and familiarization programs for employees, managers, and leadership in technology as well as relevant policy, managerial, procurement, regulatory, ethical, governance, and legal fields. In 2023, a government-wide AI training program reached over 4,800 participants from across 78 Federal agencies[100].

France reported that the DINUM's "Campus du Numérique" focuses on civil servants' training in the digital area, including in AI[101]. In **Saudi Arabia**, the Saudi Data and AI Authority (SDAIA) has established an Academy for training both government and the private sector through a combination of online

95. Information provided by the Argentinian Government.
96. Information provided by the Brazilian Government.
97. Information provided by the Indonesia Government.
98. Information provided by the Turkey Government.
99. Information provided by the China Government.
100. Information provided by the United States Government.
101. Information provided by the French Government.

and in person training programs, targeting the general audience as well as AI practitioners, experts and management people[102].

Japan has established the "Information System Unification Training" to develop digital human resources and improve the IT literacy of civil servants, including courses in AI literacy, designed to deepen the understanding of basic AI concepts; and AI training, to deal with the latest trends and complex aspects related to AI[103]. The **Republic of Korea** is providing training for civil servants focusing on digital and innovation competencies, as well as content about *"Digital Platform Government (DPG)*[104].

The **United Kingdom** highlighted the UK Government's "*Incubator for AI*" (i.AI), which focuses on upgrading the government's AI capability by creating further guidance and frameworks for the safe and effective adoption of AI functionality for government departments and the wider UK public sector. The number of digital and data professionals in government has grown by 19% between April 2022 and April 2023, and over 600 senior civil servants have been upskilled by completing the "Digital and Data Essentials" course. Most recently, the "Central Digital and Data Office" (CDDO) released training on generative AI, for all civil servants in December 2023 and published the Generative AI Framework in January 2024 to provide detailed guidance, resources, and tools for the safe and secure usage of all generative AI tools across government[105].

Canada's "*Digital Talent Strategy*" aims to build strong and diverse digital talent within the federal government in order to provide modern, secure, and data-informed digital services, based on four missions: (i) Attracting and retaining digital practitioners and digital leaders; (ii) developing and upskilling digital practitioners and digital leaders; (iii) setting digital practitioners, digital leaders, and the enterprise up for success through fit-for-purpose processes, policies, and tools; and (iv) creating a digital culture defined by diversity, equity, and inclusion and putting people first to drive high-performance[106].

Spain informed more than twenty training initiatives applied to public administrations within the digital competencies for citizenship projects[107].

---

102. Information provided by the Saudi Arabia Government.

103. Information provided by the Japan Government.

104. Information provided by the Republic of Korea Government.

105. Information provided by the United Kingdom Government.

106. Information provided by the Canada Government.

107. Information provided by the Spanish Government.

Uruguay is also adopting the training strategy, with five courses provided in 30 editions from 2019 to 2023, upskilling more than 1,600 civil servants[108]. **Portugal** provides training programs with specific courses for artificial intelligence and other emergent technologies through the National Institute of Administration (INA) and partnerships[109]. **Denmark** has established the Danish Government Digital Academy to provide civil servants with the skills and tools necessary to manage an increasingly digital public administration, currently embracing the impact of emerging technologies on the public sector, and specific ones on AI use are planned[110].

108. Information provided by the Uruguayan Government.

109. Information provided by the Portuguese Government.

110. Information provided by the Danish Government.

Findings and closing remarks

The evidence gathered shows that AI is progressively being adopted by G20 members to support their government's operations. Most members prioritize AI applications for the delivery of general public services and social protection, followed by public order and safety and education (Figure 16) using applications that include chatbots, virtual assistants, image recognition, predictive analytics, and machine learning tools.

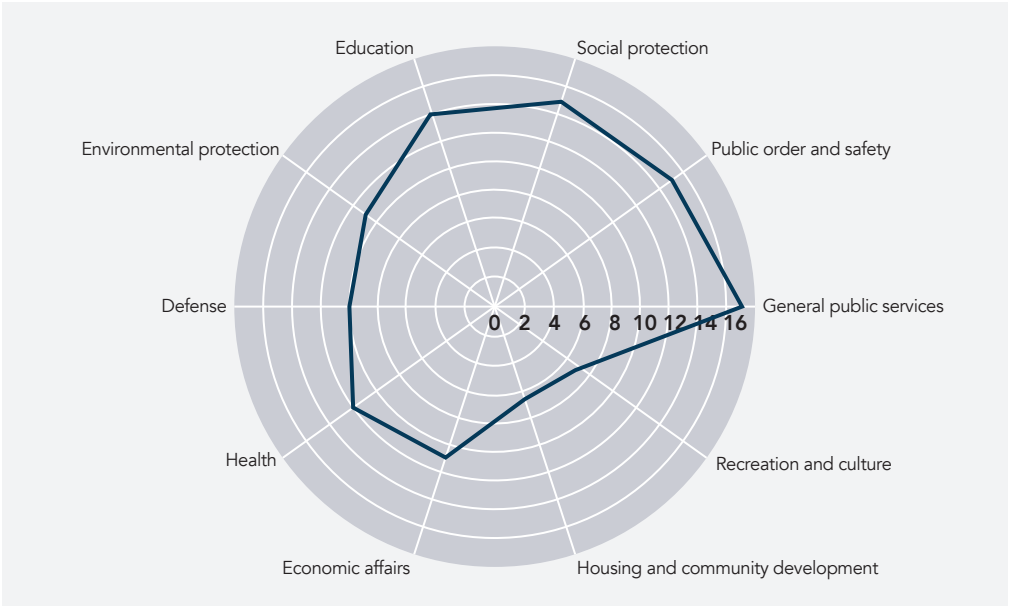
G20 members leverage AI to enhance efficiency and accessibility, ensuring that citizens can benefit from streamlined processes in welfare services and administrative tasks. AI technologies are further employed to optimize resource allocation, reduce bureaucratic delays, and provide personalized services, ultimately improving the overall quality of public service delivery.

Governments are also leveraging AI for predictive policing, surveillance, and crime analysis to enhance public safety, as AI systems can analyze vast amounts of data to identify patterns and potential threats, allowing law enforcement agencies to respond more effectively and proactively.

