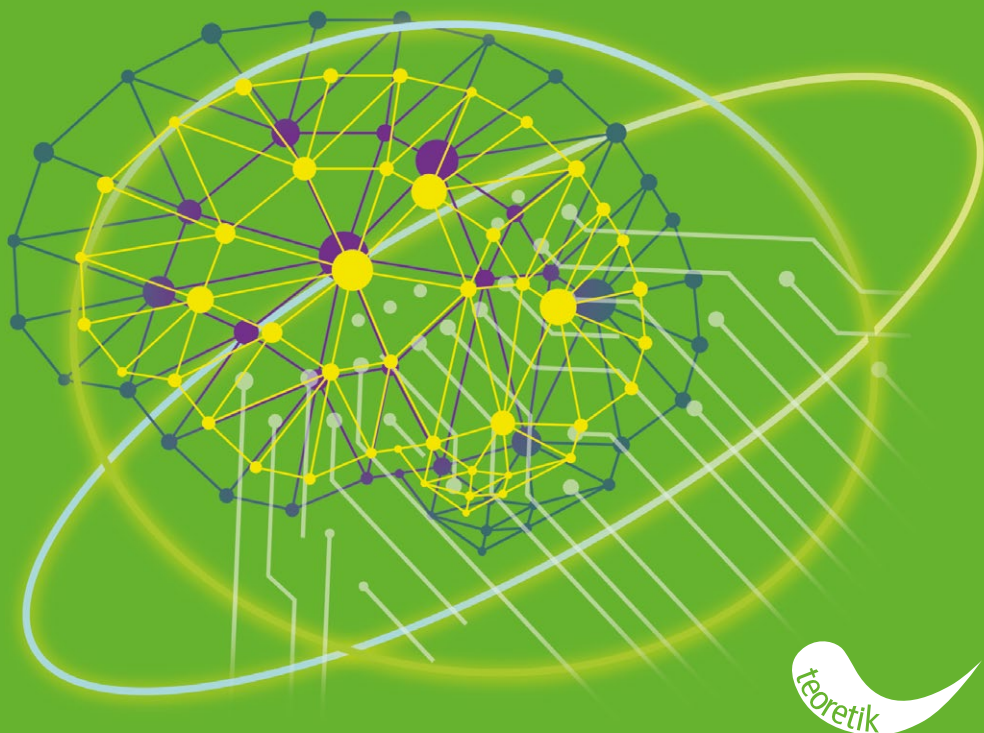


Lucia Bakošová

Leges

Green ambitions in the era of artificial intelligence



teoretik

GREEN AMBITIONS IN THE ERA OF ARTIFICIAL INTELLIGENCE

Lucia Bakošová

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Some parts of the monograph have previously been published as stand-alone scientific articles and contributions in peer-reviewed collections and scientific journals to gather feedback from the professional community on the author's interim conclusions. However, the content has since been revised and supplemented to address recent developments in legal regulations concerning artificial intelligence, particularly at global and regional levels. The primary motivation for selecting this topic was the lack of a similar monograph in public international law, coupled with the high relevance of the topic today. This monograph aims to partially fill this gap and potentially spark a broader international discussion on the future of legal regulation of artificial intelligence in light of sustainable development challenges.

The author gratefully acknowledges the financial support provided by the Slovak Research and Development Agency, which made it possible to participate in multiple domestic and international scientific conferences on sustainable development and artificial intelligence, to undertake research stays at the European University Institute in Florence, the Faculty of Law of the University of Ljubljana, the Faculty of Law of Charles University in Prague, and the Alma Mater Research Center for Human-Centered Artificial Intelligence at the University of Bologna, and to publish this monograph.

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Mgr. Lucia Bakošová, PhD.

Dedicated with love to Johny and Olívia

CONTENTS

Acknowledgments	5
About the author	11
Abbreviations	13
Introduction	15
I. GREEN AMBITIONS FOR SUSTAINABLE DEVELOPMENT	19
1. Sustainable Development in International Law	22
1.1. Elements of Sustainable Development	26
1.1.1. Substantive Elements of Sustainable Development	27
1.1.1.1. The Right to Development	27
1.1.1.2. The Integration of Environmental Protection and Economic Development	29
1.1.1.3. The Principle of Intergenerational Equity	31
1.1.1.4. The Principle of Intragenerational Equity	35
1.1.1.5. The Sustainable Utilization of Natural Resources	38
1.1.2. Procedural Elements of Sustainable Development	40
1.1.2.1. Public Participation in Environmental Decision-Making	41
1.1.2.2. Access to Environmental Information	44
1.1.2.3. Environmental Impact Assessment	46
1.1.2.4. Access to Justice in Environmental Matters ...	48
1.1.2.5. Interstate Cooperation	50
2. International Initiatives in Sustainable Development	52
2.1. United Nations Sustainable Development Goals	55
2.1.1. The Transformative Role of Artificial Intelligence in Achieving UN Sustainable Development Goals	59
3. Regional Approaches to Sustainable Development	65
3.1. European Green Deal	67
3.1.1. European Union's proposals and initiatives to achieve climate-related goals of the European Green Deal	71

3.1.2. Harnessing Artificial Intelligence for the European Green Deal	76
3.2. African Union Agenda 2063	79
3.2.1. African Union Green Recovery Action Plan 2021–2027	82
II. ARTIFICIAL INTELLIGENCE FROM LEGAL PERSPECTIVE ...	86
4. The Role of Public International Law in Regulating Artificial Intelligence and Addressing Environmental Challenges	88
4.1. International Environmental Law	90
4.1.1. Digital Technologies and AI: Transforming Climate Action	94
4.2. International Human Rights Law	96
4.2.1. Human Rights in the Age of Intelligent Measurement Systems for Climate Sustainability	102
4.2.2. The Right to Clean, Healthy and Sustainable Environment	105
4.2.2.1. The Approach of the Council of Europe to the Right to Clean, Healthy and Sustainable Environment	109
4.2.2.2. The Approach of the European Union to the Right to Clean, Healthy and Sustainable Environment	113
5. International Legal Framework on Artificial Intelligence	118
5.1. Global Partnership on Artificial Intelligence: Pioneering AI Solutions for Climate and Biodiversity	124
6. The United Nations Regulation on Artificial Intelligence	129
6.1. The Global Digital Compact and Its Implications for AI Governance	132
7. European Legal Perspective on Artificial Intelligence	135
7.1. The European Union's Regulation of Artificial Intelligence	135
7.1.1. The EU's Journey: From Coordinated Strategies to the Artificial Intelligence Act	139
7.1.2. The Artificial Intelligence Act	141

7.1.2.1. Environmental Sustainability and the AI Act: Gaps, Challenges, and Proposals for Reform	149
7.1.3. EU Soft-Law Approaches to AI Regulation: Stakeholder Initiatives for Climate Neutrality	152
7.2. The Council of Europe's Regulation on Artificial Intelligence	154
7.2.1. The Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law	161
7.2.1.1. Environmental Considerations in the Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law	166
III. CONCLUSION	169
Reference list	176

ABOUT THE AUTHOR

Mgr. Lucia Bakošová, PhD. (née Bódišová), graduated from the Faculty of Law at Pavol Jozef Šafárik University in Košice, where she successfully completed her doctoral studies in International Law in 2020. During her studies, she participated in an Erasmus+ study program at the Faculty of Law, University of Ljubljana, and attended several specialized courses aimed at deepening her expertise in public international law, including the Summer School of International Law (Bratislava), International Law in Context (Ljubljana), and International Disaster Law (Sanremo).

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In her scientific-research activities, Dr. Bakošová has served as principal investigator or researcher on several projects, including “*A Proposed Methodological Approach for Non-Governmental Organizations in the Event of a Disaster in the Slovak Republic*”, “*Artificial Intelligence from the Perspective of Law and Ethics*”, and “*Green Ambitions for Sustainable Development (The European Green Deal from the Perspective of International and National Law)*”. As part of these projects, she completed research stays at the International Institute of Humanitarian Law in Sanremo (2019), the Faculty of Law, University of Ljubljana (2021), the European University Institute in Florence (2023), the Faculty of Law, Charles University in Prague (2023), and the Alma Mater Research Center for Human-Centered Artificial Intelligence at the University of Bologna (2024).

Dr. Bakošová is the author of numerous scholarly and professional articles and contributions in public international law and its subfields, including international disaster law, international human rights law, international environmental law, and the emerging field of artificial intelligence law. She is a two-time recipient of the Rector's Award of Pavol Jozef Šafárik University in Košice and won 2nd place in the 2020 final of the Czech-Slovak legal competition for the best student work in student scientific professional ac-

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As a research fellow, Dr. Bakošová conducts research within the scientific project “*Green Ambitions for Sustainable Development (The European Green Deal from the Perspective of International and National Law)*”. She is currently based at the Institute of International Law and European Law, Faculty of Law, Pavol Jozef Šafárik University in Košice, where she teaches courses in public international law, international human rights law, diplomatic and consular law, and the emerging governance of artificial intelligence. Her recent research focuses on the legal regulation of artificial intelligence and international mechanisms for protecting human rights and fundamental freedoms within international human rights law.

ABBREVIATIONS

AI	Artificial Intelligence
AU	African Union
AUC	African Union Commission
CAHAI	Ad Hoc Committee on Artificial Intelligence
CAI	Committee on Artificial Intelligence
CJEU	Court of Justice of the European Union
CNDCP	Climate Neutral Data Centre Pact
CoE	Council of Europe
COP	Climate Change Conference
EAIB	European Artificial Intelligence Board
EAP	Environmental Action Programme
ECHR	European Convention on Human Rights and Fundamental Freedoms
ECtHR	European Court of Human Rights
ECL	European Climate Law
EGD	European Green Deal
EIA	Environmental Impact Assessment
EU	European Union
EU ETS	European Union Emission Trading System
GD	Green Deal
GDPR	General Data Protection Regulation
GHG	Greenhouse gas
GPAI	Global Partnership on Artificial Intelligence
GRAP	African Union's Green Recovery Action Plan 2021–2027
ICJ	International Court of Justice
IEA	International Energy Agency
IEEE	The Institute of Electrical and Electronics Engineers
IHRL	International Human Rights Law
IMS	Intelligent Measurement Systems
IPCC	Intergovernmental Panel on Climate Change

ISO	International Organization for Standardization
ITLOS	International Tribunal for the Law of the Sea
ITU	International Telecommunication Union
KGND	Korean Green New Deal
NDC	Nationally determined contribution
NECPs	National Energy and Climate Plans
NGD	National Green Deal
NGOs	Non-Governmental Organisations
OECD	Organization for Economic Cooperation and Development
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic
R2HE	Right to clean, healthy and sustainable environment
RAISE	Responsible AI Strategy for the Environment
REC	Regional Economic Communities
SDG	Sustainable Development Goals
SME	Small and Medium Enterprise
TEU	Treaty on the European Union
TFEU	Treaty on the Functioning of the European Union
UDHR	Universal Declaration of Human Rights
UK	The United Kingdom of Great Britain and Northern Ireland
UN	The United Nations
UNCED	The United Nations Conference on Environment and Development
UNCLOS	The United Nations Convention on the Law of the Sea
UNEP	The United Nations Environment Programme
UNESCO	The United Nations Educational, Scientific and Cultural Organization
UNFCC	The United Nations Framework Convention on Climate Change

INTRODUCTION

In an era where the global community grapples with the twin challenges of environmental degradation and technological advancement, the pursuit of sustainable development has never been more urgent. The concept of “green ambitions” encapsulates the aspirations and actions aimed at fostering a future where economic growth, environmental protection, and social equity are harmoniously balanced. As nations and corporations alike strive to reduce their carbon footprints and promote sustainable practices, these green ambitions have become a central pillar in the global dialogue on development. Sustainable development is a cross-border challenge, requiring coordinated efforts from all States and other actors in both national and international legal contexts. Addressing it effectively demands actions at local, national, regional, and global levels.

However, the ambition to achieve sustainability is increasingly intertwined with another transformative force: artificial intelligence (AI). AI is defined in various ways across natural, technical, and legal sciences, and it is explored in detail in Part II of this monograph. Nevertheless, it is appropriate to provide a basic definition of the term here, as it permeates the entire scope of the monograph. Broadly speaking, AI refers to a system capable of processing input to produce outputs – such as insights, actions, or solutions – designed to achieve specific goals or respond to particular objectives, often impacting various environments or domains. As AI technology advances, its potential to impact nearly every facet of society becomes more apparent. From enhancing weather and natural disaster predictions, environmental monitoring to optimizing energy use and storage, AI holds promise as a powerful tool in the quest for sustainability. On the other hand, AI poses serious challenges for the environment and, consequently, to achieving sustainable development. There are concerns connected to the energy consumption of AI, the ever-increasing need for non-renewable materials, as well as efficient e-waste management. Yet, this technological revolution also raises critical legal and ethical questions. How do we ensure that AI is developed and deployed in a way that aligns with our green ambitions? What legal frameworks are necessary to govern the intersection of AI and environmental sustainability? Do the existing and draft regulations on AI reflect on the goals of sustainable development?

The aim of this monograph is to critically examine the intersection of sustainable development and artificial intelligence (AI), emphasizing how AI technologies can be leveraged to advance sustainability goals while addressing the unique legal and environmental challenges they present. The analysis explores the adequacy of existing international and regional regulatory frameworks to address issues such as accountability, cross-border governance complexities, and the unintended consequences of AI, including data privacy, protection of vulnerable communities, and environmental impacts. Additionally, the monograph assesses the role of AI in optimizing resource efficiency, supporting climate action, and promoting equitable development, while offering normative guidance to align AI governance with the principles of sustainability and international law.

From an environmental perspective, the monograph considers the ecological footprint of AI technologies, including their energy consumption, reliance on non-renewable resources, and the challenges of managing electronic waste. It addresses the tension between AI's potential to advance environmental goals—such as through improved resource efficiency and climate modelling—and the environmental costs of its development and deployment. The monograph not only critiques existing frameworks but also provides normative guidance for the development of legal and policy instruments that align AI governance with sustainable development goals.

The monograph is divided into two interconnected parts. Part I explores the concept of sustainable development through the lens of public international law. It evaluates how international legal instruments and principles, such as the precautionary principle and common but differentiated responsibilities, can shape the responsible use of AI in advancing sustainability goals. This section also addresses initiatives aimed at achieving sustainability, such as the United Nations Sustainable Development Goals and recently adopted green deals, with a particular emphasis on the European Union and African Union, while situating these developments within the global context of sustainable development governance. The author critically analyses these documents to assess whether they adequately address the sustainable development and responsible use of AI systems. Insights from Part I's exploration of sustainable development principles lay the foundation for the legal and policy analysis in Part II, ensuring a cohesive approach to integrating AI governance with sustainability goals.

Part II shifts focus to the legal landscape governing AI, analysing how existing laws and regulations intersect with the rapidly evolving field of AI. It

explores the European Union's Artificial Intelligence Act and the Council of Europe's Framework Convention on Artificial Intelligence, Human Rights, Democracy, and the Rule of Law, alongside other emerging instruments shaping AI governance. Relevant norms from public international law, including international environmental law and international human rights law are analysed for their influence on AI regulation. Special attention is given to the human right to a clean, healthy, and sustainable environment, formally recognized by the UN General Assembly in July 2022, and its implications for AI governance. The analysis evaluates how AI can support this right—such as through intelligent measurement systems for resource optimization—while addressing risks like privacy violations. Additionally, it critically assesses the adequacy of frameworks emerging from the European Union and the Council of Europe in safeguarding human rights, promoting sustainable development, and mitigating the unintended consequences of AI, ensuring alignment with broader international legal principles.

Together, these discussions aim to illuminate a path forward, harnessing AI's transformative potential to advance green ambitions while ensuring that its development aligns with the principles of sustainability, equity, and international law.

I. GREEN AMBITIONS FOR SUSTAINABLE DEVELOPMENT

The international community for over fifty years is gradually addressing the pressing issue of protection of the environment, sustainable development and climate change. The *Intergovernmental Panel on Climate Change Report*, published in 2022, states that human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability. Some development and adaptation efforts have reduced vulnerability. Across sectors and regions the most vulnerable people and systems are observed to be disproportionately affected. The rise in weather and climate extremes has led to some irreversible impacts as natural and human systems are pushed beyond their ability to adapt. Most notably, climate change has caused substantial damages, and increasingly irreversible losses, in terrestrial, freshwater and coastal and open ocean marine ecosystems, reduced food and water security, adversely affected physical health of people, livelihoods and key infrastructure globally, as well as contributed to humanitarian crises where climate hazards interact with high vulnerability.¹ Likewise, the World Meteorological Organization's report *State of the Climate 2024: Update for COP29*, *COP 29 Outcomes*, or the *United Nations Framework Convention on Climate Change (UNFCCC) 2024 Yearbook of Global Climate Action* highlight an urgent global pivot toward stronger, multi-stakeholder actions and financing mechanisms to meet climate goals while addressing equity and resilience challenges.²

¹ Intergovernmental Panel on Climate Change: *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Working Group II contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 27 February 2022, pp. 9–13. Online: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_FullReport.pdf.

² World Meteorological Organization: *State of the Climate 2024: Update for COP29*, Geneva: World Meteorological Organization, 2024. Online: https://library.wmo.int/viewer/69075/download?file=State-Climate-2024-Update-COP29_en.pdf&type=pdf&navigator=1; For all documents adopted at the COP29 visit UNFCCC website. Online: <https://unfccc.int/documents>; UNFCCC: *Yearbook of Global Climate Action 2024: Marrakech Partnership for Global Climate Action*, Bonn: UN Climate Change Secretariat, 2024. Online: https://unfccc.int/sites/default/files/resource/Yearbook_GCA_2024.pdf.

In order to reverse the mentioned negative phenomena, the international community must adopt appropriate climate measures. Frequently, the newly adopted climate actions are connected with the concept of sustainable development. Although, the concept of sustainable development is not a new one, its application today is more urgent than ever. From the legal perspective, it is pervasive in all sorts of documents, such as international treaties,³ resolutions of international organizations⁴ or judicial decisions of international judicial and quasi-judicial organs.⁵

There are numerous possibilities how to achieve sustainable development regarding the continuous destruction of the environment. One of them is the use of AI systems, which may significantly accelerate the process of achieving the United Nations Sustainable Development Goals (UN SDGs). Thanks to the widespread use of satellites, mobile phones, sensors and financial transaction technologies there is now more information than ever on the state of the planet.⁶ AI in the analysed area may improve weather and natural disaster predictions, or they can help monitor, model and manage environmental systems, whether it is illegal logging, water degradation,⁷ illegal fishing and

³ For instance, *United Nations Framework Convention on Climate Change*, *Convention on Biological Diversity*, *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, *Paris Agreement*.

⁴ For instance, *Report of the United Nations Conference on Environment and Development*, A/CONF.151/26/Rev.1 (vol. I), Rio de Janeiro, 3 – 14 June 1992; *Report of the World Summit on Sustainable Development*, Johannesburg, 26 August – 4 September 2002, UN General Assembly: *The future we want*, Annex, A/RES/66/288, 27 July 2012; High-level political forum on sustainable development: *Political declaration of the high-level political forum on sustainable development convened under the auspices of the General Assembly*, Annex, A/HLPF/2019/L.1, 9 September 2019; *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992; UN General Assembly: *United Nations Millennium Declaration*, A/RES/55/2, 18 September 2000.

⁵ For instance, *The Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)*, Judgment, I.C.J. Reports 1997; *Iron Rhine Arbitration (Belgium v. the Netherlands)*, Permanent Court of Arbitration, 2003-02, 24 May 2005; *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, I.C.J. Reports 1996; *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010.

⁶ UN Science-Policy-Business Forum on Environment: *White Paper: Digital Earth: Building, Financing and Governing a Digital Ecosystem for Planetary Data*, Draft 1, February 2018, pp. 5–29. Online: <https://www.un-spbf.org/wp-content/uploads/2019/03/Digital-Ecosystem-final.pdf>.

⁷ CHUI, M. et al.: *Notes From the AI Frontier: Applying AI for Social Good*, McKinsey Global Institute, December 2018, pp. 26–27. Online: <https://www.mckinsey.com/~media/>

poaching,⁸ air pollution or the burden of farming.⁹ In general, AI applications could help design more energy-efficient buildings improve power storage and optimise renewable energy deployment by feeding solar and wind power into the electricity grid as needed.

On the other hand, it is also important to point out that AI poses serious challenges for the environment and, consequently, climate change. There are energy consumption concerns around AI, algorithms and the processing of large amounts of data.¹⁰ At the same time, production, service and final disposal of AI systems require vast amounts of non-renewable materials (such as lithium, nickel or cobalt) and efficient e-waste management, respectively.¹¹

The aim of this part is to analyse the existing international legal framework in the context of meeting the goals of sustainable development in the field of climate action. To achieve this aim, it is necessary to briefly introduce the concept of sustainable development from the international law perspective, its historical background and current development, as well as the regional approaches in this area, which are represented by the European Union's European Green Deal, and the African Union's Green Recovery Action Plan 2021–2027.

mckinsey/featured%20insights/artificial%20intelligence/applying%20artificial%20intelligence%20for%20social%20good/mgi-applying-ai-for-social-good-discussion-paper-dec-2018.ashx.

⁸ *Ibid*, pp. 24–25.

⁹ UNESCO: *Artificial Intelligence for Sustainable Development: challenges and opportunities for UNESCO's science and engineering programmes*, Working Paper, August 2019, p. 14. Online: <https://unesdoc.unesco.org/ark:/48223/pf0000368028>. Slovenská technická univerzita v Bratislave, Úrad podpredsedu vlády SR pre investície a informatizáciu: *Analýza a návrh možností výskumu, vývoja a aplikácie umelej inteligencie na Slovensku: Dielo č. 2 – Manuál pre firmy na zavedenie umelej inteligencie*, 11 December 2019, p. 86. Online: <https://www.mirri.gov.sk/wp-content/uploads/2020/03/Dielo2-Manual.pdf>.

¹⁰ NESLEN, A.: *Here's how AI can help fight climate change*, World Economic Forum, 11 August 2021. Online: <https://www.weforum.org/agenda/2021/08/how-ai-can-fight-climate-change/>.

¹¹ LEAL FILHO, W. et al.: *Deploying artificial intelligence for climate change adaptation*, *Technological Forecasting & Social Change*, Vol. 180, 2022, p. 2.

1. Sustainable Development in International Law

International community for the past decades focuses on activities that are able to ensure sustainable development in many areas. Sustainable development, as such, may be defined as a development, which as a necessary procedural step, “takes into account” environmental protection (integration), and which does so in a way that is consistent with the environmental treaty obligations undertaken by a country or, at the very least, with the core content of customary international environmental law applicable to all countries.¹² For a long time, international legal scholars are debating the legal and normative status of the sustainable development concept. “For some, the answer to the question of its relationship to the law is straightforward: sustainable development does not belong to law: it may be an important philosophical or political objective, but it is not a legal one.”¹³ The concept lacks norm-creating character, and that it can properly claim a normative status as an element of the process of judicial reasoning. Furthermore, he considers sustainable development as a meta-principle, a legal concept exercising a kind of “interstitial normativity”, pushing and pulling the boundaries of true primary norms when they threaten to overlap or conflict with each other. This means that where two primary norms come into conflict, the principle of sustainable development, as an interstitial norm, can serve to clarify how the two norms are to be balanced in a particular case. For example, where two primary norms come into conflict, such as the norm of economic development and the norm of environmental protection, the principle of sustainable development as an interstitial norm can serve to clarify how these two norms are to be balanced in a particular case.¹⁴ On the contrary, *Vinuales* states that sustainable de-

¹² DUPUY, P.-M., LE MOLI, G., VINALES, J. E.: *Customary International Law and the Environment*. In: RAJAMANI, L., PEEL, J. (eds.): *The Oxford Handbook of International Environmental Law*, Second Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-884915-5, pp. 385–401.

¹³ BARRAL, W.: *Sustainable Development in International Law: Nature and Operation of an Evolutionary Legal Norm*, *The European Journal of International Law*, Vol. 23, No. 2, 2012, p. 378.

¹⁴ LOWE, V.: *Sustainable Development and Unsustainable Arguments*. In: BOYLE, A. et al (eds.): *International Law and Sustainable Development: Past Achievements and Future Challenges*, Oxford: Oxford University Press, 1999, ISBN: 978-0-19-829807-6, p. 31.

velopment is a peculiar type of norm, a “normative concept”, which cannot perform some functions unless it is decomposed into more specific norms.¹⁵

It has been referred to in legal practice, not only in policy instruments¹⁶ such as the *Rio Declaration on Environment and Development*,¹⁷ *United Nations Millennium Declaration*¹⁸ or the *2030 Agenda for Sustainable Development*,¹⁹ but also in international treaties and decisions of judicial and quasi-judicial organs. Most commonly cited are the *United Nations Framework Convention on Climate Change*,²⁰ *Kyoto Protocol to the United Nations Framework Convention on Climate Change*,²¹ *Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*,²² *Paris Agreement*,²³ *Convention on Biological Diversity*²⁴ or the *United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*.²⁵ In most cases conventional provisions relating to sustainable development are too soft to impose an obligation on States to develop sustainability. But they may still impose an obligation on States to “strive to achieve” or “promote” sustainable development.²⁶ The sustainable development should be consid-

¹⁵ VINUALES, J. E.: *Sustainable Development*, in: RAJAMANI, L., PEEL, J. (eds.): *The Oxford Handbook of International Environmental Law*, Second Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-884915-5, p. 292.

¹⁶ See footnote no. 4.

¹⁷ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992.

¹⁸ UN General Assembly: *United Nations Millennium Declaration*, A/RES/55/2, 18 September 2000.

¹⁹ UN General Assembly: *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1.

²⁰ *United Nations Framework Convention on Climate Change*, New York, 9 May 1992, Art. 3.4.

²¹ *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, Kyoto, 11 December 1997, Arts. 2.1, 10, 12.2.

²² *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, Aarhus, 25 June 1998, Preamble.

²³ *Paris Agreement*, Paris, 12 December 2015, Arts. 2.1, 4.1, 6.1, 6.2, 6.4, 6.8, 6.9, 7.1, 8.1, 10.5.

²⁴ *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992, Art. 8 (e).

²⁵ *United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*, Paris, 14 October 1994, Arts. 1 (b), 5 (b), 9.1, 18.1.

²⁶ BARRAL, W.: *Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm*, *The European Journal of International Law*, Vol. 23, No. 2, 2012, p. 385.

ered as an objective. If the subject needs only to endeavour to achieve the result, rather than be under an absolute obligation to reach it, it is because, in the case of obligations of means, the achievement of this result is more unpredictable, and not fully under the subject's control. The obligation thus contains only a duty to employ best efforts, a category of obligations known to international law as "due diligence" obligations.²⁷

Some authors on the contrary argue, "there can be little doubt that the concept of sustainable development has entered the corpus of international customary law requiring different streams of international law to be treated in an integrated manner."²⁸ To substantiate this claim, it is often referred to a limited number of decisions of international judicial and arbitral organs that makes explicit reference to the concept of sustainable development, which supports the proposition that "sustainable" development means development in accordance with customary international environmental law. In the *Gabčíkovo-Nagymaros* case, the International Court of Justice (ICJ) referred for the first time to the need to reconcile economic development with protection of the environment, which is aptly expressed in the concept of sustainable development.²⁹ Judge Weeramantry in his separate opinion to the judgement in *Gabčíkovo-Nagymaros* case expressed the opinion that the normative value of sustainable development derives in part from its wide and general acceptance by the global community, which is shown by its adoption in multilateral treaties, international declarations, the practice of international financial institutions, planning documents and state practice. *Weeramantry* considered sustainable development as a legal principle of customary international law with an *erga omnes* character.³⁰ Furthermore, the concept has a significant role to play in the resolution of environmentally related disputes. The components of the principle come from well-established areas of international law – human rights, State responsibility, environmental law, economic and industrial law, equity, territorial sovereignty, abuse of rights, good neighbourliness. It offers an important principle for the resolution of tensions between two established rights. It reaffirms in the arena of international law that there must be both development and environmental protec-

²⁷ *Ibid*, p. 390.

²⁸ SANDS, P.: *Principles of International Environmental Law*, 2nd edition, Cambridge: Cambridge University Press, 2003, ISBN: 978-0-51-181351-1, p. 254.

²⁹ *The Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)*, Judgment, I.C.J. Reports 1997, para. 140.

³⁰ *Ibid*, p. 88, 104 and 118.

tion, and that neither of these rights can be neglected.³¹ In the *Iron Rhine Arbitration*, the tribunal specifically discussed the *Gabčíkovo-Nagymaros* case and concluded that “where development may cause significant harm to the environment there is a duty to prevent, or at least mitigate, such harm.”³² This duty, in the opinion of the tribunal, has now become a principle of general international law.³³ Paragraph 222 of the award explicitly refers to the prevention principle recognized as a customary norm in the ICJ’s *Advisory Opinion on the Legality of Nuclear Weapons*. As stated in the advisory opinion, the Court recognizes that the environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.³⁴ In the *Pulp Mills* case, the ICJ reasoned that the need to integrate economic and environmental considerations embodied in the concept of sustainable development was achieved *in casu* through the performance of both the procedural and the substantive obligations laid down by the (applicable river treaty).³⁵ In turn, these obligations were presented as specific treaty applications of core customary norms, namely the prevention principle, the customary requirement to conduct an environmental impact assessment, and the duty of cooperation.³⁶ There are also other international judicial and quasi-judicial decisions supporting the normative status of sustainable development.³⁷ Sus-

³¹ *Ibid*, p. 92.

³² *Iron Rhine Arbitration (Belgium v. the Netherlands)*, Permanent Court of Arbitration, 2003–02, 24 May 2005, para. 222.

³³ *Ibid*, paras. 57–59 and 222.

³⁴ *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, I.C.J. Reports 1996, para. 29.

³⁵ *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, paras. 75–77.

³⁶ VINUALES, J. E.: *Sustainable Development*. In: RAJAMANI, L., PEEL, J. (eds.): *The Oxford Handbook of International Environmental Law*, Second Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-884915-5, p. 291.

³⁷ For instance, *State obligations in Relation to the Environment (Advisory Opinion)*, Inter-American Court on Human Rights, OC-23/17, 2017; *Social and Economic Rights Action Center and the Center for Economic and Social Rights v. Nigeria*, African Commission on Human and People’s Rights, 155/96, 27 October 2001; *United States - Import Prohibition of Certain Shrimp and Shrimp Products*, World Trade Organization, Appellate Body Report 1998, WTO Doc. WT/DS58/AB, 12 October 1998.

tainable development represents a concept which can influence the outcome of cases, the interpretation of treaties and the practice of states and international organizations, and may lead to significant changes and developments in the existing law.³⁸

1.1. Elements of Sustainable Development

The concept of sustainable development encompasses both substantive and procedural dimensions, each contributing uniquely to its implementation. Substantively, as derived from Principles 3–8 of the *Rio Declaration on Environment and Development*, key elements include (a) the right to development, (b) the integration of environmental protection and economic development, (c) inter- and intra-generational equity, and (d) the sustainable utilization of natural resources.³⁹ These principles provide foundational guidance for implementing sustainable development in practice. Building on this framework, *Sands et al.* identify four recurring legal elements of sustainable development as reflected in international treaties:

- (1) The principle of intergenerational equity, emphasizing the preservation of natural resources for future generations.
- (2) The principle of sustainable use, advocating for the prudent and rational exploitation of natural resources.
- (3) The principle of intragenerational equity, ensuring equitable use of resources among states, considering the needs of others.
- (4) The principle of integration, mandating the incorporation of environmental considerations into economic and development planning while balancing these with developmental objectives.

These elements closely align with the substantive aspects outlined in the *Rio Declaration*. However, they often overlap and lack a universally agreed legal definition, highlighting the evolving nature of sustainable development in international law.⁴⁰ Together, these perspectives underscore the interplay

³⁸ MAHBUB, N. T.: *Sustainable Development and Its Evolution in the Realm of International Environmental Law*. In: Nnamdi Azikiwe University Journal of International Law and Jurisprudence, Vol. 7, No. 1, 2016, p. 11.

³⁹ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principles 3–8.

⁴⁰ SANDS, P., PEEL, J., FABRA, A., MACKENZIE, R.: *Principles of International Environmental Law*. Fourth Edition, Cambridge: Cambridge University Press, 2018, ISBN: 978-1-108-42095-2, pp. 218–219.

between normative principles and legal interpretations in shaping sustainable development's role in global governance.

Procedurally, as derived from Principles 10–27 of the *Rio Declaration on Environment and Development*, key elements include (a) public participation in environmental decision-making, (b) access to environmental information, (c) environmental impact assessment, (d) access to justice in environmental matters, and (e) interstate cooperation. These elements legitimize decisions and, when applied effectively, enhance their quality.⁴¹ Together, the substantive and procedural elements of sustainable development reflect a holistic approach, shaping sustainable development as both a legal and governance framework in international law.

1.1.1. Substantive Elements of Sustainable Development

1.1.1.1. The Right to Development

The right to development was for the first time endorsed by the international community in Principle 3 of the *Rio Declaration on Environment and Development*, under which “the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.”⁴² Critics have argued that this is not a right at all and point to its uncertain character in the *Declaration on the Right to Development* adopted by the UN General Assembly in 1986, and reiterated in the 1993 *Vienna Declaration on Human Rights*.⁴³ In accordance with Art. 1 of the *Declaration on the Right to Development*, the right to development is an inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized.⁴⁴ States have the right and the duty to formulate appropri-

⁴¹ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principles 10–17. See also BOYLE, A., REDGWELL, C.: *Birnie, Boyle & Redgwell's International Law and the Environment*. Fourth Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-959401-6, pp. 125–129.

⁴² *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principle 3.

⁴³ BOYLE, A., REDGWELL, C.: *Birnie, Boyle & Redgwell's International Law and the Environment*. Fourth Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-959401-6, p. 120.

⁴⁴ UN General Assembly: *Declaration on the Right to Development*, 4 December 1986, A/RES/41/128, Art. 1.

ate national development policies that aim at the constant improvement of the well-being of the entire population and of all individuals, on the basis of their active, free and meaningful participation in development and in the fair distribution of the benefits resulting therefrom.⁴⁵ The declaration also highlights the duties of states in implementing the right to development, namely:

- (1) Creation of Favourable Conditions: States bear the primary responsibility for establishing both national and international environments conducive to development.
- (2) Adherence to International Law: Development efforts must align with principles of friendly relations, cooperation, and international law as outlined in the UN Charter.
- (3) Cooperation and Solidarity: States are required to work collaboratively to remove barriers to development, foster equitable relationships, and support a global economic order that respects sovereignty, interdependence, and mutual benefit.
- (4) Policy Formulation and Support: States should collectively and individually develop policies aimed at facilitating development, particularly in supporting developing countries.
- (5) Promotion of Equity and Sustainability: Efforts should prioritize equitable resource distribution, capacity-building, and sustainable approaches to foster comprehensive development globally.⁴⁶

These principles stress the interconnectedness of state responsibilities, international collaboration, and adherence to human rights in achieving development goals. The *Vienna Declaration on Human Rights and Programme of Action* did not significantly advance the conceptual framework of the right to development but reaffirmed its status as articulated in the *Declaration on the Right to Development*. It underscored the universal and inalienable nature of this right and its integral relationship with fundamental human rights. Furthermore, the *Vienna Declaration* emphasized the international community's responsibility to foster effective cooperation to realize this right and to address barriers hindering development. This restatement reflects the declaration's broader theme of consolidating existing human rights principles while calling for their practical implementation.⁴⁷ It is important to highlight that the mentioned declarations are of legally non-binding nature. The right to de-

⁴⁵ *Ibid*, Art. 2 (3).

⁴⁶ *Ibid*, Arts. 3 and 4.

⁴⁷ World Conference on Human Rights: *Vienna Declaration and Programme of Action*, 25 July 1993, A/CONF.157/23, para. 10.

velopment was also addressed in the separate opinion of Judge *Weeramantry* in the *Gabčíkovo-Nagymaros case*, where he observed that this right does not exist in an absolute sense but is inherently conditioned by its compatibility with environmental sustainability. As such, the right to development, refined in this manner, is recognized as an integral part of modern international law.⁴⁸ Inclusion in the *Rio Declaration* represents a success for developing country advocates and reflects concerns that environmental protection should not outweigh their need for economic development. It was thus intended to serve as a counterweight to Principle 4 (which is closely elaborated in the following paragraph). At the same time, Principle 3 introduces the further important limitation that the right to development must be fulfilled “equitably” to meet both developmental and environmental needs of present and future generations.⁴⁹

1.1.1.2. *The Integration of Environmental Protection and Economic Development*

Principle 4 of the *Rio Declaration* provides that “environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.”⁵⁰ *Sands* rightly argues that Principle 4 “creates the possibility of moving environmental considerations and objectives from the periphery of international relations to the economic core, probably the most important long-term contribution which The United Nations Conference on Environment and Development (UNCED) will make to international affairs.”⁵¹ Integration permeates the *Rio* instruments, as well as the *Agenda 21*,⁵² and it is reflected in subsequent agreements and declaration including

⁴⁸ *The Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)*, Separate Opinion of Judge Weeramantry, p. 89.

⁴⁹ BOYLE, A., REDGWELL, C.: *Birnie, Boyle & Redgwell's International Law and the Environment*. Fourth Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-959401-6, p. 120. For an attempt at judicial elaboration see *Centre for Minority Rights Development (Kenya) and Minority Rights Group International on behalf of Endorois Welfare Council v. Kenya*, ACHPR (2009) paras. 228, 277, where the African Commission found a violation of the right to development enshrined in Art. 22 of the 1981 African Charter on Human and People's Rights.

⁵⁰ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principle 4.

⁵¹ SANDS, P.: *International Law in the Field of Sustainable Development*, British Yearbook of International Law, Vol. 65, Issue 1, 1994, p. 324.

⁵² *Agenda 21*, United Nations Conference on Environment & Development, Rio de Janeiro, 3 – 14 June 1992, paras. 1.1, 2.6, 2.8, 3.8, 5.35, 7.38, Chapter 8.

the 1994 *Convention to Combat Desertification*,⁵³ the 1995 *Washington Declaration on Protection of the Marine Environment from Land-based Activities*,⁵⁴ and the *Rio+20 Declaration – The Future We Want*.⁵⁵ The purpose of Principle 4 is to ensure that development decisions do not disregard environmental considerations. Integration of these competing values is fundamental to the concept of sustainable development and has implications across a broad range of national and international policy, as can be seen from *Agenda 21*, which refers to the “more systematic consideration of the environment when decisions are made on economic, social, fiscal, energy, agricultural, transportation, trade and other policies”.⁵⁶ The principle of integration has also been incorporated into the preambular provisions of certain regional agreements, such as the 1978 *Treaty for Amazonian Cooperation* and the 1978 *Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution*.⁵⁷ Additionally, it is explicitly reflected in Art. 2 of the 1985 *ASEAN Agreement on the Conservation of Nature and Natural Resources*, which states: “The Contracting Parties shall take all necessary measures, within the framework of their respective national laws, to ensure that the conservation and management of natural resources are treated as an integral part of development planning at all stages and at all levels. To that effect, they shall, in the formulation of all development plans, give as full consideration to ecological factors as to economic and social ones.”⁵⁸ The need to integrate environmental protection and economic development was regarded by the ICJ as one of the decisive elements of the *Gabčíkovo-Nagymaros*

⁵³ *United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*, Paris, 14 October 1994, preamble.

⁵⁴ *Washington Declaration on Protection of the Marine Environment from Land-based Activities*, Washington, 3 November 1995, preamble.

⁵⁵ UN General Assembly: *The future we want*, Annex, A/RES/66/288, 27 July 2012, paras. 69, 196.

⁵⁶ *Agenda 21*, United Nations Conference on Environment & Development, Rio de Janeiro, 3 – 14 June 1992, Chapter 8.2.

⁵⁷ BOYLE, A., REDGWELL, C.: *Birnie, Boyle & Redgwell's International Law and the Environment*. Fourth Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-959401-6, p. 118; *The Treaty for Amazonian Cooperation*, Brasilia, 3 July 1978; *Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution*, Kuwait City, 24 April 1978.

⁵⁸ *1985 Agreement on the Conservation of Nature and Natural Resources*, Kuala Lumpur, 9 July 1985, Art. 2 (1) and (2).

Case, even for the activities “begun in the past”.⁵⁹ In the *Iron Rhine Arbitration*, the Tribunal emphasized that “environmental law and the law on development stand not as alternatives but as mutually reinforcing, integral concepts, which require that where development may cause significant harm to the environment there is a duty to prevent, or at least mitigate, such harm. This duty in the opinion of the Tribunal, has now become a principle of general international law. This principle applies not only in autonomous activities but also in activities undertaken in the implementation of specific treaties between the Parties.”⁶⁰ One criticism of Principle 4 is that it “ambiguously stands as much for the subordination of environmental policies to economic imperatives in the eyes of some, as for the converse to others.”⁶¹ This ambiguity reflects differing interpretations of the principle’s balance between environmental protection and economic development, leaving it open to varied and sometimes conflicting applications. The subsequent jurisprudence, as referenced several times in this chapter, emphasizes the need to strike a balance between competing objectives, consistent with the overarching aim of sustainable development.⁶²

1.1.1.3. *The Principle of Intergenerational Equity*

The principle of intergenerational equity has been advanced to explain the optimum basis for the relationship between one generation and the next. The theory requires each generation to use and develop its natural and cultural heritage in such a manner that it can be passed on to future generations in no worse condition than it was received.⁶³ As *Brown-Weiss* stated, “as members

⁵⁹ *The Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)*, Judgment, I.C.J. Reports 1997, para. 140.

