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# 14. The geopolitics of AI in global environmental governance

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## INTRODUCTION

The interplay between artificial intelligence (AI), sustainable development and geopolitics has grown over the years. In this rapidly evolving landscape, AI has the potential to support the achievement of the Sustainable Development Goals (SDGs) with its ability to analyse vast amounts of data, visualise environmental phenomena, optimise industrial processes and contribute to our understanding of the complex interactions between social, political, environmental and economic dynamics (Varriale et al., 2024; Vinuesa et al., 2020). However, AI, machine learning in particular, can come at a price for the environment in terms of greenhouse gas emissions and energy consumption (see Chapter 12 in this volume by Joshi et al.), and is so far unequally developed and used within and between countries (Maslej et al., 2024). As such, assessing the sustainability of AI requires a scrutiny not only of how AI is used, but also of how it is produced and developed, for example the workers extracting raw materials for the hardware, the people involved in AI development, the energy consumption and its source when training algorithms, and legislations and geopolitical interests (Crawford, 2021; Dauvergne, 2022; Heilinger et al., 2024).

Amid discussions on what AI is, the Organisation for Economic Co-operation and Development (OECD) established that:

An AI system is a machine-based system that, [1] for explicit or implicit objectives [2] infers from the input it receives [3] how to generate outputs such as predictions, content, recommendations or decisions [4] that can influence physical or virtual environments. [5] Different AI systems vary in their levels of autonomy and adaptiveness after deployment. (OECD, 2024, p. 7).

This definition acknowledges that AI technologies usually operate within social, political and economic contexts in conjunction with other technologies. As nations and international organisations increasingly integrate AI into their sustainability strategies, the geopolitics surrounding its governance has become a critical area of study. Among others, effective governance of AI is essential for ensuring that its deployment aligns with the SDGs. Such attempts include the AI Safety Summit, the United Nations (UN)'s Resolution on Artificial Intelligence, the European Union (EU)'s AI Act, and the AI for Good initiative. However, the proliferation of strategies may hinder convergence as different understandings, objectives and priorities emerge (Roberts et al., 2024).

The promises but also risks AI represent for sustainability, the complexity of the technology itself, the diversity of ideas defended by the actors involved and the potential governance pitfalls warrant a scrutiny of AI governance from a sustainability perspective (Heilinger et al., 2024; van Wynsberghe, 2021). In our view, sustainability needs to account for equity within

and between countries and generations in terms of (1) opportunities and benefits; (2) inclusion of knowledge, protection, and democratic participation of the most marginalised; (3) capacity-building; and (4) ensuring that economic growth does not take precedence over poverty alleviation and environmental protection (Giddings et al., 2002; Gupta & Vegelin, 2016). We use these four aspects to discuss AI governance.

Against this background, this chapter provides a review of current trends in AI governance and examines a selection of strategies adopted by three states and four international organisations. By comparing these strategies, this chapter aims to discuss and analyse the geopolitical and sustainability implications that underpin current AI governance initiatives, building on Part II and III of the *Handbook*. Ultimately, this study aims to shed light on the complex interplay between AI and global environmental governance.

## THE AI GOVERNANCE LANDSCAPE

Before delving into the implications of AI for the geopolitics of sustainability, we explore the existing body of literature about AI governance and related challenges. We also present a handful of existing AI strategies as examples.

### Challenges to Governing AI

The governance of AI comes with difficulties due to knowledge disparities between tech companies and policymakers, and because some degree of foresight is necessary (Cihon et al., 2020; Larsson, 2020; Taihigh, 2021). Technological development typically occurs at a faster pace than regulatory processes, and there is a real risk that a centralised and legally binding governance framework would lock the governance of AI in a pathway that turns out to be irrelevant and unsuited to future technological development (Cihon et al., 2020; Maas, 2019).