Education was also one of the key areas highlighted for AI applications. Countries are integrating AI into educational systems to support personalized learning, automate administrative tasks, and enhance overall learning experiences. AI-powered tools can provide customized learning plans, identify students' strengths and weaknesses, and offer additional resources to help them succeed. Additionally, AI can assist educators by handling routine administrative duties, allowing them to focus more on teaching and student engagement.

Overall, the prioritization of AI in these areas reflects a commitment to harnessing technology to improve essential public services, ensure public safety, and enhance educational outcomes.

Figure 9. Sectors in which the governments have leveraged AI technologies



All responding members also reported having developed national strategies or comparable guiding policies to set strategic objectives and approaches for AI. These strategies, in some instances, outline priorities and goals for the use of AI in the public sector and provide a roadmap to achieving them.

Additionally, all countries are actively addressing ethical concerns through their respective national strategic plans and policies. By integrating ethical principles into their national strategies, countries strive to build trust and foster innovation in the rapidly evolving landscape of AI. Safety and non-discrimination emerge among the most pressing ethical considerations, with countries stressing equity as a fundamental value guiding the development, deployment, and use of AI systems.

Despite aiming to integrate ethical principles into their national strategies, the development of comprehensive regulatory frameworks and practical guidance for ensuring fairness, transparency, privacy, and inclusiveness, specifically for the use of AI in the public sector, remains limited. Only 52% of the responding countries report such provisions for AI in the public sector. Even fewer countries have established comprehensive mechanisms to evaluate and mitigate the specific risks and challenges that AI may pose to marginalized and vulnerable groups and minorities.

This gap in policy development can be attributed to several factors, including the relatively recent emergence of AI technologies in public sector applications, the rapid pace of technological advancements outpacing regulatory responses, and varying levels of prioritization and capacity endowment among different countries to address these complex issues.

This gap in policy frameworks has several implications for the deployment and utilization of AI in and by governments. First, without clear guidelines, there is a risk of inconsistent practices across agencies, potentially leading to disparities in how AI technologies are implemented and regulated. The lack of uniformity can undermine public trust and confidence in government-driven AI initiatives. Second, AI systems have the potential to exacerbate biases and inequities if not properly regulated or managed. Specific policies are essential to ensuring that AI algorithms are designed and deployed in a manner that respects human rights, promotes diversity, and avoids discriminatory outcomes. Third, the lack of transparency in AI decision-making processes within the public sector can undermine accountability. Citizens and stakeholders may be concerned about how AI technologies influence policy decisions, service delivery, and resource allocation.

Countries that report specific provisions utilize three main approaches to address the ethical concerns related to the development, deployment, and use of AI in and by the public service. The first involves the establishment of a dedicated agency or body for setting requirements and monitoring. These agencies play a pivotal role in overseeing compliance with ethical guidelines, ensuring transparency in AI applications, and safeguarding public interests against potential risks and biases inherent in AI technologies.

The second approach focuses on the development of comprehensive guidelines to AI initiatives. These guidelines are intended to promote ethical standards, responsible use of data, and accountability throughout the lifecycle of AI projects within government agencies. They provide clear frameworks for decision-making, risk assessment, and mitigation strategies to mitigate unintended consequences and ensure alignment with societal values

The third approach emphasizes practical measures aimed at advancing research and development in AI ethics. This includes initiatives to foster innovation, enhance technical expertise, and raise awareness among stakeholders about ethical considerations in AI deployment. By investing in R&D, countries aim to develop robust frameworks for ethical AI governance, address emerging challenges, and promote good practices that uphold fundamental rights, fairness, and transparency in AI-driven public services.

These three approaches collectively contribute to a governance framework that seeks to harness the transformative potential of AI while mitigating risks and ensuring that technological advancements benefit society at large.

References

Farooq, Khuram; Solowiej, Bartosz Jakub. Artificial Intelligence in the Public Sector: Maximizing Opportunities, Managing Risks (English). Equitable Growth, Finance and Institutions Insight Washington, D.C. : World Bank Group. Available at: http://documents.worldbank.org/curated/en/809611616042736565/Artificial-Intelligence-in-the-Public-Sector-Maximizing-Opportunities-Managing-Risks [Accessed 03 mar. 2024].

Innovation, Science and Economic Development Canada. (n.d.). Artificial Intelligence and Data Act (AIDA) – Companion document. Available at: https://ised-isde.canada.ca/site/innovation-better-canada/en/artificial-intelligence-and-data-act-aida-companion-document [Accessed 03 mar. 2024].

Government of the United Kingdom. (n.d.). G7 ministerial declaration: Deployment of AI and innovation. Available at: https://www.gov.uk/government/publications/g7-ministerial-declaration-deployment-of-ai-and-innovation/g7-ministerial-declaration#annex-2---toolkit-for-artificial-intelligence-ai-in-the-public-sector [Accessed 03 mar. 2024].

Government of Canada. (n.d.). Algorithmic Impact Assessment - Employment Insurance Machine Learning Workload. Available at: https://open.canada.ca/data/en/dataset/6b429c8e-ee5b-451a-883f-b6180ada9286 [Accessed 03 mar. 2024].

Government of Canada. (n.d.). Algorithmic Impact Assessment - Record of Employments (ROE) Comments Assessment. Available at: https://open.canada.ca/data/en/dataset/daa9ca66-566f-4c2e-a285-d2e217c2a00f [Accessed 03 mar. 2024].

HAI - Stanford University. (2024). AI Index: State of AI in 13 Charts. Available at: https://hai.stanford.edu/news/ai-index-state-ai-13-charts [Accessed 03 mar. 2024].

Maslej, Nestor; Fattorini, Loredana; Perrault, Raymond; Parli, Vanessa; Reuel, Anka; Brynjolfsson, Erik; Etchemendy, John; Ligett, Katrina; Lyons, Terah; Manyika, James; Niebles, Juan Carlos; Shoham, Yoav; Wald, Russell; Clark, Jack (2024). The AI Index 2024 Annual Report. AI Index Steering Committee, Institute for Human-Centered AI, Stanford University. Available at: https://aiindex.stanford.edu/report/ [Accessed 03 mar. 2024].

National Audit Office. (n.d.). Use of artificial intelligence in government. Available at: https://www.nao.org.uk/reports/use-of-artificial-intelligence-in-government/ [Accessed 03 mar. 2024].