⁶⁰ *Iron Rhine Arbitration (Belgium v. the Netherlands)*, Permanent Court of Arbitration, 2003–02, 24 May 2005, para. 59.

⁶¹ PALLEMAERTS, M.: *International Environmental Law from Stockholm to Rio: Back to the Future?* In SANDS, P. (ed): *Greening International Law*, First Edition, Abingdon: Earthscan, 1993, ISBN: 978-1-85383-151-5, p. 17.

⁶² *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, paras. 175–177; *Iron Rhine Arbitration (Belgium v. the Netherlands)*, Permanent Court of Arbitration, 2003–02, 24 May 2005, para. 59.

⁶³ BOYLE, A., REDGWELL, C.: *Birnie, Boyle & Redgwell’s International Law and the Environment*. Fourth Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-959401-6, p. 121. See also BROWN-WEISS: *In Fairness to Future Generations: International Law, Common Patrimony and Intergenerational Equity*. New York: Transnational Publishers, 1989, ISBN: 0-941320-54-5, pp. 1–385.

of the present generation, we hold the Earth in trust for future generations.”⁶⁴ She identifies four essential criteria that any theory of intergenerational equity must satisfy. First, it must ensure fairness among generations, avoiding both exploitation of resources by the present generation to the detriment of future generations and the imposition of undue burdens on the present generation to address uncertain future needs. Second, principles of intergenerational equity should be value-neutral, allowing future generations the flexibility to achieve their goals based on their own values. Third, these principles must be clear and applicable to foreseeable situations. Finally, they should be widely accepted across diverse cultural traditions and compatible with different economic and political systems.⁶⁵ The principle in question is explicitly or implicitly referenced in numerous early environmental treaties. Examples include the 1946 *International Whaling Convention*, the 1968 *African Convention on the Conservation of Nature and Natural Resources*, and the 1972 *World Heritage Convention*.⁶⁶ More recent treaties have similarly sought to safeguard natural resources and environmental assets for the benefit of present and future generations. These treaties address diverse areas, such as: wild flora and fauna,⁶⁷ the marine environment,⁶⁸ essential renewable natural resources,⁶⁹ the environment generally,⁷⁰ the resources of the Earth,⁷¹ natural heritage,⁷²

⁶⁴ BROWN-WEISS: *In Fairness to Future Generations: International Law, Common Patrimony and Intergenerational Equity*. New York: Transnational Publishers, 1989, ISBN: 0-941320-54-5, p. 353.

⁶⁵ *Ibid.*, p. 38.

⁶⁶ *The International Convention for the Regulation of Whaling*, Washington, 2 December 1946, preamble; *African Convention on the Conservation of Nature and Natural Resources*, Algiers, 15 September 1968, preamble; *Convention Concerning the Protection of the World Cultural and Natural Heritage*, Paris, 16 November 1972, Art. 4.

⁶⁷ *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, Geneva, 3 March 1973, preamble.

⁶⁸ *Kuwait Regional Convention for Cooperation on the Protection of the Marine Environment from Pollution*, Kuwait City, 24 April 1978, preamble; *The Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Area*, Cartagena, 24 March 1983, preamble; *The Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment*, Jeddah, 14 February 1982, Art. 1 (1).

⁶⁹ *The Convention on Conservation of Nature in the South Pacific*, Apia, 12 July 1976, preamble.

⁷⁰ *Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques*, New York, 10 December 1976, preamble.

⁷¹ *Convention on the Conservation of Migratory Species of Wild Animals*, Bonn, 6 November 1979, preamble.

⁷² *Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region*, Nairobi, 21 June 1985, preamble.

natural resources,⁷³ water resources,⁷⁴ biological diversity,⁷⁵ and climate system.⁷⁶ This evolution of treaties demonstrates a consistent commitment to integrating environmental preservation into international legal frameworks, emphasizing intergenerational equity and sustainable use of resources. The principle of intergenerational equity is predominantly reflected in the preambular provisions of the aforementioned international treaties. The placement of the principle of intergenerational equity in preambular provisions carries important legal implications. While not legally binding, preambles serve as interpretative tools, helping courts and tribunals, such as the ICJ, clarify the spirit and purpose of treaties, especially when their substantive provisions are ambiguous. Additionally, principles outlined in preambles can contribute to the development of customary international law when supported by consistent state practice and *opinio juris*. They also reflect the moral and political commitment of States to sustainable development and environmental stewardship, emphasizing the significance of these values without creating enforceable obligations. Furthermore, such principles help establish normative frameworks that encourage the integration of intergenerational equity into domestic laws and policies, influencing both governance and future treaty-making efforts. The discussed principle is also articulated in numerous legally non-binding documents, including the 1972 *Stockholm Declaration*, the *UN General Assembly Resolution 35/8 on the Historical Responsibility of States for the Preservation of Nature for Present and Future Generations*,⁷⁷ and the previously mentioned 1992 *Rio Declaration* and 1993 *Vienna Declaration on Human Rights*. For instance, Principles 1 and 2 of the 1972 *Stockholm Declaration* affirm that: “Man has the fundamental right to freedom, equality, and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being. He bears a solemn responsibility to protect and improve the environment for present and future generations. The natural resources of the earth, including the air, water, land, flora, and fauna, and especially representative samples of natural ecosystems, must be

⁷³ 1985 *Agreement on the Conservation of Nature and Natural Resources*, Kuala Lumpur, 9 July 1985, preamble.

⁷⁴ *The Convention on the Protection and Use of Transboundary Watercourses and International Lakes*, Helsinki, 17 March 1992, Art. 2 (5) c).

⁷⁵ *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992, preamble.

⁷⁶ *United Nations Framework Convention on Climate Change*, New York, 9 May 1992, Art. 3 (1); *Paris Agreement*, Paris, 12 December 2015, preamble.

⁷⁷ UN General Assembly: *Historical Responsibility of States for the Preservation of Nature for Present and Future Generations*, 30 October 1980, A/RES/35/8, para. 1–5.

safeguarded for the benefit of present and future generations through careful planning or management.”⁷⁸ From newer documents, the *2030 Agenda for Sustainable Development* can be mentioned, which in para. 18 states that the United Nations (UN) Member States agreed to “implement the Agenda for the full benefit of all, for today’s generation and for future generations.”⁷⁹ Regarding relevant judicial decisions on this matter, the most notable include the ICJ’s *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons*, particularly the already mentioned para. 29, as well as paras. 35 and 36. These sections emphasize the potential for actions taken by the present generation to pose serious risks to future generations, thereby reflecting the principle of intergenerational equity and the need for caution in environmental and development-related decisions.⁸⁰ *Sands et al.* argue that the undertakings in favour of future generations have limited practical legal consequences. They are considered by some to be closely associated with the civil and political aspects of the relationship between environmental protection and human rights protection. According to this view, the rights of future generations might be used to enhance the legal standing of members of the present generation to ring claims, in cases relying upon substantive rules of environmental treaties where doubt exists as to whether a particular treaty creates rights and obligations enforceable by individuals.⁸¹ In the context of human rights law, intergenerational equity is not yet articulated in a dedicated international human rights instrument, and there is relevant work to be done in agreeing on a common understanding of future generations as rights-holders.⁸² Based on the above-mentioned, *Redgewell* concludes that “at best, intergenerational equity may be said to constitute a “guiding principle” in the application of substantive norms, including existing treaty obli-

⁷⁸ *The Stockholm Declaration on the Human Environment*, United Nations Conference on the Human Environment, Stockholm, 16 June 1972, Principles 1 and 2.

⁷⁹ UN General Assembly: *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1, para. 18.

⁸⁰ *Legality of the Threat or Use of Nuclear Weapons*, Advisory Opinion, I.C.J. Reports 1996, paras. 29, 35 and 36. See also *Iron Rhine Arbitration (Belgium v. the Netherlands)*, Permanent Court of Arbitration, 2003-02, 24 May 2005, para. 58.

⁸¹ SANDS, P., PEEL, J., FABRA, A., MACKENZIE, R.: *Principles of International Environmental Law*. Fourth Edition, Cambridge: Cambridge University Press, 2018, ISBN: 978-1-108-42095-2, p. 222.

⁸² UN High-Level Committee on Programmes: *Duties to the Future through an Intergenerational Equity Lens*, 13 February 2023, para. 7. Online: <https://unsceb.org/sites/default/files/2023-02/HLCP%20Duties%20to%20the%20Future%20discussion%20paper%20%28public%29.pdf>.

gations, under international law.”⁸³ On the contrary, *Collins* argues that given the repeated recognition of environmental obligations towards future generations in the preambles of environmental conventions, in soft law instruments, and in international jurisprudence, there is ample evidence of the emergence of a principle of customary international law providing that the present generation owes a duty to preserve an environment in which future generations’ have the ability to meet their needs.⁸⁴

1.1.1.4. *The Principle of Intragenerational Equity*

Intragenerational equity, as a key component of sustainable development, focuses on achieving fairness within the current generation. It emphasizes the equitable distribution of both environmental costs and benefits arising from developmental activities, ensuring that all individuals and communities have access to resources and opportunities without disproportionate burdens.⁸⁵ Both the *Brundtland Report* and *Agenda 21* underscore that addressing the imbalance in wealth between developed and developing countries and prioritizing the needs of the poor are essential policy elements of sustainability. Unlike intergenerational equity, which deals with fairness between present and future generations, intragenerational equity targets existing inequities within the current economic system.⁸⁶ The *Rio Declaration* addresses intra-generational equity through several key principles emphasizing cooperation, responsibility, and fairness. Principle 5 highlights poverty eradication as essential for sustainable development, calling for collective global efforts to achieve this goal. Principle 7 introduces “common but differentiated responsibilities” acknowledging the varying capabilities and roles of states in addressing environmental and developmental challenges. Principle 8 advocates for reducing unsustainable consumption and production patterns to enhance quality of life for all. Principle 12 underscores the importance of international cooperation to foster an open and supportive economic en-

⁸³ REDGWELL, C.: *Intergenerational Trusts and Environmental Protection*, Manchester: Juris, 1999, ISBN: 978-1-57823-034-1, p. 123.

⁸⁴ COLLINS, L.: *Revisiting the Doctrine of Intergenerational Equity in Global Environmental Governance*. In: *The Dalhousie Law Journal*, Vol. 30, p. 132.

⁸⁵ TLADI, D.: *Intragenerational Equity: A New Name for International Environmental Justice*. In: *Fundamina: a Journal of Legal History*, Vol. 9, 2003, p. 198.

⁸⁶ BOYLE, A., REDGWELL, C.: *Birnie, Boyle & Redgwell's International Law and the Environment*. Fourth Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-959401-6, p. 124.

vironment that promotes sustainable development globally. Finally, Principle 14 addresses environmental justice, urging states to prevent the transfer of harmful activities and substances to poorer nations, protecting marginalized communities from disproportionate environmental burdens.⁸⁷ Intragenerational equity is reflected in various international treaties addressing environmental protection and socio-economic development. The *Convention on Biological Diversity* emphasizes fair and equitable sharing of benefits derived from biological diversity, access to genetic resources, and the transfer of technologies. Art. 8 (j) highlights the importance of traditional knowledge of indigenous and local communities, encouraging equitable sharing of benefits. Additionally, Arts. 19 and 20 address socio-economic development and poverty eradication in developing countries, reinforcing the need for equity in resource use and benefit-sharing.⁸⁸ Similarly, the UNFCCC prioritizes economic growth and poverty eradication for developing countries while aiming to stabilize greenhouse gas emissions. The principle of common but differentiated responsibilities, codified in Art. 4, underscores the need for equitable contributions from all parties. Developed countries are specifically tasked with providing financial and technological support to assist developing nations in fulfilling their obligations. Equity remains a foundational principle throughout the treaty, reinforcing the commitment to address climate change while promoting sustainable development.⁸⁹ Among the recently adopted international treaties, the *Paris Agreement* stands out, particularly Art. 9, which obliges developed country Parties to provide financial resources to assist developing country Parties in both mitigation and adaptation efforts, continuing their existing obligations under the Convention.⁹⁰ As *Tladi* argues, the beauty of intragenerational equity is that it is, in principle, accepted by both developed and developing nations, albeit for different reasons. For developing countries the rich countries must bear the heavier burden for environmental costs as they are responsible for the major environmental threats facing the world due to the industrialization processes and the pressures that their societies continue to place on the earth's natural resources. Thus, for the developing world intragenerational equity places a legal duty on the developed nations. Developed nations accept, in principle, the responsi-

⁸⁷ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principles 5, 7, 8, 12 and 14.

⁸⁸ *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992, Art. 1, 8 (j), 19 and 20.

⁸⁹ *United Nations Framework Convention on Climate Change*, New York, 9 May 1992, Art. 4.

⁹⁰ *Paris Agreement*, Paris, 12 December 2015, Art. 9.

bility placed on them by intragenerational obligations because of the “technologies and financial resources they command”. For the developed nations these obligations are therefore merely moral.⁹¹ When it comes to relevant decisions of international courts or arbitral bodies, the arguments presented in the *Fur Seal Arbitrations* of 1892 between the United States (US) and Great Britain reflect early notions of intragenerational fairness, emphasizing both human and ecological considerations in resource management. The US stressed the critical role of the seal fishery in sustaining the livelihoods of Indigenous communities in Alaska, framing the indiscriminate pelagic sealing by British ships as a violation of equity. This practice deprived these communities of their sole resource, undermining their survival and denying their fair share of benefits. The US also argued that the doctrine of equal rights on the high seas must align with the common welfare, ensuring it does not harm the essential rights of coastal populations. This interpretation highlighted the need for equitable practices that respect the needs of affected communities while balancing resource exploitation among nations. Additionally, the US invoked the intrinsic value and right to existence of the seals, arguing against their extermination as a violation of both the laws of civilization and nature. This introduced an early concept of existence value, linking ecological preservation to intra-generational equity and emphasizing humanity’s responsibility to manage resources sustainably for the benefit of all communities and future generations.⁹² As for the ICJ case law, the reference, although not explicit, is made in the *Gulf of Maine* case, where the Chamber recognized the need to consider the effects of maritime delimitation on the fishing activities of the parties involved. The Chamber emphasized that the delimitation should not result in “catastrophic repercussions for the livelihood and economic well-being of the population of the countries concerned.”⁹³ This

⁹¹ TLADI, D.: *Intragenerational Equity: A New Name for International Environmental Justice*. In: *Fundamina: a Journal of Legal History*, Vol. 9, 2003, p. 203.

⁹² *Fur Seal Arbitration*, Proceedings of the Tribunal of Arbitration, convened at Paris under the treaty between the United States of America and Great Britain concluded at Washington February 29, 1892, for the determination of questions between the two governments concerning the jurisdictional rights of the United States in the waters of Bering Sea. Vol. 15. Washington: Government print off, 1895. Online: <https://www.biodiversitylibrary.org/page/9346636>. See also commentary in MAGGIO, G. F.: *Inter/Intra-Generational Equity: Current Applications under International Law for Promoting the Sustainable Development of Natural Resources*. In: *Buffalo Environmental Law Journal*, Vol. 4, No. 2, 1997, pp. 195–197.

⁹³ *Delimitation of the Maritime Boundary in the Gulf of Maine Area (Canada v United States)*, Judgment, I.C.J. Reports 1984, para. 237.

principle of considering socio-economic impacts highlights the implicit acknowledgment of intragenerational equity. The same reasoning was echoed in the case of *Denmark v. Norway*, where the ICJ noted the conflict over access to fishery resources. The Court emphasized the importance of fishing activities to the economies of both states and the traditional character of the fishing practices by the populations concerned.⁹⁴ This reflects the principle of equitable resource sharing and fairness within the current generation, aligning with intragenerational equity.

1.1.1.5. The Sustainable Utilization of Natural Resources

Lastly, we turn to the sustainable utilization of natural resources as a substantive element of sustainable development. The sustainable utilization of natural resources aims to balance competing priorities by ensuring their long-term availability, maximizing social benefits, and minimizing environmental harm. This element of sustainable development was addressed for the first time in Principle 2, 3 and 5 of the *Stockholm Declaration*. The mentioned principles collectively emphasize sustainable management and equitable use of natural resources to benefit present and future generations. They call for safeguarding resources like air, water, land, flora, fauna, and ecosystems through careful planning and management. The principles also stress maintaining, restoring, or improving the earth's capacity to produce renewable resources while advocating for the responsible use of non-renewable resources to prevent their depletion. Additionally, they highlight the importance of sharing the benefits of resource utilization equitably among all humanity, reinforcing the overarching goals of sustainability and intergenerational equity.⁹⁵ Twenty years later, at the Rio Conference, States affirmed a sovereign right of States to exploit their own resources “pursuant to their own environmental and developmental policies” and their responsibility “to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of na-

⁹⁴ *Maritime Delimitation in the Area between Greenland and Jan Mayen (Denmark v. Norway)*, Judgment, I.C.J. Reports 1993, para. 75.

⁹⁵ *The Stockholm Declaration on the Human Environment*, United Nations Conference on the Human Environment, Stockholm, 16 June 1972, Principles 2, 3 and 5. SOHN, L. B.: *The Stockholm Declaration on the Human Environment*. In: the Harvard International Law Journal, Vol. 14, No. 3, 1973, pp. 456–461.

tional jurisdiction.”⁹⁶ As Boyle and Redgwell rightly observe, the right to pursue economic development, as an attribute of a state’s sovereignty over its natural resources and territory, cannot be lawfully exercised without considering its potential detrimental impacts on human rights and the environment. Equally, neither environmental protection nor human rights necessarily outweigh the right to economic development. This balanced perspective underscores the necessity of integrating these priorities within a framework of sustainable development. Such potential conflicts have not led international courts to employ the concept of *ius cogens* or to give human rights, environmental protection or economic development automatic priority.⁹⁷ Instead, the case law analysed in connection with other substantive elements of sustainable development has focused on questions of balance, necessity, and the degree of interference. It shows that few rights are absolute or unqualified. The principle of sustainable utilization of natural resources is reflected in various international environmental treaties, such as the *Convention on Biological Diversity*,⁹⁸ the *Minamata Convention on Mercury*,⁹⁹ the *Convention on the Conservation of Antarctic Marine Living Resources*,¹⁰⁰ the *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*,¹⁰¹ the *International Tropical Timber Agreement*,¹⁰² and the *Convention on International Trade in Endangered Species of Wild Fauna and Flora*.¹⁰³ However, these and other treaties adopted in this area face several shortcomings, which can be categorized into three areas: (i) their objectives often focus on aspects like environmental protection or health rather than resource efficiency; (ii) their scope is limited to specific resources or subsets of resources; and (iii) they address only parts of the value chain, such as resource extraction, efficiency, consumption, or end-of-life processes. These

⁹⁶ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principle 2.

⁹⁷ BOYLE, A., REDGWELL, C.: *Birnie, Boyle & Redgwell’s International Law and the Environment*. Fourth Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-959401-6, p. 116.

⁹⁸ *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992, Art. 1

⁹⁹ *Minamata Convention on Mercury*, Kumamoto, 10 October 2013, Art. 1.

¹⁰⁰ *Convention on the Conservation of Antarctic Marine Living Resources*, Canberra, 20 May 1980, Art. 2.

¹⁰¹ *Convention on the Protection and Use of Transboundary Watercourses and International Lakes*, Helsinki, 17 March 1992, Art. 2 (2) b).

¹⁰² *International Tropical Timber Agreement*, Geneva, 27 January 2006, Art. 1.

¹⁰³ *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, Geneva, 3 March 1973, Art. II.

limitations underscore the necessity for a more integrated and comprehensive approach to sustainable resource management. To bridge the gaps in existing frameworks, there is growing momentum behind an initiative to adopt an international treaty dedicated to a comprehensive management of natural resources.¹⁰⁴

1.1.2. Procedural Elements of Sustainable Development

Procedural elements serve as essential mechanisms for implementing sustainable development by ensuring transparency, inclusivity, and accountability in environmental governance. This aspect is prominently reflected in the *Rio Declaration*, which recognizes the importance of procedural rights and includes provisions for (a) public participation in environmental decision-making, (b) access to environmental information, (c) environmental impact assessment, (d) access to justice in environmental matters, and (e) interstate cooperation. The abovementioned procedural rights [letter a), b) and d)] are commonly referred to as access rights.¹⁰⁵ Access rights facilitate more transparent, inclusive, and accountable decision-making in matters affecting the environment and development. Access to information empowers and motivates people to participate in an informed and meaningful manner. Participatory decision-making enhances the ability of governments to respond to public concerns and demands, to build consensus, and to improve acceptance of and compliance with environmental decisions because citizens feel ownership over these decisions. Access to justice facilitates the public's ability to enforce their right to participate, to be informed, and to hold regulators and polluters accountable for environmental harm.¹⁰⁶ These elements provide a foundational framework for fostering effective and equitable environmental governance.

The *1998 Aarhus Convention* is a landmark treaty that operationalizes procedural rights in environmental law through its three pillars: access to environmental information, public participation in decision-making, and access

¹⁰⁴ Van Der VEN, C.: *An International Agreement on Natural Resources Management: An Overview of Opportunities and Challenges*, Public Waste Agency of Flanders, 2022, p. 13. Online: https://circulareconomy.europa.eu/platform/sites/default/files/an_international_agreement_on_natural_resource_management.pdf.

¹⁰⁵ BANISAR, D., PARMAR, S., DE SILVA, L., EXCELL, C.: *Moving from Principles to Rights: Rio 2012 and Access to Information, Public Participation, and Justice*. In: *Sustainable Development Law & Policy*, Vol. 12, No. 3, 2012, p. 8.

¹⁰⁶ *Ibid.*

to justice in environmental matters.¹⁰⁷ This convention has significantly influenced environmental governance in Europe and beyond, setting a global precedent for procedural rights and strengthening the role of civil society in environmental protection. Beyond the *Aarhus Convention*, procedural elements are embedded in numerous international treaties and legal frameworks. Examples include the *Paris Agreement*, which emphasizes transparency and stakeholder engagement in climate action, and the *Espoo Convention on Environmental Impact Assessment in a Transboundary Context* (*Espoo Convention*), which promotes cross-border cooperation and environmental assessments.¹⁰⁸ Additionally, international judicial and arbitral decisions, such as the *Pulp Mills* case before the ICJ, have underscored the importance of these procedural norms in resolving environmental disputes.¹⁰⁹ By integrating procedural elements into environmental governance, international law not only advances sustainable development but also empowers individuals and communities to actively shape their environmental futures. These mechanisms ensure that sustainability efforts are participatory, informed, and grounded in principles of justice and cooperation.

1.1.2.1. Public Participation in Environmental Decision-Making

Public participation in environmental decision-making is a cornerstone of effective environmental governance. It ensures that individuals, whether natural or legal, and communities have a voice in decisions that impact their environment and quality of life. This principle is enshrined in key international frameworks like Principle 10 of the *Rio Declaration*, which emphasizes transparency, access to environmental information, and opportunities for meaningful public engagement supported by judicial and administrative remedies.¹¹⁰ Similarly, the *Aarhus Convention* codifies public participation in environmental decision-making in several provisions, including requirements for timely notification, access to relevant information, and opportu-

¹⁰⁷ *Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental matters*, Aarhus, 25 June 1998.

¹⁰⁸ *Convention on Environmental Impact Assessment in a Transboundary Context*, Espoo, 25 February 1991.

¹⁰⁹ *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010.

¹¹⁰ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principle 10.

nities for public input during environmental decision-making processes.¹¹¹ A comparable international treaty was established among Latin American countries – the *2018 Escazú Agreement*. This landmark agreement focuses on ensuring access to information, public participation in environmental decision-making, and justice in environmental matters within the region.¹¹² These frameworks collectively aim to empower citizens and foster more inclusive and informed decision-making.

Various national practices demonstrate the importance and impact of public participation in environmental decision-making. In several European states, such as Denmark, Ireland, Switzerland, and the United Kingdom, the implementation of the Aarhus Convention principles in renewable energy projects, including wind farms, typically involves public hearings and online consultations to enable the public to express concerns regarding infrastructure development and to provide input on the selection of technologies and project siting. Given that the European Union is a Party to the Aarhus Convention, these participatory rights and procedural guarantees are systematically applied across all EU Member States, thereby ensuring a consistent legal framework aimed at enhancing the quality and legitimacy of decision-making processes, increasing transparency, facilitating better-informed decisions that reflect public needs, reducing delays in permitting procedures and construction timelines, mitigating opposition to energy infrastructure, and fostering trust between project developers and the affected communities.¹¹³ India's Joint Forest Management programs engage local communities in forest conservation through participatory committees, leading to improved forest cover and sustainable practices.¹¹⁴ The Dakota Access Pipeline controversy in the US underscores the consequences of insufficient engagement, highlighting the need for culturally sensitive consultations and independent impact

¹¹¹ *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, Aarhus, 25 June 1998, Arts. 6 (5) – (9), 7 and 8.

¹¹² *Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement)*, Escazú, 4 March 2018, Art. 1, 7.

¹¹³ SÜSSER, D. et al.: *Drivers and barriers of public engagement in energy infrastructure*, UsersTCPbyIEA report, 2023, pp. 47–48. Online: https://ieecp.org/wp-content/uploads/2023/11/D2-Drivers-and-barriers-public-engagement_version-November.pdf.

¹¹⁴ DHANAPAL, G.: *Revisiting participatory forest management in India*. In: *Current Science*, Vol. 117, No. 7, 2019, pp. 1161–1166; THOKER, I.A. et al.: *An appraisal of people's participation in the joint forest management programme in the Kashmir Himalayas*. In: *Forest Policy and Economics*, Vol. 166, 2024, p. 103265.

assessments.¹¹⁵ Meanwhile, Curitiba, Brazil, has achieved global recognition for sustainable urban planning by incorporating public forums into transportation and green space development.¹¹⁶

Effective tools for enhancing public participation in environmental decision-making include public hearings, consultations, and participatory governance mechanisms. Digital platforms, such as Estonia's e-Governance system, expand access to environmental information and enable remote participation.¹¹⁷ Community advisory boards offer stakeholders a platform to collaborate and influence decisions directly. Capacity-building workshops educate citizens about their rights and technical aspects of proposed projects, while participatory budgeting allows communities to allocate resources toward environmental initiatives they prioritize. Scenario-building exercises further support consensus by encouraging stakeholders to envision potential outcomes under various scenarios. By integrating these tools and mechanisms, public participation in environmental decision-making ensures early engagement, accessible communication, and the incorporation of stakeholder feedback. This not only enhances the legitimacy and sustainability of environmental decisions but also empowers individuals and communities to actively shape their environmental futures.

Public participation in environmental decision-making has been a recurring theme in decisions by international judicial and arbitral bodies. In its Advisory Opinion on *State Obligations in Relation to the Environment*, the Inter-American Court of Human Rights underscored the obligation of states to ensure opportunities for effective public participation from the earliest stages of decision-making and to adequately inform the public about these opportunities.¹¹⁸ Similarly, the Aarhus Convention Compliance Committee, in its *Findings and recommendations regarding Kazakhstan's compliance in the case concerning the construction of a high-voltage power line*, determined

¹¹⁵ PERLS, H.: *The Dakota Access Pipeline (DAPL)*, Harvard Law School – Environmental & Energy Law Program, 14 October 2024. Online: <https://eelp.law.harvard.edu/tracker/dakota-access-pipeline/>.

¹¹⁶ VAN SPEIER, J.: *Citizen Participation Influencing Public Decision Making: Brazil and the United States*. In: Public Administration Review, Vol. 69, No. 1, 2009, pp. 156–159.

¹¹⁷ VASSIL, K.: *Estonian e-Government Ecosystem: Foundation, Applications, Outcomes*, World Development Report 2016: Digital Dividends, 2015, p. 5 and 28. Online: <https://thedocs.worldbank.org/en/doc/165711456838073531-0050022016/original/WDR16BPEstoniane-GovecosystemVassil.pdf>.

¹¹⁸ *State obligations in Relation to the Environment* (Advisory Opinion), OC-23/17, 15 November 2017, para. 232.

that Kazakhstan had failed to adequately involve the public in the process.¹¹⁹ Additionally, the European Court of Human Rights (ECtHR), in *Tătar v. Romania*, affirmed the critical importance of public access to the conclusions of environmental studies and to information that enables the public to assess potential risks to which they may be exposed.¹²⁰

1.1.2.2. Access to Environmental Information

The duty to provide – and the right to obtain – access to environmental information is a relatively recent but now firmly established in international law, reflected in instruments such as the *Aarhus Convention*,¹²¹ *Escazú Agreement*,¹²² *Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)*,¹²³ *Protocol on Pollutant Release and Transfer Registers*,¹²⁴ or the *UNFCCC*.¹²⁵ This right is closely linked to public participation in environmental impact assessments and decision-making processes and has developed alongside procedural rights in human rights law. It extends beyond obligations for public awareness, education, or publicity, ensuring actionable transparency.¹²⁶

The *Aarhus Convention* provides a broad definition of environmental information under Art. 2 (3), covering data on the state of environmental elements (e.g., air, water, biodiversity), factors affecting them (e.g., pollutants,

¹¹⁹ *Findings and recommendations with regard to compliance by Kazakhstan with the obligations under the Aarhus Convention in the case construction of high-voltage power line*, Communication ACCC/C/2004/02 by Green Salvation (Kazakhstan), 18 February 2005, para. 29 and 30.

¹²⁰ *Tătar v. Romania*, Judgment, Merits and Just Satisfaction, Application No. 67021/01, 6th July 2009, para. 88.

¹²¹ *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, Aarhus, 25 June 1998, Art. 4 (1).

¹²² *Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean*, Escazú, 4 March 2018, Arts. 5 and 10.

¹²³ *Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)*, Paris, 22 September 1992, Art. 9.

¹²⁴ *Protocol on Pollutant Release and Transfer Registers to the Convention on Access to Information, Public-Participation in Decision-Making and Access to Justice in Environmental Matters*, Kiev, 21 May 2003, Arts. 1, 11 (1), 13.

¹²⁵ *United Nations Framework Convention on Climate Change*, New York, 9 May 1992, Arts. 10 and 12 (9).

¹²⁶ SANDS, P., PEEL, J., FABRA, A., MACKENZIE, R.: *Principles of International Environmental Law*. Fourth Edition, Cambridge: Cambridge University Press, 2018, ISBN: 978-1-108-42095-2, p. 707.

policies, economic analyses), and their impact on human health and safety.¹²⁷ This right is closely tied to public participation in environmental decision-making, as emphasized in Principle 10 of the *Rio Declaration*, which calls on States to ensure appropriate access to information concerning the environment that is held by public authorities facilitate public awareness, and encourage participation by making information widely available.¹²⁸ The *OSPAR Convention* was the first treaty to set specific rules on accessing environmental information. Art. 9 obliges Contracting Parties to ensure that competent authorities provide such information upon reasonable request, without requiring proof of interest or imposing unreasonable charges, within a maximum of two months. Information must be made available in written, visual, audio, or database form and include data on the maritime environment, activities impacting it, and measures implemented under the Convention. However, disclosure may be refused if it would compromise confidentiality, international relations, public security, legal or disciplinary proceedings, intellectual property, personal data, third-party materials, or if it could harm the environment. In such cases, reasons for refusal must be provided.¹²⁹ By contrast, the *Aarhus Convention* offers a broader framework, including more detailed obligations, such as shorter response times (one month, extendable to two), format requirements, and the provision of non-exempt portions of information. Furthermore, the *Aarhus Convention* applies to a wider range of environmental information beyond the marine context.¹³⁰

International judicial and arbitral decisions have further reinforced the importance of access to environmental information. In *Hatton and Others v. the United Kingdom*, the ECtHR emphasized the importance of balancing competing interests, including the public's right to access information about environmental impacts.¹³¹ It also discusses procedural safeguards, including the necessity for the public to be informed and involved in environmental

¹²⁷ *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, Aarhus, 25 June 1998, Art. 2 (3).

¹²⁸ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principle 10.

¹²⁹ *Convention for the Protection of the Marine Environment of the North-East Atlantic*, Paris, 22 September 1992, Art. 9.

¹³⁰ *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, Aarhus, 25 June 1998, Art. 4 (1).

¹³¹ *Hatton and Others v. the United Kingdom*, Judgment, Merits and Just Satisfaction, Application No. 36022/97, 8th July 2003, para. 97.

decision-making.¹³² In the *Guerra and Others v. Italy*, the ECtHR highlighted that access to environmental information is integral to the effective exercise of the right to private and family life. It stated that a lack of adequate access to information on environmental risks violated the state's obligations under Art. 8 of the *European Convention on Human Rights and Fundamental Freedoms*.¹³³ Regarding specific groups, *Centre for Minority Rights Development v. Kenya*, which was decided by the African Commission on Human and People's Rights underscored the importance of access to environmental information for indigenous communities to make informed decisions about their land and resources.¹³⁴

1.1.2.3. Environmental Impact Assessment

Environmental impact assessment (EIA) is a critical procedural tool in environmental governance, designed to identify, evaluate, and mitigate the potential adverse effects of proposed activities on the environment before they are carried out. As a cornerstone of sustainable development, it ensures that decision-makers consider environmental consequences alongside economic and social factors, promoting informed decision-making through transparency, accountability, and public participation. The scope of activities within the EIA will vary depending on the nature of the proposed action, its potential for impacts to the environment, public interest, and the decision-making culture of any given industry or government.¹³⁵ According to Marong, the EIA process operates on two primary functions to achieve its objectives. First, EIA findings serve as a critical report influencing whether development projects should proceed or require modifications to minimize environmental consequences. Second, the process actively encourages public participation, enabling affected communities and stakeholders, including non-governmental organisations (NGOs), to play a significant role in shaping project outcomes and ensuring environmental considerations are prioritized.¹³⁶

¹³² *Ibid*, para. 119–121.

¹³³ *Guerra and others v Italy*, Judgment, Merits and Just Satisfaction, Application No. 14967/89, 19th February 1998, para. 60–62.

¹³⁴ *Centre for Minority Rights Development (Kenya) and minority Rights Group International on behalf of Endorois Welfare Council v. Kenya*, 276/2003, 4 February 2010, para. 218–221.

¹³⁵ KURIAN, J. et al.: *Environmental Impact Assessment as a Tool for Sustainable Development*. In: LEAL FILHO, W. (eds): *Encyclopedia of Sustainability in Higher Education*. Cham: Springer, 2018, ISBN: 978-3-319-63951-2, p. 8.

¹³⁶ MARONG, A. B. M.: *From Rio to Johannesburg: Reflections on the Role of International*

Originating as a national mechanism, the concept of EIA has become a key component of international environmental law, with its principles codified in international treaties such as the *Espoo Convention*, the *Escazú Agreement*, the *United Nations Convention on the Law of the Sea* (UNCLOS), or the *Convention on Biological Diversity*.¹³⁷ Principle 17 of the *Rio Declaration* establishes EIA as a fundamental national instrument, mandating its application to activities likely to cause significant environmental harm. This is complemented by Principle 15, which incorporates the precautionary approach, highlighting the necessity of taking preventative measures even in the face of scientific uncertainty. Furthermore, Principle 19 introduces the obligation of transboundary cooperation, requiring states to notify and consult with potentially affected neighbouring countries about activities with significant cross-border environmental impacts.¹³⁸ Together, these principles underscore the EIA's role in balancing development objectives with the imperative to protect the environment, aligning national and international efforts to prevent environmental harm. The *Espoo Convention* focuses on transboundary EIAs, requiring Parties to notify and consult neighbouring States potentially affected by proposed projects. The whole process is constituted by 11 stages explicitly indicated by provisions. Moreover, the discretion of the concerned parties is to be restricted at various stages, such as timing of giving notification or response, information to be contained by notification or EIA documentation, time frames of consultation, etc. Furthermore, there are mechanisms for preventing the party of origin from making arbitrary or inappropriate determination as to whether the proposed activity concerned is subject to the transboundary EIA or not.¹³⁹ The provisions include a list of activities subject to EIA procedures, general criteria for determining the environmental significance of activities, and a requirement for concerned

Legal Norms in Sustainable development. In: Georgetown International Environmental Law Review, Vol. 16, No. 1, 2003, p. 70.

¹³⁷ *Convention on Environmental Impact Assessment in a Transboundary Context*, Espoo, 25 February 1991; *Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean*, Escazú, 4 March 2018; *United Nations Convention on the Law of the Sea*, Montego Bay, 10 December 1982; *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992.

¹³⁸ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principles 15, 17 and 19.

¹³⁹ KOYANO, M.: *The significance of the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) in international environmental law: examining the implications of the Danube Delta case*. In: *Impact Assessment and Project Appraisal*, Vol. 26, No. 4, 2008, p. 300.

parties to exchange information and hold discussions upon request of the affected party to assess the likelihood of significant adverse transboundary impact. Additionally, they provide for the submission of questions to an inquiry commission to determine the probability of such impacts and include a mechanism for dispute settlement with the option of arbitration.¹⁴⁰

The importance of EIA in international law has been affirmed in several judicial decisions. In the *Pulp Mills* case, the ICJ held that it is the responsibility of each state to determine the specific content of the EIA based on the project's nature, magnitude, and potential environmental impact, emphasizing the need for due diligence. The Court further stated that EIAs must be conducted before project implementation, with continuous environmental monitoring throughout the project's life.¹⁴¹ The International Tribunal for the Law of the Sea (ITLOS) emphasised in its advisory opinion *Responsibilities and Obligations of States with respect to Activities in the Area* that the obligation to conduct an EIA is a direct obligation under the UNCLOS and a general obligation under customary international law.¹⁴² Similarly, in the *South China Sea Arbitration*, the Tribunal highlighted the obligation to conduct EIAs under the UNCLOS, particularly for activities affecting marine environments, reinforcing the duty to prevent harm through precautionary measures.¹⁴³

1.1.2.4. Access to Justice in Environmental Matters

Access to justice in environmental matters is enshrined in Principle 10 of the *Rio Declaration*, which calls on States to ensure effective access to judicial and administrative proceedings, including mechanisms for redress and remedy. This principle emphasizes the importance of procedural rights in empowering individuals and communities to address environmental harm and hold violators accountable. Complementing this, Principle 13 of the *Rio Declaration* encourages States to develop national legal frameworks for liability and compensation for victims of pollution and other environmental dam-

¹⁴⁰ *Convention on Environmental Impact Assessment in a Transboundary Context*, Espoo, 25 February 1991, Arts. 3 (7) and 15, Appendix I, III, IV, and VII.

¹⁴¹ *Pulp Mills on the River Uruguay (Argentina v. Uruguay)*, Judgment, I.C.J. Reports 2010, para. 205.

¹⁴² *Responsibilities and Obligations of States with respect to Activities in the Area*, Advisory Opinion, 1 February 2011, ITLOS Reports 2011, para. 145.

¹⁴³ *South China Sea Arbitration (Philippines v. China)*, Permanent Court of Arbitration, 2013-19, 12 July 2016, para. 947-949.

age. It also urges international cooperation to create robust legal instruments addressing liability and compensation for transboundary environmental harm.¹⁴⁴ At the regional level, Art. 9 of the *Aarhus Convention* establishes the right of the public to access legal remedies in environmental matters. It requires Parties to ensure that individuals can challenge decisions related to requests for environmental information (Art. 4) through a review procedure before a court of law or an independent and impartial body. This procedure must be expeditious, inexpensive, and provide binding decisions with written reasons in cases of refusal. The provision also ensures that the public concerned, having either sufficient interest or impairment of a right, can seek review of the legality of decisions, acts, or omissions subject to Art. 6 (public participation in specific activities) and other relevant provisions. NGOs meeting certain criteria are deemed to have sufficient interest and impaired rights to challenge decisions under the Convention. Preliminary administrative reviews and requirements to exhaust administrative remedies are permitted under national law. In addition, Art. 9 mandates access to judicial or administrative procedures to challenge acts or omissions by private persons or public authorities that violate environmental laws. These procedures must provide effective remedies, including injunctive relief, and must be fair, equitable, timely, and not prohibitively expensive. Decisions must be documented in writing and made publicly accessible. Parties are further required to inform the public about review procedures and consider mechanisms to reduce financial and other barriers to access to justice.¹⁴⁵ Access to justice in environmental matters is also regulated under the *Escazú Agreement*, which offers a broader and more detailed framework compared to the *Aarhus Convention*. It emphasizes inclusivity by ensuring legal standing for anyone defending the environment, rather than limiting it to the “public concerned,” as in the *Aarhus Convention*. Additionally, the *Escazú Agreement* incorporates measures to remove barriers, such as language interpretation and free legal and technical assistance for vulnerable groups. Its comprehensive remedies include restitution, restoration, compensation, and guarantees of non-repetition, reflecting its focus on addressing environmental harm effectively. Moreover, the Agreement promotes alternative dispute resolution mecha-

¹⁴⁴ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principles 10 and 13.

¹⁴⁵ *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, Aarhus, 25 June 1998, Art. 9.

nisms, such as mediation and conciliation, to prevent and resolve environmental disputes in a collaborative and efficient manner.¹⁴⁶

The importance of the access to justice in environmental matters in international law has been affirmed in judicial decisions. For instance, in the *Lhaka Honhat v. Argentina* the Inter-American Court of Human Rights declared that states must guarantee indigenous communities access to justice for environmental harm and secure their rights to land and a healthy environment.¹⁴⁷ In the case *Stichting Varkens in Nood*, the Court of Justice of the European Union (CJEU) confirmed the importance of access to justice in environmental matters.¹⁴⁸ In this case, the CJEU answered preliminary questions regarding the interpretation of art. 9 (2) of the *Aarhus Convention*. The CJEU declared that access to justice of the public concerned must be guaranteed, even without prior involvement in the public participation procedure. Although this decision relates to art. 9 (2), it impacts the development of legislative proposals and shows how access to justice in environmental matters is viewed in the EU as a separate, autonomous procedure.¹⁴⁹

1.1.2.5. Interstate Cooperation

Interstate cooperation is a fundamental element of sustainable development, reflecting the need for collective action to address global environmental challenges. It is embedded in key international principles and treaties, such as Principle 24 of the *Stockholm Declaration*, which emphasizes cooperation to address transboundary environmental issues,¹⁵⁰ and Principle 27 of the *Rio Declaration*, which calls for good-faith partnerships to achieve sustainable development objectives. Principle 14 of the *Rio Declaration* further discourages the relocation of environmentally harmful activities to oth-

¹⁴⁶ *Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean*, Escazú, 4 March 2018, Art. 9.