In addition, AI encompasses different technologies, which are themselves often part of broader socio-technical systems. The task of defining AI is therefore difficult and contested (Larsson, 2020; Maas, 2019; Smuha, 2021). For example, training AI algorithms require tremendous amounts of data that can be produced by supporting technologies such as sensors, satellite imageries, social media content, or digital information from consumers. Moreover, AI technologies come with a high degree of complexity and uncertainty. AI-based assessments and decisions are often opaque and difficult to render understandable to users and policymakers. Some AI applications can further be already covered by existing legal frameworks (Smuha, 2021), which renders the governance of AI difficult to navigate.

Finally, while it is true that AI can be used to support the enforcement of international law, it can also render parts of international law impossible to enforce. Among others, handling cases of international customary law necessitates clear evidence of state practices, but these practices may become more challenging to identify if carried out by AI technologies (Maas, 2019). Likewise, an international treaty would require all states to have similar stakes, understanding and definitions when it comes to AI, otherwise managing international disagreements will be impossible (Maas, 2019).

To exemplify how different actors may address the governance of AI, the next section delves into the nature of the current AI governance landscape and focuses on a handful of AI strategies.

## **A Hybrid Approach to AI Governance**

The AI governance landscape is to this date fragmented (Cihon et al., 2020; Schmitt, 2022), although researchers have also identified common trends in how AI governance is approached (Jobin et al., 2019; Smuha, 2021; Ulnicane et al., 2022). The AI governance landscape is currently polycentric and composed of a variety of more or less legally binding initiatives coming from international organisations, states, and private strategies (Schmitt, 2022; Zaidan & Ibrahim, 2024). Table 14.1 gives an overview of the AI strategy of seven different actors to exemplify how the governance of AI can be understood differently. For example, China tends to emphasise the need to boost innovation and foster “common prosperity” through consumer protection, while the EU is more focused on promoting ethical perspectives and human rights in AI development while boosting its economic potential (Roberts et al., 2023). Along the same lines, the EU approach is meant to be “human-centric” and protect freedom, democracy, human rights and equality, while the Chinese approach rarely mentions individual rights and rather focuses on how AI can be used to boost its international competitiveness (Roberts et al., 2023).

A central point of discussion in the literature is the advantages and drawbacks of “hard law” (legally binding laws and treaties) compared to looser, soft law mechanisms (governance instruments that are not legally binding, like guidelines). Well-designed centralisation would allow to enforce a common set of rules and ensure compliance (Cihon et al., 2020). Some degree of convergence is already occurring (Roberts et al., 2023; Smuha, 2021). But hard law, while ensuring compliance, can be brittle and unadaptable to future innovation (Cihon et al., 2020). On the other hand, ethics guidelines have been occasionally used to avoid more legally binding rules to emerge, and AI is no exception (Wagner, 2018). This is not to say that ethics guidelines do not have their role to play. In fact, guidelines, while not legally binding, are generally more flexible and adaptable at a faster pace than legally binding instruments (Cihon et al., 2020; Larsson, 2020; Pavlidis, 2024).

As such, some globally agreed regulatory framework, supported by soft laws, are deemed desirable by many experts (Ho et al., 2023; Pavlidis, 2024; Taeiagh, 2021). The combination of hard law mechanisms in complement to voluntary guidelines is for example encouraged in the strategies of the OECD, the African Union (AU), and the EU. The core of the challenge here lies in whether the globally agreed principles would be understood in the same way by all actors, and if they do, if it is not a sign that the principles in question are too vague. In their research, Jobin et al. (2019) identified a global consensus forming around five ethical principles: transparency, justice and fairness, non-maleficence, responsibility, and privacy, although none of these principles were common to the entire sample of ethical guidelines they analysed. They also cautioned that these principles differ in interpretation and how their implementation is envisioned.

The complexity of AI technologies, their potential impact on international law and the necessity of foresight in policymaking are core challenges when it comes to governing AI. As a result, potential tensions are emphasised in the AI strategies developed by international organisations and states.