National Center for Artificial Intelligence. (n.d). Índice Latinoamericano de Inteligencia Artificial. Available at: https://indicelatam.cl/ [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). OECD Artificial Intelligence Policy Observatory. Available at: https://oecd.ai/en/ [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (2023). A blueprint for building national compute capacity for artificial intelligence (OECD Digital Economy Paper No. 350). Available at: https://www.oecd.org/publications/a-blueprint-for-building-national-compute-capacity-for-artificial-intelligence-876367e3-en.htm [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). Artificial intelligence. (n.d.). Available at: https://www.oecd.org/digital/artificial-intelligence/ [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). AI Policy Observatory. Available at: https://oecd.ai/en/ [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). Recommendation of the Council on Artificial Intelligence, OECD/LEGAL/0449. (n.d.). Available at: https://legalinstruments.oecd.org/en/instruments/oecd-legal-0449 [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development (2022), "OECD Framework for the Classification of AI systems", *OECD Digital Economy Papers*, No. 323, OECD Publishing, Paris, https://doi.org/10.1787/cb6d9eca-en

Organisation for Economic Co-operation and Development. (n.d.). National AI Policies & Strategies. Available at: https://oecd.ai/en/dashboards/overview [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). G20 AI Principles. Available at: https://oecd.ai/en/wonk/documents/g20-ai-principles [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). OECD AI Incidents Monitor. Available at: https://oecd.ai/en/incidents-methodology [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). AI use in the public sector. Available at: https://oecd.ai/en/dashboards/policy-instruments/AI_use_cases_in_the_public_sector [Accessed 03 mar. 2024].

Organisation for Economic Co-operation and Development. (n.d.). OECD Working Party and Network of Experts on AI. Available at: https://oecd.ai/en/network-of-experts/working-group/10836 [Accessed 03 mar. 2024].

Oxford Insights. (2023). Government AI Readiness Index 2023. Available at: https://oxfordinsights.com/wp-content/uploads/2023/12/2023-Government-AI-Readiness-Index-2.pdf [Accessed 03 mar. 2024].

Oxford Insights. (2023). Government AI Readiness Index 2023. Available at: https://oxfordinsights.com/ai-readiness/ai-readiness-index/ [Accessed 03 mar. 2024].

The White House. (2023). Executive order on the safe, secure, and trustworthy development and use of artificial intelligence. Available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/?utm_source=link [Accessed 03 mar. 2024].

Tribunal de Contas da União. (n.d.). TCU adota modelo personalizado de assistente de redação baseado em inteligência artificial. Tribunal de Contas da União. (n.d.). TCU adota modelo personalizado de assistente de redação baseado em inteligência artificial. Available at:https://portal.tcu.gov.br/imprensa/noticias/tcu-adota-modelo-personalizado-de-assistente-de-redacao-baseado-em-inteligencia-artificial.htm [Accessed 03 mar. 2024].

United Nations Educational, Scientific and Cultural Organization. (n.d.). Global AI Ethics and Governance Observatory. Available at: https://www.unesco.org/ethics-ai/en [Accessed 03 mar. 2024].

United Nations Educational, Scientific and Cultural Organization. (2022). Recommendation on the ethics of artificial intelligence. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000381137_eng [Accessed 03 mar. 2024].

United Nations Educational, Scientific and Cultural Organization. (2023a). Data-invisible groups and data minimization in the deployment of AI solutions [Policy brief]. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000388089 [Accessed 03 mar. 2024].

United Nations Educational, Scientific and Cultural Organization. (2023b). Readiness assessment methodology: A tool of the recommendation on the ethics of artificial intelligence. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000385198 [Accessed 03 mar. 2024].

United Nations Educational, Scientific and Cultural Organization. (2023c). Ethical impact assessment: a tool of the Recommendation on the Ethics of Artificial Intelligence. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000386276 [Accessed 03 mar. 2024].

United Nations Educational, Scientific and Cultural Organization. (2023d). Implementation of the Recommendation on the Ethics of Artificial Intelligence (AI). Available at: https://unesdoc.unesco.org/ark:/48223/pf0000387369 [Accessed 03 mar. 2024].

United Nations Educational, Scientific and Cultural Organization. (n.d.). Ethics of artificial intelligence. Available at: https://www.unesco.org/en/artificial-intelligence/recommendation-ethics [Accessed 03 mar. 2024].

United Nations Department of Economic and Social Affairs. (2022). United Nations E-Government Survey 2022: The Future of Digital Government. UN. https://doi.org/10.18356/237d52b2-en

Annex 1 – Compilation of measurement tools and frameworks

The integration of AI in and by the Public Sector has the potential to significantly enhance the capacity and efficiency of government operations, improve the delivery of more inclusive and personalized public services and promote accountability and transparency. Measurement tools are critical for understanding ongoing efforts, challenges, and opportunities.

This section provides an overview of a number of measurement tools designed to systematically monitor and evaluate the development, deployment, and use of AI in the Public Sector. It includes a brief description of their methodologies and frameworks, as well as lists of relevant indicators, drawing on existing work from international organizations such as UNESCO, OECD, UN, and institutions such as Oxford Insights and Stanford University. These measurement tools and related indicators can help policymakers and other stakeholders monitor the progress and impact of AI integration in the Public Sector.

UNESCO Recommendation on the Ethics of Artificial Intelligence

UNESCO developed the Recommendation on the Ethics of Artificial Intelligence in 2021, with 194 countries committing to its implementation to ensure AI delivers fair, sustainable, and inclusive outcomes[111]. The Recommendation serves as a comprehensive and actionable framework for the ethical development, deployment, and use of AI, encompassing the full spectrum of human rights[112].

111. Information retrieved from the Recommendation on the ethics of artificial intelligence, available at: https://unesdoc.unesco.org/ark:/48223/pf0000381137_eng [Accessed 03 Mar. 2024].

112. Information retrieved from the Readiness assessment methodology, available at: https://unesdoc.unesco.org/ark:/48223/pf0000385198 [Accessed 03 Mar. 2024].

UNESCO's policy approach further recognizes that countries are at different stages of AI development, with varying institutions, regulations and capacities, underlining the need for tailored policy support to be modified accordingly.