¹⁴⁷ *Case of the Indigenous Communities of the Lhaka Honhat (Our Land) Association v. Argentina*, Judgment of 6 February 2020, paras. 86, 302.

¹⁴⁸ *Case C-826/18, Stichting Varkens in Nood and Others*, Judgment of the Court (First Chamber) of 14 January 2021, para. 31–52.

¹⁴⁹ ELIANTONIO, M., RICHELLE, J.: *Access to Justice in Environmental Matters in the EU Legal Order: The “Sectoral” Turn in Legislation and Its Pitfalls*. In: *European Papers*, Vol. 9, No. 1, 2024, pp. 268–269.

¹⁵⁰ *The Stockholm Declaration on the Human Environment*, United Nations Conference on the Human Environment, Stockholm, 16 June 1972, Principle 24.

er states.¹⁵¹ Treaties like the *African Nature Convention* and the *Convention on Biological Diversity* establish general obligations to cooperate,¹⁵² while the *UNFCCC* and the *Paris Agreement* include specific commitments, such as preparing for climate change impacts and promoting cooperative adaptation strategies.¹⁵³ The general obligation to cooperate has also been translated into more specific commitments through techniques designed to ensure information sharing and participation in decision-making. These specific commitments include: rules on EIA, rules ensuring that neighbouring states receive necessary information (requiring information exchange, consultation and notification), the provision on emergency information, and transboundary enforcement of environmental standards.¹⁵⁴

Judicial decisions have reinforced these principles, as seen in the *Gabčíkovo-Nagymaros* case, which emphasized joint cooperation to mitigate environmental harm.¹⁵⁵ In the *MOX Plant* case, ITLOS highlighted that the duty to cooperate is a fundamental principle in the prevention of pollution of the marine environment under Part XII of the *UNCLOS* and general international law.¹⁵⁶ Similarly, the *Land Reclamation Case* between Malaysia and Singapore required collaborative consultations to establish a group of independent experts to conduct a study on the effects of Singapore's land reclamation and to propose measures to deal with any adverse effects, and to exchange information.¹⁵⁷ By fostering information exchange, transparency, and collective problem-solving, interstate cooperation remains essential for addressing transboundary risks and achieving global sustainability.

¹⁵¹ *Rio Declaration on Environment and Development*, UN Doc. A/CONF.151/26 (vol. I), 31 ILM 874 (1992), Rio de Janeiro, 14 June 1992, Principles 14 and 27.

¹⁵² *African Convention on the Conservation of Nature and Natural Resources*, Algiers, 15 September 1968, Art. XVI (1); *Convention on Biological Diversity*, Rio de Janeiro, 5 June 1992, Art. 5.

¹⁵³ *United Nations Framework Convention on Climate Change*, New York, 9 May 1992, Art. 4 (1) (e); *Paris Agreement*, Paris, 12 December 2015, Arts. 7 (6) and (7).

¹⁵⁴ SANDS, P., PEEL, J., FABRA, A., MACKENZIE, R.: *Principles of International Environmental Law*. Fourth Edition, Cambridge: Cambridge University Press, 2018, ISBN: 978-1-108-42095-2, pp. 215–216.

¹⁵⁵ *The Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)*, Judgment, I.C.J. Reports 1997, para. 141–142.

¹⁵⁶ *MOX Plant (Ireland v. United Kingdom)*, Provisional Measures, Order of 3 December 2001, ITLOS Reports 2001, para. 82.

¹⁵⁷ *Land Reclamation case (Malaysia v. Singapore)*, Provisional Measures Order, 8 October 2003, ITLOS Reports 2003, para. 83.

2. International Initiatives in Sustainable Development

Historically, the modern understating of the concept is associated with the 1972 Stockholm Conference on the Human Environment. Despite the fact that “sustainable development” was not mentioned, the connection between economic development and environmental protection was established in the principles of the *Stockholm Declaration on the Human Environment*. Particularly relevant are the principles no. 4, 13, 15–20, which reflect on different areas, such as safeguarding and managing wildlife and its habitat, management of resources, planning of human settlement and urbanization, planning, managing or controlling the environmental resources, population growth, science and technology, or education in environmental matters.¹⁵⁸ The expression “sustainable development” was, however, used in 1980 by the International Union for Conservation of Nature and Natural Resources in its *World Conservation Strategy: Living Resource Conservation for Sustainable Development*.¹⁵⁹ The mentioned document, among others, presents priority requirements, and priority national and international actions towards sustainable development through the conservation on living resources.¹⁶⁰

The abovementioned report influenced drafting of the “*Our Common Future*”, also known as the “1987 Brundtland Report”. The *Brundtland Report* laid the foundations for defining the principle of sustainable development as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: (1) the concept of ‘needs’, in particular the essential needs of the world’s poor, to which overriding priority should be given; and (2) the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.¹⁶¹

It is also worth mentioning the 1992 Rio Conference on Environment and Development that is considered as a fundamental landmark in sustainable development. During the Rio Conference, the sustainable development was

¹⁵⁸ *The Stockholm Declaration on the Human Environment*, United Nations Conference on the Human Environment, Stockholm, 16 June 1972, principles 4, 13, 15–20.

¹⁵⁹ IUCN, UNEP, WWF: *World Conservation Strategy: Living Resource Conservation for Sustainable Development*, 1980. Online: <https://portals.iucn.org/library/efiles/documents/WCS-004.pdf>.

¹⁶⁰ *Ibid*, Section 20 – Towards Sustainable Development, pp. 62–63.

¹⁶¹ World Commission on Environment and Development: *The Report of the World Commission on Environment and Development: Our Common Future*, Geneva, 1987, A/42/427, p. 41.

not only officially endorsed by the international community, but it became the unavoidable paradigm of environment/development relations.¹⁶² The outcome document – *Rio Declaration on Environment and Development*, although legally non-binding, formulated principles in strong legal terms. It is also undeniably a declaration of legal principles about sustainable development.¹⁶³ During the conference, the *Agenda 21* was also adopted, which presents a global action plan on development and environmental cooperation. It addresses issues of population, human health, human settlements and the fight against poverty. It also deals with the protection of the atmosphere, biodiversity, water resources and forests, combating desertification and drought, rural development and the use of toxic substances, including radioactive ones. It calls for the integration of environmental concerns into decision-making processes, and not only by governments but also non-state actors.¹⁶⁴

In 2000, during the Millennium Summit in New York, the *Millennium Declaration* was adopted. Its importance is emphasized by the introduction of eight development goals to be achieved by 2015. The Millennium Development Goals encompass goals to:

- (1) eradicate extreme poverty and hunger,
- (2) achieve universal primary education,
- (3) promote gender equality and empower women,
- (4) reduce child mortality,
- (5) improve maternal health,
- (6) combat HIV/AIDS, malaria and other diseases,
- (7) ensure environmental sustainability, and
- (8) develop a global partnership for development.¹⁶⁵

Further development of the sustainable development concept is also visible through the outcome documents¹⁶⁶ of the Johannesburg World Summit on Sustainable Development (2002), whose aim was to review the progress

¹⁶² BARRAL, W.: *Sustainable Development in International Law: Nature and Operation of an Evolutive Legal Norm*, The European Journal of International Law, Vol. 23, No. 2, 2012, p. 379.

¹⁶³ *Ibid.*

¹⁶⁴ *Agenda 21*, United Nations Conference on Environment & Development, Rio de Janeiro, 3 – 14 June 1992, pp. 3–351. Online: <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>.

¹⁶⁵ UN General Assembly: *United Nations Millennium Declaration*, A/RES/55/2, 18 September 2000.

¹⁶⁶ *Political Declaration and Plan of Implementation of the World Summit on Sustainable Development*.

in implementing the outcomes of the 1992 Rio Conference. Key commitments were made on water, energy, health, agriculture, biological diversity and other areas of concern.¹⁶⁷ Ten years later, at the Rio Conference on Sustainable Development (2012) the process to develop a set of Sustainable Development Goals that are built on the Millennium Development Goals was launched. Furthermore, the outcome document of the 2012 Rio Conference “*The Future that We Want*” reaffirmed the Rio principles (such as the principle of common but differentiated responsibilities), and past actions plans that were adopted in order to achieve sustainable development. The declaration includes broad sustainability objectives within themes of poverty eradication, food security and sustainable agriculture, energy, sustainable transport, sustainable cities, health and population and promoting full and productive employment. States also adopted innovative guidelines on green economy policies,¹⁶⁸ and put in place a strategy for financing sustainable development.¹⁶⁹

The latest significant step towards the sustainable development presents the United Nations Summit on Sustainable Development, which took place in New York in 2015. During this conference, the United Nations Sustainable Development Goals were adopted. The mentioned goals are analysed in the following chapter, therefore we will not pay more attention to them in this chapter. However, it is worth mentioning the Stockholm +50 high-level meeting that took place in Stockholm in the beginning of June 2022. Anchored in the Decade of Action, under the theme “Stockholm+50: a healthy planet for the prosperity of all – our responsibility, our opportunity,” commemorated the 1972 United Nations Conference on the Human Environment and celebrated 50 years of global environmental action. By recognizing the importance of multilateralism in tackling the Earth’s triple planetary crisis – climate, nature, and pollution – the event aimed to act as a spring-

opment. For more see: United Nations: *Report of the World Summit on Sustainable Development*, Johannesburg, 26 August – 4 September 2002, A/CONF.199/20, pp. 1–72.

¹⁶⁷ *Ibid.*

¹⁶⁸ For instance, the green economy policies in the context of sustainable development and poverty eradication should be consistent with international law, respect each country’s national sovereignty over their natural resources, be supported by an enabling environment and well-functioning institutions at all levels, promote sustainable consumption and production patterns. For more see United Nations: *Report of the United Nations Conference on Sustainable Development*, Rio de Janeiro, 20 – 22 June 2012, A/CONF.216/16, para. 58.

¹⁶⁹ United Nations: *Report of the United Nations Conference on Sustainable Development*, Rio de Janeiro, 20 – 22 June 2012, A/CONF.216/16, pp. 1–54.

board to accelerate the implementation of the UN Decade of Action to deliver the SDG, including the *2030 Agenda*, *Paris Agreement on Climate Change*, the post-2020 global *Biodiversity Framework*, and encourage the adoption of green post-COVID-19 recovery plans. The Stockholm +50 meeting presented an opportunity to (1) support a universal recognition of the human right to a clean, healthy and sustainable environment, (2) explore rights of nature, (3) mainstream alternative knowledge systems and (4) enhance youth, women, indigenous peoples and local communities' engagement in decision making around sustainability transitions. In its *Report*, conference participants pointed out that the triple planetary crisis, which had been identified as the major obstacles to sustainable development, and which contributed significantly to poverty, food insecurity and the incidence and spread of disease and had brought the Earth dangerously close to tipping points beyond which there would be little chance of recovery.¹⁷⁰ Many representatives noted that it was necessary to adopt a new paradigm premised on long-term economic thinking that valued well-being over gross domestic product; on moral and spiritual values that recognized the intrinsic value of all beings; on an explicit recognition of the right of every human being to a healthy environment; and on a recognition of “ecocide” as an international crime.¹⁷¹ It was also stressed that an increasingly digital society led to an increasing amount of energy consumed, material used, and e-waste generated if those issues were not properly addressed, said that Member States must adopt international standards and guidance for implementing circular economy principles and transitioning to green energy solutions in the information, communication and technology sector; ensure free and open access to high-quality data and information for use in policymaking; and create an enabling environment to ensure total radio silence in the bands used globally for monitoring various environmental indicators.¹⁷²

2.1. United Nations Sustainable Development Goals

A modern milestone in achieving sustainable development is the *2030 Agenda for Sustainable Development*, which was adopted by the UN Member States at the 2015 Summit as an attempt to integrate economic, social and environ-

¹⁷⁰ United Nations: *Stockholm+50: a healthy planet for the prosperity of all – our responsibility, our opportunity: Report*, Stockholm, 2 and 3 June 2022, A/CONF.238/9, para. 34.

¹⁷¹ *Ibid*, para. 45.

¹⁷² *Ibid*, para. 47.

mental dimensions of development. The *2030 Agenda* consists of 17 sustainable development goals and 169 targets that are global in nature and universally applicable, taking into account different national realities, capacities and levels of development and respecting national policies and priorities for the period of 15 years, starting from January 2016. It builds on the *Millennium Development Goals*, which were not achieved, such as gender inequality and women empowerment, or environmental sustainability.¹⁷³

Seventeen SDGs are integrated and balance three dimensions of sustainable development. As stated in the preamble of the *2030 Agenda*, the international community is determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.¹⁷⁴ Targets are defined as aspirational and global, with each Government setting its own national targets guided by the global level of ambition but taking into account national circumstances. Each Government decides how these aspirational and global targets should be incorporated into national planning processes, policies and strategies.¹⁷⁵ For instance, Slovakia introduced six national priorities for the implementation of the *2030 Agenda*, which focuses on:

- (1) education,
- (2) transformation towards an environmentally sustainable and knowledge-based economy in the context of demographic change,
- (3) poverty reduction and social inclusion,
- (4) sustainability of settlements, regions and the countryside in the context of climate change,
- (5) rule of law, democracy and security, and
- (6) good health.¹⁷⁶

¹⁷³ United Nations: *The Millennium Development Goals Report 2015*, New York, 2015, ISBN: 978-92-1-101320-7, pp. 8–9. Online: [https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20\(July%201\).pdf](https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf).

¹⁷⁴ UN General Assembly: *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1, preamble, p. 2.

¹⁷⁵ *Ibid*, para. 55.

¹⁷⁶ *Voluntary National Review of the Slovak Republic on the Implementation of the 2030 Agenda for Sustainable Development*, 2018, pp. 19–61. Online: https://sustainabledevelopment.un.org/content/documents/20131Agenda2030_VNR_Slovakia.pdf.

After five years, *2020 Report on the results achieved in the national priorities for the implementation of the 2030 Agenda* concludes that Slovakia has been achieving good results in the national priority Poverty Reduction and Social Inclusion, however, challenges persist in the remaining national priorities, markedly in national priorities of sustainable cities, regions and countries in the context of climate change, rule of law, democracy and security, and good health. Compared to the EU average, Slovakia achieves better results in several social SDGs, including poverty reduction and inequality. Some progress has also been made in the areas of good health and wellbeing of people and quality education, although in these indicators, the Slovakia lags behind the EU average. However, environmental pressures and the changing climate have negative effects on the sustainable development of the Slovakia. There has also been a less favourable development in the area of low-emission energy consumption and resource productivity. Slovakia still faces problems in strengthening climate action, affordable and clean energy and more responsible consumption and production.¹⁷⁷

For the purposes of this monograph, our primary focus is on SDG 13: Take urgent action to combat climate change and its impacts. However, this goal is inherently interconnected with other SDGs, including SDG 7: Ensure access to affordable, reliable, sustainable, and modern energy for all; SDG 11: Make cities and human settlements inclusive, safe, resilient, and sustainable; SDG 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development; and SDG 15: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt biodiversity loss.¹⁷⁸ These interconnections not only broaden the potential for leveraging AI to achieve these goals but also highlight the possible legal challenges that may arise. Importantly, they create opportunities to apply existing legal frameworks within international environmental law, as well as emerging norms regulating AI. This aspect is explored further in Part II of the monograph.

The *2030 Agenda* outlines five key targets under SDG 13: (1) strengthening resilience and adaptive capacity to climate-related hazards and natu-

¹⁷⁷ Ministry of Investments, Regional Development and Informatization of the Slovak Republic: *2020 Report on the results achieved in the national priorities for the implementation of the 2030 Agenda*, September 2020, p. 61. Online: https://www.mirri.gov.sk/wp-content/uploads/2020/12/EN_Sprava_dosiahnute_vysledky_A2030.pdf.

¹⁷⁸ For more detail on specific goal targets see: UN General Assembly: *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1, pp. 21–25.

ral disasters; (2) integrating climate change measures into national policies, strategies, and planning; (3) improving education, awareness-raising, and institutional capacity on climate change mitigation, adaptation, impact reduction, and early warning; (4) implementing the commitment by developed countries under the UNFCCC to mobilize \$100 billion annually by 2020 and fully operationalize the Green Climate Fund; and (5) promoting mechanisms for effective climate planning and management in least developed countries and small island developing States, with a focus on women, youth, and marginalized communities.¹⁷⁹ While these targets reflect a comprehensive framework aligned with the *Paris Agreement*, challenges persist, including funding shortfalls,¹⁸⁰ uneven implementation, insufficient ambition on emission reductions, and disparities in capacity among nations. Strengthening accountability mechanisms, increasing financial and technical support for least developed countries, enhancing participation of vulnerable groups, and fostering green innovation and international cooperation are critical to ensuring these targets effectively drive climate action and promote equitable sustainable development.¹⁸¹

Since the adoption of the *2030 Agenda*, significant steps have been taken by the UN and its Member States to advance the SDGs. The UN General Assembly established the High-Level Political Forum on Sustainable Development, which serves as a central platform for reviewing progress,¹⁸² with Member States presenting Voluntary National Reviews to share best practices and challenges. Launched by UN Secretary-General António Guterres in 2019, the Decade of Action (2020–2030) aims to accelerate progress toward achieving the SDGs by addressing persistent gaps and challenges. It emphasizes three key areas: global action through enhanced international cooperation and financing, local action by empowering governments and communities to implement tailored solutions, and people action by mobilizing civil society, businesses, and individuals to drive change. This initiative also highlights the integration of SDGs into national policies and recovery

¹⁷⁹ *Ibid.*, p. 23.

¹⁸⁰ OECD, The World Bank, UN Environment: *Financing Climate Futures: Rethinking Infrastructure*. Paris: OECD Publishing, 2018, pp. 15–16. Online: <https://doi.org/10.1787/9789264308114-en>.

¹⁸¹ United Nations: *The Sustainable Development Goals Report 2023: Special Edition*, New York: United Nations Publications, 2023, pp. 48–57. Online: <https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf>.

¹⁸² UN General Assembly: *Format and Organizational Aspects of the High-Level Political Forum on Sustainable Development*, 9 July 2013, A/RES/67/290, para. 2.

strategies, particularly following setbacks from the COVID-19 pandemic.¹⁸³ Partnerships like the UN SDG Action Campaign and the digital 2030 Connect Platform have fostered multi-stakeholder collaboration and innovative solutions. UN-led initiatives such as the SDG Indicator Framework, the UN Global Compact, and the UN Decade on Ecosystem Restoration (2021–2030) further align global efforts with sustainability priorities.

Recent milestones include the 2024 Summit for the Future, which adopted the *Pact for the Future*, reaffirming commitment to the *2030 Agenda*,¹⁸⁴ and the Stockholm+50 High-Level Meeting in 2022, emphasizing environmental sustainability and the right to a healthy environment. These steps are complemented by global reporting mechanisms, including the Sustainable Development Goals Report (published annually since 2016) and the Global SDG Indicator Database, ensuring transparency and accountability. Despite these advancements, challenges persist, such as funding gaps and the uneven impacts of global crises like COVID-19, driving renewed focus on innovative financing mechanisms, enhanced partnerships, and leveraging technologies such as AI to achieve the SDGs.

2.1.1. The Transformative Role of Artificial Intelligence in Achieving UN Sustainable Development Goals

The 2022 Intergovernmental Panel on Climate Change Report emphasizes that digital technologies can contribute to mitigation of climate change and the achievement of several SDGs. *Vinuesa et al.* highlight that AI systems can facilitate the achievement of 134 SDG targets across all goals, although they may also inhibit progress on 59 targets.¹⁸⁵ Currently, the AI systems are used in Japan to send disaster alerts regarding tsunami flooding,¹⁸⁶ in Brazil to monitor the process of deforestation in the Amazon¹⁸⁷ or in China as a tool

¹⁸³ For more on Decade of Action (2020–2030) see: <https://www.un.org/sustainabledevelopment/decade-of-action/>.

¹⁸⁴ UN General Assembly: *Pact for the Future*, 22 September 2024, A/RES/79/1, Objectives 1. See also Objectives 9 and 10 specifically focusing on climate and environmental goals of UN SDGs.

¹⁸⁵ VINUESA, R. et al.: *The role of artificial intelligence in achieving the Sustainable Development Goals*. In: Nature Communications, Vol. 11, 2020, p. 1.

¹⁸⁶ Tohoku University: *Fujitsu Leverages World's Fastest Supercomputer and AI to Predict Tsunami Flooding*, 16 February 2021. Online: <https://www.preventionweb.net/news/fujitsu-leverages-worlds-fastest-supercomputer-and-ai-predict-tsunami-flooding>.

¹⁸⁷ ERTHAL ABDENUR, A.: *How Can Artificial Intelligence Help Curb Deforestation in the Amazon?*, IPI Global Observatory, 23 November 2020. Online: <https://theglobalobserva->

to design smart cities.¹⁸⁸ AI and digital technologies significantly enhance energy management across sectors, boosting efficiency and promoting the adoption of low-emission technologies, including decentralized renewable energy systems. They simultaneously create economic opportunities. Tools such as “digital twins” of the Earth¹⁸⁹ will be essential for achieving climate neutrality, optimizing resource use, and fostering a sustainable future aligned with the UN SDGs.¹⁹⁰

A notable example is the Climate TRACE project, which uses AI to improve the accuracy and transparency of global emission inventories. By combining data from over 300 satellites and 11,000 sensors with AI algorithms, it identifies and quantifies emissions sources linked to industries like oil and gas, shipping, aviation, and agriculture, as well as natural events like forest fires.¹⁹¹

AI also contributes to resource efficiency through smart grids and intelligent buildings.¹⁹² For instance, the Neuron system, a fully customizable visualization tool, uses 5G and Internet of Things (IoT) sensors to optimize energy consumption in buildings. In Hong Kong, it has been implemented in 10 buildings, achieving energy savings of 10–30% per building.¹⁹³ Beyond energy optimization, neural networks and smart algorithms can also contribute to developing joint actions aimed at preserving the ecosystem’s health and biological diversity, combat desertification, soil degradation and marine pollution.¹⁹⁴ Furthermore, it can also help monitor, model and manage en-

tory.org/2020/11/how-can-artificial-intelligence-help-curb-deforestation-amazon/.

¹⁸⁸ QUAN, Ch.: *Top 8 Smart Cities in China*, China Highlights, 2 March 2021. Online: <https://www.chinahighlights.com/travelguide/top-china-smart-cities.htm>.

¹⁸⁹ For instance, see the Digital Twin of Planet Earth project conducted by the European Space Agency. Online: https://www.esa.int/ESA_Multimedia/Images/2020/09/Digital_Twin_Earth.

¹⁹⁰ European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Fostering a European Approach to Artificial Intelligence*, Brussels, 21 April 2021, COM(2021) 205 final, Annex, p. 37.

¹⁹¹ For more details see: Climate TRACE. Online: <https://www.climate TRACE.org/inventory>.

¹⁹² For instance, see MAROT, A. et al.: *Learning to run a Power Network Challenge: A Retrospective Analysis*. In: *Proceedings of Machine Learning Research*, 2021, pp. 112–132. Online: <http://proceedings.mlr.press/v133/marot21a/marot21a.pdf>.

¹⁹³ Global Partnership on Artificial Intelligence, Climate Change AI and Centre for AI & Climate: *Climate Change and AI: Recommendations for Government*, November 2021, p. 87. Online: <https://www.gpai.ai/projects/climate-change-and-ai.pdf>.

¹⁹⁴ LEAL FILHO, W. et al.: *Deploying artificial intelligence for climate change adaptation*, *Technological Forecasting & Social Change*, Vol. 180, 2022, p. 2.

vironmental systems, whether it is illegal logging, water degradation, illegal fishing and poaching,¹⁹⁵ air pollution or the burden of farming.¹⁹⁶

AI's predictive capabilities play a critical role in disaster preparedness.¹⁹⁷ For example, the Kuzi system helps African farmers adapt to climate change by forecasting locust outbreaks up to three months in advance. By analysing soil moisture, wind patterns, humidity, and vegetation indices, Kuzi empowers stakeholders to prepare and mitigate the devastating effects of such infestations.¹⁹⁸

AI systems also enhance climate engagement by reducing the psychological distance to climate impacts. Projects using adversarial networks train AI on historical disaster imagery to generate visualizations of potential future scenarios.¹⁹⁹ While these applications are promising, they raise legal and ethical concerns, particularly regarding data privacy and the potential manipulation of human behaviour.

Despite its benefits, AI poses environmental challenges. The main issue is the energy consumption that is associated with the development and use of AI, algorithms and the processing of large amounts of data.²⁰⁰ *Strubell et al.* note that training a single AI model can emit as much carbon as five cars in their lifetime.²⁰¹ Additionally, the production, maintenance, and disposal of AI systems require significant non-renewable resources, conflicting with

¹⁹⁵ For instance see: Mapping the Andean Amazon Project (MAAP). Online: <https://www.maaproject.org/en/>; CHUI, M. et al.: *Notes from the AI Frontier: Applying AI for Social Good*, McKinsey Global Institute, December 2018, pp. 24–27.

¹⁹⁶ UNESCO: *Artificial Intelligence for Sustainable Development: challenges and opportunities for UNESCO's science and engineering programmes*, Working Paper, August 2019, p. 14. Online: <https://unesdoc.unesco.org/ark:/48223/pf0000368028>.

¹⁹⁷ For instance see: The BigEarthNet. Online: <https://bigearth.net>; ALEMANY, S., BELTRAN, J., PEREZ, A., GANZFRIED, S.: *Predicting Hurricane Trajectories Using a Recurrent Neural Network*. In: *Proceedings of the AAAI Conference on Artificial Intelligence*, Vol. 33(01), 2019, pp. 468–475. Online: <https://doi.org/10.1609/aaai.v33i01.3301468>.

¹⁹⁸ For more details see: Kuzi. Online: <https://www.selinawamucii.com/kuzi/>.

¹⁹⁹ WALSH, T., EVATT, A. de WITT, C.S.: *Artificial Intelligence & Climate Change: Supplementary Impact Report*, 2020, pp. 7–8. Online: https://www.oxfordfoundry.ox.ac.uk/sites/default/files/learning-guide/2019-11/Artificial%20Intelligence%20%26%20Climate%20Change_%20Supplementary%20Impact%20Report.pdf.

²⁰⁰ NESLEN, A.: *Here's how AI can help fight climate change*, World Economic Forum, 11 August 2021. Online: <https://www.weforum.org/agenda/2021/08/how-ai-can-fight-climate-change/>.

²⁰¹ STRUBELL, E., GANESH, A., MCCALLUM, A.: *Energy and Policy Considerations for Deep Learning in Natural Language Processing*. In: *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics (ACL)*. Florence, July 2019, p. 3650. Online: <https://arxiv.org/abs/1906.02243>.

sustainability objectives. Efficient e-waste management and minimizing resource extraction are essential to addressing these contradictions.²⁰²

The potential of AI in Earth observation remains largely untapped due to the complexity of data preparation, algorithm training, and ground truthing. *Gailhofer et al.* emphasize that using AI techniques in Earth observation requires significant additional work for data preparation, the integration of physical principles into algorithms, the ground truthing of data to validate products and for the development of data sets to train AI algorithms, which is complex and time-consuming for Earth observation parameters. Currently, the lack of training data sets for Earth observation applications is a limiting factor in AI applications and the potential of AI in this area is considered largely untapped.²⁰³

Moreover, digitalization can lead to trade-offs across UN SDGs. Increased demand for digital devices exacerbates e-waste and reinforces inequalities in labour markets and the digital divide.²⁰⁴ For instance, training neural networks for natural language processing has a significant carbon footprint.²⁰⁵

Most of the international initiatives around AI do not sufficiently consider the environmental dimension of sustainable development.²⁰⁶ A better understanding of how input is processed in AI-based decisions could inform regulatory measures, enabling a systemic approach to assess AI's envi-

²⁰² LEAL FILHO, W. et al.: *Deploying artificial intelligence for climate change adaptation*, Technological Forecasting & Social Change, Vol. 180, 2022, p. 2.

²⁰³ GAILHOFER, P., et al.: *The role of Artificial Intelligence in the European Green Deal*, Study for the special committee on Artificial Intelligence in a Digital Age (AIDA), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2021, ISBN: 978-92-846-8049-8, p. 17.

²⁰⁴ Intergovernmental Panel on Climate Change: *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Working Group II contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 27 February 2022, B.4.3. Online: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_FinalDraft_FullReport.pdf; See also VINUESA, R. et al.: *The role of artificial intelligence in achieving the Sustainable Development Goals*. In: Nature Communications, Vol. 11, 2020, pp. 4–5.

²⁰⁵ STRUBELL, E., GANESH, A., McCALLUM, A.: *Energy and Policy Considerations for Deep Learning in Natural Language Processing*. In: *Proceedings of the 57th Annual Meeting of the Association for Computational Linguistics (ACL)*. Florence, Italy, July 2019, pp. 3645–3650. Online: <https://arxiv.org/abs/1906.02243>.

²⁰⁶ GAILHOFER, P. et al.: *The role of Artificial Intelligence in the European Green Deal*, Study for the special committee on Artificial Intelligence in a Digital Age (AIDA), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2021, p. 10. Online: [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/662906/IPOL_STU\(2021\)662906_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/662906/IPOL_STU(2021)662906_EN.pdf).

ronmental impact. Without proper guidance, AI-driven research with green transition potential may be overlooked if economic benefits are not immediately evident.²⁰⁷

Recognizing some of the mentioned challenges, the UN General Assembly adopted the resolution *Seizing the Opportunities of Safe, Secure, and Trustworthy Artificial Intelligence Systems for Sustainable Development* in March 2024. The resolution seeks to harness AI's potential to advance the *2030 Agenda* by addressing issues like inclusivity and sustainability. Acknowledging the rapid acceleration of AI systems and technological change, and their potential to advance the SDGs, the resolution emphasizes the urgency of achieving global consensus on safe, secure, and trustworthy AI systems.²⁰⁸ It underscores the urgency of inclusive international cooperation to develop interoperable safeguards and standards that foster innovation while preventing governance fragmentation. This includes the development and implementation of domestic regulatory and governance frameworks that support responsible AI innovation and investment, alongside measures to identify, prevent, and mitigate AI vulnerabilities and risks before deployment.²⁰⁹ The resolution stresses that standards for AI systems should enhance, rather than hinder, the achievement of all SDGs. Recognizing the digital divides and challenges faced by developing countries, it underscores the importance of narrowing disparities through capacity building, technical and financial assistance, and ensuring equitable participation in international AI governance processes. Furthermore, the resolution underscores the imperative of respecting, protecting, and promoting human rights and fundamental freedoms throughout the entire life cycle of AI systems. It calls upon all Member States and relevant stakeholders to refrain from or cease the use of AI systems that cannot operate in compliance with international human rights law or that pose undue risks to the enjoyment of human rights, particularly for individuals in vulnerable situations.²¹⁰

However, the resolution insufficiently addresses the risks posed by AI, such as widening digital divides, reinforcing biases, and exacerbating structural inequalities, particularly in developing countries. While it highlights

²⁰⁷ *Ibid*, pp. 10–11.

²⁰⁸ UN General Assembly: *Seizing the Opportunities of Safe, Secure, and Trustworthy Artificial Intelligence Systems for Sustainable Development*, 21 March 2024, A/RES/78/265, *preamble para. 7*, para. 2.

²⁰⁹ *Ibid*, para. 6 (a) and (b).

²¹⁰ *Ibid*, para. 5.

the benefits of AI for the SDGs, it lacks concrete measures, enforceable standards, and accountability mechanisms in protecting human rights and advancing environmental sustainability. Additionally, concerns about geopolitical power imbalances suggest that the governance frameworks it proposes might favour technologically advanced nations, potentially marginalizing the Global South and further complicating equitable access to AI's benefits.

3. Regional Approaches to Sustainable Development

In an era marked by escalating environmental crises and the imperative for sustainable development, nations along with regional organizations are increasingly compelled to seek innovative solutions. One such approach has been the adoption of “Green Deals” (GD) worldwide, designed to achieve the UN SDGs and honour commitments under international instruments addressing climate change and sustainable development. Before addressing specific GDs, it is essential to explore the origins of the term “Green Deal”. The concept, more accurately termed “Green New Deal,” first emerged in 2006 with the United States’ Green New Deal Task Force. This proposal outlined a series of programs aimed at tackling the interconnected challenges of climate change, economic inequality, and social justice.²¹¹ At the global level, the United Nations Environment Programme (UNEP) began promoting the green transition in 2008, advocating for the integration of environmental sustainability into economic recovery efforts. In 2009, UNEP launched the *Global Green New Deal*, a strategy designed to reduce carbon dependency, improve the management of ecosystems and water resources, and stimulate green economic growth. This initiative aligned with the Millennium Development Goals, urging governments to channel significant stimulus funding toward green sectors. It outlined three core objectives: (1) economic recovery through investments in sustainable technologies and green infrastructure; (2) poverty eradication through equitable access to resources and green jobs; and (3) reduced carbon emissions and ecosystem degradation via improved environmental policies.²¹² Building on these efforts, regional organizations have tailored GDs to address their specific environmental, economic, and socio-political contexts.

In general, the term “Green Deal” can be understood as a comprehensive strategy for implementing pro-environmental solutions across various sectors of the economy. Based on analyses of regional and national frameworks,²¹³

²¹¹ SMOL, M.: *Is the green deal a global strategy? Revision of the green deal definitions, strategies and importance in post-COVID recovery plans in various regions of the world*. In: Energy Policy, Vol. 169, 2022, p. 113152.

²¹² UNEP: *Global Green New Deal: Policy Brief*, 2009, pp. 3–12. Online: https://wedocs.unep.org/bitstream/handle/20.500.11822/7903/A_Global_Green_New_Deal_Policy_Brief.pdf?sequence=3&isAllowed=1.

²¹³ At the regional level, we analysed the European Green Deal, the AU Green Recovery Action Plan 2021–2027, and the AU Climate Change and Resilient Development Strategy and Action Plan (2022–2032). At the national level, we examined South Korea’s Green New

GDs aim to integrate the three fundamental aspirations of sustainable development: enhancing human well-being, ensuring environmental sustainability, and promoting economic resilience.²¹⁴ The adopted GDs share several common features, with one of the most significant being their focus on creating policy programs aimed at combating climate change. However, direct comparisons between these strategies are challenging because they operate at different levels of implementation. These include sectoral strategies (such as European and African sub-strategies for biodiversity, the food sector, etc.), national strategies (e.g., those of the US, UK, and South Korea), and international initiatives (such as the *UN Global Green New Deal*). As Smol emphasizes, it is important that the proposed measures are tailored to the specific needs of the environmental and socio-economic conditions of given region, and possibilities of implementation of green solutions by both society and enterprises. Integrating different stakeholder groups throughout the value chain can be crucial in the green transformation which is the main tool of implementing GDSs.²¹⁵

Among the most prominent GDs is the *European Green Deal*, introduced in December 2019. However, it is not the only one. The AU adopted a comparable framework in 2021, reflecting its regional priorities. In the following subchapters, we analyse these regional GDs, examining their objectives, legal frameworks, and implementation mechanisms. Additionally, we evaluate their legal force and the extent to which they align with the principles of sustainable development.

While these frameworks provide strategic guidance, they remain legally non-binding and do not require states to translate them into enforceable obligations or concrete actions. Nevertheless, they embed key principles of sustainable development, such as intergenerational equity, the integration of environmental protection with economic development, environmental impact assessments, and access to environmental information. As such, they serve as foundational references for subsequent binding and operational GDs.

Deal, India's National Action Plan on Climate Change, China's Made in China 2025 Plan, UK's Green Deal, Canada's Pact for a Green New Deal, and the US's Draft of the Green New Deal.

²¹⁴ SMOL, M.: *Is the green deal a global strategy? Revision of the green deal definitions, strategies and importance in post-COVID recovery plans in various regions of the world*. In: *Energy Policy*, Vol. 169, 2022, p. 113155.

²¹⁵ *Ibid*, p. 113159.

3.1. European Green Deal

The area of sustainable development, protection of the environment and climate change has not been one of the focus areas when the EU was established, as well as in the early years of its existence. However, currently the EU can be characterised as one of the most active subjects of international law in the mentioned areas. The EU is a Party to numerous key international environmental treaties that address various aspects, such as biodiversity and nature,²¹⁶ climate change and ozone depletion,²¹⁷ desertification,²¹⁸ water and air pollution,²¹⁹ or environmental governance.²²⁰ On the EU level, the basis of legal regulation regarding the environment is addressed in the Articles 191–193 of the *Treaty on the Functioning of the European Union* (hereinafter “TFEU”), as well as Articles 3–5 of the *Treaty on European Union* (hereinafter “TEU”). In case of the latter, only in a general manner. Particular relevance has the Art. 3 (3) TEU, on the basis of which the Union shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment.²²¹ Furthermore, Art. 3(5) TEU extends this commitment to the Union’s external relations, stating that the EU shall contribute to global sustainable development and environmental protection in its interactions with third countries and international organisations. Similarly, Art. 21 TEU emphasizes the EU’s obligation to promote environmental sustainability as a core principle of its external action, integrating it into trade, cooperation, and diplomatic efforts. These provisions highlight the EU’s dual approach, where environmental protection is pursued both internally and externally, reinforcing its role as a global leader in

²¹⁶ *Convention on Biological Diversity* (1992), *Ramsar Convention on Wetlands of International Importance* (1975), *Convention for the Conservation of Antarctic Marine Living Resources* (1980).

²¹⁷ *Vienna Convention for the Protection of the Ozone Layer* (1985), *The United Nations Framework Convention on Climate Change* (1992), *Paris Agreement* (2015).

²¹⁸ *United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa* (1994).

²¹⁹ *Geneva Convention on Long-range Transboundary Air Pollution* (1979).

²²⁰ *Espoo Convention on Environmental Impact Assessment* (1991), *Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental matters* (1998) and its *Protocol on Pollutant Release and Transfer Registers* (2003).

²²¹ *Consolidated version of the Treaty on European Union*, 26 October 2012, OJ L. 326/13, Art. 3 (3).

environmental governance. The limits of Union competences are governed by the principle of conferral. The use of Union competences is governed by the principles of subsidiarity and proportionality. These principles are explicitly laid down in Arts. 5 (1)–(4) of the TEU, which define the framework for how and when the Union may act, ensuring that action is taken only within the limits of the competences conferred upon it by the Member States, and in a manner that is necessary and proportionate to achieve the objectives of the Treaties. Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level.²²² We argue that pressing climate-related actions are better achieved at the EU level than on a national level. The past international experience in climate change confirms that States are often too reluctant to adopt appropriate measures, especially since the international environmental law does not possess an effective monitoring or sanction mechanisms. In accordance with the Art. 191 (1) TFEU, Union policy on the environment shall contribute to pursuit of the following objectives: (i) preserving, protecting and improving the quality of the environment; (ii) protecting human health; (iii) prudent and rational utilisation of natural resources; (iv) promoting measures at international level to deal with regional or worldwide environmental problems, and in particular combating climate change.²²³ The following article defines the manner in which measures in the analysed area are to be taken through the EU institutions. The scope of the EU's actions is limited by the principle of subsidiarity and the requirement for unanimity in the Council in the fields of fiscal matters, town and country planning, land use, quantitative water resource management, choice of energy sources and structure of energy supply. However, Article 193 TFEU provides flexibility by allowing Member States to adopt more stringent environmental protection measures than those set by the EU, provided that these are compatible with the Treaties and are notified to the European Commission. This provision highlights that while the EU sets minimum environmental standards, national governments retain the authority to enhance them, reflecting a more dynamic and multilayered approach to environmental governance. General

²²² *Ibid*, Art. 5.

²²³ *Consolidated version of the Treaty on the Functioning of the European Union*, 26 October 2012, OJ L 326/47, Art. 191.

action programmes setting out priority objectives to be attained shall be adopted by the European Parliament and the Council, acting in accordance with the ordinary legislative procedure and after consulting the Economic and Social Committee and the Committee of the Regions.²²⁴ Indeed, the implementation of the international treaties to which the EU is a Party and the abovementioned articles is done by secondary legislation. The EU policy has largely contributed to the diffusion and strengthening of environmental law, and has allowed its harmonization at a relatively high standard among the EU Member States. The EU has also disseminated its rules far beyond its borders, in countries which are members of the European Economic Area, or by setting them as conditions that external actors must meet in order to obtain rewards or avoid sanctions in trade agreements or accession treaties or even more indirectly, by convincing other of their appropriateness.²²⁵ However, its efforts have suffered from significant deficits. Clashing interests of Member States, some of which still heavily depend on coal, and industrial lobbies raising concerns about international competitiveness and jobs have constrained the EU's ambitions. Insufficient mechanisms for monitoring and compliance have handicapped the implementation of these policies.²²⁶

An important step towards sustainable development of Europe has been taken on 11 December 2019, when the *European Green Deal* (EGD)²²⁷ was presented by the President of the European Commission, Ursula von der Leyen. The EGD presents a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. It also aims to protect, conserve and enhance the EU's natural capital, and protect the health and well-being of citizens from environment-related risks and im-

²²⁴ *Ibid*, Art. 192.