*Table 14.1 Summary of the AI strategy of the UN, OECD, AU, EU, China, US and Japan*

Actor	Key objectives
UN	<ul style="list-style-type: none"> <li>• Curb the digital divide within and between countries. Focus on the Global South, women, people of colour, and people with disabilities.</li> <li>• Promote a collaborative governance and research framework for safe, secure and trustworthy AI.</li> <li>• Promote the adoption of domestic governance approaches suitable to national contexts.</li> <li>• Ensure trustworthy AI contributes to the SDGs</li> </ul>
OECD	<ul style="list-style-type: none"> <li>• “Responsible stewardship of trustworthy AI”: “inclusive growth, sustainable development and well-being; respect for the rule of law, human rights and democratic values, including fairness and privacy; transparency and explainability; robustness, security and safety; and accountability” (OECD, 2024, p. 4).</li> <li>• Promote national and international cooperation to improve research and policies.</li> <li>• Strengthen human capacity and prepare the workforce.</li> </ul>
African Union	<ul style="list-style-type: none"> <li>• “To harness digital technologies and innovation to transform African societies and economies to promote Africa’s integration, generate inclusive economic growth, stimulate job creation, break the digital divide, and eradicate poverty for the continent’s socio-economic development and ensure Africa’s ownership of modern tools of digital management” (African Union, 2020, p. 5).</li> <li>• Create a harmonised legal, political, and financial environment to promote cooperation between African countries and institutions.</li> <li>• Include young populations, women, and minorities. Boost the achievement of the SDGs.</li> <li>• Increase broadband access, digital infrastructures, and the use of e-services.</li> </ul>
EU	<ul style="list-style-type: none"> <li>• Promote human-centred, trustworthy AI, based on European values and fundamental rights within the EU internal market.</li> <li>• Classification between AI systems that represent minimal risks (unregulated), limited risks (transparency and reporting obligations), high-risks (regulated), and unacceptable risks (prohibited).</li> <li>• Encourage the development of voluntary codes of conduct about the impact of AI systems on environmental sustainability and vulnerable groups.</li> </ul>
China	<ul style="list-style-type: none"> <li>• Take proactive actions to develop AI to benefit socio-technical development and national security, and increase competitiveness.</li> <li>• AI principles: build a strong research environment, a coordinated AI innovation system, be market-driven, and based on open source and openness.</li> <li>• Support the development of AI, technological standards, and intellectual property.</li> <li>• AI as a driver of economic and social development. Promote the development of an intelligent society. Train an AI labour force and popularise AI.</li> <li>• Use AI to meet the challenges of an aging society, and resource as well as environmental limitations.</li> </ul>
US	<ul style="list-style-type: none"> <li>• Remove governmental control and barriers over AI innovation.</li> <li>• Retain AI leadership for economic and national security: promote human flourishing, free speech, and a bright future for American citizens.</li> <li>• Remove “ideological bias or engineered social agendas” in AI systems (The White House, 2025b).</li> </ul>

Actor	Key objectives
Japan	<ul style="list-style-type: none"> <li>• “[T]ake the leadership to build an international network in the AI field for research, education and social infrastructure. Accelerate AI research and development, human resources development, and the achievement of SDGs” (Japan’s Secretariat of Science, Technology and Innovation Policy, 2022b, p. 7).</li> <li>• Use AI to maintain international competitiveness. Ensure Japan’s sustainable survival.</li> <li>• Respect the human-centred AI principles of dignity, diversity and inclusion, and sustainability. Ensure that AI systems are safe and secure.</li> <li>• Use AI to strengthen planetary resilience and respond to emergency situations.</li> </ul>

*Source:* UN General Assembly, 2024; OECD, 2024; African Union, 2020; European Parliament & Council of the European Union, 2024; Chinese Department of International Cooperation & Ministry of Science and Technology, 2017; The White House, 2025a, 2025b; and Japan’s Secretariat of Science, Technology and Innovation Policy, 2022a, 2022b.

## TENSIONS WITHIN AI STRATEGIES

We identify three main concerns that structure global AI governance: finding a balance between global yet precise regulations, accommodating risks and benefits in the short and long term, and navigating need for collaboration and national interest.