Figure 10. UNESCO Recommendation on the Ethics of AI: Values and principles

Source: adapted from UNESCO Recommendation on the Ethics of AI: key facts[113]

UNESCO Readiness Assessment Methodology

As mandated by its Member States in the Recommendation and In a view to support countries implementing this international normative instrument, UNESCO developed the AI Readiness Assessment Methodology (RAM) and the Ethical Impact Assessment (EIA) for AI systems. The RAM is a comprehensive diagnostic tool that enables Member States to understand how prepared they are to implement AI ethically and responsibly for all their citizens. It is intended to highlight institutional and governance strengths to build on as well as gaps to address[114].

113. Information retrieved from UNESCO's Recommendation on the Ethics of Artificial Intelligence: key facts, available at: https://unesdoc.unesco.org/ark:/48223/pf0000385082 [Accessed 20 July 2024].

114. Information retrieved from the Readiness assessment methodology, available at: https://unesdoc.unesco.org/ark:/48223/pf0000385198 [Accessed 03 Mar. 2024].

The EIA bolsters the RAM by providing a tool to help governments, companies, and other organizations that are procuring, developing, or implementing AI systems to identify, assess, and mitigate the risks[115]. The RAM and the EIA were officially launched on 13 December 2022, during the inaugural Global Forum on the Ethics of AI in Prague, under the Czech Presidency of the European Union. These instruments were designed to assess the resilience of national policies and institutions to the implementation of AI, which in turn enable UNESCO to tailor support for governments to ensure an ethical AI ecosystem aligned with the Recommendation [116].

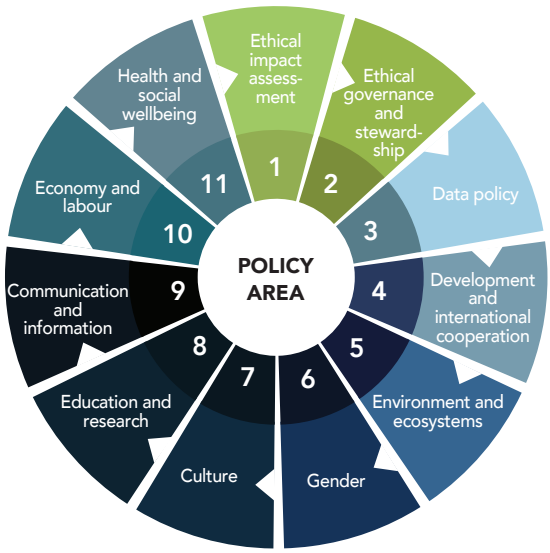
As a tool that assists countries in understanding their readiness to ethically develop, deploy and use AI, the RAM provides valuable information and analytical basis on each participating country's situation. The RAM country reports offer comparative information and reports on key trends and good practices and services as a resource for countries to learn from each other, promoting the exchange of information, and fostering a more balanced, equitable, and accessible global AI ecosystem. The Brazilian Presidency of the G20 recognizes the value of the RAM. It is the basis to the Toolkit for AI Readiness Assessment, and a reference measurement tool and framework that could contribute to a better understanding of the integration of AI in the public sector.

The RAM encompasses five dimensions: Legal and Regulatory, Social and Cultural, Economic, Scientific and Educational, and Technological and Infrastructural. Within each dimension, questions are categorized and broken down into indicators and sub-indicators that include both qualitative and quantitative indices. Public datasets are recommended for answering quantitative questions, but in specific cases, alternative local data can be used to provide relevant insights. In specific cases, alternative local data could provide relevant insights. The RAM covers the 11 policy areas outlined in the UNESCO Recommendation, as illustrated in the Figure 11 below.

115. Information retrieved from the Readiness assessment methodology, available at: https://unesdoc.unesco.org/ark:/48223/pf0000386276 [Accessed 20 July 2024].

116. Information retrieved from the Implementation of the Recommendation on the Ethics of Artificial Intelligence, available at: https://unesdoc.unesco.org/ark:/48223/pf0000387369 [Accessed 03 Mar. 2024].

Figure 11. UNESCO Recommendation on the Ethics of AI: Policy area



Source: adapted from UNESCO Recommendation on the Ethics of AI: key facts[117].

Among the quantitative indicators of the RAM, those most aligned with the public sector assess the technological, educational, economic, and regulatory capacity of countries. These include: Score of the country on the Cybersecurity Index, Open Data Inventory Score, Percentage of male/female tertiary education graduates in STEM programmes, Number of AI and AI-related publications per capita, Number of citations for AI and AI-related publications per capita, Number of AI researchers in universities/PRO per capita, Number of AI patents granted per capita, Proportions of primary, lower secondary, and secondary schools with access to the internet for pedagogical purposes, Proportions of primary, lower secondary, and secondary schools with access to computers for pedagogical purposes, Percentage of STEM graduates in tertiary education, Percentage of ICT graduates in tertiary education, Number of AI-related PhDs per capita, Share of the population with a mobile telephone subscription, Share of the population with a fixed broadband subscription, Share of the population using the internet, Share of population covered by at least a 3G mobile network, Share of population with access to electricity, Number of data centers in the country per capita[118].

117. Information retrieved from UNESCO's Recommendation on the Ethics of Artificial Intelligence: key facts, available at: https://unesdoc.unesco.org/ark:/48223/pf0000385082 [Accessed 20 July 2024].

118. Information retrieved from the Readiness assessment methodology, available at: https://unesdoc.unesco.org/ark:/48223/pf0000385198 [Accessed 03 Mar. 2024].

Whenever possible, the RAM captures quantitative indices already measured by other sources (e.g. OECD, UN, ITU, UNESCO Institute for Statistics), to reduce the burden on countries for data collection. Combining these quantitative indices with local insights, the RAM aims to draw policy-relevant conclusions and inform decisions. The results of the RAM provide a roadmap for building government capacities, strengthening human capital and institutions, and enhancing policies and regulatory frameworks to address AI challenges effectively.

To date, the RAM has been implemented in almost sixty countries worldwide. Completed RAM reports can be found on "Global AI Ethics and Governance Observatory", hosted by UNESCO in collaboration with the Alan Turing Institute and the ITU[119].