²²⁵ MALJEAN-DUBOIS, S.: *Regional Organizations: The European Union*, In: RAJAMANI, L., PEEL, J. (eds.): *The Oxford Handbook of International Environmental Law*, Second Edition, Oxford: Oxford University Press, 2021, ISBN: 978-0-19-884915-5, pp. 650–665.

²²⁶ GRABBE, H., LEHNE, S.: *Climate Politics in a Fragmented Europe*, Brussels: Carnegie Europe, 2019, p. 1. Online: <https://carnegieeurope.eu/2019/12/18/climate-politics-in-fragmented-europe-pub-80616>.

²²⁷ For more on the *European Green Deal* see: European Commission: *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of Regions – European Green Deal*, Brussels, 11 December 2019, COM(2019) 640 final.

pacts.²²⁸ The EU thus seeks to be a first mover in global regulatory competition around the green transition, but also wants to lead by example and diffuse its environmental norms. It can therefore be argued that the European Commission seeks to capitalize on both the EU's normative and regulatory power. The agenda builds on the global momentum around the climate emergency, such as the warning issued by the Intergovernmental Panel on Climate Change in 2018 that the world needed to reach net zero emissions by 2050 to avoid a climate disaster, and the societal mobilization triggered by the Friday's for Future movement the same year.²²⁹ The EGD also reflects on the UN SDGs that were adopted in 2015, particularly goal no. 7 – Ensure access to affordable, reliable, sustainable and modern energy for all; goal no. 11 – Make cities and human settlements inclusive, safe, resilient and sustainable; goal no. 13 – Take urgent action to combat climate change and its impacts; goal no. 14 – Conserve and sustainably use the oceans, seas and marine resources for sustainable development; and goal no. 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.²³⁰

The EGD is not a law in itself, but a general policy strategy that outlines the ambitions and goals in different policy sectors. For its implementation, existing regulations and standards are and will be revised over the next few years and new laws and directives will be developed and implemented. There are eight key areas that make up the EGD:

- 1) Increasing the EU's climate ambition for 2030 and 2050;
- 2) Supplying clean, affordable, secure energy;
- 3) Mobilising industry for a clean and circular economy;
- 4) Building and renovating in an energy and resource efficient way;
- 5) A zero pollution ambition for a toxic-free environment;
- 6) Preserving and restoring ecosystems and biodiversity;
- 7) Farm to Fork: a fair, healthy and environmentally friendly food system;
- 8) Accelerating the shift to sustainable and smart mobility.

²²⁸ European Commission: *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: The European Green Deal*, Brussels, 11 December 2019, COM(2019) 640 final, p. 2.

²²⁹ ECKERT, S.: *The European Green Deal and the EU's Regulatory Power in Times of Crisis*. In: *Journal of Common Market Studies*, Vol. 59, 2021, pp. 81–82.

²³⁰ For more detail on specific goal targets see: UN General Assembly: *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, A/RES/70/1, pp. 21–25.

The mentioned areas can be divided into three main themes: (1) climate-related goals that focus on emission reductions, energy efficiency and clean energy; (2) environmental aims, linked to biodiversity, pollution and circularity; and (3) a healthy and sustainable food system, which combines environmental and health ambitions.²³¹ Due to the wide extent of areas that EGD targets, in the monograph we focus only on the use of AI in the first area, namely the climate-related goals and on selected legal instruments and initiatives.

3.1.1. European Union's proposals and initiatives to achieve climate-related goals of the European Green Deal

To achieve the goals outlined in the EGD, it is necessary that appropriate legal regulations are adopted. In March 2020, the European Commission introduced the *European Climate Law* (ECL) which establishes a framework for the irreversible and gradual reduction of anthropogenic greenhouse gas emissions by sources and enhancement of removals by sinks regulated in Union law. It sets out a binding objective of climate neutrality in the Union by 2050 in pursuit of the long-term temperature goal set out in point (a) of Art. 2 (1) of the *Paris Agreement*, and provides a framework for achieving progress in pursuit of the global adaptation goal established in Art. 7 of the *Paris Agreement*. The ECL also sets out a binding Union target of a net domestic reduction in greenhouse gas (GHG) emissions for 2030.²³² The ECL – alongside the *Regulation on the Governance of the Energy Union and Climate Action* (*Governance Regulation*) – establishes a regulatory framework for the implementation and further development of climate policy in the EU, with a view to achieving the Union's mid- to long-term climate targets.²³³ The relevant Union institutions and the Member States shall take the necessary measures at Union and national level, respectively, to enable the collective achievement of the climate-neutrality objective, taking into account the

²³¹ VAN ZEBEN, J.: *The European Green Deal: The future of a polycentric Europe?* In: *European Law Journal*, Vol. 26, No. 5–6, 2022, p. 307.

²³² *Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law')*, 30 June 2021, OJ L 243, Arts. 1 and 4.

²³³ *Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action*, 11 December 2018, OJ L 328/1, Art. 1. See: KULOVESI, K. et al.: *The European Climate Law: Strengthening EU Procedural Climate Governance?* In: *Journal of Environmental Law*, Vol. 36, 2024, p. 24.

importance of promoting both fairness and solidarity among Member States and cost-effectiveness in achieving this objective.²³⁴ The main actions included in the ECL are: (a) mapping out the pace of emission reductions until 2050 to give predictability to businesses, stakeholders and citizens; (b) developing a system to monitor and report on the progress made towards the goal; (c) ensuring a cost-efficient and socially-fair green transition.

Like most national framework climate laws, the ECL bears the hallmarks of what we term “procedural climate governance”. The notion of procedural governance is related to the distinction between substantive and procedural policy measures. Whereas substantive climate policy instruments, such as the EU emissions trading system, aim to directly mitigate GHG emissions, procedural climate governance instead sets the overarching goals for substantive climate policy and puts in place the instruments, institutions and processes for planning, implementing, enforcing and adjusting substantive climate policies.²³⁵ It also includes features related to the quality of climate governance, such as access to justice, inclusiveness and public participation, and independent scientific advice.²³⁶

ECL creates obligations primarily for the European Commission and, to a lesser extent, for the Member States. The ECL establishes a framework for continuous progress towards climate-neutrality and adaptation to climate change. Under Art. 5, the Union institutions and Member States must enhance adaptive capacity, strengthen resilience, and reduce vulnerability to climate change in line with Art. 7 of the *Paris Agreement*.²³⁷ They are also required to ensure that Union and national adaptation policies are coherent, mutually supportive, and provide co-benefits for sectoral policies, while in-

²³⁴ Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 (‘European Climate Law’), 30 June 2021, OJ L 243, Art. 2 (2).

²³⁵ BALI, A. S., HOWLETT, M., LEWIS, J. M., RAMESH, M.: *Procedural policy tools in theory and practice*. In: Policy and Society, Vol. 40, No. 3, 2021, p. 295.

²³⁶ KULOVESI, K. et al.: *The European Climate Law: Strengthening EU Procedural Climate Governance?* In: Journal of Environmental Law, Vol. 36, 2024, p. 24.

²³⁷ Under Art. 7 (1) of the *Paris Agreement*, Parties establish the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal referred to in Art. 2 – Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.

tegrating adaptation consistently across all relevant socioeconomic and environmental policy areas. Special attention must be given to the most vulnerable populations and sectors, with a focus on promoting nature-based and ecosystem-based solutions. To guide this process, the European Commission is mandated to adopt and regularly review a Union strategy on adaptation to climate change. Member States, in turn, are required to adopt and implement national adaptation strategies and plans, informed by robust climate vulnerability analyses and guided by the latest scientific evidence. These strategies should consider the unique vulnerabilities of key sectors such as agriculture, water, and food systems, and include regular updates as part of their reporting obligations under *Governance Regulation*.²³⁸

Art. 6 of the ECL further tasks the Commission with assessing, by 30 September 2023 and every five years thereafter, the collective progress of all Member States towards achieving the climate-neutrality objective and making progress on adaptation. This assessment, which also includes an evaluation of national measures based on integrated national energy and climate plans, will be published alongside the State of the Energy Union report. Where the Commission finds that Member States' measures are inconsistent with the climate-neutrality objective or progress on adaptation, it may issue recommendations. Member States receiving such recommendations must, within six months, notify the Commission on how they intend to address the recommendations, fostering a spirit of solidarity between Member States and the Union. Additionally, the Commission is required to review the consistency of Union measures, legislative proposals, and budgetary decisions with the climate-neutrality objective and adaptation goals. Impact assessments for these measures must include an evaluation of their alignment with the ECL's objectives, with the results made publicly available at the time of adoption. In cases of inconsistency, the Commission must justify the deviation and ensure that necessary corrective measures are taken to maintain progress towards the ECL's goals.²³⁹

As of now, the European Commission has not published the specific assessment under Art. 6 of the ECL. However, the Commission has released related reports that evaluate progress towards climate neutrality. For instance,

²³⁸ Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), 30 June 2021, OJ L 243, Art. 5.

²³⁹ *Ibid*, Art. 6 and 7.

the “*EU-wide assessment of the draft updated National Energy and Climate Plans (NECPs) 2023*” was published in December 2023. This report assesses the collective ambition and progress of Member States in meeting the EU’s climate objectives. The European Commission’s is generally positive, reflecting Member States’ commitment to robust energy and climate planning and their determination to advance national and regional actions. However, the assessment identifies significant gaps in maintaining the EU’s overall ambition and meeting specific legislative requirements, which raises concerns about the credibility of many Member States. The Commission urges Member States to address these gaps, finalize their plans promptly, and conduct inclusive public consultations to build acceptance for subsequent actions. It commits to supporting the transition to climate neutrality, enhancing energy autonomy, accelerating renewable energy deployment, promoting clean technologies, and fostering private investment and workforce development. To ensure effective implementation, the Commission will engage in one-on-one discussions with Member States, facilitate exchanges of best practices, address cross-cutting issues like investments and grid planning, and maintain close dialogue with the European Parliament and the Council to monitor progress on energy and climate objectives.²⁴⁰

When we turn to other legislative initiatives, the EU’s “*Fit for 55*” package represents a comprehensive effort to align climate, energy, and transport laws with the EU’s 2030 and 2050 climate ambitions. This package includes interconnected proposals and strategies targeting various sectors, such as biodiversity, circular economy, zero pollution, sustainable and smart mobility, renovation wave, hydrogen, batteries, and offshore renewable energy. It revises existing legislation and introduces new initiatives across key areas, including energy, transport, buildings, land use, and forestry.²⁴¹ Progress was

²⁴⁰ European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - EU wide assessment of the draft updated National Energy and Climate Plans An important step towards the more ambitious 2030 energy and climate objectives under the European Green Deal and RePowerEU*, Brussels, 18.12.2023 COM(2023) 796 final, pp. 20–21.

²⁴¹ The initiative includes: the revision of the EU emissions trading system (EU ETS), including its extension to shipping, and a revision of the rules for aviation emissions and the establishment of a separate emissions trading system for road transport and buildings; a revision of the effort sharing regulation on member states’ reduction targets in sectors outside the EU ETS; a revision of the land use, land-use change and forestry regulation on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry; an amendment of the regulation setting CO₂ emission standards for cars and vans; a revision of the renewable energy directive; a recast of the energy efficiency direc-

further bolstered by the 2021 EU Strategy on Adaptation to Climate Change, which integrates adaptation measures with other European Green Deal initiatives, such as the Biodiversity Strategy, Farm to Fork, and Circular Economy Action Plans. Key measures focus on data sharing, nature-based solutions, and integrating adaptation into macro-fiscal policies.²⁴²

As of December 2024, significant progress has been made. The Council of the EU has adopted key pieces of legislation delivering on the 2030 climate targets, including reforms to the EU Emissions Trading System, the establishment of a Social Climate Fund, and the implementation of the Carbon Border Adjustment Mechanism. These measures aim to reduce greenhouse gas emissions, promote renewable energy, and enhance energy efficiency across the EU.²⁴³ Furthermore, the European Parliament and the Council have reached provisional agreements on several components of the package, such as the *Effort Sharing Regulation*, which sets binding annual greenhouse gas emission targets for Member States, and the *Renewable Energy Directive*, which increases the EU's binding renewable energy target for 2030. These developments underscore the EU's commitment to achieving its climate objectives and transitioning towards a sustainable and resilient economy.²⁴⁴ In addition to legislative progress, the EU has been actively engaging with Member States to ensure effective implementation of the “Fit for 55” measures. This includes providing guidance on national energy and climate plans, facilitating the exchange of best practices, and supporting investments in clean technologies and infrastructure. The European Commission continues to monitor progress and collaborate with stakeholders to address chal-

tive; a revision of the energy tax directive; a carbon border adjustment mechanism; a revision of the directive on the deployment of alternative fuels infrastructure; ReFuelEU Aviation for sustainable aviation fuels; FuelEU Maritime for a green European maritime space; a social climate fund; a revision of the energy performance of buildings directive; reducing methane emissions in the energy sector; a revision of the third energy package for gas.

²⁴² European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change*, Brussels, 24 February, 2021 COM(2021) 82 final.

²⁴³ For more information see “Fit for 55” at: <https://www.consilium.europa.eu/en/policies/fit-for-55/?utm>.

²⁴⁴ For more information see “Fit for 55”: *Delivering on the proposals* at: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal/fit-55-delivering-proposals_en?utm.

lenges and ensure that the EU remains on track to meet its climate goals.²⁴⁵ Overall, the “*Fit for 55*” package represents a pivotal step in the EU’s efforts to combat climate change, fostering a comprehensive approach that integrates environmental, economic, and social dimensions to achieve a climate-neutral Europe by 2050.

3.1.2. Harnessing Artificial Intelligence for the European Green Deal

AI plays a pivotal role in adapting and mitigating climate change while advancing the objectives outlined in the EGD. Under the priority of building strategic leadership in high-impact sectors, particular focus is placed on the use of AI in environmental protection, less polluting mobility, and sustainable agriculture. AI technologies are positioned to support EGD objectives through four primary channels:

- (1) facilitating the transition to a circular economy by optimizing production processes to become more resource- and energy-efficient;
- (2) improving the integration and management of energy systems, empowering businesses, public authorities, and citizens to adopt the most sustainable and efficient energy options;
- (3) enabling the decarbonization of key sectors such as buildings, agriculture, and manufacturing, alongside the efficient management of transport flows across road, rail, and air to reduce congestion, enhance inter-modality, and support the adoption of electric self-driving vehicles; and
- (4) providing innovative solutions that were previously unattainable with conventional technologies.²⁴⁶

To enhance climate adaptation efforts, the European Commission has emphasized the critical role of digital transformation. Advanced digital technologies such as remote sensing, smart weather stations, AI, and high-performance computing are promoted to strengthen decision-making pro-

²⁴⁵ For more information see *Timeline – European Green Deal and Fit for 55* at: <https://www.consilium.europa.eu/en/policies/green-deal/timeline-european-green-deal-and-fit-for-55/?utm>.

²⁴⁶ European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Fostering a European Approach to Artificial Intelligence*, Brussels, 21 April 2021, COM(2021) 205 final, Annex, p. 38.

cesses.²⁴⁷ The successful integration of AI into the EGD objectives requires a robust framework for data gathering and sharing, which is essential for training AI systems and supporting their application in climate adaptation efforts. The European Data Strategy plays a critical role in this regard. It aims to create a single European data space where personal and non-personal data, including sensitive business data, are secure and accessible. By enabling businesses and public authorities to leverage high-quality industrial data, the strategy supports innovation while minimizing environmental impacts.²⁴⁸ Furthermore, the Commission plans to establish common rules for collecting and recording climate-related data, which will be centrally stored at the EU level through the Risk Data Hub to improve accessibility for stakeholders. Public-private partnerships will play a key role, with data treated as a public good akin to scientific knowledge. To streamline this approach, centralizing environmental data could significantly enhance AI efficiency by avoiding duplication, reducing acquisition costs, and minimizing environmental impact.²⁴⁹ The work on access to environmental data in the data strategy is not specifically focused on AI, but it is a prerequisite for AI applications to support the targets of the EGD.²⁵⁰

A specific “Common Europe Green Deal Data Space” is envisioned to support EGD priorities such as climate change mitigation, circular economy, zero pollution, biodiversity, and compliance assurance. Initiatives like GreenData4All and Destination Earth illustrate concrete actions in this area. GreenData4All seeks to modernize the *Directive establishing an Infrastructure for Spatial Information in the EU (INSPIRE Directive)*, along with the *Access to Environmental Information Directive*, to simplify access to environ-

²⁴⁷ European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Forging a climate-resilient Europe – the new EU Strategy on Adaptation to Climate Change*, Brussels, 24 February, 2021 COM(2021) 82 final, p. 5.

²⁴⁸ European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A European strategy for data*, Brussels, 19.2.2020 COM(2020) 66 final, pp. 4–5.

²⁴⁹ BAKOŠOVÁ, L.: *European Legal Perspective on Artificial Intelligence in the Context of the European Green Deal*. In: KLUČKA, J., BAKOŠOVÁ, L. SISÁK, L. (eds.): *Artificial Intelligence from the Perspective of Law and Ethics: Contemporary Issues, Perspectives and Challenges*, Praha: Leges, 2021, ISBN: 978-80-7502-590-6, pp. 203–204.

²⁵⁰ GAILHOFER, P., et al.: *The role of Artificial Intelligence in the European Green Deal*, Study for the special committee on Artificial Intelligence in a Digital Age (AIDA), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2021, ISBN: 978-92-846-8049-8, p. 39.

mental data for public authorities, businesses, and citizens. The review of the *INSPIRE Directive* presents an opportunity to include climate-related disaster loss data and extend public access to high-value datasets. Climate-related disaster loss data could also be designated as high-value datasets in future updates to the *Directive on Open Data and the Re-use of Public Sector Information*, ensuring greater accessibility.²⁵¹ As of February 2024, the European Commission has called for evidence to update these rules, aiming to enhance data sharing and public access to environmental information. Destination Earth, a digital twin of the Earth, aims to provide detailed environmental simulations to support decision-making and policy implementation. Launched in January 2021, Destination Earth is progressing through its planned stages. By 2025, the platform aims to incorporate additional digital twins and become accessible to the public sector for environmental and climate policy assessments.²⁵²

Despite these numerous initiatives, a dedicated regulatory instrument specifically addressing AI's role in achieving the objectives of the EGD is notably absent. This regulatory gap underscores the need for a closer examination of the EU's legal framework for AI, particularly the *Artificial Intelligence Act*, which emphasizes principles such as accountability, transparency, and risk management. These principles provide a robust foundation for aligning AI deployment with the EU's broader objectives of sustainability, resilience, and climate neutrality. Moreover, the EU boasts an already comprehensive legal framework encompassing the protection of fundamental rights, product safety, consumer rights, and data protection, which could be leveraged and integrated to address the unique challenges and opportunities presented by AI in the context of the EGD.

In addition to formal legislative instruments, the EGD also relies on non-binding initiatives developed through collaboration between stakeholders and the European Commission. One prominent example is the Self-Regulatory Initiative for Climate Neutral Data Centres, which unites 54 data centre operators and 22 trade associations. This initiative, described in detail in *Chapter 7.1.3.*, created the *Climate Neutral Data Centre Pact*, outlining

²⁵¹ *European Commission: Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change*, Brussels, 24 February 2021 COM(2021) 82 final, p. 6.

²⁵² For more information on Destination Earth see: <https://destination-earth.eu>.

19 recommendations to facilitate climate neutrality.²⁵³ While the Pact does not explicitly address AI systems, data centres play a crucial role in supporting AI operations by providing the computational power and storage necessary for training and deploying AI applications.

3.2. African Union Agenda 2063

Africa faces the dual challenge of pursuing economic growth and development while addressing the urgency of climate change and environmental degradation. To tackle this, the AU, as outlined in Art. 3 of its *Constitutive Act*, promotes sustainable development at the economic, social, and cultural levels, as well as the integration of African economies.²⁵⁴ Building on these principles, the AU has adopted several strategic frameworks. The most notable of its strategic frameworks is *Agenda 2063*, titled “*The Africa We Want*”, a 50-year blueprint for sustainable development, adopted in 2015. As the continent’s shared framework for inclusive growth, *Agenda 2063* clusters 20 goals into seven aspirations which envision a prosperous and inclusive Africa, characterized by sustainable development, political unity, and good governance, while fostering peace, security, and a strong cultural identity.²⁵⁵ They emphasize people-driven development that leverages the potential of women and youth, and position Africa as a resilient and influential global player rooted in Pan-African values and shared heritage.²⁵⁶ Aspiration no. 1: “A prosperous Africa based on inclusive growth and sustainable development” envisions the eradication of poverty within a generation and the creation of shared prosperity through social and economic transformation. Key goals include ensuring high standards of living with access to basic necessities, fostering an education and skills revolution underpinned by science and technology, and expanding access to quality healthcare. The aspiration

²⁵³ Self-Regulatory Initiative for Climate Neutral Data Centres: *The Climate Neutral Data Centre Pact*. Online: <https://www.climateutraldatacentre.net/self-regulatory-initiative/#circular-economy>.

²⁵⁴ *Constitutive Act of the African Union*, Lomé, 11 July 2000, Art. 3 (j) .

²⁵⁵ Several continental frameworks have been developed to address the development of key sectors such as agriculture, trade, transport, energy and mining. The continental frameworks include the Comprehensive African Agricultural Development Programme, The Programme for Infrastructural Development in Africa, The African Mining Vision, Boosting Intra African Trade, Accelerated Industrial Development for Africa.

²⁵⁶ African Union: *Agenda 2063: The Africa We Want - Framework Document*, September 2015, pp. 12–16. Online: https://au.int/sites/default/files/documents/33126-doc-framework_document_book.pdf.

also focuses on transforming economies through industrialization, increasing agricultural productivity, harnessing the blue economy, and promoting environmentally sustainable and climate-resilient communities. Key climate objectives include sustainable resource management, biodiversity conservation, water security, and promoting renewable energy to reduce greenhouse gas emissions. The Agenda also emphasizes preparedness for climate-related hazards and sustainable consumption patterns.²⁵⁷

To operationalize these goals, the *African Union Climate Change and Resilient Development Strategy and Action Plan (2022–2032)* was adopted, providing a framework for building climate-resilient economies. The Strategy builds on the continent's commitment to ensuring an effective multilateral approach to addressing climate change through the *UNFCCC* and the *Paris Agreement* adopted thereunder, while emphasizing equitable access to sustainable development and the eradication of poverty and recognizing the specific needs and special circumstances of African countries. The Strategy seeks to enhance Africa's capacity to respond to climate impacts through the mobilisation of domestic and international financial resources, enhancing access to technology and innovation, and developing safety nets for loss and damage.²⁵⁸ Digital transformation plays a pivotal role in building climate resilience across Africa by enabling access to timely, accurate, and up-to-date climate data for informed decision-making. Central to this transformation is the shift from analogue to digital systems (digital enablement), which supports the development of innovative solutions for climate response and green economy growth. In agriculture, digitalization is seen as transformative, enhancing product development, service delivery, and operational efficiency. Key technologies such as drones, satellite systems, AI, and cloud technologies drive climate advisory services, data capture, and delivery of financial products like index-based insurance. A holistic approach to digitalization is crucial, addressing infrastructure, financing models, private sector engagement, and policies that create an enabling environment. Environmental considerations are integral, emphasizing energy efficiency, waste control, and sustainable practices in technology development. The strategy also calls for reducing environmental impacts, aligning with international agreements, and promoting inclusive digital transformation centred on African knowl-

²⁵⁷ *Ibid*, Annex 3, pp. 146–148.

²⁵⁸ African Union: *African Union Climate Change and Resilient Development Strategy and Action Plan (2022–2032)*, 2022, p. 2. Online: https://au.int/sites/default/files/documents/41959-doc-CC_Strategy_and_Action_Plan_2022-2032_08_02_23_Single_Print_Ready.pdf.

edge, communities, and governance.²⁵⁹ This approach ensures African-led, climate-conscious innovation that respects local contexts and leaves no one behind.

The implementation of the *Agenda 2063* required establishment of new institutional arrangements in order to effectively move the Agenda toward realized change, development, integration, and transformation. However, the exact nature, structure, and composition of these “institutional arrangements” was not clearly stated in the document.²⁶⁰ The implementation, monitoring, and evaluation of *Agenda 2063* involve stakeholders at the continental, regional, and national levels. At the continental level, AU organs such as the Assembly, Executive Council, Ministerial Committee, and the African Union Commission (AUC) provide strategic coordination, develop frameworks, oversee ten-year plans, and evaluate progress. At the regional level, Regional Economic Communities (RECs) adapt continental plans to regional contexts, coordinate implementation among member states, and integrate regional monitoring and evaluation efforts. At the national level, governments align national plans with *Agenda 2063*, lead resource mobilization, execute medium-term plans, and evaluate progress, with sub-national governments and civil society playing a critical role in grassroots planning, goal-setting, and monitoring.²⁶¹ This tiered approach ensures alignment and collaboration to achieve the agenda’s transformative goals. However, as *Ndizera and Muzee* argues, it is more than likely that the implementation of the Agenda will face the problem of commitment. Given that the Agenda seeks to ultimately establish a political union and supra-national organs to act on behalf of African governments, it is unlikely that some African leaders will let go their sovereign power easily.²⁶² One of the reasons cited for lack of progress in African regional integration is the unwillingness of governments to surrender sovereignty of their macroeconomic policy to a regional authority and face potential consumption costs that may rise by importing from a high cost member country, and accept unequal distribution of gains and losses that may follow an integration agreement, and discontinue exist-

²⁵⁹ *Ibid*, pp. 56–58.

²⁶⁰ DeGHETTO, K., GRAY, J. R., KIGGUNDU, M. N.: The African Union’s Agenda 2063: Aspirations, Challenges, and Opportunities for Management Research. In: *Africa Journal of Management*, Vol. 2, No. 1, 2016, p. 98.

²⁶¹ African Union: *Agenda 2063: The Africa We Want – Framework Document*, September 2015, pp. 118–121.

²⁶² NDIZERA, V., MUZEE, H.: *A critical review of Agenda 2063: Business as usual?* In: *African Journal of Political Science and International Relations*, Vol. 12, No. 8, 2018, p. 151.

ing economic ties with non members. This lack of strong and sustained political commitment and macroeconomic instability have hindered the progress of economic integration in Africa. *Geda and Kibret* further note that African countries are reluctant to create supra-national bodies and transfer power to them as the sanctioning authority.²⁶³

3.2.1. African Union Green Recovery Action Plan 2021–2027

Building on abovementioned foundation, the AU launched its GD, the *Green Recovery Action Plan (GRAP) 2021–2027*, as a response to the COVID-19 pandemic, which exposed and exacerbated vulnerabilities in Africa's economic and environmental systems, necessitating urgent, coordinated responses to support sustainable recovery. GRAP aligns closely with *Agenda 2063* while focusing on five key priority areas:

- (1) **Climate Finance:** Enhancing the accessibility and efficiency of financial flows for both mitigation and adaptation efforts, ensuring that climate funding mechanisms benefit the most vulnerable populations, including women, youth, and marginalized groups.
- (2) **Renewable Energy:** Supporting the implementation of renewable energy initiatives, improving energy efficiency, and facilitating national just transition programs to promote clean energy solutions across the continent.
- (3) **Nature-Based Solutions and Biodiversity:** Promoting sustainable land management, forestry, ocean conservation, and ecotourism to protect and restore Africa's rich biodiversity.
- (4) **Resilient Agriculture:** Advancing inclusive economic development and creating green jobs by fostering resilient agricultural practices that can withstand climate shocks.
- (5) **Green and Resilient Cities:** Focusing on water management, flood control, and the integration of information and communication technologies to develop sustainable urban environments.²⁶⁴

²⁶³ GEDA, A., KIBRET, H.: Regional Economic Integration in Africa: A Review of Problems and Prospects with a Case study of COMESA. Working Papers 125, Department of Economics, SOAS University of London, p. 3. Online: <https://ideas.repec.org/p/soa/wpaper/125.html>.

²⁶⁴ African Union: *African Union Green Recovery Action Plan 2021–2027*, 2021, p. 9. Online: https://au.int/sites/default/files/documents/40790-doc-AU_Green_Recovery_Action_Plan_ENGLISH1.pdf.

GRAP builds on existing initiatives to advance sustainable development across sectors.²⁶⁵

As for the implementation, the AUC coordinates GRAP at the continental level, providing strategic guidance while encouraging Member States to develop aligned national strategies, implement activities, and contribute to comprehensive implementation reports.²⁶⁶ GRAP is being closely implemented with Pan African institutions including the United Nations Economic Commission for Africa and a wide range of regional and continental initiatives, development banks, the private sector, and AU Member States, so as to complement and enhance national recovery plans.

AI holds significant potential to enhance the effectiveness of GRAP's initiatives. Particularly prominent use of AI is connected to agriculture and food security, energy, and climate.²⁶⁷ For instance, AI-powered tools can support precision agriculture by providing farmers with real-time data on weather patterns, soil health, and crop management, thereby increasing productivity and resilience to climate change.²⁶⁸ Despite these advancements, the availability of locally relevant data remains limited in Africa and poses a major obstacle to developing and deploying tailored solutions that address challenges that are unique to the continent. In addition to barriers in accessing government and domain specific data, one of the most significant gaps is in language data. The scarcity of local language data limits the relevance of AI-enabled services and poses a significant barrier to the development of generative AI solutions that rely on language models.²⁶⁹

In this context, the African Union's Continental Artificial Intelligence Strategy, endorsed in July 2024, will guide AI's integration into GRAP and other sustainable development strategies. It proposes a people-centric approach with five focus areas: maximizing AI benefits across key sectors;

²⁶⁵ For instance, Africa Adaptation Initiative, Africa Renewable Energy Initiative, African Union Sustainable Forest Management Framework, African Climate Resilient Agricultural Development Programme, The Great Green Wall for the Sahara and Sahel and Southern Africa.

²⁶⁶ *Ibid*, p. 25.

²⁶⁷ GSMA: *AI for Africa: Use cases delivering impact*, July 2024, p. 4. Online: https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2024/07/AI_for_Africa.pdf; African Union: *African Union Green Recovery Action Plan 2021 – 2027*, 2021, p. 20.

²⁶⁸ See for instance: GIKUNDA, K.: *Harnessing Artificial Intelligence for Sustainable Agricultural Development in Africa: Opportunities, Challenges, and Impact*. 2024, pp. 2–3. Online: <https://arxiv.org/pdf/2401.06171>.

²⁶⁹ GSMA: *AI for Africa: Use cases delivering impact*, July 2024, p. 5.

addressing associated risks; enhancing Member State capabilities in infrastructure and skills; fostering regional and international cooperation; and stimulating public and private investment in AI. The Strategy outlines fifteen actionable recommendations, including establishing AI governance systems, promoting AI adoption in public and private sectors, ensuring high-quality datasets, and fostering research and innovation. It emphasizes the importance of ethical principles, democratic values, human rights, and the rule of law – aligned with *Agenda 2063* – in shaping governance regimes for AI. Furthermore, regional cooperation and international partnerships are recognized as crucial for mobilizing resources to support AI development. The successful implementation of these actions requires prioritization, coordination, and knowledge sharing among AU institutions, Member States, and development partners, ultimately aiming to optimize AI's benefits for the African populace.²⁷⁰

Despite the ambitious goals and framework of the GRAP, its implementation faces several significant challenges that must be addressed to ensure its success. One of the primary obstacles is the limited accessibility and availability of financial resources. While GRAP emphasizes the importance of climate finance, African nations often encounter difficulties in accessing international funding mechanisms due to complex application processes, rigid eligibility criteria, and insufficient institutional capacity.²⁷¹ This gap in funding is particularly evident in large-scale renewable energy and resilient agricultural projects, where financial autonomy is crucial for implementation.²⁷² Another challenge lies in weak institutional and governance capacity. Effective implementation of GRAP demands robust governance structures, but many Member States face issues such as limited technical expertise and overlapping mandates among agencies. The lack of alignment between the AUC and national policies often leads to delays and inefficiencies. Building institutional capacity through regional training programs and leveraging AI to

²⁷⁰ African Union: *Continental Artificial Intelligence Strategy: Harnessing AI for Africa's Development and Prosperity*, July 2024, pp. 27–61. Online: https://au.int/sites/default/files/documents/44004-doc-EN-_Continental_AI_Strategy_July_2024.pdf.

²⁷¹ United Nations Development Programme: *Climate Finance in Africa: An Overview of Climate Finance Flows, Challenges and Opportunities*, 2024, pp. 39–52. Online: https://au.int/sites/default/files/documents/44101-doc-Climate_Finance_in_Africa_Report.pdf.

²⁷² GABRAH, A. Y. B., AMOAKO, G. K., AMPONG, G. O. A.: *Africa's Response to SDGs: Barriers and Challenges*. In: ADOMAKO, S., DANSO, A., BOATENG, A. (eds): *Corporate Sustainability in Africa*. Cham: Palgrave Studies in African Leadership - Palgrave Macmillan, 2023, ISBN: 978-3-031-29273-6, pp. 47–63.

standardize monitoring and reporting processes could significantly improve coordination and implementation efficiency. As mentioned above, the insufficient integration of technology and data further hampers GRAP's effectiveness. The adoption of advanced solutions such as AI, satellite monitoring, and precision agriculture requires robust digital infrastructure, which is often lacking across many African regions. Reliable data collection and processing are crucial for optimizing resource use and providing real-time insights. Investments in digital infrastructure and partnerships with technology providers could bridge this gap and enhance the integration of technological solutions.²⁷³

²⁷³ GSMA: *AI for Africa: Use cases delivering impact*, July 2024, p. 70.

II. ARTIFICIAL INTELLIGENCE FROM LEGAL PERSPECTIVE

It has been over 65 years, since the notion “artificial intelligence” was introduced at the 1956 Dartmouth Summer Research Project on Artificial Intelligence.²⁷⁴ The aim of the study, which was conducted at the conference, was to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. Furthermore, the participants at the conference attempted to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves.²⁷⁵

Although the conference was not immediately successful, it sparked further interest and research in AI. Even before the 1956 Dartmouth Conference, in the novel *Runaround* (1942), writer Isaac Asimov imagined a world in which human like robots would behave like servants and whose activities would be regulated by a set of programming rules that would prevent robots from causing harm. Asimov’s “*Handbook of Robotics*”, which was applied in 2058, contains three rules, namely:

- 1.) A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- 2.) A robot must obey orders given it by human beings except where such orders would conflict with the First Law.
- 3.) A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

AI today far surpasses the capabilities imagined in Asimov’s time. Over the past decade, exponential advancements in AI have transformed it from a niche academic field into a dominant driver of technological innovation, reshaping industries and societies alike. Techniques like deep learning, powered by neural networks, have unlocked unprecedented potential in areas such as image recognition, natural language processing, and decision-making systems. Generative AI, such as large language models (e.g., ChatGPT),

²⁷⁴ Officially known as the Dartmouth Summer Research Project on Artificial Intelligence.

²⁷⁵ MCCARTHY, J., MINSKY, M., ROCHESTER, N., SHANNON, C.: *A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence*, August 31, 1955. In: *AI Magazine*, Vol. 27, No. 4, 2006, pp. 12–13.

has demonstrated the ability to produce human-like text, art, and even code, blurring the line between human and machine creativity. These advancements have broad societal implications, from enabling personalized healthcare to raising concerns about misinformation, privacy, and labour market disruptions. Unlike the early AI systems discussed at the Dartmouth Conference, today's AI systems can adapt, learn, and make predictions with minimal human intervention, underscoring the need for updated regulatory frameworks to address their far-reaching impacts.

Therefore, in the recent times, new rules of robotics have been adopted, which reflect the current and partly the future development.²⁷⁶ Till this day, however, the AI developers apply the so-called Turing Test from 1950, which is still considered as a benchmark to identify intelligence of an artificial system: if a human is interacting with another human and a machine and unable to distinguish the machine from the human, then the machine is said to be intelligent.²⁷⁷ However, modern advancements reveal its limitations. AI systems today, especially those leveraging natural language processing and transformer models, can convincingly mimic human conversation without demonstrating true understanding or reasoning. For example, generative AI can pass the Turing Test in controlled scenarios but may still fail in tasks requiring deep contextual awareness or ethical judgment. This discrepancy highlights the need for more robust criteria to evaluate AI intelligence, including benchmarks that consider ethical behaviour, transparency, and alignment with human values.

In the following chapters, we first explore the established norms of public international law governing sustainable development and environmental protection, with a special emphasis on the right to a clean, healthy, and sustainable environment. This foundational analysis is followed by an examination of both existing and emerging international legal norms specifically tailored to the regulation of AI. Special attention is devoted to legal frameworks developed by pivotal international and regional organizations, including the UN, EU and CoE, highlighting their role in bridging environmental and human rights considerations within the evolving governance of AI.

²⁷⁶ BAKOŠOVÁ, L.: *Ethical and Legal Aspects of the Use of Artificial Intelligence in Health and Nursing Care*. In: *STUDIA IURIDICA Cassoviensia*, Vol. 8, No. 2, 2020, p. 4.

²⁷⁷ HAENLEIN, M., KAPLAN, A.: *A Brief History of Artificial Intelligence: On the Past, Present and Future of Artificial Intelligence*. In: *California Management Review*, Vol. 61, No. 4, 2019, p. 3.

4. The Role of Public International Law in Regulating Artificial Intelligence and Addressing Environmental Challenges

Public international law is the system of norms and principles that regulate behaviour between subjects of international law. While it may not be immediately apparent, that international law should have any role to play in regulating either the development or deployment of AI, throughout its history international law has, at times, been quite creative in responding to the need to protect the international community from the excesses of, and possibly catastrophic and even existential risks posed by technology. Admittedly, the traditional approach of international law to the regulation of emerging technologies has been one of reaction rather than pro-action; only attempting to evaluate and regulate their development or use *ex post facto*. Regulating uncertain, unknown, and even unknowable futures requires flexibility, transparency, accountability, participation by a whole range of actors beyond the State, and the ability to obtain, understand, and translate scientific evidence into law, even while the law remains a force for stability and predictability.²⁷⁸

Public international law faces significant challenges in regulating AI due to its rapid evolution and cross-border nature. Accountability, a central challenge in AI regulation, intersects with issues of liability, transparency, and ethical governance, particularly in autonomous systems like self-driving cars or weaponry. Bias and discrimination embedded in AI algorithms also present challenges, as biased datasets can perpetuate or amplify social inequalities, potentially violating human rights. AI's inherently global nature poses unique challenges to cross-border governance, necessitating cooperation among states to establish consistent legal standards. Existing international frameworks represent early steps toward creating unified norms, but gaps in enforcement and harmonization persist. For example, UNESCO's *Recommendation on the Ethics of Artificial Intelligence* provides a global framework that emphasizes human rights, environmental sustainability, and accountability as guiding principles for AI governance.²⁷⁹ Similarly, the OECD

²⁷⁸ RAYFUSE, R.: *Public International Law and the Regulation of Emerging Technologies*. In: BROWNSWORD, R., SCOTFORD, E., YEUNG, K. (eds.): *The Oxford Handbook of Law, Regulation and Technology*, Oxford: Oxford University Press, 2017, pp. 500–501, ISBN: 978-0-19-968083-2.

²⁷⁹ UNESCO: *Recommendation on the Ethics of Artificial Intelligence*, SHS/BIO/PI/2021/1, 23 November 2021. Online: <https://unesdoc.unesco.org/ark:/48223/ptf0000381137>

AI Principles, adopted by over 40 countries, focus on ensuring that AI systems are trustworthy, inclusive, and beneficial to humanity. These principles encourage transparency, fairness, and the promotion of human-centered values in the development and deployment of AI.²⁸⁰ Despite these efforts, significant challenges remain. Jurisdictions often differ in their approaches to data protection, cybersecurity, and AI ethics, leading to fragmented regulatory landscapes. For instance, while the EU's *Artificial Intelligence Act* proposes a comprehensive risk-based approach to AI governance, other regions lack similarly detailed frameworks. This disparity creates barriers to interoperability and complicates efforts to hold AI developers and deployers accountable on a global scale. Furthermore, cross-border issues such as data sovereignty and the export of dual-use AI technologies highlight the need for collaborative solutions that balance innovation with ethical and legal considerations. As AI technologies continue to evolve, bridging these regulatory gaps will require greater alignment between national and regional policies, supported by robust international cooperation. By building on existing frameworks like UNESCO's and the OECD's, public international law can provide a foundation for harmonized AI governance that addresses both technological advancements and their global implications.

The transformative potential of AI intersects directly with the themes of sustainable development and environmental protection, both central to this monograph. AI offers innovative tools to address global challenges, including climate change, biodiversity loss, and environmental degradation, aligning with the objectives of international environmental law. From optimizing energy use and enhancing precision in resource management to improving environmental monitoring through satellite imagery and predictive analytics, AI can serve as a catalyst for achieving a sustainable future. However, these benefits come with legal and ethical complexities, such as accountability for environmental harm, the risk of exacerbating existing inequalities, and the environmental impact of AI itself, including its energy-intensive operations and reliance on non-renewable resources.

At the same time, international human rights law, particularly the emerging recognition of the right to a clean, healthy, and sustainable environment, must address the dual nature of AI technologies. While AI has the potential to improve transparency, accessibility to environmental information, and decision-making processes, it also raises concerns about equity and privacy.

²⁸⁰ OECD: *Principles on Artificial Intelligence*, 22 May 2019, OECD/LEGAL/0449.

This evolving landscape calls for a re-evaluation of how existing international norms can be adapted to govern the use of AI in ways that safeguard both environmental and human rights.

The subsequent chapters delve into the intersection of international environmental and human rights law with sustainable development and AI. They explore how legal frameworks can guide the integration of emerging technologies while ensuring that these innovations support, rather than undermine, the right to a clean, healthy, and sustainable environment—a cornerstone of contemporary sustainability discourse.