### Global Rules and Precise Regulations

The AI initiatives we reviewed often call for a global governance framework that can accommodate the variety of AI technologies and their future development, whilst being sufficiently concrete for implementation. Here we discuss how different strategies navigate these tensions on various levels. For concrete examples of such challenges, see Chapter 13 in this volume by Kinderlin and Barol.

Different strategies have been adopted to address the need for common but concrete rules. In the case of the EU, the OECD and the AU, the objective is to provide a common framework, leave a margin of manoeuvre to the stakeholders within this framework, but also encourage dialogue and collaboration to strengthen coherence between different national and private initiatives. In the EU, the legal concepts of “high risk” AI and “future-proofing regulations” are examples on how this challenge has been addressed. Article 5 of the EU AI Act lays out the prohibited practices regarding AI systems. Article 6 defines what constitutes “high-risk” AI. It is then up to AI deployers to assess what constitutes high-risk AI and act accordingly. One of the foundation pillars of the AU’s digital strategy (which includes AI), is to develop and implement a common legal and policy environment in Africa to regulate the risks brought by AI and develop harmonised sectorial, national and regional strategies based on the principles of inclusion, human-centredness and cybersecurity. Similarly, China, the US and Japan defend the idea that common standards should be adopted between states, with the nuance that their domestic understanding of AI technologies should be used as the basis for these global standards. China has for example suggested that AI governance be based on the principles of putting ethics first, ensuring safety and controllability, fairness and inclusiveness, openness, and peaceful use, seen as inspired by Chinese values (Lu et al., 2023). China also hopes to become a global norm-setter in the field of AI (Cheng & Zeng, 2023).

## **Risks and Benefits in the Short and Long Term**

A second concern is the need to find a balance between long-term and short-term risks, ensuring long-term benefits for society, and avoiding risks for humans and the planet, all the while harnessing shorter-term economic gains and innovation. This links to a more general discussion in sustainability studies regarding long-term thinking (see Chapter 26 in this volume by Carlsen).

Some of the short-term issues recognised are algorithmic bias, boosting research and development, and developing globally common standards. More long-term concerns relate to how to prepare the labour market for future changes induced by AI, but also how AI can be included in more long-term objectives, for example the SDGs (UN, OECD, AU), building future resilience to planetary disasters (Japan), or using AI to prepare the country for future challenges (China). Finding a balance between innovation and legal certainty also builds into this dual temporality in the sense that AI needs to be safe in the long term, but this should not undermine AI research and its economic potential now. The EU AI Act is a result of this attempt, as the rules laid out to promote data privacy and transparency, and to avoid surveillance are meant to strengthen the internal market. The idea of a human-centred approach for trustworthy AI is also defended by the UN, the AU, the EU and Japan. In addition, the initiatives mentioned underscore the understanding of economic growth and sustainable development as compatible, albeit in the case of AI it is understood that these synergies must be actively sought after. For example, the OECD tries to accommodate the tension between economic and social gains by highlighting in its first principle that:

Stakeholders should proactively engage in responsible stewardship of trustworthy AI in pursuit of beneficial outcomes for people and the planet, such as augmenting human capabilities and enhancing creativity, advancing inclusion of underrepresented populations, reducing economic, social, gender and other inequalities, and protecting natural environments, thus invigorating inclusive growth, well-being, sustainable development and environmental sustainability. (OECD, 2024, p. 4).

## **Technological Sovereignty and Need for Collaboration**

Another tension is between concerns for technological sovereignty and global collaboration imperatives. On the one hand, states are dependent on each other, for example, for chip production or knowledge exchange. On the other hand, AI often encapsulates the hopes to be leveraged and ensure global leadership on the market. The EU has for example argued that European values and respect for human rights put it in an ideal position to lead the way towards AI systems that are beneficial to humans (Francisco & Linnér, 2023). China sees AI as a transformative technology capable of bringing the country to its next stage of social and economic development, while securing its leading position worldwide. Japan also aspires to lead the way. As such, China, the US, Japan and the EU want to retain strategic autonomy and ensure an economic competitive advantage.