UNESCO Ethical Impact Assessment

The UNESCO Ethical Impact Assessment (RIA) is a tool designed to identify and assess AI systems' benefits, concerns, and risks and appropriate measures for the prevention, mitigation, remediation, and monitoring of identified risks. It aims to ensure that AI systems comply with fundamental principles such as human rights, labor rights, and environmental considerations. The EIA further complements the macro diagnosis from the RAM by providing an action-oriented step-by-step process to help government officials and public organizations make sure that their procured and in-house developed AI systems are aligned with the values and principles of the Recommendation [120].

The methodology is designed to be a living document that should be progressively updated in two main parts, focusing respectively on procedure and substance: i) Scoping Questions, which aim to understand the foundations of the AI system, establishing preliminary questions about the suitability of automation and stakeholder engagement plans; ii) Implementing the UNESCO Principles, which assesses whether the design, development, and implementation of the AI system comply with the ethical principles established in the UNESCO Recommendation. Each principle is analyzed in the areas of Safety and Security, Fairness, Non-Discrimination, Diversity, Sustainability,

119. Global AI Ethics and Governance Observatory, available at: https://www.unesco.org/ethics-ai/en [Accessed 20 July 2024].

120. Information retrieved from the UNESCO Ethics of Artificial Intelligence, available at: https://www.unesco.org/en/artificial-intelligence/recommendation-ethics [Accessed 03 Mar. 2024].

Privacy and Data Protection, Human Oversight and Determination, Transparency and Explainability, Accountability and Responsibility, Awareness and Literacy[121].

While initially proposed for public procurers of AI systems, given its focus on algorithms entering sensitive public domains, the EIA framework is equally applicable to system developers in both the public and private sectors. It serves as a guide to ensure the ethical development of AI and compliance with international standards such as the UNESCO Recommendation.

OECD AI Principles

The OECD supports governments in measuring and analyzing the economic and social impacts of AI technologies and applications and engaging with stakeholders to identify best practices for public policies[122]. Key initiatives include the OECD AI Principles, which promote innovative and trustworthy AI that respects human rights and democratic values[123]; the OECD AI Policy Observatory (OECD.AI)[124], which offers insights into AI policies and strategies across member countries; the OECD framework for classifying AI systems; and the OECD AI Incidents Monitor (AIM), which tracks and analyzes global AI incidents to understand risks and inform policy decisions.

These principles promote innovative, trustworthy AI that respects human rights and democratic values. They provide a comprehensive set of standards to guide policymakers and AI developers in creating and implementing AI systems that are fair, transparent, and accountable.

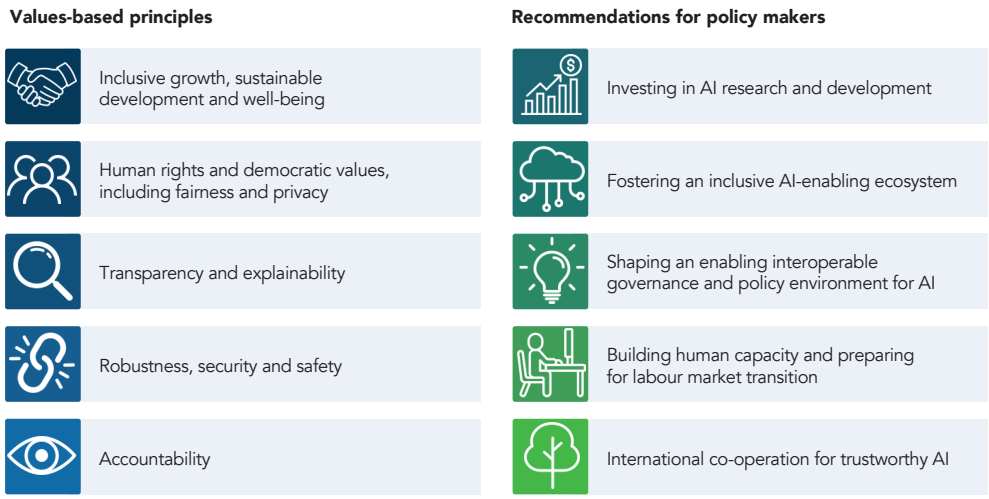
121. Information retrieved from the Ethical impact assessment, available at: https://unesdoc.unesco.org/ark:/48223/pf0000386276 [Accessed 03 Mar. 2024].

122. Information retrieved from the Artificial intelligence - OECD, available at: https://www.oecd.org/digital/artificial-intelligence/ [Accessed 03 Mar. 2024].

123. Information retrieved from the OECD AI Principles overview, available at: https://oecd.ai/en/ai-principles [Accessed 03 Mar. 2024].

124. Information retrieved from the OECD Artificial Intelligence Policy Observatory, available at: https://oecd.ai/en/ [Accessed 03 Mar. 2024].

Figure 12. OECD AI Principles



Source: Adapted from OECD AI Principles (https://oecd.ai/en/ai-principles), 2024.

OECD and G20 members have adopted these AI Principles and the OECD tools to develop policies and create AI risk management frameworks. The European Union, the Council of Europe, and the United Nations have also committed to using the OECD AI system definition and lifecycle in their legislation, regulations, and guidelines[125].

OECD's AI Policy Observatory

OECD.AI is a forum created by the OECD at the end of 2019 to assist member countries in formulating policies and strategies, as well as monitoring the responsible development of reliable AI systems for the benefit of society[126]. It is based on the Recommendation of the Council on Artificial Intelligence, the first intergovernmental standard on AI adopted in May 2019 by OECD member countries and several partner economies, which also served as the basis for the G20 AI Principles[127].

125. Information retrieved from the Recommendation of the Council on Artificial Intelligence, available at: https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449 [Accessed 03 Mar. 2024].

126. Information retrieved from the About OECD.AI, available at: https://oecd.ai/en/about/what-we-do [Accessed 03 Mar. 2024].