4.1. International Environmental Law

Before we turn our focus to the international regulation of AI on the global and regional level, it is necessary to point out the applicable international legal framework in the area concerning SDG No. 13. As it was mentioned before,²⁸¹ States' adopted measures in climate action must reflect on the existing customary norms and principles of the international environmental law, especially do no harm principle, environmental impact assessment, precautionary principle, principle of human right to the environment, principle of protection and conservation of the environment and natural resources. These principles provide a foundational legal basis for state actions and guide their climate initiatives. The mentioned principles are present in numerous environmental treaties.

When we turn to international treaties, there are several (with a large number of contracting Parties) whose aim is to combat climate change and its impacts. Particularly, the *UNFCCC*, the *Kyoto Protocol* to the *UNFCCC* and the *Paris Agreement*. Although the mentioned multilateral treaties do not regulate artificial intelligence *per se*, they provide States Parties with goals, commitments, principles and mechanisms that indirectly regulate their use in climate action, especially when it comes to negative effects on climate change.

The considerable role of the *UNFCCC* in international law has been confirmed, *inter alia*, in the *2030 Agenda*, where the UN Member States confirmed that it is the primary international, intergovernmental forum for negotiating the global response to climate change. The aim of the *UNFCCC* is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame suffi-

²⁸¹ See Chapter 1.1.1 on Substantive Elements of Sustainable Development.

cient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.²⁸² The Convention provides State Parties with, *inter alia*, principles that shall guide them in their actions to achieve the objective of the Convention and to implement its provisions. Especially relevant is Principle 3, in accordance with which the State Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.²⁸³ This principle becomes particularly relevant in the context of AI. While AI offers transformative tools for climate action, such as predictive climate modelling and optimization of renewable energy systems, its large-scale deployment poses risks that align with the need for precautionary measures. For instance, the intensive energy demands of AI systems, coupled with their reliance on data centres powered by non-renewable energy sources, can contribute to increased greenhouse gas emissions. Adopting precautionary policies to evaluate the full environmental impact of AI before widespread deployment aligns with the UNFCCC's goal of minimizing harm while fostering innovation.

The Art. 4 (f) builds on the principle “do no harm” and obliges the State Parties to take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change.²⁸⁴ This foundational principle becomes critical in addressing the environmental risks posed by AI technologies. While AI applications can enhance energy efficiency and climate monitoring, they also generate significant environmental footprints through energy-intensive computation, rare earth mineral extraction, and electronic waste. For instance, training large-scale AI models requires massive computational resources, which,

²⁸² *United Nations Framework Convention on Climate Change*, New York: United Nations, General Assembly, 9 May 1992, Art. 2.

²⁸³ *Ibid*, Art. 3 (3).

²⁸⁴ *Ibid*, Art. 4 (f).

if powered by non-renewable energy, could exacerbate climate change. The principle of “do no harm” mandates that states incorporate safeguards to ensure that AI’s deployment does not unintentionally undermine climate action goals, such as by prioritizing clean energy sources for AI systems and implementing robust e-waste management practices.

Other articles relevant to the achievement of SDG No. 13 are Art. 6 on education, training and public awareness and Art. 11 on financial mechanism. Since the mentioned articles do not, even indirectly, affect the regulation of AI in climate action, we will not analyse them further, as well as similar provisions of the *Paris Agreement*.

The *Paris Agreement* has a number of features that may influence how countries adapt, improve, or create new domestic processes in order to comply with its obligations. All parties to the Agreement are required to maintain a NDC that outlines their self-defined mitigation goals.²⁸⁵ They are legally obligated to pursue domestic measures with the aim of achieving those goals.²⁸⁶ The Agreement reaffirms the UNFCCC goal of keeping average warming below two degrees Celsius while pursuing efforts to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change. Furthermore, to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; and to make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.²⁸⁷ Every five years, they must update or communicate a new NDC.²⁸⁸ Regarding the use of artificial intelligence in combating climate change, we may analogically apply Art. 10 (1) under which the parties share a long-term vision on the importance of fully realizing technology development and transfer in order to improve resilience to climate change and to reduce greenhouse gas emissions.²⁸⁹ This provision, in a way, restricts State Parties to use AI systems that have or may have adverse impact on climate change. However, such regulation is worded too vaguely which has only limited effect on the use of AI systems in climate ac-

²⁸⁵ *Paris Agreement*, Paris, 12 December 2015, Art. 4 (2).

²⁸⁶ HUANG, J.: *Exploring Climate Framework Laws and the Future of Climate Action*, Pace Environmental Law Review, Vol. 38, Issue 2, 2021, pp. 310–311.

²⁸⁷ *Paris Agreement*, Paris, 12 December 2015, Art. 2 (a), (b), (c).

²⁸⁸ *Ibid*, Art. 9.

²⁸⁹ *Ibid*, Art. 10 (1).

tion. As *Huang* argues, governments will also need to take into account information from the global stocktake in their target-setting process. The review processes and climate change committees tasked with assessing new science and updating or realigning the ambition of interim targets in climate framework laws make this work pro forma and ostensibly provide for greater accountability over time.²⁹⁰

The current international environmental law framework provides a basis for integrating AI into climate action but faces several challenges. Firstly, international treaties on climate change and sustainable development lack specific guidelines for AI, reducing their regulatory impact. Secondly, the current legal framework encompasses limited sanctions for non-compliance, undermining effectiveness. Thirdly, there is a need for AI-specific principles, such as transparency, accountability, and fairness in AI systems must complement existing international environmental law. Transparency ensures that AI methodologies used in climate modelling or resource optimization are accessible and verifiable, building trust and enabling informed policymaking, aligning with Art. 6 of the *UNFCCC* on public awareness and education. Accountability frameworks are crucial to prevent environmental harm from AI deployments, such as increased carbon emissions from energy-intensive data centres, and could be integrated into mechanisms like the *UNFCCC* Global Stocktake. Fairness is particularly critical to address disparities in access to AI technologies, ensuring equitable benefits for developing nations, consistent with Art. 10 of the *Paris Agreement's* emphasis on technology transfer. However, AI misuse poses risks, including biased algorithms that disproportionately affect marginalized communities, unsustainable energy demands from large-scale models, and greenwashing through misleading AI-generated data. To address these gaps, international frameworks like the *UNFCCC* could establish AI-specific guidelines, expand Technology Needs Assessments to include AI, promote collaboration through mechanisms like the Climate Technology Centre and Network, and integrate AI monitoring into the Global Stocktake process. These measures would ensure AI's transformative potential is harnessed responsibly and equitably to advance global climate goals.

²⁹⁰ HUANG, J.: *Exploring Climate Framework Laws and the Future of Climate Action*, *Pace Environmental Law Review*, Vol. 38, Issue 2, 2021, p. 313.

4.1.1. Digital Technologies and AI: Transforming Climate Action

While the principles and treaties of international environmental law establish a robust foundation for addressing climate challenges, recent advancements in AI and digital technologies have emerged as transformative tools in global efforts to combat climate change.²⁹¹ These technologies address gaps in data, scalability, and decision-making efficiency, making them pivotal to achieving climate goals in an era of rapid environmental change. Building on these legal frameworks, the latest COP conferences have increasingly recognized the role of innovative technologies in achieving the goals of the UNFCCC and the *Paris Agreement*.

At the 2021 Glasgow Climate Change Conference (COP26), the *Glasgow Climate Pact*, reflecting the interconnection between sustainable development goals and climate change, calls upon Parties to accelerate the development, deployment and dissemination of technologies, and the adoption of policies, to transition towards low-emission energy systems, including by rapidly scaling up the deployment of clean power generation and energy efficiency measures, including accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies, while providing targeted support to the poorest and most vulnerable in line with national circumstances and recognizing the need for support towards a just transition.²⁹² States at the COP26 recognized the importance of international collaboration on innovative climate action, including technological advancement, across all actors of society, sectors and regions, in contributing to progress towards the objective of the UNFCCC and the goals of the *Paris Agreement*.²⁹³

In 2023, the UNFCCC's Technology Mechanism launched an initiative on Artificial Intelligence for Climate Action aiming to explore the role of AI as a powerful technological tool for advancing and scaling up transformative

²⁹¹ See for instance, UNFCCC – Technology Executive Committee: *Technology and Nationally Determined Contributions: Stimulating the Uptake of Technologies in Support of Nationally Determined Contribution Implementation*, 2023, pp. 15–49. Online: https://www.ctc-n.org/sites/default/files/AB2023.22.5.C_Concept%20note%20on%20the%20Technology%20Mechanism%20Initiative%20on%20Artificial%20Intelligence%20for%20Climate%20Action_UPDATE.pdf.

²⁹² *The Glasgow Climate Pact*, Decision -/CP.26, advance unedited version, 13 November 2021, para. 20. Online: https://unfccc.int/sites/default/files/resource/cop26_auv_2f_cover_decision.pdf.

²⁹³ *Ibid*, para. 53.

climate solutions for mitigation and adaptation action in developing countries with a focus on least developed countries and small island developing States. Led by the Technology Executive Committee and Climate Technology Centre and Network, the initiative promotes global policy discussions, capacity-building, and technical assistance to deploy AI-powered climate technologies. It aligns with the Technology Mechanism Joint Work Programme (2023–2027) and emphasizes partnerships with public and private entities such as Google, Microsoft AI for Good, and UNESCO. Key workstreams include AI for mitigation, adaptation, and climate technology development, with planned activities such as regional networks, workshops, a high-level COP28 event, and mapping existing AI initiatives.²⁹⁴ Despite its potential, the initiative must address regulatory gaps, ethical concerns, and resource disparities to ensure AI solutions are sustainable, equitable, and impactful.

At COP28 in Dubai, the International Telecommunication Union (ITU) launched the Green Digital Action initiative, a multi-stakeholder effort aimed at intensifying the information and communication technology community's role in combating the climate crisis. The initiative seeks to advance digital-technology-driven climate action by fostering increased collaboration among diverse stakeholders. It aims to co-create and accelerate practical solutions that directly support the global climate agenda while mobilizing commitments and strengthening accountability across governments, businesses, civil society, and others. This includes leveraging platforms like the Partner2Connect Digital Coalition to promote green and digital transitions. Additionally, the initiative focuses on catalyzing partnerships and enhancing coordination with key mechanisms such as the Marrakech Partnership, the World Standards Cooperation, the Digital with Purpose movement, and the UN Early Warning for All initiative, ensuring a unified approach to leveraging digital innovation for climate resilience and sustainability.

At COP29 in Baku, in connection to the Green Digital Action initiative, States and stakeholders adopted the *Declaration on Green Digital Action*, which underscores the critical need to bridge digital divides, which impede equitable and inclusive transitions. The *Declaration* recognises that disparities in access, capacity, and resources deepen inequalities and obstruct global climate efforts. Without clear international guidelines, the deployment of AI risks exacerbating these inequalities and environmental harm, necessitat-

²⁹⁴ UNFCCC – Technology Executive Committee: *Technology Mechanism Initiative on Artificial Intelligence for Climate Action*, 5 September 2023, TEC/2023/27/08, Annex, para. 1–9.

ing coordinated efforts to establish ethical, transparent, and inclusive frameworks. It sets out objectives, including leveraging digital tools to reduce greenhouse gas emissions and improve energy efficiency across sectors and to support climate-resilient communities, including through the UNFCCC Technology Mechanism. It also calls for policies to minimize the environmental footprint of digital technologies, and fostering innovation through investments in climate funds, research, and development of sustainable digital solutions. It highlights measures such as powering digital infrastructure with clean energy, extending product lifecycles, enhancing e-waste management, and promoting data-driven decision-making.

Additionally, the *Declaration* addresses building resilient digital infrastructure, promoting digital inclusion and literacy, encouraging sustainable consumer practices, and facilitating the sharing of best practices. To implement these goals, states and stakeholders are urged to integrate digital sustainability into national climate strategies, invest in environmentally sustainable technologies, and ensure alignment between digital and climate policies. States are also encouraged to use evidence-based methodologies to demonstrate the net positive contributions of digital solutions and incorporate them into Technology Needs Assessments, Action Plans, and NDCs under the *Paris Agreement*.²⁹⁵

Together, these initiatives exemplify a unified approach to leveraging technological innovation in alignment with the UNFCCC's objectives. By harnessing the power of AI and digital technologies, the global community can accelerate the transition toward a low-carbon future, ensuring that climate action is both impactful and inclusive.

4.2. International Human Rights Law

As AI reshapes societies, International Human Rights Law (IHRL) provides a critical and adaptive framework to ensure these advancements uphold the principles of human dignity, equality, and freedom. As *Keitner* states, IHRL is both the articulation of obligations which states are bound to respect in the promotion of human welfare and the establishment of an international human rights system to protect and ensure the enjoyment of such rights.²⁹⁶

²⁹⁵ COP29 Declaration on Green Digital Action, 2024. Online: <https://cop29.az/en/pages/cop29-declaration-on-green-digital-action>.

²⁹⁶ KEITNER, CH.: *International Law Frameworks (Concepts and Insights)*. Fifth Edition, St. Paul: Foundation Press, 2021, ISBN: 9781647084417, p. 149.

At its core, IHRL is grounded in principles of universality, indivisibility, interdependence, and equality, which establish obligations for States and guide private sector accountability in the development and deployment of AI. As AI increasingly permeates various facets of life, it is essential to examine its alignment with human rights principles to safeguard against potential misuse while leveraging its transformative potential for sustainable development. AI may challenge different dimensions of human rights, for example in terms of freedoms (privacy and data protection, ownership, autonomy, personality), equality (more specifically, non-discrimination) and justice (fair trial, access to justice).²⁹⁷

Human rights in the contemporary sense have developed in theory and in practice since the adoption of *Universal Declaration of Human Rights* in 1948.²⁹⁸ A series of international human rights treaties and other instruments have been adopted since 1945 to create a body of internationally recognized human rights. Key international instruments, such as the *International Covenant on Civil and Political Rights*,²⁹⁹ and the *International Covenant on Economic, Social and Cultural Rights*,³⁰⁰ are particularly relevant. These instruments protect rights potentially impacted by AI. Regional frameworks, such as the *European Convention on Human Rights* and the *African Charter on Human and Peoples' Rights*, further reinforce these protections. Additionally, soft-law instruments like the *UN Guiding Principles on Business and Human Rights*, the *OECD AI Principles*, and the *UNESCO Recommendation on the Ethics of Artificial Intelligence* reflect efforts to align AI governance with human rights principles.

Under human rights law, companies bear responsibilities to ensure their AI technologies respect and uphold human rights, guided by the *UN Guiding Principles on Business and Human Rights*. These principles establish a glob-

²⁹⁷ Van EST, R., GERRITSEN, J.: *Human rights in the robot age Challenges arising from the use of robotics, artificial intelligence, and virtual and augmented reality – Expert report written for the Committee on Culture, Science, Education and Media of the Parliamentary Assembly of the Council of Europe (PACE)*. The Hague: Rathenau Instituut, 2017, p. 17. Online: <https://www.rathenau.nl/sites/default/files/2018-02/Human%20Rights%20in%20the%20Robot%20Age-Rathenau%20Instituut-2017.pdf>.

²⁹⁸ TURNER, S.: *Introduction: A Brief History of Environmental Rights and the Development of Standards*. In: TURNER, S., SHELTON, D., RAZZAQUE, J., MCINTYRE, O., MAY, J. (eds): *Environmental Rights: The Development of Standards*. Cambridge: Cambridge University Press, 2019, ISBN: 978-11-0848224-0, p. 1.

²⁹⁹ *International Covenant of Civil and Political Rights*, New York, 19 December 1966.

³⁰⁰ *International Covenant on Economic, Social and Cultural Rights*, New York, 19 December 1966.

al standard of expected conduct for businesses and require them to: make high-level commitments to respect human rights in AI applications; avoid causing or contributing to adverse human rights impacts and mitigate linked effects; conduct due diligence to identify and address human rights risks; implement prevention and mitigation strategies; continuously review AI-related activities, including stakeholder and public consultations; and provide accessible remedies to address any adverse human rights impacts caused by AI systems.³⁰¹

While existing frameworks demonstrate flexibility in adapting to AI-related challenges, gaps remain, particularly in the absence of a universal legally binding AI-specific treaty, necessitating stronger international coordination and governance mechanisms. The only exception so far is the *Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law* adopted under the auspices of the CoE.

In the context of the issues analysed in the monograph, it is particularly important to emphasize that it has long been recognised that there are aspects of human rights and environmental law that overlap.³⁰² The issue of sustainable development is inextricably linked to the recognition of environmental human rights, such as the right to access information on environmental matters, public participation in decision-making, and access to justice in environmental matters have been significantly strengthened by Principle 10 of the *Rio Declaration*, by the *Aarhus Convention* and by judicial decisions, the effect of which is to incorporate the requirements of Principle 10 into existing human rights law.³⁰³ Apart from the procedural environmental human rights, the international human rights also recognize substantive environmental rights, such as the right to environment, or in the contemporary understanding the right to clean, healthy and sustainable environment, right to water and sanitation.³⁰⁴ Together, procedural and substantive rights cre-

³⁰¹ UN Office of the High Commissioner for Human Rights: *Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework*, New York and Geneva, 2011, Principles 13–31. Online: https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinessshr_en.pdf.

³⁰² SOHN, L. B.: *The Stockholm Declaration on the Human Environment*. In: the Harvard International Law Journal, Vol. 14, No. 3, 1973, pp. 451–55.

³⁰³ BOYLE, A.: *Human Rights or Environmental Rights? A Reassessment*. In: Fordham Environmental Law Review, Vol. 18, No. 3, 2006, p. 484. See also Chapter 1.1. *Elements of Sustainable Development*, which addresses most of the environmental human rights.

³⁰⁴ JANKUV, J.: *Mechanizmy ochrany ľudských environmentálnych práv v medzinárodnom práve verejnom, v práve Európskej únie a v právnom poriadku Slovenskej republiky*. Praha:

ate a dual-layered approach, ensuring that environmental concerns are addressed both through participatory mechanisms and enforceable standards.

As Turner emphasizes, many environmental rights are expressed in broad terms. The type of language that is used in human rights treaties and constitutions will often confer on rights holders the right to live in an environment that is, for example, “healthy”, “safe” or “clean”. Such terminology places an obligation upon States to realise certain objectives but often leaves judges, lawyers and citizens wondering precisely what is meant by them. Similarly, in terms of civil and political rights, the rights to information, to participate in decision-making and to have access to justice relating to environmental issues leave many questions relating to the precise levels of disclosure, involvement and remedy that citizens are entitled to.³⁰⁵ Decisions of international judicial and extrajudicial bodies that provide a more detailed definition of the aforementioned environmental rights therefore appear to be crucial.

Lastly, international human rights organizations and organs are in the last years active in order to address the challenges and opportunities of the development, deployment and use of AI on internationally recognized human rights. For instance, the UN Human Rights Council in 2019 requested the Advisory Committee to prepare a report on the possible impacts, opportunities and challenges of new and emerging digital technologies with regard to the promotion and protection of human rights, including mapping of relevant existing initiatives by the UN and recommendations on how human rights opportunities, challenges and gaps arising from new and emerging digital technologies could be addressed by the Council and its special procedures and subsidiary bodies.³⁰⁶

The Report “*Possible impacts, opportunities and challenges of new and emerging digital technologies with regard to the promotion and protection of human rights*” aims to address the international community’s heightened need to establish appropriate guidelines for new technologies³⁰⁷ and human

Leges, 2018, ISBN: 978-80-7502-309-4, pp. 11–85.

³⁰⁵ TURNER, S.: *Introduction: A Brief History of Environmental Rights and the Development of Standards*. In: TURNER, S., SHELTON, D., RAZZAQUE, J., MCINTYRE, O., MAY, J. (eds): *Environmental Rights: The Development of Standards*. Cambridge: Cambridge University Press, 2019, ISBN: 978-11-0848224-0, p. 2.

³⁰⁶ UN Human Rights Council: *New and emerging digital technologies and human rights*, 11 July 2019, A/HRC/RES/41/11, para. 1–4.

³⁰⁷ The term “new technologies” is used to refer to technological innovations that transform the boundaries between virtual, physical and biological spaces. They include new technologies and techniques for datafication (the process of transforming subjects, objects and

rights. The document outlines the transformative potential of new technologies in supporting and advancing human rights. It emphasizes their role in enhancing communication, empowering individuals, and fostering inclusion. Technologies such as automation, predictive analytics, and robotics are highlighted as tools to improve public services, enable democratic processes, and strengthen civil society's networking and advocacy efforts. These technologies have proven particularly impactful for vulnerable groups, providing tools for education, healthcare, and social inclusion, such as biometric systems for refugee protection and assistive devices for persons with disabilities. However, the document also underscores the importance of designing technologies within the framework of international human rights principles to address risks and prevent misuse. It calls for the entire business ecosystem to align with human rights standards to ensure these advancements genuinely contribute to societal well-being.³⁰⁸ On the contrary, the report outlines significant challenges posed by new technologies to human rights, emphasizing risks such as privacy violations, cybersecurity threats, misinformation, radicalization, inequality, mass surveillance, and cyberviolence. Excessive data collection and datafication threaten privacy, with personal data often used without informed consent, raising concerns about manipulation in political and consumer contexts. Poor cybersecurity can lead to privacy breaches and exploitation, while misinformation and deep fakes undermine public trust and individual autonomy. Radicalization and hate speech proliferate online, often targeting vulnerable groups and exacerbating discrimination. Technologies reliant on biased algorithms risk perpetuating inequality, particularly in areas such as law enforcement, hiring, and credit scoring. The digital divide, mass surveillance, and economic displacement from automation further marginalize vulnerable populations. Additionally, cyberviolence, including gender-based abuse, has intensified, highlighting the need for robust safeguards and regulatory frameworks to balance technological advancement with the protection of fundamental rights.³⁰⁹ The Advisory Committee concludes that the current international human rights framework faces

practices into digital data), data distribution and automated decision-making, such as AI, the Internet of things, blockchain technology and cloud computing, among others.

³⁰⁸ UN Human Rights Council: *Possible impacts, opportunities and challenges of new and emerging digital technologies with regard to the promotion and protection of human rights Report of the Human Rights Council Advisory Committee*, 19 May 2021, A/HRC/47/52, para. 10–13.

³⁰⁹ *Ibid*, para. 14–28.

both conceptual and operational gaps in addressing challenges posed by new technologies. Conceptually, existing treaties and practices, largely designed for an offline world, struggle to align with the realities of the digital age. Issues such as inadequate integration of human rights principles into technological design, disproportionate focus on certain risks (e.g., privacy violations) over others like inequality, and the lack of a comprehensive framework to address trade-offs between conflicting rights exacerbate the problem. Operationally, the rapid evolution of technology outpaces regulatory efforts, leaving states and international organizations struggling to update laws, secure resources, and enforce compliance effectively. The global and transnational nature of technology complicates jurisdictional governance, leaving victims of rights violations without adequate remedies. The private sector's growing role in shaping technological impacts further widens gaps, as some business models exploit legal grey areas or prioritize profitability over human rights. These challenges demand increased resources for human rights bodies, better international cooperation, and innovative mechanisms to ensure both public and private actors uphold human rights obligations.³¹⁰

We may also mention the statement of *Volker Türk*, the UN High Commissioner for Human Rights presented at High-level side event of the 53rd session of the Human Rights Council, where he stated that any regulation of AI must be grounded on human rights. Furthermore, regulations need to require assessment of the human rights risks and impacts of AI systems before, during, and after their use. Transparency guarantees, independent oversight, and access to effective remedies are needed, particularly when the State itself is using AI technologies. AI technologies that cannot be operated in compliance with international human rights law must be banned or suspended until such adequate safeguards are in place. Existing regulations and safeguards need to be implemented – for example, frameworks on data protection, competition law, and sectoral regulations, including for health, tech or financial markets. A human rights perspective on the development and use of AI will have limited impact if respect for human rights is inadequate in the broader regulatory and institutional landscape. At the same time, companies must live up to their responsibilities to respect human rights in line with the Guiding Principles on Business and Human Rights. Companies are responsible for the products they are racing to put on the market. The human rights framework provides an essential foundation that can provide guardrails for

³¹⁰ *Ibid*, para. 48–57.

efforts to exploit the enormous potential of AI, while preventing and mitigating its enormous risks.³¹¹

During the preparation of the *UN Global Digital Compact*, which is analysed in more detail in Chapter 6.1. *The Global Digital Compact and Its Implications for AI Governance*, there was a proposal to establish a digital human rights advisory mechanism, facilitated by the Office of the UN High Commissioner for Human Rights, to provide guidance on human rights and technology issues, building on the work of the human rights mechanisms and experts, showcase good practices and convene stakeholders to explore effective and coherent responses to legislative or regulatory issues.³¹² However, this proposal was ultimately not incorporated into the *UN Global Digital Compact*.

4.2.1. Human Rights in the Age of Intelligent Measurement Systems for Climate Sustainability

While advancements in AI technologies for climate protection offer transformative opportunities to address environmental challenges, they also present significant implications for the enjoyment of human rights, requiring careful navigation to balance innovation with safeguarding fundamental freedoms. This issue is addressed, for instance in Action no. 30 of the *Pact for the Future*, under which UN Member States will ensure that science, technology and innovation contribute to the full enjoyment of human rights by all. In accordance with para. 54 of the Pact, UN Member States will integrate a human rights perspective into regulatory and norm-setting processes for new and emerging technologies and call on the private sector to respect human rights and uphold ethical principles in the development and use of new and emerging technologies.³¹³ This global commitment finds a tangible example in the EU's push for widespread adoption of intelligent measurement systems (IMS), illustrating both the potential benefits and the inherent risks to human rights.

³¹¹ Office of the High Commissioner for Human Rights: *Artificial intelligence must be grounded in human rights, says High Commissioner*, 12 July 2023. Online: <https://www.ohchr.org/en/statements/2023/07/artificial-intelligence-must-be-grounded-human-rights-says-high-commissioner>

³¹² United Nations: *Our Common Agenda Policy Brief 5: A Global Digital Compact – an Open, Free and Secure Digital Future for All*, 2023, p. 15. Online: <https://indonesia.un.org/sites/default/files/2023-07/our-common-agenda-policy-brief-gobal-digi-compact-en.pdf>.

³¹³ UN General Assembly: *Pact for the Future*, 22 September 2024, A/RES/79/1, para. 54 (b).

Building on the analysed topic, we highlight data protection in the context of IMS. As mentioned in the previous chapters, one potential use of AI in combating climate change lies in AI systems designed for continuous monitoring and data collection related to energy and water consumption, as well as other building operation metrics, with the aim of optimizing them. The EU has set a goal for 80% of EU consumers to utilize IMS by 2024,³¹⁴ aiming to accelerate the transition to cleaner energy, reduce energy consumption, and contribute to the goals of the EGD. IMS must enable bidirectional communication with utility operators for maintenance and control, support advanced tariff systems, allow remote control of power supply or flow, limit energy output, and provide import/export functionalities. Additionally, they must ensure secure data connections, prevent fraud, and include mechanisms for fraud detection.³¹⁵ However, the functionality of IMS raises concerns about the private information that can be gleaned about individuals through their behavioural patterns, with fears of accidental or malicious surveillance, targeted home invasions, profiling, behaviour tracking, or identity theft.³¹⁶ This places additional responsibilities on the utilities as guardians of this data and raises important questions about this data's storage, use, transfer, and disposal.³¹⁷

For instance, the amended *EU Electricity Directive* of 2019 requires IMS to comply with EU data protection rules, specifically the *General Data Protection Regulation* (GDPR). Beyond the mentioned legal tools, international human rights law instruments regulating the right to privacy, such as the ECHR, are also applicable.³¹⁸ The processing of personal data must adhere to

³¹⁴ Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, L 158/125.

³¹⁵ Agency for the Cooperation of Energy Regulators: *Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2017 - Electricity and Gas Retail Markets Volume*, 2018, para. 67. Online: <https://www.acer.europa.eu/sites/default/files/documents/Publications/MMR%202017%20-%20RETAIL.pdf>.

³¹⁶ STEIN, A.: *Artificial Intelligence and Climate Change*. In: *Yale Journal on Regulation*, Vol. 37, 2020, p. 924.

³¹⁷ MURRILL, B., LIU, E., THOMPSON, R.: *Smart Meter Data: Privacy and Cybersecurity*, Congressional Research Service, 2012. Online: <https://sgp.fas.org/crs/misc/R42338.pdf>; McLEAN, M.: *How Smart Is Too Smart?: How Privacy Concerns Threaten Modern Energy Infrastructure*. In: *Vanderbilt Journal of Entertainment and Technology Law*, Vol. 18, No. 4, 2020, pp. 895–899.

³¹⁸ *European Convention on Human Rights and Fundamental Freedoms*, Rome, 4 October 1950, Art. 8.

principles of lawfulness, purpose limitation, data minimization, confidentiality, and accuracy.³¹⁹ Fundamental rights granted to IMS users under GDPR include the right to know the type of information collected, the right to refuse the sale of data to third parties, the right to request data deletion, and the right to equal services and pricing.³²⁰ Art. 25 of the GDPR obliges controllers (in this context, utility providers) to implement appropriate technical and organizational measures, such as pseudonymization, at the time of determining the means of processing and during processing itself, to effectively apply data protection principles like data minimization and incorporate safeguards to meet GDPR requirements and protect the rights of data subjects. Furthermore, if high risks to the rights and freedoms of individuals are anticipated, controllers must conduct a data protection impact assessment prior to processing.³²¹ In addition to pseudonymization, data collection through IMS must meet the requirement of proportionality relative to the purpose of processing and the legal basis for such processing. To enhance data protection in IMS, Lee & Hees recommend the management of collected data by an independent third party (a supervisory authority) and the deletion or permanent restriction of access to the data after a period deemed appropriate for achieving the intended goals.³²²

In the US, the ability of the government to access information from IMS has come under constitutional scrutiny in the context of warrants for this data. In 2018, the Seventh Circuit Court held that collecting data from smart meters constituted a “search” under the Fourth Amendment.³²³ The court held that the data “even when collected at fifteen-minute intervals, reveals details about the home that would be otherwise unavailable to government officials with a physical search. [The utility company] therefore ‘searches’ its residents’ homes when it collects this data.” Nevertheless, the court also held that the search was reasonable after balancing the intrusion against the promotion of the legitimate government interest in modernizing the electrical

³¹⁹ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, OJ L 119/1, Art. 5.

³²⁰ *Ibid.*, Art. 15–22.

³²¹ *Ibid.*, Art. 25 and 35.

³²² LEE, D., HEES, D.J.: *Data privacy and residential smart meters: Comparative analysis and harmonization potential*. In: *Utilities Policy*, Vol. 70, 2021, p. 8.

³²³ *Naperville Smart Meter Awareness v. City of Naperville*, No. 16-3766, 7th Circuit Court, 2018, p. 527.

grid.³²⁴ Other state courts have disagreed, finding a warrant for such data was not required.³²⁵ This divergence underscores the global complexity of reconciling technological advancements with privacy rights. As AI continues to drive climate initiatives, addressing privacy and human rights concerns is critical. Balancing technological innovation with robust legal safeguards will be essential to ensure that AI serves as a tool for sustainable development without compromising fundamental freedoms.

4.2.2. The Right to Clean, Healthy and Sustainable Environment

The right to a clean, healthy, and sustainable environment (R2HE) is a cornerstone of sustainable development, linking social, economic, and environmental dimensions to human well-being.³²⁶ Recognized as a human right by the UN General Assembly in July 2022 by *Resolution 76/300*,³²⁷ the R2HE builds on earlier milestones, including the UN Human Rights Council *Resolution 48/13 (2021)* which acknowledged the right in October 2021 as a human right that is important for the enjoyment of human rights³²⁸ and the *Stockholm Declaration*. The *Stockholm Declaration* first articulated the relationship between human rights and environmental protection, affirming that “man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations.”³²⁹ Despite this historical progress, R2HE is yet to be enshrined in a global human rights treaty. On the contrary, R2HE is recognized in regional treaties³³⁰ and national constitu-

³²⁴ *Ibid*, p. 528.

³²⁵ STEIN, A.: *Artificial Intelligence and Climate Change*. In: Yale Journal on Regulation, Vol. 37, 2020, p. 924. See *United States v. Colby*, No. A-07-CR-072-LY, 2007 WL 9718271, W.D. Tex. Dec. 13, 2007.

³²⁶ UN General Assembly: *Right to clean, healthy and sustainable environment*, A/RES/76/300, 28 July 2022, preamble para. 8.

³²⁷ *Ibid*, para. 1.

³²⁸ UN Human Rights Council: *The human right to a clean, healthy and sustainable environment*, 8 October 2021, A/HRC/RES/48/13, para.1.

³²⁹ *Declaration of the United Nations Conference on the Human Environment* (June 16, 1972). In: *Report of the United Nations Conference on the Human Environment*, UN Doc. A/CONF.48/14/Rev. 1, Principle 1.

³³⁰ See for instance the preamble of the *Aarhus Convention*; Art. 24 of the *African Charter on Human and Peoples' Rights*; Art. 38 of the *Arab Charter of the Human Rights*; Art. 11 of the *Protocol of San Salvador*.

tions in over 110 States.³³¹ Only the *African Charter on Human and Peoples' Rights*, provides for its interpretation in decisions by a review body.³³² As *John H. Knox* stated, R2HE could be seen as the missing jewel in the crown of environmental human rights, critical to the fight to protect humans from global environmental challenges such as climate change, the loss of biological diversity, and pervasive air and water pollution.³³³

The R2HE, as such, is related to other rights and existing international law,³³⁴ such as the right to life, the right to enjoy the highest attainable standard of physical and mental health, the right to sufficient food, the right to safe drinking water and sanitation, the right to an adequate standard of living, or the right to development. At the same time, procedural rights, such as the right to participate in decision-making, and access to justice and effective remedies, including the secure exercise of these rights free from reprisals and retaliation are vital to the protection of the environment.³³⁵ Recognition of the R2HE empowers all people with a critical tool to hold their governments, big polluters and all those responsible for environmental harm to account.³³⁶ Realizing the R2HE also requires international cooperation, solidarity and equity in environmental action, including resource mobilization, as well as recognition of extraterritorial jurisdiction over human rights harms caused by environmental degradation.³³⁷ *Boyd* argues that the adoption of constitu-

³³¹ UN Human Rights Council: *Right to a healthy environment: good practices: Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*, A/HRC/43/53, 30 December 2019, para. 10.

³³² UN Human Rights Council: *Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment*, A/HRC/37/59, 28 January 2018, para. 11.

³³³ KNOX, J. H.: *Constructing the Human Right to a Healthy Environment*. In: *Annual Review of Law and Social Science*, Vol. 16, 2020, p. 81.

³³⁴ UN Human Rights Council, *The human right to a clean, healthy and sustainable environment*, A/HRC/RES/48/13, 8 October 2021, para 2.

³³⁵ UN Human Rights Council: *Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*, A/HRC/37/59, 24 January 2018, para 2.

³³⁶ UN Human Rights Office of the High Commissioner, UN Environment Programme, UN Development Programme: *What is the Right to Healthy Environment?* 2023, p. 4. Online: <https://www.undp.org/sites/g/files/zskgke326/files/2023-01/UNDP-UNEP-UNHCHR-What-is-the-Right-to-a-Healthy-Environment.pdf>.

³³⁷ UN Human Rights Council: *Right to a healthy environment: good practices: Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*, A/HRC/43/53, 30 December 2019.

tional R2HE has led to stronger environmental laws and to judicial decisions requiring environmental protection.³³⁸

Another important aspect are the basic obligations of States under human rights law as they relate to the enjoyment of a clean, healthy and sustainable environment. In 2018, the former Special Rapporteur on the Environment, *John H. Knox*, introduced the framework principles on human rights and the environment. The framework principles reflect the application of existing human rights obligations in the environment context. States have obligations under human rights law to protect against environmental harm. The obligations include procedural obligations (such as duties to provide information, facilitate participation and provide access to remedies), substantive obligations (including to regulate private actors) and heightened obligations to those in particularly vulnerable situations.³³⁹ In this chapter, we only highlight those framework principles, which are particularly important in connection to the development and use of AI. As it was mentioned earlier, rapid advancement of AI technologies poses unique challenges and opportunities for R2HE. While AI can optimize environmental monitoring, renewable energy systems, and disaster response, it also has significant environmental impacts, such as energy-intensive data centers and e-waste generation

In accordance with the framework principles, States should respect, protect and fulfil human rights in order to ensure a safe, clean, healthy and sustainable environment.³⁴⁰ States should therefore refrain from violating human rights through causing or allowing environmental harm; protect against harmful environmental interference from other sources, including business enterprises, other private actors and natural causes; and take effective steps to ensure the conservation and sustainable use of the ecosystems and biological diversity on which the full enjoyment of human rights depends. States should undertake due diligence to prevent such harm and reduce it to the extent possible, and provide for remedies for any remaining harm.³⁴¹ Under the Framework Principle 8 of the UN Framework Principles on Human Rights and the Environment States should require the prior assessment of the

³³⁸ KNOX, J. H., PEJAN, R.: Introduction to The Human Right to a Healthy Environment. In: KNOX, J. H., PEJAN, R. (eds). *The Human Right to a Healthy Environment*. New York: Cambridge University Press, 2018, ISBN 978-1108431583, p. 8.

³³⁹ UN Human Rights Council: *Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*, A/HRC/37/59, 24 January 2018, para. 3.

³⁴⁰ *Ibid*, Framework principle 2, p. 7.

³⁴¹ *Ibid*, pp. 7–8.

possible environmental impacts of proposed projects and policies, including projects related to the development and use of AI, including their potential effect on the enjoyment of human rights.³⁴² Various stakeholders significantly affect the development and use of AI. Therefore, States should ensure the effective enforcement of their environmental standards against public and private actors,³⁴³ as well as compliance with all applicable environmental and human rights laws.

Furthermore, business enterprises should conduct human rights impact assessments in accordance with the *Guiding Principles on Business and Human Rights*.³⁴⁴ Guiding Principles 18 and 19 provide that businesses should identify and assess any actual or potential adverse human rights impacts with which they may be involved either through their own activities or because of their business relationships. This include meaningful consultation with potentially affected groups and other relevant stakeholders, integrate the findings from their impact assessment across relevant internal functions and processes, and take appropriate action.³⁴⁵

Realizing R2HE requires international cooperation, equity, and solidarity. States must establish and enforce effective legal frameworks to prevent, reduce, and remedy transboundary environmental harm that infringes on the full enjoyment of human rights.³⁴⁶ Leveraging tools like AI responsibly within these frameworks can support sustainable development while safeguarding human dignity and mitigating risks. By embedding R2HE into legal and technological governance, the global community can uphold human rights, strengthen accountability, and drive transformative action for a sustainable and equitable future. In the following subchapters, we examine the approaches of the CoE and the EU toward the R2HE, as these regional organizations were the first to adopt regionally legally binding documents on AI.

³⁴² *Ibid*, p. 11.

³⁴³ UN Human Rights Council: *Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*, A/HRC/37/59, 24 January 2018, Framework principle 12.

³⁴⁴ UN Office of the High Commissioner for Human Rights: *Guiding Principles on Business and Human Rights: Implementing the United Nations “Protect, Respect and Remedy” Framework*, New York and Geneva, 2011. Online: https://www.ohchr.org/sites/default/files/documents/publications/guidingprinciplesbusinessshr_en.pdf.

³⁴⁵ *Ibid*, Guiding Principle 18 and 19.

³⁴⁶ UN Human Rights Council: *Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*, 24 January 2018, A/HRC/37/59, Framework principle 13.

4.2.2.1. *The Approach of the Council of Europe to the Right to Clean, Healthy and Sustainable Environment*

The historical development of R2HE within the CoE reflects a gradual recognition of its importance, despite persistent challenges in codifying it as a standalone human right. From the late 1990s to the present day, the Parliamentary Assembly and the Committee of Ministers have adopted several key documents, marking significant milestones in this journey; however, these are legally non-binding instruments. The Parliamentary Assembly's *Recommendation No. 1431* (1999) was the first document to address R2HE within the CoE framework. It urged the Committee of Ministers to explore the feasibility of drafting an amendment or an additional protocol to the *European Convention on Human Rights* (ECHR) to recognize individuals' right to a healthy and viable environment.³⁴⁷ In response, the Committee of Ministers, in *Document No. 8892* (2000), acknowledged the legal and conceptual difficulties associated with recognizing R2HE as an individual and enforceable right. Consequently, it concluded that the conditions were not yet ripe for drafting such a protocol.³⁴⁸ In *Recommendation No. 1614* (2003), the Parliamentary Assembly reiterated its call for the recognition of R2HE, recommending that Member States incorporate the right into national constitutions and laws.³⁴⁹ It also suggested drafting a protocol to the ECHR to enhance procedural environmental rights, as outlined in the Aarhus Convention.³⁵⁰ However, the Committee of Ministers, in *Document No. 10041* (2004), maintained its position that the existing ECHR provisions, interpreted through the case law of the European Court of Human Rights (ECtHR), indirectly protected environmental rights, and thus, drafting an additional protocol was unnecessary at that stage.³⁵¹

³⁴⁷ Council of Europe - Parliamentary Assembly: *Future action to be taken by the Council of Europe in the field of environment protection*, Recommendation no. 1431 (1999), 4 November 1999, para. 11.2 (b).

³⁴⁸ Council of Europe - Committee of Ministers: *Document No. 8892 - Future action to be taken by the Council of Europe in the field of environment protection*, 20 November 2000, para. 8.

³⁴⁹ Council of Europe - Parliamentary Assembly: *Environment and Human Rights*, Recommendation no. 1614 (2003), 27 June 2003, para. 9.2.

³⁵⁰ *Ibid*, paras. 10.1 and 10.2.