The strategies of the EU, the AU, China and Japan focus on technical sovereignty and on boosting their comparative advantage in the AI sector. On the other hand, they also call for more collaboration with other states, academia, and the private sector to boost the research and development of AI. The AU encourages collaboration among African states by developing a common political and legal environment that will facilitate the development of a single

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digital market. China has alternatively sought collaboration with BRICS, ASEAN and middle eastern countries, and through the G20 and the Shanghai Cooperation Organization (Lu et al., 2023). An outlier here is the US, which has forgone collaboration entirely and is instead paving the way for an “America first” approach to AI, where ensuring leadership and national security becomes paramount.

On the other hand, the OECD seeks to provide platforms for collaboration, for example the AI Policy Observatory and the informal OECD Network of Experts on AI, both launched in 2020, and the Working Party on AI Governance, launched in 2022. The UN resolution also calls for better inclusion and collaboration, encouraging better support for developing states in terms of infrastructures, technological transfer, resources and expertise.

The desire to become a leader in the AI market, but also the need for collaboration, is all the more central if one looks at the geopolitics of AI governance and sustainable development.

## DISCUSSION: AI, SUSTAINABILITY AND GEOPOLITICS

The following sections put the global governance of AI in perspective with sustainability considerations (Giddings et al., 2002; Gupta & Vegelin, 2016). AI strategies are laden with geopolitical concerns. We have mentioned concerns for economic competitive advantages, and discussions about technological sovereignty and collaboration. More existential threats are also mentioned, in particular the risks of misinformation, propaganda and social unrest. This comes in a context of unequal opportunities in terms of influence on the governance of AI and use of the technology.

### **The AI Race Leaving the Global South Behind**

From the sustainability perspective we follow (Giddings et al., 2002; Gupta & Vegelin, 2016), the current AI governance regime fails to ensure equity regarding (1) opportunities and benefits; (2) the inclusion and protection of the most vulnerable; and (3) capacity-building. The UN, the OECD and the AU are trying to use their agenda-setting power to increase the inclusion of vulnerable populations and encourage capacity-building, but historical material imbalances have not been addressed.

When it comes to equity in opportunities and benefits, the first actors to adopt successful AI regulations are likely to set the trends for other actors to follow (Smuha, 2021). This comes in a context where high-income countries, with the US, China and the EU ahead, are driving research and development on AI (Maslej et al., 2024). In this context, developing states are less systematically recognised as potential partners in multilateral agreements and AI strategies (Jobin et al., 2019; Radu, 2021), and less likely to lead regulation-making processes (Smuha, 2021). This is all the more the case if most technologies used in the Global South are developed elsewhere and do not benefit from the profits generated (Goralski & Tan, 2020; Truby, 2020). However, by calling for the inclusion of the Global South and vulnerable communities, the UN plays its role as agenda-setter and contributes to a better inclusion both in the governance and the use of AI. Similarly, national strategies like Japan’s promote better diversity in AI.

The inclusion and protection of the most vulnerable would warrant more attention. As currently implemented, AI systems tend to deepen global inequalities and defer negative

externalities to vulnerable groups and future generations (Crawford, 2021; Dauvergne, 2022; Heilinger et al., 2024). Vulnerable groups tend to be less represented within big data pools, in part because of data privacy regulations, but also because the lack of digitalisation in some countries renders the creation of data difficult. Biases can also arise when a technology designed for a specific context is transferred into another, or when the results are misinterpreted (Galaz et al., 2021). In this context, the use of data for sustainability purposes has been critiqued. Current discourses present data as a resource to extract and displaces data ownership from individuals to companies in a way similar to the historical dispossessions of resources and land (Coudry & Mejias, 2019). In that sense, the way the governance of AI unfolds might rely on unfair historical power imbalances. These concerns are absent in the strategies reviewed.