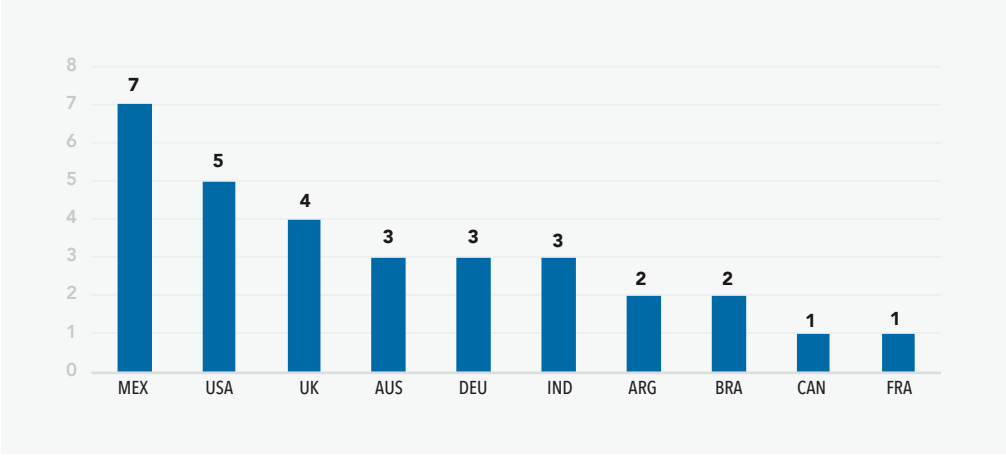
127. Information retrieved from the G20 AI Principles - OECD.AI, available at: https://oecd.ai/en/wonk/documents/g20-ai-principles [Accessed 03 Mar. 2024].

The platform combines resources from across the OECD, as well as partners and stakeholder groups, to create a one-stop hub for AI policymakers and other stakeholders. It offers a database of AI policies from almost 70 countries, serving as a source of research, data and visualizations on trends and developments in AI[128].

National strategies and policies

OECD.AI offers an active repository of over 1,000 AI policy initiatives from 69 countries, territories, and the European Union. Initiatives for using AI in the public sector can be observed among the various policy instruments available[129]. The OECD.AI includes indicators showing the number of initiatives by territory, target groups, policy instrument fields, and related policy instruments.

Figure 13. AI initiatives in the public sector by territory



Source: OECD.AI.

128. Information retrieved from the About OECD.AI, available at: https://oecd.ai/en/about/background [Accessed 03 Mar. 2024].

129. Information retrieved from the National AI policies & strategies – OECD.AI, available at: https://oecd.ai/en/dashboards/overview [Accessed 03 Mar. 2024].

The OECD monitors and provides a detailed list of policies related to the use of AI in the public sector in each member country. More details on national policies can be found on the OECD.AI platform[130].

OECD Framework for Classifying AI Systems

The OECD Framework for the Classification of AI Systems is a tool developed to help policymakers, regulators, and legislators characterize and assess AI systems in specific contexts (e.g., health and finance), including the development of risk assessments as well as governance policies for ongoing AI risk management. It classifies AI systems into five dimensions: People & Planet, Economic Context, Data & Input, AI Model, and Task & Output[131]. Each of these dimensions has specific properties and attributes that define and assess policy implications to maintain an approach that aligns with the OECD Principles for AI.

The Economic Context dimension, for example, assesses the socio-economic environment where AI is applied, considering the impact and scale of its implementation. In the public sector, this includes public safety, justice, health, and influencing specific policies and regulations. The framework uses the International Standard Industrial Classification of All Economic Activities (ISIC REV 4), which allows comparability with other international data sources on employment, skills, company demographics, and added value. One of the sectoral categories of economic activities is Public administration and defense; compulsory social security (Section O), which involves AI applications of a governmental nature, usually carried out by the public administration for predictive algorithms in the legal system, predictive policing, use of AI by the judiciary and national defense (e.g., drone footage for surveillance, cyber defense, command and control, autonomous vehicles).

130. Information retrieved from the AI use in the public sector - OCDE.AI: https://oecd.ai/en/dashboards/policy-instruments/AI_use_cases_in_the_public_sector [Accessed 03 Mar. 2024].

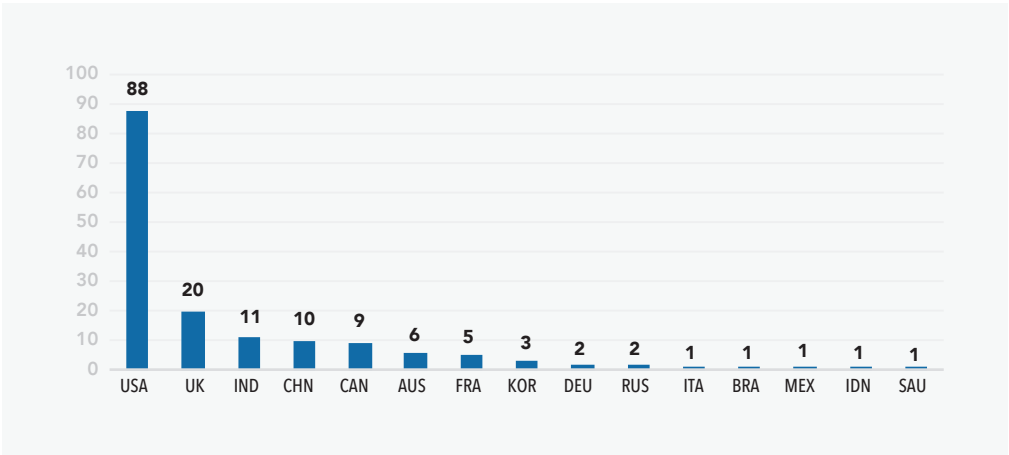
131. Information retrieved from the OECD Framework for the Classification of AI systems, available at: https://doi.org/10.1787/cb6d9eca-en [Accessed 03 Mar. 2024].

OECD AI Incidents Monitor (AIM)

The OECD defines an AI incident as an event, circumstance, or series of events in which an AI system causes actual harm, such as injury to persons, disruption of critical infrastructure, violations of human rights, or damage to property, communities, or the environment. The AI Hazard is an event that could plausibly cause an AI incident[132].

AIM is a tool that aims to monitor AI-related incidents and hazards to inform the development of an AI incident reporting framework and related policy discussions. These incidents and hazards are classified according to the OECD Framework for Classifying AI Systems, considering severity, industry, related AI principles, types of damage, and affected parties. This analysis is based on news articles' titles, summaries, and first paragraphs, processed by platforms such as Event Registry[133].

Figure 14. Number of AI incidents affecting the government per country (Peak month 2024/02)



Source: OECD.AI (AI Incidents Monitor), 2024.

132. Information retrieved from the OECD Working Party and Network of Experts on AI, available at: https://oecd.ai/en/network-of-experts/working-group/10836 [Accessed 03 Mar. 2024].