³⁵¹ Council of Europe - Committee of Ministers: *Environment and Human Rights - Document No. 10041*, 24 January 2004, para. 4.

The debate gained momentum in *Recommendation No. 2211 (2021)*, where the Parliamentary Assembly proposed an additional protocol to the ECHR and the European Social Charter, explicitly recognizing R2HE. The recommendation addresses general principles of the R2HE, namely the principle of transgenerational responsibility, equity and solidarity, the principle of environmental non-discrimination, and the principles of prevention, precaution, non-regression and *in dubio pro natura*. The draft also points to the substantive and procedural rights connected to the R2HE.³⁵² Incorporating R2HE into the Convention and Charter would establish Member States' responsibility to ensure environmental conditions that uphold dignity, health, and fundamental rights. It would also highlight the interconnection between social rights and environmental protection. Lastly, the drawing up of the "Five Ps" Convention would afford an opportunity to incorporate therein the principles of prevention, precaution and non-regression, which are necessary if humanity's right to a healthy environment is to be properly protected.³⁵³

In its subsequent *Recommendation CM/Rec(2022)20*, the Committee of Ministers emphasized that the primary responsibility for protecting the environment and human rights lies with Member States. It encouraged governments to reflect on the implications of R2HE, consider its recognition at the national level, and align domestic legislation with international principles of environmental law.³⁵⁴ The Appendix emphasizes, for example, that Member States should ensure the respect of general principles of international environmental law, the effective enjoyment of the rights and freedoms set forth in the ECHR and the European Social Charter, and should encourage or, where appropriate, require business enterprises to act in compliance with their human rights responsibilities related to the environment.³⁵⁵ However, the Committee did not support the proposal for an additional protocol, reaffirming its reliance on the existing ECHR framework. The *Reykjavík Dec-*

³⁵² *Ibid*, Appendix - *The proposed text for an additional protocol to the European Convention on Human Rights, concerning the right to a safe, clean, healthy and sustainable environment*, Arts. 2–6.

³⁵³ Council of Europe – Parliamentary Assembly: *Anchoring the right to a healthy environment: need for enhanced action by the Council of Europe*, Recommendation no. 2211, 29 September 2021, para. 3.

³⁵⁴ Council of Europe – Committee of Ministers: *Recommendation CM/Rec(2022)20 of the Committee of Ministers to member States on human rights and the protection of the environment*, 27 September 2022, paras. 1 and 2.

³⁵⁵ *Ibid*, Appendix to Recommendation CM/Rec(2022)20, paras. 1, 2 and 6.

laration (2023) further reinforced this stance. Member states committed to strengthening their work on the human rights aspects of environmental protection, in line with political recognition of R2HE as a human right, as articulated in *UN General Assembly Resolution 76/300*.³⁵⁶ However, the Declaration stopped short of endorsing binding legal instruments within the CoE framework.

Currently, R2HE is within the CoE protected indirectly through related human rights that are recognized in the ECHR and its additional protocols, most notably the right to life and the right to respect for private and family life, housing and correspondence.³⁵⁷ ECtHR adopted several groundbreaking decisions on this matter. For instance, *López Ostra v. Spain*,³⁵⁸ *Guerra and others v Italy*,³⁵⁹ *Öneryıldız v. Turkey*,³⁶⁰ *Tănase v. Romania*³⁶¹ or *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland*.³⁶² In the last mentioned case, the Court derived from Art. 8 a right for individuals to enjoy effective protection by the State authorities from serious adverse effects on their life, health, well-being and quality of life arising from the harmful effects and risks caused by climate change.³⁶³ The State's primary duty is to adopt, and to effectively apply in practice, regulations and measures capable of mitigating the existing and potentially irreversible, future effects of climate change. This obligation flows from the causal relationship between climate change and the enjoyment of Convention rights, and the fact that the object and purpose of the Convention, as an instrument for the protection of human rights, requires that its provisions must be interpreted and applied such as

³⁵⁶ Council of Europe, Reykjavík Declaration: United around our values, 16 – 17 May 2023, Appendix V - The Council of Europe and the environment, p. 21.

³⁵⁷ See for instance JANKUV, J.: *Enshrining Human Right to Environment in International Law and European Law: successful story or never-ending story*. In: KLUČKA, J., SISÁK, L., GAZDAGOVÁ, L. (eds): 20 rokov v Európskej únii z pohľadu práva a éra udržateľnosti. Košice: Šafárik Press, 2024, ISBN: 978-80-574-0367-8, pp. 101–104.

³⁵⁸ *López Ostra v. Spain*, Judgement, Merits and Just Satisfaction, Application No. 16798/90, 9 December 1994.

³⁵⁹ *Guerra and others v Italy*, Judgment, Merits and Just Satisfaction, Application No. 14967/89, 19 February 1998.

³⁶⁰ *Öneryıldız v. Turkey*, Judgment, Merits and Just Satisfaction, Application no. 48939/99, 18 June 2002.

³⁶¹ *Tănase v. Romania*, Judgment, Merits and Just Satisfaction, Application No. 41720/13, 25 June 2019.

³⁶² *Verein KlimaSeniorinnen Schweiz and Others v. Switzerland*, Judgment, Merits and Just Satisfaction, Application No. 53600/20, 9 April 2024.

³⁶³ *Ibid.* point 544.

to guarantee rights that are practical and effective, not theoretical and illusory.³⁶⁴ This line of reasoning is directly relevant to the right to a clean, healthy, and sustainable environment (R2HE). Although the ECHR does not explicitly recognize such a right, the ECtHR has consistently interpreted Arts. 2 (right to life) and 8 (right to private and family life) as imposing positive obligations on States to protect individuals from serious environmental harm. This has been evident in cases concerning pollution, industrial risks, and natural disasters. The dynamic interpretation of the Convention as a “living instrument,” coupled with the doctrine of positive obligations, forms the basis for the “greening” of its provisions. This evolutionary approach allows the ECtHR to address contemporary challenges, including environmental harm and climate change, within the framework of existing rights.³⁶⁵ The *Verein KlimaSeniorinnen* case represents a significant judicial development, as it directly acknowledges climate change as a human rights issue. Importantly, the Court’s recognition of a causal link between environmental harm and fundamental rights reinforces the argument that the R2HE should be read into the Convention through evolutive interpretation. This approach aligns with previous jurisprudence, such as *Fadeyeva v. Russia* and *Tătar v. Romania*, where the Court required States to take active measures to prevent and mitigate environmental risks that affect human well-being. Thus, by applying the same principles, the ECtHR has a legal basis to progressively integrate environmental considerations into human rights protection under the ECHR.

While R2HE remains indirectly protected, its increasing recognition at international and regional levels signals a shift toward more explicit protections. Building on ECtHR jurisprudence and political commitments such as the *Reykjavík Declaration*, the CoE has the opportunity to lead global efforts in formalizing R2HE within enforceable legal frameworks. Such progress would not only strengthen human rights protections but also align with broader goals of sustainable development and climate action, setting a precedent for other regions.

³⁶⁴ *Ibid*, point 545.

³⁶⁵ BRAIG, K. F., PANOV, S.: *The Doctrine of Positive Obligations as a Starting Point for Climate Litigation in Strasbourg: The European Court of Human Rights as a Hilfssheriffin Combating Climate Change?* In: *Journal of Environmental Law and Litigation*, Vol. 35, 2020, p. 272.

4.2.2.2. *The Approach of the European Union to the Right to Clean, Healthy and Sustainable Environment*

The historical development of R2HE within the EU is less extensive compared to that within CoE. Notably, the EU operates under three parallel human rights catalogues: the rights enshrined in the *Charter of Fundamental Rights of the European Union* (Charter), the *ECHR*, and those developed under the doctrine of fundamental rights by the Court of Justice of the European Union (CJEU) or its predecessor, the Court of Justice of the European Communities, as reflected in Art. 6 of the TEU.³⁶⁶

To date, the R2HE is not expressly recognized by the primary law of the EU. However, various documents and provisions indirectly address aspects of this right. The earliest such reference is the *Dublin Declaration of the European Council on the Environmental Imperative* (1990), which emphasized the need to guarantee citizens the right to a clean and healthy environment.³⁶⁷ Despite efforts by the European Commission to include the R2HE in treaty provisions, Member States have not acted on these recommendations.³⁶⁸

The most significant legal acknowledgment of environmental protection within the EU framework is found in Art. 37 of the *Charter*, which states that “a high level of environmental protection and the improvement of the quality of the environment must be integrated into the policies of the Union and ensured in accordance with the principle of sustainable development.”³⁶⁹ However, it is important to note that Article 37 establishes not an individual human right, but rather a fundamental principle guiding the Union’s policies and actions, without creating directly enforceable rights for individuals. Additional provisions in Art. 11 of the Treaty on the Functioning of the

³⁶⁶ ŠTURMA, P.: *Mezinárodní a evropské kontrolní mechanismy v oblasti lidských práv*. 3. doplněné vydání. Praha: C. H. Beck, 2010, ISBN 978-80-7400-318-9, pp. 56–57.

³⁶⁷ *Declaration by the European Council on the Environmental Imperative*, Bull. Eur. Comm., No. 6, at 17 (1990), p. 20.

³⁶⁸ DÉJANT-PONS, M., PALLEMAERTS, M. *Human Rights and the Environment*. Strasbourg: Council of Europe Publishing, 2002, ISBN 92-871-4777-9, p. 16.

³⁶⁹ *Charter of Fundamental Rights of the European Union*, OJ C 326, 26 October 2012, p. 391–407, art. 37.

European Union (TFEU)³⁷⁰ and Art. 191 TFEU,³⁷¹ as well as Arts. 3(3)³⁷² and 21(2)³⁷³ of the Treaty on European Union (TEU), complement Art. 37. Collectively, these provisions amount to a recognition of environmental protection as a core EU objective, though not explicitly as a standalone human right. By virtue of Art. 51(1)³⁷⁴ of the Charter, the EU institutions are subject to this obligation at all times and the Member States are subject to it when implementing EU law.

The *Aarhus Convention*, regarded as a cornerstone for procedural environmental rights, is central to the EU's environmental governance. By enshrining rights of access to information, public participation in decision-making, and access to justice, it empowers citizens and enhances transparency and accountability in environmental matters. The Convention has profoundly shaped EU law, particularly through its integration into *Regulation 1367/2006 on the application of the provisions of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters to Community institutions and bodies*, which applies Aarhus principles to EU institutions.³⁷⁵ As the European Union is a Party to the Aarhus Convention, pursuant to Article 216(2) of the Treaty on the Functioning of the European Union (TFEU), the Convention is binding

³⁷⁰ Environmental protection requirements must be integrated into the definition and implementation of the Union's policies and activities, in particular with a view to promoting sustainable development.

³⁷¹ The Union policy on the "Environment".

³⁷² The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance.

³⁷³ The Union shall define and pursue common policies and actions, and shall work for a high degree of cooperation in all fields of international relations, in order to: (f) help develop international measures to preserve and improve the quality of the environment and the sustainable management of global natural resources, in order to ensure sustainable development.

³⁷⁴ The provisions of this Charter are addressed to the institutions and bodies of the Union with due regard for the principle of subsidiarity and to the Member States only when they are implementing Union law. They shall therefore respect the rights, observe the principles and promote the application thereof in accordance with their respective powers.

³⁷⁵ SCHOUKENS, H., BOUQUELLE, F.: *Introduction: The right to a healthy environment revisited as a necessary leverage point in times of climate crisis in Europe and beyond?* In: SCHOUKENS, H., BOUQUELLE, F. (eds): *The Right to a Healthy Environment in and Beyond the Anthropocene*, Cheltenham: Edward Elgar Publishing Limited, 2024, eISBN 9781035300426, pp. 22–23.

upon the EU and its Member States, thereby ensuring its effective implementation both at the institutional and national levels. In this context, the Regulation ensures that the Convention's guarantees are embedded in the EU's procedural framework, fostering citizen engagement in environmental governance.

To ensure a high level of protection of the environment, the EU has adopted a robust suite of legal instruments addressing both substantive and procedural environmental obligations, even in the absence of explicit R2HE recognition. The substantive environmental obligations are regulated, for instance, by the *Directive 2008/99/EC on the protection of the environment through criminal law*, the *Directive 2008/1/EC concerning integrated pollution prevention and control*. The procedural obligations are regulated, for instance, by the already mentioned *Regulation 1367/2006*, the *Directive 2008/50/EC on ambient air quality and cleaner air for Europe*, or the *Directive 2001/42/EC on the assessment of the effects of certain plans and programs on the environment*.³⁷⁶ After the adoption of the EGD, the EU adopted a great amount of legally binding and non-binding documents aiming to protect individual components of the environment.³⁷⁷

The EU's Environmental Action Programmes (EAP) progressively acknowledge the importance of a healthy environment as a right. The 8th Environmental Action Programme explicitly recognises that progressing towards the recognition of the R2HE, as laid out in Resolution 48/13 of the UN Human Rights Council is an enabling condition for attaining the priority objec-

³⁷⁶ LASSALLE, D., MAQUIL, F., RADUCU PELIN, I.: *Mapping Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment: Individual Report on the European Convention on Human Rights and the European Union*, Global Studies Institute of the University of Geneva, December 2013, pp. 38–43. Online: <https://www.ohchr.org/sites/default/files/Documents/Issues/Environment/Mappingreport/14.ECHR-EU-report-24-June-2014.docx>.

³⁷⁷ For instance, Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), 30 June 2021, OJ L 243; Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: 'Fit for 55': delivering the EU's 2030 Climate Target on the way to climate neutrality, Brussels, 14 July 2021, COM(2021) 550 final; Council of the EU: Conclusions on Biodiversity – the need for urgent action, Brussels, 16 October 2020, COM(2020) 380 final. See JANKUV, J.: *Enshrining Human Right to Environment in International Law and European Law: successful story or never-ending story*. In: KLUČKA, J., SISÁK, L., GAZDAGOVÁ, L. (eds): *20 rokov v Európskej únii z pohľadu práva a éra udržateľnosti*. Košice: Šafárik Press, 2024, ISBN: 978-80-574-0367-8, pp. 105–106.

tives of the 8th EAP.³⁷⁸ The latest development can be traced to 2021, when the European Parliament adopted resolution on the *EU Biodiversity Strategy for 2030: Bringing nature back into our lives*, where the Parliament considers that the R2HE should be recognised in the *EU Charter* and that the EU should take the lead on the international recognition of such a right.³⁷⁹ However, further steps have not been taken by the EU organs and Member States on this matter.

The CJEU's jurisprudence on environmental matters historically does not explicitly frame the R2HE as a fundamental right. The Court primarily focuses on ensuring compliance with obligations under EU secondary legislation, such as directives on air, water, and forest protection, rather than explicitly protecting fundamental rights.³⁸⁰ Although lawsuits under Art. 258 TFEU are not directly aimed at the protection of fundamental rights, they nevertheless play a crucial role in ensuring compliance with environmental obligations, which in turn benefits public health and environmental protection. Beyond infringement proceedings, other legal mechanisms contribute to shaping environmental governance within the EU. Art. 267 TFEU enables national courts to refer environmental cases to the CJEU, potentially bringing fundamental rights dimensions into its interpretation. Similarly, Art. 260 TFEU reinforces compliance through financial penalties, while Art. 263 TFEU allows for judicial review of EU legislation's environmental impact. The right to an effective remedy under Art. 47 of the Charter of Fundamental Rights also strengthens the enforcement of environmental norms. However, despite these mechanisms, the CJEU maintains a cautious approach regarding the explicit recognition of environmental rights. In its jurisprudence,³⁸¹ The Court tries to avoid any statements regarding the need to protect people's lives and health when formulating its legal opinions and conclusions in

³⁷⁸ Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a General Union Environment Action Programme to 2030, OJ L 114, p. 22.

³⁷⁹ European Parliament, *EU Biodiversity Strategy for 2030: Bringing nature back into our lives*, 9 June 2021, P9_TA(2021)0277, point 143.

³⁸⁰ LAZORČÁKOVÁ, T. Possibilities and Approaches of the European Court of Human Rights and Court of Justice of the European Union in Fundamental Rights Protection in the Context of Environmental Litigation, *Bratislava Law Review*, Vol. 7, No. 2, 2023, p. 90.

³⁸¹ See, for instance, CJEU, Judgment of 22 June 2022, *European Commission against Slovak republic*, C-661/20; CJEU, Judgment of 28 April 2022, *European Commission against French republic*, C-286/21; CJEU, Judgment of 2 March 2023, *European Commission against Poland*, C-432/21; CJEU, Judgment of 9 February 2023, *European Commission against Slovakia*, C-342/21; CJEU, Judgment of 28 April 2022, *European Commission against Bulgaria*, C-510/20.

judgments. Instead, it focuses exclusively on ensuring that Member States fulfil their obligations under specific environmental directives. While the Court acknowledges that exceeding limit values negatively impacts public health, particularly that of children, such statements are typically framed in the context of compliance rather than as a direct acknowledgment of the need to protect human health.³⁸² This cautious approach reflects the EU's reluctance to explicitly integrate environmental rights into its legal framework.

While the EU has yet to explicitly recognize R2HE as a standalone human right, its legal instruments, environmental directives, and broader policy initiatives reflect a commitment to environmental protection. Recent developments, such as the 8th EAP and the European Parliament's calls for R2HE recognition, signal growing momentum toward integrating this right into EU law. However, until concrete steps are taken, the R2HE within the EU remains indirectly protected through existing legal frameworks and procedural mechanisms.

³⁸² LAZORČÁKOVÁ, T. Possibilities and Approaches of the European Court of Human Rights and Court of Justice of the European Union in Fundamental Rights Protection in the Context of Environmental Litigation, *Bratislava Law Review*, Vol. 7, No. 2, 2023, p. 90.

5. International Legal Framework on Artificial Intelligence

AI is rapidly transforming societies and economies, yet its development and deployment pose significant legal, ethical, and regulatory challenges, underscoring the urgent need for a coherent and comprehensive international legal framework. To date, over 160 organizational, national, and international sets of rules have been developed to provide ethical guidelines and principles for AI.³⁸³ Currently, there is no universal organization or governing body dedicated to harmonizing AI principles at the global level. While various initiatives, such as the UN, the Global Partnership on Artificial Intelligence, the OECD, and UNESCO, contribute to the development of ethical and operational AI standards, these efforts remain fragmented and non-binding. Regional frameworks like the EU's *Artificial Intelligence Act* and the CoE's *Framework Convention on AI, Human Rights, Democracy, and the Rule of Law* provide binding standards within their respective jurisdictions but are not universally applicable. Standardization bodies like ISO and IEEE focus on technical guidelines but lack enforcement capabilities. The absence of a centralized international organization or legally binding framework creates significant challenges in achieving global coordination and consistency in AI regulation.

The first challenge in creating an international legal framework for AI is defining AI itself. From the perspective of international law, there is currently no universally accepted legal definition of AI. This lack of consensus hampers meaningful discussions on international cooperation and poses significant obstacles to adopting global legislation, as laws cannot effectively govern a concept that remains undefined.³⁸⁴ The term "AI" has numerous definitions across natural, technical, and legal sciences, reflecting its inherently interdisciplinary nature. AI is one of the prime examples of an interdisciplinary research area because it combines numerous and diverse disciplines like computer science, psychology, cognitive science, logic, mathematics, and philosophy.³⁸⁵ AI can be understood from two interconnected perspectives.

³⁸³ KLUČKA, J.: *General Overview of the Artificial Intelligence and International Law*. In: KLUČKA, J., BAKOŠOVÁ, L., SISÁK, L. (eds.): *Artificial Intelligence from the Perspective of Law and Ethics: Contemporary Issues, Perspectives and Challenges*, Praha: Leges, 2021, p. 15, ISBN: 978-80-7502-590-6.

³⁸⁴ *Ibid.*, p. 13.

³⁸⁵ UNESCO: *Report of the World Commission on the Ethics of Scientific Knowledge and Technology on Robotics Ethics*, September 2017, SHS/YES/COMEST-10/17/2 REV, para. 38.

First, AI refers to a research domain: a cross-disciplinary effort to understand, model, and replicate intelligence and cognitive processes by employing computational, mathematical, logical, mechanical, and even biological principles and devices.³⁸⁶ As *Minsky*, a pioneer of AI, described it, AI is “the science of making machines do things that would require intelligence if done by men.”³⁸⁷ Second, AI also refers to the tangible outcome of this research: a machine or artefact that embodies some form of intelligence, capable of “thinking” or solving problems in ways similar to human cognition.³⁸⁸

The dual perspective on AI—encompassing both the research domain and its tangible outputs—also extends to its legal definitions. Most legal instruments regulating AI, whether legally binding or not, adopt their own specific definitions. While these definitions often overlap, they create challenges, particularly in the international context. A key concern is that an internationally legally binding definition might be either too narrow, excluding many AI systems, or too broad, encompassing systems that do not genuinely constitute AI. As *Klučka* notes, an internationally acceptable definition of AI must meet five critical criteria: (i) inclusiveness, (ii) accuracy, (iii) complexity, (iv) feasibility and (v) consistency.³⁸⁹

Initially, most documents addressing the definition or regulation of AI were non-binding, focusing primarily on establishing ethical standards for developers, manufacturers, and users of AI. One of the most widely referenced instruments is the *Ethics Guidelines for Trustworthy AI*, drafted by the High-Level Expert Group on AI established by the European Commission in June 2018. In accordance with these guidelines, AI systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information,

³⁸⁶ FRANKISH, K., RAMSEY, W. M. (eds.): *The Cambridge Handbook on Artificial Intelligence*, Cambridge: Cambridge University Press, 2014, p. 7. ISBN: 978-0-521-87142-6.

³⁸⁷ COPELAND, J.: *Artificial Intelligence: Philosophical Introduction*, New Jersey: Wiley-Blackwell, 1993, p. 1. ISBN: 978-0-631-18385-3.

³⁸⁸ *Ibid.*, para. 43.

³⁸⁹ KLUČKA, J.: *General Overview of the Artificial Intelligence and International Law*. In: KLUČKA, J., BAKOŠOVÁ, L., SISÁK, L. (eds.): *Artificial Intelligence from the Perspective of Law and Ethics: Contemporary Issues, Perspectives and Challenges*, Praha: Leges, 2021, pp. 13–14, ISBN: 978-80-7502-590-6.

derived from this data and deciding the best action(s) to take to achieve the given goal.³⁹⁰

Legally binding documents have since introduced more formalized definitions. The *Artificial Intelligence Act (AI Act)* defines an “AI system” as “software that is developed with one or more of the techniques and approaches listed in Annex I³⁹¹ and can, for a given set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments they interact with.”³⁹² Similarly, the *Framework Convention on Artificial Intelligence, Human Rights, Democracy and Rule of Law* defines AI system as a machine-based system that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations or decisions that may influence physical or virtual environments. Different AI systems vary in their levels of autonomy and adaptiveness after deployment.³⁹³ While the *AI Act* targets technical regulation within the EU, the *Framework Convention* aligns with the CoE’s broader focus on human rights, democracy, and ethical considerations, reflecting its societal and flexible approach.

Awad et al. highlighted three aspects of AI that make it difficult for common regulatory approaches and policies to tackle negative externalities of AI. First, AI systems are often black boxes: it can be unclear how exactly they process their input to arrive at a decision, even to those who actually programmed them in the first place. Second, AI systems may be constantly learning and changing their perceptual capabilities or decision processes, outpacing human efforts at defining and regulating their negative externalities.

³⁹⁰ High-Level Expert Group on Artificial Intelligence: *Ethics Guidelines for Trustworthy AI*, Independent High-Level Expert Group on Artificial Intelligence Set Up by the European Commission, Brussels, 8 April 2019, p. 36. Online: <https://ec.europa.eu/futurium/en/ai-alliance-consultation.1.html> (cited 31 May 2022).

³⁹¹ (a) Machine learning approaches, including supervised, unsupervised and reinforcement learning, using a wide variety of methods including deep learning; (b) Logic- and knowledge-based approaches, including knowledge representation, inductive (logic) programming, knowledge bases, inference and deductive engines, (symbolic) reasoning and expert systems; (c) Statistical approaches, Bayesian estimation, search and optimization methods.

³⁹² European Union: *Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts*, Brussels, 21 April 2021, 2021/0106(COD), art. 3.

³⁹³ *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024, Art. 2.

ties. Third, even when an AI system is shown to have made biased decisions, it can be unclear whether the bias is due to its decision process or learned from the human behaviour it has been trained on or interacted with.³⁹⁴ These negative externalities of AI, pose specific and potentially high risks to the safety and fundamental rights that existing legislation is unable to address or in view of which it is challenging to enforce existing legislation.³⁹⁵

Public international law is likely to play a limited role in regulating commercial autonomous technologies intended for civilian use. However, the international community may eventually recognize the need to harmonize domestic laws to ensure consistent legal regulation of these technologies across borders. As *Vihul* argues, the legal mechanism for harmonization would be the adoption of a so-called uniform law treaty that obligates States that are parties to the instrument to legislate domestically with respect to their criminal, civil or administrative laws. For example, such a treaty could prescribe uniform safety standards, liability rules, certification schemes, data management processes, human supervision requirements over the use of the technology, fail-safe mechanisms to be put in place, operational constraints, rules regarding bias, and criminal offences involving autonomous technologies.³⁹⁶

Despite these possibilities, we contend that the adoption of an international treaty on AI—whether addressing general AI or specific applications—is unlikely in the near future. Regulating a rapidly evolving field like AI presents significant challenges, including issues of explainability, transparency, and harm prevention, which remain unresolved. Additionally, States may be hesitant to become parties to such a treaty, given their preference for domestic strategies that avoid stifling AI innovation. At present, it appears that existing norms of public international law, including international environmental law and international human rights law, provide foundational “cornerstones” for regulating AI-related issues in general, offering principles such as accountability, precaution, and equity. However, when it comes to ‘climate AI,’ these norms must be applied with particular attention to the

³⁹⁴ AWAD, E. et al.: *Crowd sourcing Moral Machines*. In: Communications of the ACM, Vol. 63, No. 3, 2020, p. 48-55. Online: <https://doi.org/10.1145/3339904>.

³⁹⁵ European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Fostering a European Approach to Artificial Intelligence*, Brussels, 21 April 2021, COM(2021) 205 final, p. 3.

³⁹⁶ VIHUL, L.: *International Legal Regulation of Autonomous Technologies*, Centre for International Governance Innovation, 16 November 2020. Online: <https://www.cigionline.org/articles/international-legal-regulation-autonomous-technologies/>.

unique challenges posed by the intersection of AI and climate action, including transparency, fairness, and sustainability in addressing global environmental and societal impacts. However, it is important to note that non-state actors play a pivotal role in the development and deployment of climate AI. These actors, which include private companies and research institutions, are not directly bound by most norms of international law. This regulatory gap underscores the need for collaborative frameworks that engage both state and non-state stakeholders to address the unique challenges posed by climate AI.

In the absence of international legally binding instruments regulating AI at the universal level, and particularly in the context of climate change, attention must turn to non-legally binding instruments adopted at the global level to address potential legal gaps. One such document is the *OECD Principles on Artificial Intelligence*, which reflects a consensus among States on core principles for AI regulation, even though it is not specifically tailored to climate AI. These principles are based on the values of responsible stewardship of trustworthy AI and include five key guidelines:

- a) AI should benefit people and the planet through inclusive growth, sustainable development and prosperity;
- b) AI systems should be designed to respect the rule of law, human rights, democratic values and diversity, and should include appropriate safeguards – for example, allowing for human intervention if necessary – in order to ensure a just society;
- c) There should be transparency and responsible publicity about AI systems to ensure that people understand and can challenge artificial intelligence-based results;
- d) AI systems must operate reliably and safely throughout their life cycles and potential risks should be continuously assessed and managed;
- e) Organizations and individuals developing, implementing or operating AI systems should be responsible for their proper functioning in accordance with the above principles.³⁹⁷

As *Klučka* argues, these principles prefer human-centred approaches in relation to the future development of AI, reduce disparities between countries and to ensure a minimum level of guarantees for all people.³⁹⁸ While not binding, the OECD Principles represent an important step toward establish-

³⁹⁷ OECD: *Principles on Artificial Intelligence*, 22 May 2019, OECD/LEGAL/0449, pp. 7–8.

³⁹⁸ KLUČKA, J.: *General Overview of the Artificial Intelligence and International Law*. In: KLUČKA, J., BAKOŠOVÁ, L. SISÁK, L. (eds.): *Artificial Intelligence from the Perspective*

ing shared values and practices for AI governance that can help bridge existing regulatory gaps at the international level.

International legal regulation of AI is also shaped by ethical standards and codes adopted at the universal level, such as the *UNESCO Recommendation on the Ethics of Artificial Intelligence*. This recommendation aims to establish standards for AI regulation among UN Member States and provides a universal framework of values, principles, and actions to guide the development of legislation, policies, and other instruments related to AI, consistent with international law.³⁹⁹ Its core values emphasize the promotion of human dignity, the protection and promotion of human rights and fundamental freedoms, environmental and ecosystem flourishing, diversity and inclusiveness, and the creation of peaceful, just, and interconnected societies.⁴⁰⁰ In addition to these values, the recommendation sets forth principles that serve as design guidance for AI systems. These principles include:

- (a) proportionality and do no harm;
- (b) safety and security;
- (c) fairness and non-discrimination;
- (d) sustainability;
- (e) right to privacy, and data protection;
- (f) human oversight and determination;
- (g) transparency and explainability;
- (h) responsibility and accountability;
- (i) awareness and literacy;
- (j) multi-stakeholder and adaptive governance and collaboration.⁴⁰¹

The principle of multi-stakeholder governance emphasizes that AI regulation must respect international law and national sovereignty. States retain the right to regulate data generated within or passing through their territories in compliance with international law, including measures for effective data protection and respect for privacy. Inclusive governance requires the participation of diverse stakeholders throughout the AI system lifecycle, ensuring that benefits are shared equitably and contribute to sustainable development.

of Law and Ethics: Contemporary Issues, Perspectives and Challenges, Praha: Leges, 2021, p. 17, ISBN: 978-80-7502-590-6.

³⁹⁹ UNESCO: *Recommendation on the Ethics of Artificial Intelligence*, SHS/BIO/PI/2021/1, 23 November 2021, para. 8 (a). Online: <https://unesdoc.unesco.org/ark:/48223/pf0000381137>.

⁴⁰⁰ *Ibid*, para. 13–24.

⁴⁰¹ *Ibid*, para. 25–47.

Special attention should be given to marginalized groups and Indigenous peoples, respecting their self-governance over data.⁴⁰²

Environmental considerations are embedded within the recommendation's values and principles. UNESCO advocates for ecosystem-friendly AI design through measures such as reducing carbon footprints, assessing environmental risk factors, and eliminating unsustainable exploitation of natural resources. By integrating these ethical and environmental considerations, the recommendation seeks to align AI development with broader goals of sustainability and human rights.⁴⁰³

5.1. Global Partnership on Artificial Intelligence: Pioneering AI Solutions for Climate and Biodiversity

When it comes to documents focusing specifically addressing AI and climate change, a significant milestone was achieved in November 2021 with the release of the *Climate Change and AI: Recommendations for Government* report. This report, a collaborative effort by the Global Partnership on Artificial Intelligence (GPAI), Climate Change AI,⁴⁰⁴ and the Centre for AI & Climate,⁴⁰⁵ highlights 48 actionable recommendations for governments to both leverage AI for addressing climate challenges and mitigate the climate-related risks associated with AI. The GPAI, comprising 24 Member States and the EU,⁴⁰⁶ brings together AI and subject-matter experts globally to guide the responsible adoption of AI. Its mission aligns with human rights, inclusion, diversity, innovation, economic growth, and societal benefit, while seeking to support the UN SDGs. The report, presented at the Glasgow Climate Change Conference (COP26) outlines key recommendations for governments, including:

⁴⁰² *Ibid*, para. 46 and 47.

⁴⁰³ *Ibid*, para. 84–86.

⁴⁰⁴ Climate Change AI is an international non-profit organization that catalyses work at the intersection of climate change and AI by providing education and infrastructure, advancing discourse, and building partnerships.

⁴⁰⁵ The Centre for AI & Climate is a centre dedicated to accelerating the adoption of data science and artificial intelligence to support faster action on climate change. Its mission is to connect capabilities across technology, policy, and business to accelerate the application of data science and artificial intelligence in climate solutions.

⁴⁰⁶ Member States of the Global Partnership on Artificial Intelligence are: Australia, Belgium, Brazil, Canada, the Czech Republic, Denmark, France, Germany, India, Ireland, Israel, Italy, Japan, Republic of Korea, Mexico, the Netherlands, New Zealand, Poland, Singapore, Slovenia, Spain, Sweden, the United Kingdom and the United States.

- (1) Improve data ecosystems in sectors critical to climate transition, including the development of digital twins in e.g. the energy or transport sector.
- (2) Increase support for research, innovation, and deployment through targeted funding, infrastructure, and improved market designs.
- (3) Make climate change a central consideration in AI strategies to shape the responsible development of AI as a whole.
- (4) Support greater international collaboration and capacity building to facilitate the development and governance of AI-for-climate solutions.⁴⁰⁷

The report further emphasizes the need for standards and best practices to guide the responsible design and participatory application of AI in climate contexts. These standards should include frameworks for: assessing whether AI is relevant or well-suited for a particular problem; for repeated iteration with stakeholders and impacted communities throughout problem scoping, development, deployment, and maintenance; and for auditing the impacts of solutions from the climate and broader social perspectives. Such standards could, for instance, be established within the context of broader initiatives on ethical and responsible AI within international bodies, professional organizations, or other contexts.⁴⁰⁸ Regarding data facilitation, the report calls for making climate-critical industry data open and accessible, except where privacy, security, or commercial concerns cannot be mitigated.⁴⁰⁹ Governments are also urged to establish methodological standards for impact assessments at the national and international level, including taxonomies to classify and assess different AI systems and application areas.⁴¹⁰

Building on these recommendations, GPAI continued its efforts through the Responsible AI Strategy for the Environment (RAISE) initiative in 2022. RAISE implemented key elements of the AI & Climate Roadmap by assessing the environmental impacts of AI compute and preparing industry-specific AI readiness guidance for net-zero transitions. Additionally, the initiative expanded its scope to develop a roadmap for leveraging AI to support

⁴⁰⁷ Global Partnership on Artificial Intelligence, Climate Change AI and Centre for AI & Climate: *Climate Change and AI: Recommendations for Government*, November 2021, pp. 10–12. Online: <https://www.gpai.ai/projects/climate-change-and-ai.pdf>.

⁴⁰⁸ *Ibid.*, p. 26.

⁴⁰⁹ *Ibid.*, p. 32.

⁴¹⁰ *Ibid.*, p. 56.

biodiversity preservation. These activities resulted in three major deliverables:

- (1) a report on AI's environmental impacts (AI Footprint),⁴¹¹
- (2) AI readiness booklets for net zero in four key sectors (energy, transport, agriculture, and foundational industries),⁴¹² and
- (3) a roadmap for biodiversity and AI, outlining opportunities and recommendations for action.⁴¹³

Based on the *AI Footprint Report*, policymakers must ensure that AI contributes to global sustainability targets by addressing key measurement gaps in environmental impacts. First, establishing standardized frameworks for sustainable AI is essential, with organizations like the OECD playing a central role in creating consistent terminology, indicators, and reporting requirements. Second, data collection on environmental impacts at national, firm, and AI model levels should expand to include metrics such as GHG emissions, energy use, and resource consumption. Third, efforts are needed to disaggregate AI-specific data from general-purpose ICT usage, requiring collaboration among governments, private sectors, and academia. Fourth, the environmental impacts of AI should go beyond operational energy use and emissions to assess production, transport, end-of-life stages, and indirect impacts on biodiversity and planetary boundaries like freshwater use and land system change. Finally, improving environmental transparency and equity is vital, particularly as negative impacts are anticipated to disproportionately affect emerging economies. Research and information sharing must focus on supporting sustainability objectives globally and ensuring inclusivity across diverse national contexts.⁴¹⁴

The *AI for Net Zero* guide provides organizations with tools and checklists to facilitate their transition to net-zero emissions at low cost, applicable

⁴¹¹ OECD: *Measuring the environmental impacts of artificial intelligence compute and applications: The AI footprint*. OECD Digital Economy Papers, No. 341, OECD Publishing, Paris, 2022. Online: <https://doi.org/10.1787/7babf571-en>.

⁴¹² GPAI: *AI for Net Zero Electricity: Assessing the Electricity Sector's Readiness for AI*. Report, 2022. Online: https://gpai.ai/projects/responsible-ai/environment/AINetZeroElectricity_2022.pdf.

⁴¹³ GPAI: *Biodiversity and Artificial Intelligence: Opportunities & Recommendations for Action*. Report, 2022. Online: <https://gpai.ai/projects/responsible-ai/environment/biodiversity-and-ai-opportunities-recommendations-for-action.pdf>.

⁴¹⁴ OECD: *Measuring the environmental impacts of artificial intelligence compute and applications: The AI footprint*. OECD Digital Economy Papers, No. 341, OECD Publishing, Paris, 2022, pp. 35–37.

across all industries. It highlights case studies in four sectors—electricity, agriculture, foundation industries, and transport—and includes an AI Readiness Self-Assessment Tool to help organizations evaluate and enhance their readiness for AI adoption. The guide identifies five key themes for AI readiness:

- (1) opportunity identification, where businesses assess challenges to determine AI's role;
- (2) human capacity, emphasizing training for managers and data scientists to effectively procure and manage AI;
- (3) data quality, requiring investments in AI-grade data collection, cleaning, and sharing systems;
- (4) digital infrastructure, advising on the procurement of optimal compute and storage solutions; and
- (5) AI governance, ensuring principles and processes are in place to manage AI-specific risks.

The guide stresses that readiness can be developed alongside early AI projects by clearly defining objectives, actions, and system constraints while considering safety, efficiency, ethics, and cost. By addressing these elements, organizations can effectively leverage AI to achieve net-zero emissions.⁴¹⁵

The *GPAI 2022 report on Biodiversity and Artificial Intelligence* highlights the potential of AI to address biodiversity loss, emphasizing its role in species classification, land use monitoring, policy impact tracking, and promoting biodiversity-positive business models. However, AI must be deployed responsibly to avoid risks such as data misuse, inequality, and unsustainable practices. The report outlines four key areas for AI application: automating biodiversity monitoring while addressing data inequalities and trust issues; identifying drivers of biodiversity loss through open supply chain data and global initiatives; enhancing biodiversity policymaking through AI-driven policy design, enforcement, and impact monitoring; and optimizing biodiversity actions in sectors like agriculture, energy, and fashion. Challenges include low AI capacity, limited data collection, and funding gaps, with recommendations for capacity building, ensuring community data rights, fostering international data collaboration, and adopting open funding models, especially for the Global South. By scaling AI solutions responsibly, the re-

⁴¹⁵ GPAI: *AI for Net Zero Electricity: Assessing the Electricity Sector's Readiness for AI*. Report, 2024, pp. 2–3.

port envisions AI as a tool to foster sustainable, biodiversity-positive development globally.⁴¹⁶

Through these combined efforts, GPAI aims to demonstrate how AI can address urgent environmental challenges while advancing global sustainability goals. RAISE emphasizes the importance of international cooperation, calling for the connection of existing initiatives and stakeholders to enhance knowledge sharing and innovation. Key recommendations include amplifying local community voices, respecting data sovereignty, incorporating non-traditional knowledge systems, and transforming findings into actionable insights at national and subnational levels. Practical actions focus on innovative data sharing, establishing standards for environmental reporting and metrics, and leveraging generative AI for initiatives like knowledge dissemination and data generation. In the short term, RAISE plans to collaborate with the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services and standardize environmental reporting. Long-term goals include cementing GPAI's role as a facilitator, fostering collaboration, and implementing innovative knowledge-sharing mechanisms. Governments are urged to prioritize climate and biodiversity preservation in national policies and develop long-term strategies with key stakeholders, highlighting the critical role of collaboration in addressing global environmental challenges.⁴¹⁷

When it comes to the future of regulation of AI in climate action, it is important that the international community in order to mitigate the downside effects of AI and reconcile tensions between and across SGDs, shape the right path towards the technology's implementation. In doing so, there needs to be infrastructure for national innovations systems, mapping for trajectories and interconnectedness of SDGs, open data and a robust pool of AI talent to operationalise applications for SDGs, and the mitigation of misuse and malicious uses of AI.⁴¹⁸ These measures are essential to ensuring the effective and ethical implementation of AI in achieving global climate and sustainability objectives.

⁴¹⁶ GPAI: *Biodiversity and Artificial Intelligence: Opportunities & Recommendations for Action*. Report, 2022, pp. 4–7.

⁴¹⁷ GPAI: *Responsible AI Strategy for the Environment: Workshop Report*, Report, 2023, p. 3. Online: <https://gpai.ai/projects/responsible-ai/Responsible%20AI%20Strategy%20for%20the%20Environment%20-%20Workshop%20Report.pdf>.

⁴¹⁸ MIAILHE, N., HODES, C., JAIN, A. et al.: *AI for Sustainable Development Goals*. In: DEL-PHI – Interdisciplinary Review of Emerging Technologies, Vol. 2, No. 4, 2019, p. 211.

6. The United Nations Regulation on Artificial Intelligence

The UN, as a universal international organization, serves as an appropriate forum for establishing a common approach to the adoption of legal standards on AI. Over the past years, numerous UN documents and reports have explored the future regulation of AI. Key publications include *The Age of Digital Interdependence* (2019),⁴¹⁹ *A United Nations system-wide strategic approach and road map for supporting capacity development on artificial intelligence* (2019),⁴²⁰ *the UN Secretary General's Roadmap for Digital Cooperation* (2020),⁴²¹ *the UN Secretary-General's Our Common Agenda report* (2021),⁴²² or the *Principles for the Ethical Use of AI in the UN System* (2022) (hereinafter "Principles").⁴²³ The latest addition is the *Global Digital Compact* which was adopted by UN Member States in 2024 at the Summit for Future, which addressed in the following subchapter. While most of these documents outline steps for drafting and adopting a legally binding framework on AI and emphasize foundational pillars such as peace and security, human rights, and development, they do not impose legal obligations.