Finally, regarding capacity-building, the Global South faces challenges to using AI in their territories. AI systems require powerful and stable computational capacities, something vulnerable communities may lack (Bakker & Ritts, 2018; Borines et al., 2025). Developing states are already facing the consequences of climate change with fewer resources than developed countries, and are less likely to use AI for climate mitigation or adaptation. They are therefore in a vulnerable position both in the field of AI and climate action. The AU's strategy shows that in many African countries, infrastructures such as broadband access are still lacking.

### **Sustainability Sidelined by National Interests**

The different AI strategies follow historical concerns for the balance of power between countries and hope for leadership. The sense of an ongoing “global AI race”, where AI will bring winners and laggards in a winner-take-all setting (Ulnicane, 2022), further enshrines the governance of AI within this perspective.

AI strategies do not account for the global, complex and interconnected nature of climate change and the way in which human activities contribute to environmental insecurity (Dalby, 2014; McDonald, 2024). Instead, the dynamics at play tend to focus on powerful actors and hereby repeat the dichotomy between the centre and the periphery, typical of traditional geopolitical thinking (Francisco, 2025). Developing and using AI technologies come at a cost for the environment, and rely on raw materials that are becoming increasingly strategic (in this volume, see Chapter 9 by Månberger, and Chapter 12 by Joshi et al.). The AI race discourse hereby misses how the material production and deployment of new technologies affect communities on multiple scales beyond the EU, the US and China (Heilinger et al., 2024; Png, 2024).

Current geopolitical tensions may further provoke a disinterest in the sustainable development of AI. The Trump administration promised a public–private investment of \$500 billion to develop data centres, and plans to boost fossil fuel extraction to meet energy needs. Trump considering buying Greenland has also been linked to the presence of minerals on the territory that are necessary to build computers (Murray, 2025). Japan, the EU, the OECD and the UN are still encouraging the development of AI in a human and sustainable way, but this will prove insufficient if leading AI nations do not follow.

This is in a context in which AI is becoming crucial in military development. The use of AI, social media algorithms, online propaganda and bots increases political dissensus. Russia has for example conceptualised the use of online content to increase political instability amongst NATO members (Thornton & Miron, 2020). AI can also be used to curb social movement

and against environmental activists (Dauvergne, 2021). Autonomous weapons further make violence in conflicts more abstract and decrease the number of humans in the line of decision (Asaro, 2019). In that situation, countries that are able to use such weapons might gain a considerable advantage on states and populations who do not, while limiting the risks of opposition from their military apparatus.

By failing to make AI sustainable and by prioritising the development of military AI and securing national interest, equity principles are jeopardised: developing countries and vulnerable groups are at the forefront of the risks, indirectly by facing the consequences of climate change and the negative externalities of AI systems, and directly if AI technologies are used against them.

## CONCLUSION AND PATH FORWARD

In this chapter, we sought to explore the geopolitical and sustainability underpinnings of AI governance. To this end, we have reviewed the current AI landscape and concluded that the governance of AI is increasingly hybrid: there is a convergence on some principles and agreed-upon challenges, and the emergence of legally binding instruments. At the same time, this trend is complemented by soft law mechanisms. Common tensions identified in the AI strategies are the need for common rules precise enough for implementation; navigating risks and opportunities in the short and long term; and balancing technological sovereignty with the need for collaboration in AI development.

However, AI technologies, both in their regulation and implementation, have not sufficiently included vulnerable populations and the Global South, despite positive strides. The environmental implications of AI are also not accounted for. Concerns for sovereignty, competitive advantage and the balance of power are at the forefront, while the need to leave no one behind is as pressing as ever.

We would like to conclude with three recommendations on how to strengthen the linkages between the emerging AI governance system and the SDGs. First, we advocate for converting major AI technologies, such as large language models, into public goods. These should be supported by the public sector to ensure development pathways that are beneficial and accessible to all. Second, we need a structure akin to the European Organisation for Nuclear Research (CERN) for AI, where leading researchers can work together without commercial influence to develop joint trustworthy solutions that are openly available to all. Finally, we support the calls to regulate AI in a way that addresses the complex and integrated nature of sustainable development (Heilinger et al., 2024).

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