133. Information retrieved from the OECD AI Incidents Monitor, available at: https://oecd.ai/en/incidents-methodology [Accessed 03 Mar. 2024].

AIM has recorded 808 AI incidents and 7,756 related articles since monitoring began. The peak of incidents occurred in February 2024, with 161 incidents and 1,553 articles. There has been a 50.53% drop in the number of incidents and a 64.73% drop in the number of articles compared to previous quarters[134]. However, the OECD does not guarantee the complete accuracy of the information provided as the AIM comprises articles from various news sources and aggregators with no direct affiliation with the OECD and may, therefore, contain errors or omissions of information.

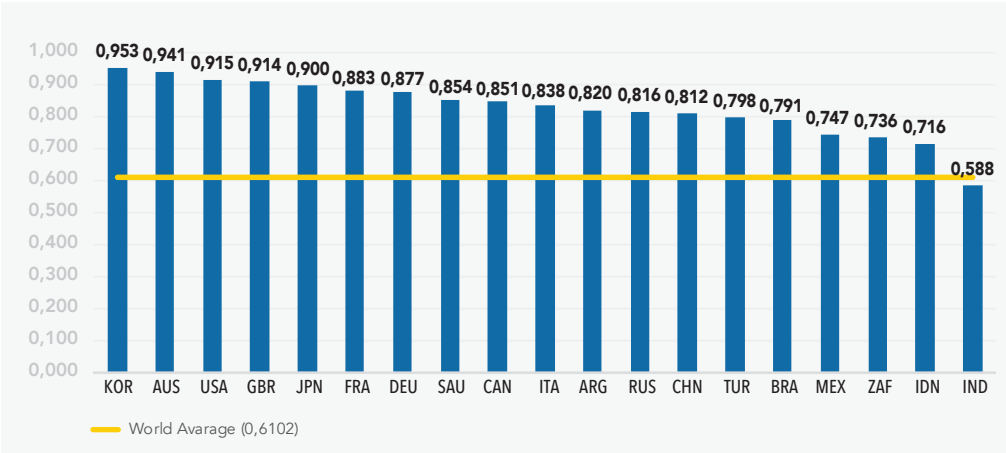
UN E-Government Development Index

The United Nations E-Government Survey, produced every two years by the Department of Economic and Social Affairs (UN DESA) and the Division for Public Institutions and Digital Government (DPIDG), is a measurement and development tool, serving as both a monitoring mechanism and a guiding framework for the digitization of the public sector[135]. The latest 2022 report assesses the e-government development status in all United Nations Member States, including their areas of improvement and challenges. This research measures the performance of countries concerning each other using the E-Government Development Index (EDGI) based on the weighted average of three sub-indices: Online Services Index (OSI) based on data collected by UN DESA for the 193 Member States, Telecommunications Infrastructure Index (TII) based on data provided by the International Telecommunications Union (ITU) and the Human Capital Index (HCI) based on data mainly provided by the UNESCO.

134. Data filtered with date range (last year), G20 members, all industry, and Affected stakeholders (Government), Type of search: All of the concepts/keywords (AND) in the OECD AI Incidents Monitor tool, available at: https://oecd.ai/en/incidents [Accessed 03 Mar. 2024].

135. Information retrieved from the UN E-Government Survey 2022, available at: https://doi.org/10.18356/237d52b2-en [Accessed 03 Mar. 2024].

Figure 15. E-Government development index (2022)



Source: UN E-Government Knowledgebase, 2022.

The Figure shows that the leading G20 members in e-government development are the Republic of Korea, Australia, the United States, the United Kingdom, and Japan, showing significant progress in digital infrastructure, human capital, and online services. However, it is essential to point out that the EDGI is a normalized reactive index, and the slight differences between countries do not necessarily indicate that performance was inferior or superior during the two years of the survey.

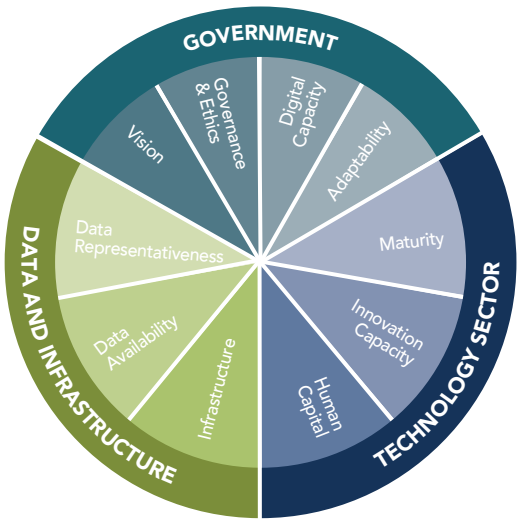
Oxford Government AI Readiness Index

Oxford Insights publishes an annual Government AI Readiness Index that serves as a barometer to assess how governments are prepared to implement and govern AI technologies in public services[136]. In 2023, the focus was on determining the AI readiness of 193 governments worldwide, including introducing an interactive map and improving data accessibility. The index includes 39 indicators distributed across ten dimensions, which comprise 3 pillars: Government, Data and Infrastructure, and Technology Sector, as illustrated in Figure 16[137].

136. Information retrieved from the Government AI Readiness Index 2023 report, available at: https://oxfordinsights.com/ai-readiness/ai-readiness-index/ [Accessed 03 Mar. 2024].

137. Information retrieved from the Government AI Readiness Index 2023 report, available at: https://oxfordinsights.com/wp-content/uploads/2023/12/2023-Government-AI-Readiness-Index-2.pdf [Accessed 03 Mar. 2024].

Figure 16. The pillars of the government AI readiness index



Source: Oxford Insight, Government AI Readiness Index 2023.