The main organ within the UN addressing issues related to AI is the High-Level Panel on Digital Cooperation, convened by the UN Secretary-General to provide recommendations for optimizing the use of digital technologies and mitigating associated risks. Key areas of focus include building an inclusive digital economy and society; developing human and institutional capacity; protecting human rights and agency; promoting digital trust, security, and stability; and fostering global digital cooperation. In 2019, the Panel published the report "*The Age of Digital Interdependence*,"

⁴¹⁹ UN Secretary-General's High-level Panel on Digital Cooperation: *The Age of Digital Interdependence*, 2019. Online: <https://www.un.org/en/pdfs/DigitalCooperation-reportfor%20web.pdf>.

⁴²⁰ United Nations: *A United Nations system-wide strategic approach and road map for supporting capacity development on artificial intelligence*, 17 June 2019, CEB/2019/1/Add.3.

⁴²¹ UN General Assembly: *Roadmap for digital cooperation: implementation of the recommendations of the High-level Panel on Digital Cooperation: Report of the Secretary General*, 29 May 2020, A/RES/74/821.

⁴²² United Nations: *Our Common Agenda: Report of the Secretary-General*, New York: United Nations, 2021, Online: https://www.un.org/en/content/common-agenda-report/assets/pdf/Common_Agenda_Report_English.pdf.

⁴²³ United Nations Inter-Agency Working Group on Artificial Intelligence: *Principles for the Ethical Use of Artificial Intelligence in the United Nations System*, 20 September 2022, Online: https://unsceb.org/sites/default/files/2022-09/Principles%20for%20the%20Ethical%20Use%20of%20AI%20in%20the%20UN%20System_1.pdf.

which included five key recommendations aimed at enhancing global digital cooperation. Among these, Recommendation 3C is particularly pertinent to AI. It states that “autonomous intelligent systems should be designed in ways that enable their decisions to be explained, ensuring human accountability for their use. Audits and certification schemes should monitor AI systems’ compliance with engineering and ethical standards, developed through multi-stakeholder and multilateral approaches. Life and death decisions should not be delegated to machines.” The recommendation calls for strengthened digital cooperation among diverse stakeholders to establish standards and principles for transparency and non-bias in autonomous systems across various social contexts.⁴²⁴

In May 2020, the UN Secretary-General introduced the “*Roadmap for Digital Cooperation*,” which outlines actionable recommendations for various stakeholders to enhance global digital cooperation in critical areas, such as ensuring the protection of human rights in the digital era, affirming that these rights apply both online and offline, or promoting digital trust and security by initiating global dialogue to advance SDGs. One of the Roadmap’s key proposals involves addressing inclusion, coordination, and capacity-building for Member States concerning AI. To this end, the Secretary-General aimed to establish a multi-stakeholder advisory body on global AI cooperation. This body would provide guidance to the UN Secretary-General and the international community on fostering AI that is trustworthy, human rights-based, safe, sustainable, and conducive to peace. It would include representatives from UN Member States, relevant UN entities, businesses, academic institutions, and civil society groups.⁴²⁵

The *Principles*, although legally non-binding, reflect core ethical principles present in many AI ethical frameworks worldwide. They aim to guide UN system organizations in developing, designing, deploying and use AI systems in a way that prioritizes trustworthiness, human dignity, equality, environmental preservation, biodiversity, ecosystem protection, cultural diversity, and data responsibility.⁴²⁶ These principles emphasize fairness and

⁴²⁴ UN Secretary-General’s High-level Panel on Digital Cooperation: *The Age of Digital Interdependence*, 2019, pp. 27–30.

⁴²⁵ UN General Assembly: *Roadmap for digital cooperation: implementation of the recommendations of the High-level Panel on Digital Cooperation: Report of the Secretary General*, 29 May 2020, A/RES/74/821, para. 88.

⁴²⁶ United Nations Inter-Agency Working Group on Artificial Intelligence: *Principles for the Ethical Use of Artificial Intelligence in the United Nations System*, 20 September 2022, pp. 2–3.

non-discrimination, requiring AI systems to avoid biases that could lead to inequities, and highlight the importance of sustainability, calling for AI technologies to minimize their environmental impact. They also prioritize transparency and explainability, ensuring AI operations are understandable and decisions can be justified. Accountability is another key tenet, with mechanisms to clearly attribute responsibility for AI system outcomes. Furthermore, the principles stress the need for privacy and data protection, safeguarding individual rights while maintaining secure and ethical handling of data. Recognizing the potential risks of AI, the framework calls for safety and security measures to prevent misuse, as well as human autonomy and oversight, ensuring AI supports rather than replaces human decision-making. Lastly, the document underlines the importance of promoting AI awareness and literacy within the UN system to ensure informed and responsible use of AI technologies across its operations.⁴²⁷

In October 2023, the UN Secretary-General convened a multi-stakeholder High-level Advisory Body on AI to analyse and advance recommendations for international AI governance, in alignment with the *Roadmap for Digital Cooperation*. The Advisory Body on AI was tasked with offering options on how AI governance can promote the common good while ensuring alignment with human rights and the UN SDGs.⁴²⁸ This body brought together experts from diverse fields, including academia, industry, civil society, and government, to address critical challenges such as accountability, transparency, and equitable access to AI benefits. The body's mandate included identifying mechanisms to mitigate risks associated with AI, such as bias, misuse, and unequal power dynamics, while fostering innovation to maximize AI's potential in addressing global issues like poverty, climate change, and healthcare. Additionally, it emphasizes the need for ethical AI practices, cross-border collaboration, and the establishment of frameworks that uphold fairness, inclusivity, and sustainability in AI development and deployment. Its final report, *Governing AI for Humanity* identifies significant gaps in global AI governance, including uneven access to AI benefits, regulatory fragmentation, and ethical risks from unregulated AI systems.⁴²⁹ To address

⁴²⁷ *Ibid*, pp. 4–6.

⁴²⁸ United Nations, *UN Secretary-General launches AI Advisory Body on risks, opportunities, and international governance of artificial intelligence*, Press release, 2023. Online: https://www.un.org/sites/un2.un.org/files/231025_press-release-aiab.pdf.

⁴²⁹ United Nations – AI Advisory Body: *Governing AI for Humanity*, New York: United Nations Publications, 2024, eISBN: 9789211067873, pp. 42–46.

these issues, the report proposes seven key recommendations: establishing an International Scientific Panel on AI to provide authoritative assessments; launching a global policy dialogue to harmonize governance approaches; creating an AI standards exchange platform for interoperability and safety standards; developing a capacity-building network to ensure equitable access and strengthen AI capabilities; establishing a Global Fund for AI to finance initiatives aligned with sustainable development and the common good; designing a Global AI Data Framework for responsible data sharing and access; and setting up an AI Office within the UN Secretariat to coordinate global efforts and align AI governance with human rights and the UN SDGs.⁴³⁰ These recommendations emphasize accountability, transparency, and ethical standards, aiming to create a human-centred and inclusive global AI framework. The outcomes of this initiative are expected to shape future international agreements and strategies for the responsible governance of AI technologies. The Report was the basis for the adoption of the *Global Digital Compact*.

6.1. The Global Digital Compact and Its Implications for AI Governance

At the 2024 Summit of the Future, UN Member States adopted the *Pact for the Future*,⁴³¹ including its annexes: the *Global Digital Compact* and the *Declaration on Future Generations*. Action no. 27 of the Pact specifically highlights the transformative role of AI as an enabler of sustainable development. UN Member States expressed a strong commitment to realizing this potential while mitigating risks through enhanced international cooperation, multi-stakeholder engagement, and the promotion of an inclusive, responsible, and sustainable digital future.⁴³²

The *Global Digital Compact* provides a comprehensive framework for fostering international cooperation to harness the benefits of digital technologies and AI while addressing associated challenges. It emphasizes closing digital divides to ensure equitable access to digital advancements, particularly for developing nations, as a means of accelerating progress toward the SDGs. While acknowledging the vast opportunities presented by digital technologies, the Compact underscores the importance of mitigating risks through

⁴³⁰ *Ibid*, pp. 47–76.

⁴³¹ UN General Assembly: *Pact for the Future*, 22 September 2024, A/RES/79/1.

⁴³² *Ibid*, para. 51.

human oversight and robust governance mechanisms to ensure these technologies uphold human rights and contribute to sustainable development.⁴³³

Key objectives of the Compact include advancing universal connectivity, expanding access to the digital economy, promoting equitable data governance, fostering an inclusive digital environment that respects human rights, and enhancing international governance of AI for the benefit of humanity.⁴³⁴ Guided by principles of inclusivity, human rights adherence, gender equality, accessibility, development orientation, and environmental sustainability, the Compact calls for collaborative efforts among States, the private sector, civil society, and academia.⁴³⁵ It also outlines specific actions to be achieved by 2030, such as ensuring universal connectivity, enhancing digital literacy, and addressing governance challenges. The Compact emphasizes the necessity for ongoing monitoring and follow-up through platforms like the Internet Governance Forum and the UN Human Rights Council, ensuring accountability and progress tracking.⁴³⁶

Notably, Objective no. 5 explicitly addresses the international governance of AI, highlighting its critical role in benefiting humanity while safeguarding against its risks. States recognized the need for a balanced, inclusive and risk-based approach to the governance of AI, with the full and equal representation of all countries, especially developing countries, and the meaningful participation of all stakeholders.⁴³⁷ Recognizing existing international, regional, and national efforts, the Compact calls for international cooperation to address AI's potential impacts, opportunities, and risks while ensuring alignment with international law, including human rights law, and frameworks like UNESCO's *Recommendation on the Ethics of AI*.⁴³⁸ The Compact highlights AI's potential to accelerate progress across all SDGs and commits to equitable governance that respects cultural diversity, promotes local data generation, and addresses risks to labour, employment, and the environment. It emphasizes the need for agile, multidisciplinary, and multi-stakeholder approaches to AI governance, with the UN playing a central role. Specific commitments include establishing an Independent International Scientific Panel on AI to assess AI's risks and benefits, initiating a Global Dialogue

⁴³³ *Ibid*, Annex – *The Global Digital Compact*, para. 1–6.

⁴³⁴ *Ibid*, para. 7.

⁴³⁵ *Ibid*, para. 8.

⁴³⁶ *Ibid*, para. 26–29 and 73.

⁴³⁷ *Ibid*, para. 50.

⁴³⁸ *Ibid*, para. 52.

on AI Governance, and promoting interoperability of AI governance frameworks through shared best practices.⁴³⁹ Regarding the follow-up and review, the Compact outlines mechanisms for implementation at national, regional, and global levels, stressing the importance of private sector and civil society engagement. It proposes the creation of an office within the UN Secretariat to coordinate digital cooperation and track progress. A high-level review of the Compact's implementation is planned for the 82nd session of the UN General Assembly, ensuring ongoing evaluation and stakeholder participation.⁴⁴⁰

The Compact has received criticism from various stakeholders, highlighting challenges and potential shortcomings. Some experts argue that the Compact's timing is premature, given the upcoming review of the World Summit on Information Society in 2025, which addresses similar issues, suggesting a lack of synchronization. Critics also point to the Compact's broad agenda, which lacks detailed action plans, concrete timelines, and robust enforcement mechanisms, potentially limiting its practical impact. Concerns have been raised about the marginalization of technical experts in its governance framework, which may lead to policies more influenced by political interests than technical realities. Human rights and gender narratives within the Compact have also faced criticism for reflecting predominantly Western perspectives, potentially neglecting diverse cultural contexts. While the Compact is an important step toward global digital cooperation, these critiques underscore the complexities of creating a universally accepted framework for equitable and inclusive digital governance.⁴⁴¹

⁴³⁹ *Ibid*, para. 53 and 57.

⁴⁴⁰ *Ibid*, para. 64–74.

⁴⁴¹ See for instance KOMAITIS, K.: *Analysis: a brave new reality after the UN's Global Digital Compact*, The Digital Forensic Research Lab, 1 October 2024. Online: <https://dfr-lab.org/2024/10/01/analysis-a-brave-new-reality-after-the-uns-global-digital-compact/>; HENDRIX, J.: *Reactions to the Adoption of the UN Global Digital Compact*, TechPolicy. Press, 8 October 2024. Online: <https://www.techpolicy.press/reactions-to-the-adoption-of-the-un-global-digital-compact/>; CLEELAND, B., STAUFFER, M., ESTIER, M.: *Response to the Zero Draft of the Global Digital Compact: What it Means for AI Governance*, Simon Institute for Longterm Governance, 5 April 2024. Online: <https://www.simoninstitute.ch/blog/post/response-to-the-zero-draft-of-the-global-digital-compact/>.

7. European Legal Perspective on Artificial Intelligence

As AI continues to evolve and integrate into various facets of society, the need for robust legal frameworks to govern its deployment becomes ever more critical. This chapter examines the European legal perspective on AI, focusing on the regulatory approaches adopted by key institutions such as the EU and the CoE. With the EU at the forefront of global AI regulation, the chapter begins by exploring the landmark *Artificial Intelligence Act* and its implications for AI governance within Member States. Additionally, we will delve into the EU's soft-law approaches, which emphasize stakeholder initiatives aimed at achieving climate neutrality through responsible AI practices. The chapter also highlights the CoE's efforts to promote human rights, democracy, and the rule of law in the context of AI, particularly through the *Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law*. By dissecting these regulatory frameworks, this chapter aims to provide a comprehensive understanding of Europe's legal landscape regarding AI and its potential impact on innovation and societal values.

7.1. The European Union's Regulation of Artificial Intelligence

The EU is a leading global actor in shaping the development and governance of AI, leveraging its regulatory influence to promote human rights, ethical standards, and sustainability. With its dual focus on AI excellence and trustworthiness, the EU seeks to boost research, industrial capacity, and innovation while safeguarding fundamental rights.⁴⁴² This chapter examines the evolution of the EU's approach to AI governance, tracing its development from early strategies to the adoption of the *AI Act* and its alignment with the EGD and subsequent EU strategies.

Before exploring AI-specific governance, it is important to highlight that, even prior to the *AI Act*, the EU had already established a solid framework of legislation at both the EU and national levels to protect fundamental rights and ensure safety and consumer protection. This framework includes cor-

⁴⁴² European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Fostering a European Approach to Artificial Intelligence*, Brussels, 21 April 2021, COM(2021) 205 final, p. 1 and 4.

nerstone instruments such as the *General Data Protection Regulation*⁴⁴³ for privacy and data protection, the *Machinery Directive*⁴⁴⁴ (replaced from 20 January 2027 by *Machinery Regulation*⁴⁴⁵) and *General Product Safety Directive* (replaced from 13 December 2024 by *General Product Safety Regulation*)⁴⁴⁶ for product safety, the *Cybersecurity Act*⁴⁴⁷ for digital security, and the *Consumer Rights Directive*⁴⁴⁸ for consumer protection. Other notable measures include the *Product Liability Directive*⁴⁴⁹ (new *Product Liability Directive* was adopted on 10 October 2024), *European Data Governance Act*,⁴⁵⁰ *Digital Services Act*,⁴⁵¹

⁴⁴³ Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, OJ L 119/1.

⁴⁴⁴ Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC, OJ L 157.

⁴⁴⁵ Regulation (EU) 2023/1230 of the European Parliament and of the Council of 14 June 2023 on machinery and repealing Directive 2006/42/EC of the European Parliament and of the Council and Council Directive 73/361/EEC, OJ L 165.

⁴⁴⁶ Regulation (EU) 2023/988 of the European Parliament and of the Council of 10 May 2023 on general product safety, amending Regulation (EU) No 1025/2012 of the European Parliament and of the Council and Directive (EU) 2020/1828 of the European Parliament and the Council, and repealing Directive 2001/95/EC of the European Parliament and of the Council and Council Directive 87/357/EEC, OJ L 135.

⁴⁴⁷ Regulation (EU) 2019/881 of the European Parliament and of the Council of 17 April 2019 on ENISA (the European Union Agency for Cybersecurity) and on information and communications technology cybersecurity certification and repealing Regulation (EU) No 526/2013, OJ L 151.

⁴⁴⁸ Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council Text with EEA relevance, OJ L 304.

⁴⁴⁹ Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products, OJ L 210.

⁴⁵⁰ Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act), OJ L 152.

⁴⁵¹ Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act), OJ L 277.

Digital Markets Act,⁴⁵² and sector-specific rules such as the *Energy Efficiency Directive*⁴⁵³ and *Ecodesign Regulation*.⁴⁵⁴

However, the unique characteristics of AI technologies, including their opacity, complexity, and capacity for autonomous decision-making, pose significant challenges to the application and enforcement of these existing regulations and directives. From the point of view of responsibility, the focus must be on ensuring the same level of protection as with traditional technologies, while carefully balancing the needs of technological innovation.⁴⁵⁵ For instance, AI's lack of transparency complicates accountability under GDPR, while autonomous decision-making raises questions about liability under the *Product Liability Directive*. These challenges, combined with heightened risks, necessitate a tailored regulatory response to address gaps effectively. To ensure the comprehensive and effective regulation of AI, complementary legal frameworks are essential. Therefore, several EU regulations and directives have been amended or replaced. These frameworks must address critical areas such as product safety and liability, digital security and integrity, sustainability in technology, and equitable data governance.

AI introduces unique challenges in product safety, particularly in terms of transparency, predictability, and accountability. The newly adopted *Machinery Regulation* addresses the safety risks arising from new digital technologies, including AI, by mandating rigorous risk assessments and safety certifications for AI-integrated products.⁴⁵⁶ In addition, the *Directive on Product Liability* has broadened the concept of 'product' to include software (such as operating systems and applications, including those with integrated AI systems). The release of the product into the market is no longer an exemption

⁴⁵² Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act), OJ L 265.

⁴⁵³ Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast), OJ L 231.

⁴⁵⁴ Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC, OJ L 2024/1781.

⁴⁵⁵ ANDRAŠKO, J., MESARČÍK, M., HAMULAK, O.: *The regulatory intersections between artificial intelligence, data protection and cyber security: challenges and opportunities for the EU legal framework*. In: AI & Society, Vol. 36, 2021, p. 627.

⁴⁵⁶ Regulation (EU) 2023/1230 of the European Parliament and of the Council of 14 June 2023 on machinery and repealing Directive 2006/42/EC of the European Parliament and of the Council and Council Directive 73/361/EEC, OJ L 165, recital 32, 55, Art. 10.

from liability when it does not entail the loss of control of the product by the manufacturer and the manufacturer does not introduce the necessary updates, improvements or machine learning algorithms to maintain the appropriate level of security, especially for digital products such as software or products that may be vulnerable to the evolution of cybersecurity risks.⁴⁵⁷ This update ensures that the legal framework reflects the evolving nature of products and associated risks, thereby strengthening accountability in cases involving harm caused by AI-enabled tools.

Ensuring AI systems' security and integrity is a critical priority, particularly given the susceptibility of AI to cyberattacks and misuse. The *NIS2 Directive* (*Directive on measures for a high common level of cybersecurity across the Union*) and the EU's Cybersecurity Strategy provide a foundation for protecting critical infrastructure and digital services. These measures impose obligations such as regular risk assessments, incident management protocols, short-deadline reporting requirements to national authorities, and a suite of technical and organizational safeguards.⁴⁵⁸ This comprehensive framework ensures that AI systems are designed and maintained to mitigate risks, such as data breaches or the manipulation of decision-making processes.

AI's environmental impact, particularly its energy-intensive nature, aligns with the objectives outlined in the EU Digital Strategy. The strategy includes measures such as the *Ecodesign Regulation on servers and data storage product on servers and data storage products*, the *EU Code of Conduct on Data Centre Energy Efficiency*, and the *Energy Efficiency Directive*, which collectively promote energy-efficient programming, waste heat recovery, and sustainability in data centre operations.⁴⁵⁹ These initiatives are integral to the EU's commitment to achieving climate-neutral and energy-efficient data centres by 2030, embedding environmental considerations into the governance of digital technologies like AI.

⁴⁵⁷ *Proposal for a Directive of the European Parliament and of the Council on liability for defective products*, Brussels, 28 September 2022, COM(2022) 495 final, Art. 4, Chapter II and III.

⁴⁵⁸ *Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive)*, OJ L 333, Chapter IV.

⁴⁵⁹ *Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast)*, OJ L 231, Arts. 1, 4, 12.

AI relies heavily on data, necessitating equitable and ethical data governance. Regulations like the *Data Governance Act*, *Digital Services Act*, and *Digital Markets Act* establish a framework to ensure transparency, accountability, and non-discrimination. These regulations aim to prevent data monopolies, promote fair competition, and encourage the ethical use of data in AI systems, striking a balance between fostering innovation and safeguarding societal and individual rights. Complementing these measures, the *EU Data Act* emphasizes the need for equitable access to data, ensuring that businesses and governments alike can benefit from shared datasets while respecting privacy and security norms.⁴⁶⁰

Sector-specific regulations, such as those governing road transport (e.g., Regulation (EU) 2019/2144 on vehicle general safety), workplace safety (e.g., Directive 89/391/EEC on occupational safety and health), and health-care (e.g., Regulation (EU) 2017/745 on medical devices), are also pivotal in shaping AI governance within their domains.⁴⁶¹

7.1.1. *The EU's Journey: From Coordinated Strategies to the Artificial Intelligence Act*

The journey began with the European AI Strategy in 2018, which emphasized the socio-economic aspects of increasing investment in AI research and innovation.⁴⁶² This strategy also led to the creation of the High-Level Expert Group on AI, tasked with drafting ethical guidelines and policy recommendations. One of the seminal documents in this effort was the *Declaration on Cooperation on Artificial Intelligence*, where EU Member States committed to a shared vision for AI governance, building on EU fundamental rights and values, including privacy and protection of personal data, as well as principles such as transparency and accountability.⁴⁶³

⁴⁶⁰ Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act), OJ L 2023/2854, Arts. 1, 4 and 6, Chapter III.

⁴⁶¹ CLARK, R.: *Regulatory Alternatives for AI*. In: Computer Law & Security Review, Vol. 35, 2019, p. 402.

⁴⁶² European Commission: *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: Artificial Intelligence for Europe*, 25 April 2018, COM/2018/237.

⁴⁶³ *Declaration on Artificial Intelligence Cooperation*, 10 April 2018, pp. 3–5. Online: <https://ec.europa.eu/jrc/communities/en/community/digitranscope/document/eu-declaration-cooperation-artificial-intelligence>.

Building on this foundation, the EU and its Member States adopted the *Coordinated Plan on Artificial Intelligence* in 2018. This plan laid the groundwork for policy coordination and encouraged the development of national AI strategies.⁴⁶⁴ Recognizing the rapid evolution of AI technology, the plan was updated in 2021 to address emerging challenges. The updated plan focuses on accelerating investments, aligning AI policies to avoid fragmentation, and leveraging AI for resilient economic and social recovery.⁴⁶⁵ In order to accelerate, act and align to seize opportunities of AI technologies and to facilitate the European approach to AI, the reviewed *Coordinated Plan* puts forward four key sets of proposals for the EU and the Member States:

- (1) Set enabling conditions for AI development and uptake in the EU;
- (2) Make the EU the place where excellence thrives from the lab to the market;
- (3) Ensure that AI works for people and is a force for good in society; and
- (4) Build strategic leadership in high-impact sectors.⁴⁶⁶

Subsequently, in 2019 particular progress was made, when the High-Level Expert Group on AI adopted the *Ethics Guidelines for Trustworthy AI*, which not only outlines the main ethical requirements regarding the development and use of AI, but also provides definition of the term “AI”. In accordance with the document, the AI is trustworthy when following requirements are fulfilled: human agency and oversight; technical robustness and safety; privacy and data governance; transparency; diversity, non-discrimination and fairness; environmental and societal well-being; and accountability.⁴⁶⁷

⁴⁶⁴ European Commission: *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: Coordinated Plan on Artificial Intelligence*, 7 December 2018, COM(2018) 795.

⁴⁶⁵ European Commission: *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Fostering a European Approach to Artificial Intelligence*, Brussels, 21 April 2021, COM(2021) 205 final, Annex, p. 2.

⁴⁶⁶ (1) Bring AI into play for climate and environment; (2) Use the next generation of AI to improve health; (3) Maintain Europe’s lead: Strategy for Robotics in the world of AI; (4) Make the public sector a trailblazer for using AI; (5) Apply AI to law enforcement, migration and asylum; (6) Make mobility safer and less polluting through AI; (7) Support AI for sustainable agriculture.

⁴⁶⁷ High-Level Expert Group on Artificial Intelligence: *Ethics Guidelines for Trustworthy AI*, Brussels, 2019, pp. 14–21. Online: <https://digital-strategy.ec.europa.eu/en/library/ethics-guidelines-trustworthy-ai>.

The implementation of these strategic priorities underscored the need for a regulatory framework that could address the risks and opportunities presented by AI in a structured and coherent manner. This paved the way for the drafting of the *AI Act*. In October 2020, the European Council invited the European Commission to: a) propose ways to increase European and national public and private investments in AI research, innovation, and deployment; b) ensure better coordination and more networks and synergies between European research centres based on excellence; c) provide a clear, objective definition of high-risk AI systems.⁴⁶⁸

These steps were aimed at ensuring the EU's global leadership in developing secure, trustworthy, and ethical AI. In April 2021, the European Commission introduced the *Proposal for an EU regulation on AI*⁴⁶⁹ and already mentioned reviewed coordinated plan, which included a set of joint actions for the Commission and Member States. The Proposal was a direct response to the EU's 2020 *White Paper on AI*, which concluded that the use of AI creates specific high risks that existing EU and national legislation could not adequately address.⁴⁷⁰

Another significant milestone was the adoption of the Council's general approach in December 2022, which enabled the Council to enter negotiations with the European Parliament. A year later, on 9 December 2023, the Council and the European Parliament reached a provisional agreement on the *AI Act*. On 21 May 2024, the Council officially approved the *AI Act*, which is set to apply from 2026.

7.1.2. *The Artificial Intelligence Act*

Serving as a landmark initiative, the *AI Act* seeks to establish a comprehensive and harmonized regulatory framework that not only addresses the risks associated with AI but also champions innovation, trust, and ethical principles, positioning Europe as a global leader in AI governance. With its ex-

⁴⁶⁸ European Council, *Conclusions – 1 and 2 October 2020*, Brussels, 2020, EUCO 13/20, para. 13. Online: <https://www.consilium.europa.eu/media/45910/021020-euco-final-conclusions.pdf>.

⁴⁶⁹ European Commission: *Proposal for a Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) and amending certain Union legislative acts*, Brussels, 21. 4. 2021, 2021/0106(COD).

⁴⁷⁰ For instance, the *General Product Safety Directive (2001/95/EC)*, the *Machinery Directive (2006/42/EC)*, the *General Data Protection Regulation (2016/679/EU)*; European Commission: *White Paper on Artificial Intelligence – A European approach to excellence and trust*, Brussels, 19 February 2020, COM(2020) 65 final, pp. 11–15.

traterritorial application and potential demonstration effect for policymakers, the AI Act is poised to significantly influence the global development of AI regulation. Often referred to as the “Brussels effect,” this influence positions the AI Act to shape international business practices and technological advancements while fostering global cooperation on AI governance.⁴⁷¹ By establishing a comprehensive regulatory framework, the AI Act aims to set a global benchmark, promoting a distinctly European approach to technology regulation on the world stage.⁴⁷²

The *AI Act* lays down:

- a) harmonised rules for the placing on the market, the putting into service, and the use of AI systems in the Union;
- b) prohibitions of certain AI practices;
- c) specific requirements for high-risk AI systems and obligations for operators of such systems;
- d) harmonised transparency rules for certain AI systems;
- e) harmonised rules for the placing on the market of general-purpose AI models;
- f) rules on market monitoring, market surveillance, governance and enforcement;
- g) measures to support innovation, with a particular focus on SMEs, including start-ups.⁴⁷³

It applies to a broad range of stakeholders to ensure comprehensive governance of AI systems within the Union and beyond. It covers providers placing AI systems or general-purpose AI models on the Union market, regardless of their location; deployers of AI systems established or located in the Union; providers and deployers outside the Union whose AI system outputs are used within the Union; importers and distributors of AI systems; product manufacturers integrating AI systems into their products and market-

⁴⁷¹ MELTZER, J., TIELEMANS, A.: *The European Union AI Act: Next steps and issues for building international cooperation*, Global Economy and Development at Brookings, May 2022, p. 1. Online: <https://www.brookings.edu/research/the-european-union-ai-act-next-steps-and-issues-for-building-international-cooperation-in-ai/>

⁴⁷² CANCELA-OUTEDA, C.: *The EU's AI act: A framework for collaborative governance*. In: *Internet of Things*, Vol. 27, 2024, p. 6.

⁴⁷³ *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)*, OJ L 2024/1689, Art. 1 (2).

ing them under their own name or trademark; authorized representatives of non-Union-based providers; and individuals located in the Union who are affected by AI systems.⁴⁷⁴ This extensive scope reflects the Regulation's aim to establish accountability, transparency, and alignment with EU standards across diverse jurisdictions and participants in the AI ecosystem.

However, the Act excludes certain activities, such as AI systems developed solely for scientific research and development, unless tested in real-world conditions. Similarly, it exempts AI used for purely personal and non-professional purposes, as well as systems released under open-source licenses unless classified as high-risk. Activities related to military, defence, or national security are also excluded, as are specific uses by public authorities in third countries or international organizations engaged in law enforcement or judicial cooperation, provided fundamental rights safeguards are observed.⁴⁷⁵ These carefully defined exclusions balance the Act's aims with existing legal frameworks and broader policy objectives.

This comprehensive framework establishes prohibitions and strict regulations on the use of certain AI practices to ensure the protection of fundamental rights and freedoms within the European Union. Key provisions include the prohibition of AI systems that manipulate individuals through subliminal or deceptive techniques, exploit vulnerabilities based on personal characteristics such as age or disability, or engage in social scoring leading to unjustified or disproportionate treatment. Additionally, AI systems used for profiling individuals to predict criminal behaviour or systems creating or expanding facial recognition databases through untargeted scraping are prohibited. Emotional inference technologies are restricted in workplaces and educational settings unless intended for medical or safety purposes. The use of 'real-time' remote biometric identification systems in public spaces for law enforcement purposes is tightly regulated and permitted only under specific conditions, such as locating missing persons or preventing substantial threats to public safety. These uses must comply with proportional safeguards, including fundamental rights impact assessments and prior judicial authorization, except in cases of urgency. Member States are responsible for detailing rules and notifying the Commission about such uses. Exemptions include free and open-source AI systems, unless categorized as high-risk, and certain activities related to military, defence, or national security. AI sys-

⁴⁷⁴ *Ibid*, Art. 2 (1).

⁴⁷⁵ *Ibid*, Art. 2 (3) – (12).

tems used in research and development are also excluded, provided they are not deployed for real-world conditions without compliance. These provisions balance innovation and safety, ensuring that AI systems respect human dignity, privacy, and freedoms while addressing the risks associated with emerging technologies.⁴⁷⁶

The *AI Act* focuses mostly on the high-risk AI systems, which are defined as those used as safety components or products covered by EU legislation listed in Annex I⁴⁷⁷ and subject to third-party conformity assessments, or those listed under Annex III⁴⁷⁸ use cases unless they perform narrow procedural tasks, improve results of completed human activities, detect decision-making patterns without replacing human review, or perform preparatory tasks for Annex III use cases. The Commission retains the power to modify high-risk classifications based on concrete evidence of risks or their absence. Providers must document assessments for non-high-risk systems before market placement. Additionally, the Commission will issue practical guidance on high-risk classifications within 18 months of the Act's entry into force.⁴⁷⁹

Under Arts. 8–17, providers of high-risk AI systems must comply with a set of rigorous requirements to ensure the safety, accountability, and transparency of their systems. These include establishing a comprehensive risk management system that operates throughout the AI system's lifecycle,⁴⁸⁰ and ensuring robust data governance practices, such as the use of relevant, representative, error-free, and complete training, validation, and testing da-

⁴⁷⁶ *Ibid*, Art. 5.

⁴⁷⁷ For instance, *Directive 2006/42/EC on machinery*; *Directive 2009/48/EC on the safety of toys*; *Regulation (EU) 2017/745 on medical devices*; *Regulation (EU) 2016/424 on cableway installations*; *Directive (EU) 2016/797 on the interoperability of the rail system within the European Union*; *Regulation (EU) No 167/2013 on the approval and market surveillance of agricultural and forestry vehicles*.

⁴⁷⁸ High-risk AI systems under Art. 6 (2) are those with significant implications across areas like biometrics, critical infrastructure, education, employment, public services, law enforcement, migration, and justice. Examples include systems for biometric identification, managing utilities, evaluating educational outcomes, recruitment, determining public benefits, and assessing creditworthiness. In law enforcement, high-risk systems involve profiling, evidence evaluation, and risk assessment. Migration-related systems for asylum decisions and border control also qualify, as do systems aiding judicial authorities in legal analysis and application.

⁴⁷⁹ *Ibid*, Art. 6–7.

⁴⁸⁰ *Ibid*, Art. 9.

tasets in line with the system's intended purpose.⁴⁸¹ Providers are required to produce detailed technical documentation demonstrating compliance, which also serves as a reference for authorities assessing such compliance.⁴⁸² Further obligations involve designing systems with record-keeping capabilities that automatically log events critical for identifying risks or substantial modifications during the system's lifecycle.⁴⁸³ Providers must also supply deployers with comprehensive instructions for use, facilitating their compliance with applicable regulations.⁴⁸⁴ To ensure operational safety, providers are tasked with designing systems that enable deployers to implement effective human oversight during the period in which the AI system is in use while maintaining high standards of accuracy, robustness, and cybersecurity.⁴⁸⁵ Lastly, providers are required to establish a quality management system that guarantees ongoing compliance with the Act.⁴⁸⁶ These measures collectively aim to foster trust and ensure that high-risk AI systems align with EU standards for safety and fundamental rights.

While providers are tasked with ensuring the design and development of high-risk AI systems meet rigorous standards under Arts. 8–17, the responsibilities extend downstream to deployers, who play a crucial role in safeguarding fundamental rights during the use of these systems. In accordance with Art. 21, providers of high-risk AI systems which consider or have reason to consider that a high-risk AI system which they have placed on the market or put into service is not in conformity with the Act must immediately take the necessary corrective actions to bring that system into conformity, to withdraw it or to recall it. They shall inform the distributors of the high-risk AI system in question and, where applicable, the authorised representative and importers accordingly.⁴⁸⁷ Art. 27 of the *AI Act* requires deployers of certain high-risk AI systems to perform a fundamental rights impact assessment before deployment. This assessment involves describing the system's use, identifying affected groups, assessing potential risks of harm, detailing human oversight measures, and establishing governance and complaint mechanisms. The obligation applies to the system's first use, with

⁴⁸¹ *Ibid*, Art. 10.

⁴⁸² *Ibid*, Art. 11.

⁴⁸³ *Ibid*, Art. 12.

⁴⁸⁴ *Ibid*, Art. 13.

⁴⁸⁵ *Ibid*, Art. 14–15.

⁴⁸⁶ *Ibid*, Art. 17.

⁴⁸⁷ *Ibid*, Art. 21.

flexibility to rely on previous or existing assessments in similar contexts, and deployers must notify market surveillance authorities of the results. The assessment complements GDPR-related data protection impact assessments, ensuring alignment with EU law. To facilitate compliance, the AI Office will provide a standardized template and automated tools for deployers.⁴⁸⁸

The governance structure of the *AI Act*, outlined in Articles 64 to 70, establishes a comprehensive framework to ensure consistent implementation, effective oversight, and enforcement across Member States, while also fostering international collaboration on AI regulation. The governance of AI within the *AI Act* framework involves establishing national and supranational bodies. Two key institutions are formed at the supranational level: the AI Office and the European AI Board (EAIB). While distinct in structure and task, these entities are somehow complementary.

The AI Office, being a part of the administrative structure of the Directorate-General for Communication Networks, Content and Technology is tasked with harmonizing the implementation and enforcement of the Act across the EU, ensuring consistent application of its provisions. It supports the development of implementing and delegated acts, facilitates the establishment and operation of regulatory sandboxes, and promotes standardization and best practices. The Office plays a pivotal role in assessing and monitoring general-purpose AI models,⁴⁸⁹ assisting investigations into rule violations, and providing administrative support to key bodies like the EIAB, Advisory Forum, and Scientific Panel. Additionally, it consults and cooperates with stakeholders, collaborates with other relevant Directorates-General and Commission services, and fosters international cooperation to align global AI governance efforts.⁴⁹⁰

The EAIB plays a critical role in ensuring the consistent and effective application of the *AI Act* across the EU. It is expected to ensure coordination among Member States, enhancing the Act's implementation through advice, consultation, and awareness initiatives. It comprises of the European Data Protection Supervisor, the Commission, and national supervisors, which is

⁴⁸⁸ *Ibid*, Art. 27.

⁴⁸⁹ An AI model, including when trained with a large amount of data using self supervision at scale, that displays significant generality and is capable to competently perform a wide range of distinct tasks regardless of the way the model is placed on the market and that can be integrated into a variety of downstream systems or applications.

⁴⁹⁰ *Ibid*, Art. 64 and *Commission Decision of 24.1.2024 establishing the European Artificial Intelligence Office*, Brussels, 24.1.2024, C(2024) 390 final, Arts. 1–7.

similar to the General Data Protection Regulation's (GDPR) oversight mechanism. Its key responsibilities include coordinating national authorities, supporting joint activities, and harmonizing administrative practices. The Board advises the Commission and Member States on implementing the Act, particularly concerning general-purpose AI models, and provides recommendations on codes of conduct, technical standards, and amendments to Annex III. It promotes AI literacy, fosters public awareness, and facilitates the development of benchmarks and shared understandings among market operators and authorities. The Board also supports cooperation with EU institutions, third countries, and international organizations, while assisting in capacity building through training and regulatory sandboxes. Additionally, it contributes to guidance development, monitors systemic risks in AI, and advises on international AI governance, emphasizing collaboration and innovation in AI regulation.⁴⁹¹

Besides these two, the Act also introduces other significant, though partially autonomous, supranational bodies, namely the Scientific Panel and the Advisory Forum. Art. 67 of the Act establishes an advisory forum to provide technical expertise and advice to the AI Board and the Commission, supporting their tasks under the *AI Act*. The forum ensures balanced representation of stakeholders, including industry, start-ups, SMEs, civil society, and academia, with appointments made by the Commission based on recognized expertise. Permanent members include key EU agencies such as the Fundamental Rights Agency and European Union Agency for Network and Information Security, along with standardization bodies. Subsequently, Art. 68 establishes a scientific panel of independent experts to support enforcement activities under the *AI Act*. Comprised of individuals selected by the Commission for their current scientific and technical expertise in AI, the panel's role is to provide impartial and objective insights. Panel members are required to maintain confidentiality regarding the information and data accessed during their activities, ensuring the integrity and credibility of their work.⁴⁹²

⁴⁹¹ Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (*Artificial Intelligence Act*), OJ L 2024/1689, Arts. 65–66.

⁴⁹² *Ibid*, Arts. 67–68. See also CANCELA-OUTEDA, C.: *The EU's AI act: A framework for collaborative governance*. In: *Internet of Things*, Vol. 27, 2024, p. 8.

Supranational authorities have an essential role, but the effective implementation and enforcement of this Regulation frequently require a local presence, placing the responsibility primarily on Member States.⁴⁹³ Art. 70 of the *AI Act* mandates Member States to designate national competent authorities, including notifying and market surveillance authorities, to implement and enforce the Act. These authorities must operate independently, impartially, and with sufficient technical, financial, and human resources, including expertise in AI, data protection, cybersecurity, and fundamental rights. Member States must also appoint a single market surveillance authority to act as the primary point of contact for the Regulation, notifying the Commission of their identity by August 2, 2025, and providing public access to this information. Authorities are tasked with ensuring cybersecurity, maintaining confidentiality, and providing guidance, particularly for SMEs, in alignment with the Commission and the EAIB. Regular reporting on the adequacy of resources and annual reviews of competence are required, and the European Data Protection Supervisor will oversee Union institutions under the Regulation.⁴⁹⁴

The governance of AI established under the *AI Act* is not without critical challenges, including concerns about enforcement consistency across Member States, potential regulatory fragmentation, the adequacy of resources and expertise at the national level, and balancing innovation with the protection of fundamental rights and societal values. As *Novelli et al.* propose, addressing these issues could involve enhancing the autonomy of the AI Office by transforming it into a decentralized agency, to ensure independence and reduce political influence; streamlining advisory structures by merging the Advisory Forum and the Scientific Panel into a unified body to improve coherence, efficiency, and the quality of advice; improving EU body coordination by addressing overlapping jurisdictions through strengthened networks or an EU AI Coordination Hub for unified oversight; granting the AI Board authority to revise national decisions to prevent inconsistencies in enforcement, drawing lessons from GDPR implementation; and introducing mech-

⁴⁹³ NOVELLI, C. et al.: *A Robust Governance for the AI Act: AI Office, AI Board, Scientific Panel, and National Authorities*. In: *European Journal of Risk Regulation*, Vol. 15, 2024, p. 17.