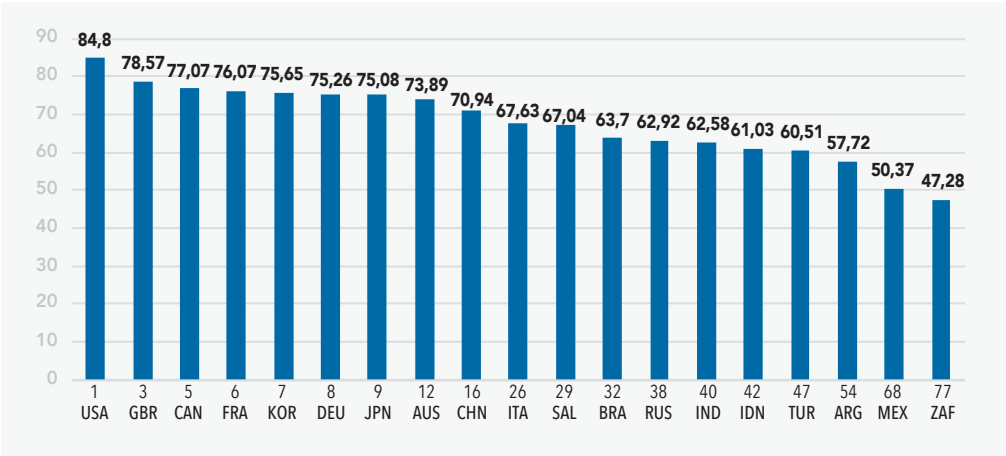
The first pillar (Government) assesses the capacity of governments to develop and govern AI, considering the dimensions of Vision (indicators such as National AI strategy), Governance and ethics (indicators such as Data protection and privacy legislation, Cybersecurity, Regulatory quality, National ethical framework, Accountability) Digital capacity (indicators such as Online services, Key IT infrastructure, Government promotion of investment in emerging technologies) and Adaptability (with indicators such as Government effectiveness, Government responsiveness to change, Procurement data).

The second pillar (Data and Infrastructure) assesses the availability and quality of data and the technological infrastructure needed to support AI tools, which is divided into three dimensions. The Infrastructure dimension includes indicators such as Telecommunications infrastructure, Supercomputers, Broadband quality, 5G infrastructure, and Adoption of emerging technologies. The Data Availability dimension measures the presence of Open data, Data governance, Mobile-cellular telephone subscriptions, Households with internet access, and Statistical capacity. Finally, the Data Representativeness dimension examines whether the available data is representative of the population as a whole, using indicators such as the Gender gap in Internet access and the Cost of internet-enabled devices relative to GDP per capita.

The third and final pillar (Technology Sector) measures the maturity of the country's technology sector and its ability to provide AI tools. The following dimensions are considered in this pilar: Maturity, Innovation Capacity, and Human Capital. The Maturity dimension includes indicators such as the number of AI unicorns, Number of non-AI technology unicorns, Value of trade in ICT services per capita, Value of trade in ICT goods per capita, and Computer software spending. Innovation Capacity assesses Time spent dealing with government regulations, VC availability, R&D spending, and Company investment in emerging technology. The human capital dimension examines the availability of talents in AI and their skills, using indicators such as graduates in STEM, GitHub users per thousand population, and the quality of engineering and technology higher education and ICT skills.

Based on these dimensions and their indicators, it is possible to obtain the specific score for each pillar and, consequently, an overall ranking of the 193 countries in terms of their readiness to adopt and implement AI in public services.

Figure 17. Government AI readiness index scores overall score (/100) and rank (/193)



Source: Oxford Insights, 2023.

The data in the figure and analysis of the Government AI Readiness Index 2023 report show that the United States and Canada lead the way in North America, with scores of 84.80 and 77.07, respectively, excelling in Governance and Data and Infrastructure, with the US significantly outperforming in the Technology Sector. In Latin America, Brazil remains the regional leader in the Technology Sector, scoring 45.08. The UK (78.57) and France (76.07) continue to lead in Western Europe, while Russia is close behind with 62.92 in Eastern Europe. In Sub-Saharan Africa, South Africa leads with 47.28, excelling in Data and Infrastructure. In South Asia, India (61.03) and Turkey (60.51) stand out, while in East Asia, the Republic of Korea (75.65) and Japan (75.08) do well in all pillars. In the Pacific, Australia (73.89) ranks 12th globally, excelling in Data and Infrastructure[138].

Stanford AI Index

The Stanford AI Index is an independent initiative of the Stanford Institute for Human-Centered Artificial Intelligence (HAI), led by the AI Index Steering Committee, an interdisciplinary group of experts from academia and industry[139]. With this index, it is possible to broadly monitor the AI ecosystem through the technical progress of AI capabilities, the community and investments that drive its development and deployment, as well as public opinion on current and future impacts and the policy measures taken to stimulate AI innovation and manage its risks and challenges.

The latest AI Index report covers AI development and research, technical performance, responsible AI, economics, science and medicine, education, politics and governance, diversity, and public opinion. The index uses data from multiple sources, obtained through the collaboration of organizations such as LinkedIn, Quid, McKinsey, Studyportals, the Schwartz Reisman Institute, and the International Federation of Robotics.

138. Information retrieved from the Government AI Readiness Index 2023 report, available at: https://oxfordinsights.com/wp-content/uploads/2023/12/2023-Government-AI-Readiness-Index-2.pdf [Accessed 03 Mar. 2024].

139. Information retrieved from the AI Index: State of AI in 13 Charts, available at: https://hai.stanford.edu/news/ai-index-state-ai-13-charts [Accessed 03 Mar. 2024].

Chapter 7: Policy and Governance presents AI-related policy and governance, including global and US legislative efforts, legislative mentions of AI, and national regulatory strategies. Indicators are given to monitor the implementation and effects of AI adoption on public policy, including indicators such as: Global Legislative Records on AI, U.S. Legislative Records, AI Mentions, National AI Strategies, U.S. Regulation, Federal Budget for AI R&D, U.S. Government AI-Related Contract Spending[140].

The Federal Budget for AI R&D indicator is based on data from the National Science and Technology (2022-2024) reports published in December of each year and previous editions of the AI Index (2021 and 2022). This indicator contains the analysis of different AI segments (e.g., data integration, computer vision, machine learning, autonomy, and natural language processing) covering the federal R&D budget in AI from various fiscal years. It details how the US federal government allocates funds for AI R&D in multiple departments and agencies that participate in the Networking and Information Technology Research and Development (NITRD) Program and National Artificial Intelligence Initiative, making it a relevant indicator for strategic planning and transparency of public spending, as well as for monitoring and evaluating the impact of AI policies on public services.

140. Information retrieved from the AI Index 2024 Annual Report, available at: https://aiindex.stanford.edu/report/ [Accessed 03 Mar. 2024].