⁴⁹⁴ *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)*, OJ L 2024/1689, Art. 70.

anisms for continuous adaptation through a dedicated unit within the AI Office to monitor, learn from, and disseminate best practices, thereby enhancing the regulatory framework's responsiveness and effectiveness.⁴⁹⁵

7.1.2.1. Environmental Sustainability and the AI Act: Gaps, Challenges, and Proposals for Reform

The *AI Act* addresses environmental sustainability in terms of potential infringements on the right to a high level of environmental protection and the improvement of environmental quality, especially concerning health and safety. At least where human rights or clearly defined human interests are not simultaneously concerned, environmental risks remain outside of the scope of the Act. More generally, the difficulties to assess and allocate risks triggered by AI, which may lead to environmental impacts as a result of several interacting causes and potentially in the long term, could pose an obstacle to a risk-based approach to regulation. As *Gailhofer et al.* argue, further research is needed to explore how precautionary, risk-based regulation of algorithms can effectively address cumulative and dispersed environmental hazards.⁴⁹⁶

During the drafting process, the Climate Change AI, an international NGO, proposed several changes to enhance the Act's provisions on environmental sustainability. First, it recommended that the Act more explicitly involves climate change mitigation and adaptation in the classification rules for high-risk AI systems. In particular, more explicitly acknowledging environmental protection – including reduction of greenhouse gas emissions to mitigate climate change – as one of the fundamental rights that, if affected negatively by the AI system, trigger a high-risk classification. The Climate Change AI proposed that then proposed Art. 7 of the *AI Act* on Amendments to Annex III shall read as follows: “The fundamental right to a high level of environmental protection enshrined in the Charter and implemented in Union policies should also be considered when assessing the severity of the harm that an AI system can cause, including in relation to the health and

⁴⁹⁵ NOVELLI, C. et al.: *A Robust Governance for the AI Act: AI Office, AI Board, Scientific Panel, and National Authorities*. In: *European Journal of Risk Regulation*, Vol. 15, 2024, p. 25.

⁴⁹⁶ GAILHOFER, P., et al.: *The role of Artificial Intelligence in the European Green Deal*, Study for the special committee on Artificial Intelligence in a Digital Age (AIDA), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2021, ISBN: 978-92-846-8049-8, p. 37.

safety of persons and the ability to appropriately address climate change.”⁴⁹⁷ In connection to the Art. 7 (g), which addresses the impacts that are not easily reversible, the Climate Change AI recommended following wording: “the extent to which the outcome produced with an AI system is easily reversible, whereby outcomes having an impact on the health or safety of persons, or an environmental impact such as the ability of meeting greenhouse gas emission targets, shall not be considered as easily reversible.”⁴⁹⁸ Regarding the transparency and reporting of climate-relevant data, it was recommended that the reporting requirements for high-risk AI systems are expanded to collect data on greenhouse gas impacts, including impacts through both computational energy use and the applications for which these systems are used. This recommendation aimed to leverage reporting obligations to gather essential data for effective decarbonization strategies.⁴⁹⁹ Unfortunately, these proposals were not adopted in the final version of the Act.

As for R2HE, the text of the *AI Act* does not refer to R2HE, but to the right to a high level of environmental protection and the improvement of the quality of the environment including in relation to the health and safety of people. Apart from several recitals⁵⁰⁰ and the already mentioned Art. 1, the only article focusing on the impact of the AI on the environment is Art. 95 (2), under which “the AI Office and the Member States shall facilitate the drawing up of codes of conduct concerning the voluntary application, including by deployers, of specific requirements to all AI systems, on the basis of clear objectives and key performance indicators to measure the achievement of those objectives, including elements such as, but not limited to: (b) assessing and minimising the impact of AI systems on environmental sustainability, including as regards energy-efficient programming and techniques for the efficient design, training and use of AI.”⁵⁰¹

⁴⁹⁷ Climate Change AI: *Feedback on the proposed Harmonised Rules on Artificial Intelligence*, 6 August 2021, pp. 2–3. Online: https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12527-Artificial-intelligence-ethical-and-legal-requirements/F2665623_en.

⁴⁹⁸ *Ibid*, pp. 2–3.

⁴⁹⁹ *Ibid*, pp. 3–4.

⁵⁰⁰ *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)*, OJ L 2024/1689, recitals no. 1, 2, 8, 27, 48, 155, 165, 176.

⁵⁰¹ *Ibid*, Art. 95 (2) (b).

The final version of the *AI Act* is somewhat disappointing from the perspective of protection of the environment and the R2HE. For instance, the draft Art. 4 (f), which was dedicated to general principles applicable to all AI systems, stated that AI systems shall be developed and used in a sustainable and environmentally friendly manner as well as in a way to benefit all human beings, while monitoring and assessing the long-term impacts on the individual, society and democracy.⁵⁰² This provision, however, was omitted from the final version. Furthermore, the Act has also diverted from the proposed changes of *Solíz Pérez*, the Rapporteur of the Committee on the Environment, Public Health and Food Safety of the European Parliament. In his opinion from 22 April 2022, he is concerned that the *AI Act* does not provide sufficient protection to the environment and by implication the protection of the R2HE.⁵⁰³ The Rapporteur proposed that the *AI Act* shall include the environment among the areas that require a high level of protection. In order to do so, the environment has been included in all the recitals and articles together with health, safety and the protection of fundamental rights. As was stated, this will entail the classification as “high risk AI” of all those systems that can have major negative implications on the environment. This opinion was later incorporated into the recital 48 of the *AI Act*, stating that the fundamental right to a high level of environmental protection enshrined in the Charter and implemented in Union policies should also be considered when assessing the severity of the harm that an AI system can cause, including in relation to the health and safety of persons.⁵⁰⁴ At the same time, the

⁵⁰² European Parliament: *Amendments adopted by the European Parliament on 14 June 2023 on the proposal for a regulation of the European Parliament and of the Council on laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) and amending certain Union legislative acts*, COM(2021)0206 – C9-0146/2021 – 2021/0106(COD), amendment 140.

⁵⁰³ European Parliament – Committee on the Environment, Public Health and Food Safety: *Opinion of the Committee on the Environment, Public Health and Food Safety for the Committee on the Internal Market and Consumer Protection and for the Committee on Civil Liberties, Justice and Home Affairs on the proposal for a regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts*, COM(2021)0206 – C9-0146/2021 – 2021/0106(COD), 22 April 2022, p. 3.

⁵⁰⁴ *Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence and amending Regulations (EC) No 300/2008, (EU) No 167/2013, (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1139 and (EU) 2019/2144 and Directives 2014/90/EU, (EU) 2016/797 and (EU) 2020/1828 (Artificial Intelligence Act)*, OJ L 2024/1689, recital 48.

Rapporteur has reinforced the right to proper redress mechanisms in case of negative environmental impacts as set out in the *Aarhus Convention* and has set the principle of “do no significant harm” as established in the *Taxonomy Regulation* as a limit to ensure that AI systems abide with the EU’s high level of environmental standards and rights.⁵⁰⁵ However, the proposed changes were not incorporated in the final version of the *AI Act*.

The final *AI Act* reflects significant gaps in addressing environmental sustainability and R2HE. While it sets a foundation for incorporating environmental concerns, the lack of binding provisions highlights a missed opportunity to align AI governance more closely with the EU’s environmental and climate goals.

7.1.3. EU Soft-Law Approaches to AI Regulation: Stakeholder Initiatives for Climate Neutrality

The EU has recognized the vital role of stakeholders in supporting its regulatory and policy initiatives, particularly in the context of the EGD and AI. In international law it is common that the majority of legislation addresses conduct done by subjects of international law. However, in the last decades, stakeholders have become an integral part of the drafting process of modern international law legislation. Their important role is highlighted by the fact that are directly involved in the development, use and service of AI and in sustainable development which is a cornerstone of today’s international regulation. Due to the fact, that there is a limited number of international legally binding or non-binding instruments in the analysed area, stakeholders oftentimes introduce initiatives to enhance goals presented by international organizations or States.

Regarding the use of AI in the context of EGD, most notable is the Self-Regulatory Initiative for Climate Neutral Data Centres (the Initiative), set in 2021, which brings together 74 data centre operators and 23 trade associations. This voluntary initiative aims to establish a framework for sustainability, energy efficiency, and climate neutrality. The outcome document,

⁵⁰⁵ European Parliament – Committee on the Environment, Public Health and Food Safety: *Opinion of the Committee on the Environment, Public Health and Food Safety for the Committee on the Internal Market and Consumer Protection and for the Committee on Civil Liberties, Justice and Home Affairs on the proposal for a regulation of the European Parliament and of the Council laying down harmonized rules on Artificial Intelligence (Artificial Intelligence Act) and amending certain Union Legislative Acts*, COM(2021)0206 – C9-0146/2021 – 2021/0106(COD), 22 April 2022, pp. 3–4.

the *Climate Neutral Data Centre Pact* (CNDCP), encompasses a comprehensive set of 19 recommendations. The current signatories of the Pact represent 90% of the industry in Europe and most of its key players,⁵⁰⁶ which presents a promising start in the achievement of EGD goals. They have committed themselves to taking measures that focus on sustainability, energy efficiency, water saving, clean energy, reliability, security and the use of technologies and systems to make data centres climate neutral by 2030.⁵⁰⁷

To accelerate the adoption of climate-neutral data centres, the CNDCP calls for action to accelerate the path toward climate neutrality in Europe. First, it urges the European Commission to recognize the Pact as a qualifying sustainability standard in Green Public Procurement guidelines and the Sustainable Taxonomy, leveraging public procurement frameworks to drive broader adoption of self-regulatory requirements across the data centre and cloud infrastructure industry. Second, Member States are encouraged to incorporate the Pact into their national procurement frameworks to set high sustainability standards and prevent fragmented national approaches. Lastly, the Pact emphasizes the need for Member States to ensure that new public sector data centres and retrofitted facilities comply with its requirements, promoting efficient, sustainable practices while phasing out wasteful public sector data centres. These actions aim to unify efforts across the EU to achieve climate-neutral data centres.⁵⁰⁸

Signatories of the CNDCP commit to a comprehensive set of targets aimed at achieving climate neutrality by 2030. These include significant improvements in energy efficiency, with data centres required to meet Power Usage Effectiveness targets of 1.3 in cool climates and 1.4 in warm climates by 2025, ensuring optimized energy consumption regardless of geographical conditions. Additionally, they pledge to match electricity demand with 75% renewable or carbon-free energy by 2025, progressively increasing this to 100% by 2030, thus significantly reducing their reliance on fossil fuels. Water conservation is another critical focus, with commitments to adopt efficient cooling technologies and streamline the reuse of industrial and non-potable water sources. Circular economy principles are central to their efforts, requiring

⁵⁰⁶ Datacenter Forum: *Climate Neutral Data Centre Pact Presents Plans to European Union*, 25 June 2021. Online: <https://www.datacenter-forum.com/datacenter-forum/climate-neutral-data-centre-pact-presents-plans-to-european-union>.

⁵⁰⁷ For more details see: *Climate Neutral Data Centre Pact*. Online: https://www.climateneutraldatacentre.net/wp-content/uploads/2023/02/20615_Self-Regulatory-Initiative-1.pdf.

⁵⁰⁸ *Climate Neutral Data Centre Pact*, p. 2.

the assessment of 100% of used server equipment for reuse, repair, or recycling, thereby minimizing electronic waste and promoting sustainable material use. Furthermore, signatories are exploring innovative approaches to heat reuse, such as integrating waste heat into district heating systems, which not only reduces emissions but also creates value for local communities.⁵⁰⁹

The Pact is governed by a coalition of the Cloud Infrastructure Service Providers in Europe and the European Data Centre Association, with compliance ensured through an independent auditing framework. It also provides policy recommendations, including recognition of the Pact as a qualifying sustainability standard in procurement guidelines, encouraging Member States to adopt uniform standards, and preventing market fragmentation. Through these commitments, the initiative aims to lead the data centre industry toward sustainability and climate neutrality in Europe.

While the CNDPC represents a promising step toward achieving climate neutrality, its success depends on several factors. First, the integration of stakeholder recommendations into binding EU or national legislation remains uncertain. Second, the adoption of these recommendations by Member States has been uneven, particularly in areas like green public procurement. Lastly, the long-term effectiveness of voluntary initiatives like the CNDPC relies on sustained industry commitment and robust monitoring mechanisms.

The CNDPC exemplifies the potential of stakeholder-driven soft-law initiatives to complement binding EU regulations in addressing climate challenges. By fostering collaboration between the private sector, Member States, and the European Commission, the Pact provides a strong foundation for integrating sustainability into the AI ecosystem. However, the extent to which these recommendations influence formal legislative frameworks will determine their ultimate impact in the fight against climate change.

7.2. The Council of Europe's Regulation on Artificial Intelligence

The CoE stands as one of the most proactive international intergovernmental organizations in the regulation of AI.⁵¹⁰ Its most significant achievement in this domain is the adoption of the *Framework Convention on Artificial Intel-*

⁵⁰⁹ *Ibid*, pp. 3–8.

⁵¹⁰ For an overview of all the organs and committees of the Council of Europe active in the area of AI governance, see: Council of Europe: *Council of Europe & Artificial Intelligence*. Online: <https://www.rivista.ai/wp-content/uploads/2024/05/BROCHURE-Artificial-Intelligence-EN-March-2023-PRINT.pdf>.

lignce, Human Rights, Democracy, and the Rule of Law (the Convention), the first international treaty on AI, in May 2024. The scope and objectives of the *Convention*, along with its impact on the international governance of AI and sustainable development, are explored in the subsequent subchapter.

Prior to the adoption of the *Convention*, the CoE, its Member States, and even Non-member States took several initiatives that paved the way for this milestone. A pivotal moment came in 2019, when the Commissioner for Human Rights of the CoE issued the recommendation titled “*Unboxing Artificial Intelligence: 10 Steps to Protect Human Rights*.” This document, directed at CoE Member States, aimed to foster a human rights-oriented approach to AI technologies, ensuring their beneficial use while mitigating associated risks.⁵¹¹ The Recommendation builds on work done in this area by the Council of Europe, in particular the *European Ethical Charter on the use of artificial intelligence in judicial systems*, the *Guidelines on Artificial Intelligence and Data Protection*, the *Declaration by the Committee of Ministers on the manipulative capabilities of algorithmic processes* and the *Study on the human rights dimensions of automated data processing techniques and possible regulatory implications*. It is further rooted in the universal, binding framework established by IHRL, including the CoE’s human rights instruments, and aligns with the report of the UN Special Rapporteur on the promotion and protection of the right to freedom of opinion and expression.⁵¹²

The Recommendation prioritizes human rights’ protection over any other competing interest at stake, listing ten “steps” or “areas of interest” to guide the Member States in their attempts to regulate AI. It emphasizes key measures to ensure AI aligns with human rights standards. These include conducting human rights impact assessments, engaging in public consultations, and ensuring transparency and information disclosure about AI systems. It calls for promoting non-discrimination and equality, safeguarding data protection and privacy, and ensuring AI respects freedoms such as expression, assembly, association, and the right to work. Independent oversight bodies should monitor AI compliance, while individuals must have access to effective remedies for rights violations. Furthermore, states should ensure private

⁵¹¹ NARDOCCI, C.: *Artificial Intelligence at the Crossroads between the European Union & the Council of Europe: Who Safeguards What & How?* In: Italian Journal of Public Law, Vol. 16, Issue 1, 2024, p. 179.

⁵¹² Council of Europe – Commissioner for Human Rights: *Unboxing Artificial Intelligence: 10 steps to protect Human Rights*, May 2019, p. 6. Online: <https://rm.coe.int/unboxing-artificial-intelligence-10-steps-to-protect-human-rights-reco/1680946e64>.

sector adherence to human rights standards and promote AI literacy to empower society to engage critically with AI technologies.⁵¹³

These measures laid the foundation for subsequent CoE initiatives and the establishment of two key committees: the Ad Hoc Committee on Artificial Intelligence (CAHAI) and the Committee on Artificial Intelligence (CAI). These bodies were tasked with drafting the first international human rights law treaty specifically focused on AI. Established in 2019, the CAHAI was tasked to examine, on the basis of broad multi-stakeholder consultations, the feasibility and potential elements of a legal framework for the development, design and application of artificial intelligence, based on CoE standards in the field of human rights, democracy and the rule of law.⁵¹⁴

In December 2020, the CAHAI published its *Feasibility Study*, which identified several gaps in legal protection that existing instruments could not sufficiently address. These gaps highlighted the need for a more comprehensive and targeted legal framework to govern AI systems. The study highlighted that current legal instruments often frame rights and obligations in broad terms, which, while flexible, can lead to difficulties in interpretation when applied to the complex and evolving context of AI. Essential principles, such as the need for human oversight, technical robustness, transparency, and explainability of AI systems, remain inadequately addressed. Moreover, there is insufficient focus on the responsibilities of developers and deployers of AI systems to ensure these systems operate effectively and uphold human rights, democracy, and the rule of law. The study also noted that existing frameworks lack cohesion, particularly in addressing the cross-border implications of AI technologies. The fragmented approach to AI regulation creates uncertainty and may impede the development of mutual trust necessary for international cooperation and the cross-border trade of AI products and services.⁵¹⁵

To address these issues, the Study proposed modernizing existing legal instruments and adopting a new binding legal instrument – such as a convention or framework convention – specifically focused on AI. This new instrument could be complemented by non-binding legal instruments and sector-specific CoE measures to tackle the unique challenges of AI in specific domains. Such a combination would enhance legal certainty for AI stake-

⁵¹³ *Ibid*, pp. 7–15.

⁵¹⁴ Council of Europe – Ad Hoc Committee On Artificial Intelligence: *Feasibility Study*, 17 December 2020, CAHAI(2020)23, para. 4.

⁵¹⁵ *Ibid*, para. 84–88.

holders and provide guidance for private actors pursuing self-regulatory initiatives.⁵¹⁶ Importantly, the Study emphasized that any binding document should avoid being overly prescriptive to ensure it remains adaptable to future technological developments.⁵¹⁷

The Study also outlined key values, rights and principles that could form the foundation of a future legal framework. These principles include human dignity; the prevention of harm to human rights, democracy, and the rule of law; human freedom and autonomy; non-discrimination, gender equality, fairness, and diversity; transparency and explainability of AI systems; data protection and the right to privacy; accountability and responsibility; and the principles of democracy and the rule of law.⁵¹⁸ These nine values, rights and principles are horizontally applicable. They apply to the design, development, and deployment of AI systems across sectors and use cases.⁵¹⁹

Building on these foundational principles, the Study emphasized that Member States have a dual responsibility in ensuring that AI systems respect human rights. Beyond protecting human rights in the public sphere, they are also tasked with ensuring that private actors adhere to these standards, aligning with international frameworks such as the *UN Guiding Principles on Business and Human Rights*.⁵²⁰ To meet these obligations, Member States should review domestic legislation for compliance with human rights standards, addressing any gaps where necessary. They must establish oversight mechanisms, provide judicial remedies for AI-related violations, and empower authorities to audit AI systems, particularly in instances of suspected non-compliance. However, this transparency must be balanced with confidentiality concerns related to privacy and intellectual property.⁵²¹ Private

⁵¹⁶ *Ibid*, para. 178; BALCERZAK, M.: *Implications of the United Nations human rights standards for the development of artificial intelligence*. In: BALCERZAK, M., KAPELAŃSKA-PRĘGOWSKA, J. (eds): *Artificial Intelligence and International Human Rights Law: Developing Standards for a Changing World*. Cheltenham: Edward Elgar Publishing Limited, 2024, ISBN: 978-1-0353-3793-4, p. 30.

⁵¹⁷ Council of Europe - Ad Hoc Committee On Artificial Intelligence: *Feasibility Study*, 17 December 2020, CAHAI(2020)23, para. 177.

⁵¹⁸ *Ibid*, para. 95–121.

⁵¹⁹ LESLIE, D., BURR, CH., AITKEN, M., COWLS, J., KATELL, M., BRIGGS, M.: *Artificial Intelligence, Human Rights, Democracy, and the Rule of Law: A Primer*, The Council of Europe, 2021, p. 18. Online: https://www.turing.ac.uk/sites/default/files/2021-03/cahai_feasibility_study_primer_final.pdf.

⁵²⁰ Council of Europe - Ad Hoc Committee On Artificial Intelligence: *Feasibility Study*, 17 December 2020, CAHAI(2020)23, para. 122.

⁵²¹ *Ibid*, para. 123.

actors, who often play a critical role in public procurement and the infrastructure of AI systems, are equally responsible for ensuring their technologies conform to human rights principles. Introducing a legal framework that mandates private actors to comply with these standards would align their interests with those of society and individuals, while also ensuring access to justice in cases of violations. Regulatory measures should adopt a risk-based approach, supplemented by a precautionary approach when necessary. Factors such as the potential impact on human rights, the probability of adverse effects, and AI-specific characteristics like automation and opacity should guide these measures.⁵²²

A year later, the CAHAI's final report "*Possible elements of a legal framework on artificial intelligence, based on the Council of Europe's standards on human rights, democracy and the rule of law*" proposes a legally binding transversal instrument to ensure that AI development, design, and application align with human rights, democracy, and the rule of law,⁵²³ and subsequently addresses the main elements and requirements of a legally binding instrument. At the outset, the report emphasizes that the transnational nature of AI systems in terms of effects and actors involved should suggest that non-member States of the CoE may likewise have access to the treaty to favour the far-reaching impact of the legislative framework and to contain the risks of excessive fragmentation of international human rights law instruments on AI. In line with the full awareness of the "transnational criteria" is, also, the preference for not too stark definitions and for striking a balance between legal certainty, which calls for precise definitions, and technology neutrality, which would opt for abstract definitions to allow the adaptation of the chosen terminology to the future technological developments.⁵²⁴ The CAHAI underscores the importance of including fundamental principles in the instrument to protect human dignity and ensure respect for human rights, democracy, and the rule of law.⁵²⁵

⁵²² *Ibid*, para. 124–126.

⁵²³ Council of Europe - Ad Hoc Committee On Artificial Intelligence: *Possible elements of a legal framework on artificial intelligence, based on the Council of Europe's standards on human rights, democracy and the rule of law*, 3 December 2021, CAHAI(2021)09rev, para. 45

⁵²⁴ NARDOCCI, C.: *Artificial Intelligence at the Crossroads between the European Union & the Council of Europe: Who Safeguards What & How?* In: Italian Journal of Public Law, Vol. 16, Issue 1, 2024, p. 182.

⁵²⁵ Council of Europe - Ad Hoc Committee On Artificial Intelligence: *Possible elements of a legal framework on artificial intelligence, based on the Council of Europe's standards on human rights, democracy and the rule of law*, 3 December 2021, CAHAI(2021)09rev, para. 14–17.

The proposed instrument emphasizes a risk-based approach, suggesting that legal requirements for AI systems should correspond to the potential risks they pose. It also recommends establishing a methodology for risk classification, categorizing AI systems into “low risk”, “high risk,” and “unacceptable risk” based on their impact on human rights, democracy, and the rule of law. Additionally, the document suggests the possibility of imposing moratoriums or bans on AI applications deemed to present unacceptable risks.⁵²⁶ Notably, and more explicitly than the EU, the CAHAI links the evaluation of risk to the likelihood of AI systems negatively affecting human rights, democracy, and the rule of law. This approach helps clarify the content and significance of the notion of “risk”, which, in contrast, the EU’s AI Act appears to take largely for granted.⁵²⁷

Furthermore, the document addresses the roles and responsibilities of Member States and private actors, emphasizing the necessity for national supervisory authorities to ensure effective compliance with the instrument. The CAHAI also notes that the instrument should facilitate international cooperation and be open to accession by states outside the European region that share the Council of Europe’s standards.⁵²⁸

The CAHAI concluded its mandate in 2021 and left the floor to the CAI, which was tasked with elaborating a convention on AI and “maintaining a transversal approach, also by co-ordinating its work with other intergovernmental committees and CoE’s entities equally addressing the implications of AI in their respective field of activity, by providing these committees and entities with guidance in conformity with the legal framework under development and by assisting them in resolving problems.”⁵²⁹ The CAI was instructed to complete within the end of November 2023 the draft of an “ap-

⁵²⁶ *Ibid*, para. 18–21.

⁵²⁷ BALCERZAK, M.: *Implications of the United Nations human rights standards for the development of artificial intelligence*. In: BALCERZAK, M., KAPELAŃSKA-PRĘGOWSKA, J. (eds): *Artificial Intelligence and International Human Rights Law: Developing Standards for a Changing World*. Cheltenham: Edward Elgar Publishing Limited, 2024, ISBN: 978-1-0353-3793-4, pp. 31–32.

NARDOCCI, C.: *Artificial Intelligence at the Crossroads between the European Union & the Council of Europe: Who Safeguards What & How?* In: *Italian Journal of Public Law*, Vol. 16, Issue 1, 2024, p. 182

⁵²⁸ Council of Europe - Ad Hoc Committee On Artificial Intelligence: *Possible elements of a legal framework on artificial intelligence, based on the Council of Europe’s standards on human rights, democracy and the rule of law*, 3 December 2021, CAHAI(2021)09rev, para. 43.

⁵²⁹ Council of Europe – Committee on Artificial Intelligence: *Working Methods Relating to Coordination*, 1 April 2022, CAI(2022)05, para. 1.

propriate legal instrument on the development, design, and application of AI systems based on the CoE's standards on human rights, democracy and the rule of law, and conducive to innovation, under the relevant decisions of the Committee of Ministers".⁵³⁰

The CAI's drafting process progressed through the "Zero Draft," followed by an updated version in January 2023,⁵³¹ and culminated in the "Consolidated Working Draft" in July 2023,⁵³² which served as the basis for negotiations in the fall of 2023. The Committee of Ministers decided to allow for the inclusion in the negotiations of the EU and interested non-European States sharing the values and aims of the CoE – States from around the globe, namely Argentina, Australia, Canada, Costa Rica, the Holy See, Israel, Japan, Mexico, Peru, the US and Uruguay, joined the process of negotiations in the CAI and participated in the elaboration of this Framework Convention as observer States.

The Consolidated Working Draft aimed to establish a more homogeneous legal framework among contracting States by reducing references to domestic laws. As highlighted by *Nardocci*, structure of the text moves from the enumeration of the obligations and principles developers and users must conform to. The human rights-based approach emerges, therefore, evidently already in the structure of the Convention which begins by listing the old and new human rights linked to AI. Chapters II and III outline obligations and principles each contracting State has to secure in the processes related to AI systems,⁵³³ including transparency, oversight, accountability, non-discrimination, privacy, data protection, safety, security, robustness, and safe innovation.⁵³⁴ Building on provisions in the Revised Zero Draft, the Consoli-

⁵³⁰ NARDOCCI, C.: *Artificial Intelligence at the Crossroads between the European Union & the Council of Europe: Who Safeguards What & How?* In: Italian Journal of Public Law, Vol. 16, Issue 1, 2024, p. 184.

⁵³¹ Council of Europe – Committee on Artificial Intelligence: *Revised Zero Draft [Framework] Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law*, 6 January 2023, CAI(2023)01.

⁵³² Council of Europe – Committee on Artificial Intelligence: *Consolidated Working Draft of the Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law*, 7 July 2023, CAI(2023)18.

⁵³³ NARDOCCI, C.: *Artificial Intelligence at the Crossroads between the European Union & the Council of Europe: Who Safeguards What & How?* In: Italian Journal of Public Law, Vol. 16, Issue 1, 2024, p. 187.

⁵³⁴ Council of Europe – Committee on Artificial Intelligence: *Consolidated Working Draft of the Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law*, 7 July 2023, CAI(2023)18, Arts. 5–12.

dated Working Draft in draft Arts. 15 and 16 places greater emphasis on risk assessment and training. Unlike its predecessor, which limited training obligations to external supervision, the Consolidated Working Draft requires training for all stakeholders involved in the lifecycle of AI systems.⁵³⁵ The major amendment in the Consolidated Working Draft concerns the role of contracting States. While the Revised Zero Draft mandated national supervisory authorities for oversight, the Consolidated Working Draft allows States to determine their own oversight mechanisms. Under draft Art. 25, each Party must establish or designate independent and impartial mechanisms with sufficient powers, expertise, and resources to ensure compliance with the Convention. If multiple mechanisms are designated, measures should be taken to facilitate their cooperation. Additionally, where mechanisms differ from existing human rights structures, efforts should be made to promote effective collaboration between these mechanisms and domestic human rights institutions.⁵³⁶

7.2.1. *The Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law*

The *Convention* represents the first international treaty dedicated to AI. Notably, the *Convention* is open to non-Member States of the CoE, reflecting its intended global reach. This signals the CoE's leadership in AI regulation, as many international organizations have yet to adopt similar measures. It also underscores the willingness of numerous states to entrust the regulation of AI to a supranational human rights framework rather than relying solely on domestic governance.⁵³⁷

The *Convention's* purpose and object is to ensure that activities within the lifecycle of AI systems are fully consistent with human rights, democracy and the rule of law. At the same time, it is important to underline that the *Convention* does not intend to regulate all aspects of the activities within the lifecycle of AI systems, nor AI technologies as such.⁵³⁸ Furthermore, it does

⁵³⁵ *Ibid*, Arts. 15–16.

⁵³⁶ *Ibid*, Art. 25.

⁵³⁷ NARDOCCI, C.: *Artificial Intelligence at the Crossroads between the European Union & the Council of Europe: Who Safeguards What & How?* In: Italian Journal of Public Law, Vol. 16, Issue 1, 2024, p. 186.

⁵³⁸ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series - No. 225, point 12.

not expressly regulate the economic and market aspects of AI systems.⁵³⁹ To give effect to the provisions set out in the *Convention*, each Party shall adopt and maintain appropriate legislative, administrative or other measures. To this end, Parties are required to adopt and maintain appropriate legislative, administrative, or other measures. These measures must be tailored and proportional, considering the severity and likelihood of adverse impacts on human rights, democracy, and the rule of law throughout the AI lifecycle. They may include specific or general measures that apply regardless of the technology used. To support effective implementation, the *Convention* establishes a follow-up mechanism and promotes international cooperation.⁵⁴⁰ The *Convention*, like the EU's *AI Act*, applies to both public and private sectors—a scope that was not initially envisioned during the drafting process.

The *Convention* puts an obligation on all Parties to address the risks posed by activities within the lifecycle of AI by public and private actors, while taking into account the respective roles and responsibilities of all stakeholders and giving flexibility to Parties in meeting the agreed obligations according to their domestic legal and institutional frameworks and their respective international human rights obligations. To ensure legal certainty and transparency, each Party is obliged to set out in a declaration how it intends to meet the mentioned obligation, either by applying the principles and obligations set forth in Chapters II to VI of the *Convention* to activities of private actors or by taking other appropriate measures to fulfil the obligation.⁵⁴¹ Activities related to national security are excluded, provided they align with international law and democratic principles. Similarly, national defence matters fall outside the scope. The *Convention* does not apply to AI research and development unless such activities involve testing or actions that could interfere with human rights, democracy, or the rule of law.⁵⁴²

Chapter III of the *Convention* reflects on the previous work of the CAHAI and CAI, when it obligates Parties to ensure that AI systems uphold human rights, democracy, and the rule of law by implementing measures that protect human dignity, autonomy, equality, and privacy while promoting trans-

⁵³⁹ *Ibid*, point 5.

⁵⁴⁰ *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024. Art. 1.

⁵⁴¹ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series – No. 225, point 30.

⁵⁴² *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024. Art. 3.

parency, accountability, and reliability. It emphasizes safeguarding democratic processes, ensuring non-discrimination, and addressing inequalities to achieve equitable outcomes. Parties must establish oversight mechanisms to manage risks and ensure AI-generated content is identifiable. Privacy and data protection are prioritized, alongside fostering safe innovation through controlled environments for development and testing.⁵⁴³ As such, no provision of the *Convention* is intended to create new human rights or human rights obligations or undermine the scope and content of the existing applicable protections, but rather, by setting out various legally binding obligations contained in its Chapters II to VI, to facilitate the effective implementation of the applicable human rights obligations of each Party in the context of the new challenges raised by AI.⁵⁴⁴ This framework balances the promotion of innovation with the need to mitigate adverse impacts on fundamental rights and democratic principles.

Art. 14 mandates Parties to ensure accessible and effective remedies for human rights violations caused by AI systems, consistent with international obligations and domestic law. Measures include documenting and providing information on AI systems that significantly affect human rights, making such information available to authorized bodies and affected persons, and ensuring it is sufficient for individuals to contest decisions or the system's use. Parties must also provide effective mechanisms for lodging complaints with competent authorities. Furthermore, Art. 15 requires Parties to establish procedural safeguards for individuals significantly impacted by AI systems, ensuring procedural rights and guarantees in line with international and domestic law. Additionally, it emphasizes notifying individuals when they are interacting with AI systems rather than humans, where appropriate for the context. Together, these provisions aim to protect individuals' rights and provide recourse against adverse impacts from AI systems.⁵⁴⁵

The *Convention* establishes a framework for managing risks and adverse impacts of AI systems, requiring Parties to adopt measures to identify, assess, prevent, and mitigate actual and potential impacts on human rights, democracy, and the rule of law. These measures must account for the context,

⁵⁴³ *Ibid*, Arts. 4–13.

⁵⁴⁴ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series – No. 225, point 13.

⁵⁴⁵ *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024, Arts. 14–15.

intended use, severity, and probability of impacts and incorporate stakeholder perspectives, particularly those of affected individuals. Risk management must be iterative, include monitoring and documentation of risks and impacts, and, where necessary, involve testing AI systems before their deployment or after significant modifications. Parties must address adverse impacts adequately and use these findings to refine risk management measures. Additionally, they are required to evaluate the need for moratoriums, bans, or other measures for AI uses deemed incompatible with human rights, democracy, or the rule of law.⁵⁴⁶ The determination of what is “incompatible” in this context is made by each Party.⁵⁴⁷ This approach aims to ensure responsible governance and mitigate risks throughout the AI lifecycle.

Chapter VI emphasizes the inclusive and rights-based implementation of the *Convention*. Parties must ensure non-discriminatory application and consider the specific needs of vulnerable groups such as persons with disabilities and children. Public discussions and multistakeholder consultations should address key AI-related issues, considering their social, legal, ethical, and environmental implications. Promoting digital literacy and skills across all population segments, including experts managing AI risks, is also required. The *Convention* safeguards existing human rights and legal obligations and allows Parties to provide broader protections beyond its provisions.⁵⁴⁸ These measures ensure comprehensive and participatory implementation.

Chapter VII establishes mechanisms for the effective implementation and oversight of the *Convention*. The Conference of the Parties comprises Party representatives tasked with facilitating implementation, addressing issues, considering amendments, promoting cooperation, and exchanging information on legal and technological developments.⁵⁴⁹ The flexibility of the follow-up mechanism established by the *Convention* is reflected by the fact that there is no temporal requirement for its convocation. It will be convened by the Secretary General of the CoE as appropriate and periodically. However, it can only be convened at the request of the majority of the Parties or at the

⁵⁴⁶ *Ibid*, Art. 16.

⁵⁴⁷ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series – No. 225, point 111.

⁵⁴⁸ *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024, Arts. 17–21.

⁵⁴⁹ *Ibid*, Art. 23

request of the Committee of Ministers of the CoE.⁵⁵⁰ Parties must submit periodic reports on their implementation activities and engage in international cooperation to share information, assist non-Parties, and mitigate risks to human rights, democracy, and the rule of law. To ensure compliance, Parties are required to establish or designate independent and impartial oversight mechanisms with adequate powers, expertise, and resources. These mechanisms must cooperate effectively, including with existing human rights structures where applicable.⁵⁵¹ This framework ensures accountability, collaboration, and continuous improvement in the governance of AI systems.

Building on these implementation provisions, Art. 27 addresses the relationship between the *Convention* and other existing agreements or legal frameworks. Art. 27 ensures that existing agreements or treaties between Parties on matters covered by the *Convention* may still be applied, provided they are consistent with the *Convention's* objectives and purpose. For Parties that are members of the EU, EU rules will govern their mutual relations concerning matters within the *Convention's* scope, without undermining the *Convention's* purpose or its full application to non-EU Parties.⁵⁵² The Drafters acknowledged the increased integration of the EU, particularly as regards regulation of AI systems. The Drafters intended EU law to include measures, principles and procedures provided for in the EU legal order, in particular laws, regulations or administrative provisions as well as other requirements, including court decisions.⁵⁵³ Similarly, non-EU Parties bound by such rules may also apply them in their relations. This provision ensures alignment and coherence with existing legal frameworks while preserving the *Convention's* objectives.

⁵⁵⁰ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series - No. 225, point 131.

⁵⁵¹ *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024, Art. 26.

⁵⁵² *Ibid*, Art. 27.

⁵⁵³ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series - No. 225, point 147.

7.2.1.1. *Environmental Considerations in the Framework Convention on Artificial Intelligence, Human Rights, Democracy and the Rule of Law*

While the *Convention* establishes a robust governance framework, explicit recognition of environmental considerations and the R2HE is notably absent, reflecting the CoE's cautious stance on this evolving human right. The only provisions, where the environment is mentioned is in one of the preambular articles and Art. 19. The former states that "the Convention is intended to address specific challenges which arise throughout the lifecycle of AI systems and encourage the consideration of the wider risks and impacts related to these technologies including, but not limited to human health and the environment, and socio-economic aspects." And under Art. 19, "each Party shall seek to ensure that important questions raised in relation to AI systems are, as appropriate, duly considered through public discussion and multi-stakeholder consultation in the light of social, economic, legal, ethical, environmental and other relevant implications." The mentioned article, in a way, reflects on the procedural elements of sustainable development, namely public participation in environmental decision-making, access to environmental information, environmental impact assessment, and access to justice in environmental matters. These elements are key to fostering inclusive, transparent, and equitable decision-making processes. By enabling diverse stakeholder engagement, public participation ensures that AI governance aligns not only with environmental sustainability goals but also with the broader principles of social equity and justice that underpin sustainable development. However, both provisions are framed in general terms, allowing for a wide range of interpretations, particularly in light of relevant judicial and quasi-judicial decisions by international judicial, arbitral, or quasi-judicial bodies, as highlighted in chapters dedicated to individual elements of sustainable development.

While the *Convention* provides limited explicit references to environmental considerations and the R2HE, its broader human rights-based framework offers indirect avenues for addressing these concerns. This connection becomes particularly evident in Art. 4, which establishes an overarching obligation for each Party to ensure that all activities related to the lifecycle of AI systems are compatible with human rights and non-discrimination obli-

gations under international and domestic law.⁵⁵⁴ Art. 4's vague formulation indirectly supports the R2HE and the application of elements of sustainable development. This right, essential for enjoying other fundamental rights, is constitutionally protected in most CoE Member States. Consequently, Parties to the *Convention* will likely be obligated to respect, protect, and fulfil the R2HE. Although the *Convention* does not explicitly reference the R2HE, its human rights-based approach ensures indirect protection through rights like the right to life, private and family life, and access to justice.

On the positive side, likewise the *AI Act*, the *Convention* contains provisions prescribing the need to identify, assess, prevent and mitigate *ex ante* and, as appropriate, iteratively throughout the lifecycle of the AI system the relevant risks and potential impacts to human rights, democracy and the rule of law by following and enabling the development of a methodology with concrete and objective criteria for such assessments. These obligations are one of the key tools for enabling the implementation of the requirements of the *Convention* and Chapters II and III in particular and should be implemented by the Parties in light of all relevant principles, including the principles of transparency and oversight as well as the principle of accountability and responsibility.⁵⁵⁵ Along with the risks to human rights, democracy and the rule of law, the assessments can, where appropriate, take due account of the need to preserve a healthy and sustainable environment, as well as projected benefits for society as a whole and positive impacts on human rights, democracy and the rule of law. Such factors as “severity”, “probability”, duration and reversibility of risks and impacts are also very important in the AI context and should be taken into account in the risk management framework,⁵⁵⁶ specifically when identifying and assessing risks and potential impacts.⁵⁵⁷

The absence of explicit acknowledgment of environmental considerations and the R2HE in the *Convention* underscores the need for future amend-

⁵⁵⁴ *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024, Art. 4.

⁵⁵⁵ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series – No. 225, point 105.

⁵⁵⁶ *Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Strasbourg, 17 May 2024, Art. 16 (2) (b).

⁵⁵⁷ *Explanatory Report to the Council of Europe Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law*, Vilnius, 5 December 2023, Council of Europe Treaty Series – No. 225, point 108.

ments or complementary frameworks. Such measures should align AI governance with the global movement toward recognizing environmental rights as integral to human rights protections, as well as with GDs and initiatives aimed at promoting environmentally friendly AI systems. Notably, toward the end of the drafting process, the CoE did not rule out the potential adoption of future legally binding or non-binding instruments at the sectoral level. These instruments would aim to ensure that the design, development, and application of AI in specific domains adhere to standards for human rights, democracy, and the rule of law, and, implicitly, to the principles of sustainable development.

III. CONCLUSION

As humanity navigates the profound challenges of environmental degradation and rapid technological advancement, this monograph has sought to illuminate the critical role of legal frameworks in harmonizing the transformative potential of AI with the imperatives of sustainable development. Part I has thoroughly examined the evolution of sustainable development within the framework of international law. The concept of sustainable development has evolved into a pivotal element of international law, influencing treaty interpretation, judicial reasoning, and state practice. While its precise legal status remains debated among scholars, it is increasingly recognized as a guiding principle for reconciling economic development with environmental protection. The dual perspectives on its normative nature – whether as a meta-principle shaping the balance between conflicting norms or as a distinct legal obligation – highlight its flexibility and adaptability within diverse legal contexts. Sustainable development has been extensively referenced in multilateral treaties, international declarations, and decisions by judicial and quasi-judicial bodies. Landmark cases such as *Gabčíkovo-Nagymaros* and the *Iron Rhine Arbitration* have affirmed its role in mediating tensions between developmental aspirations and environmental responsibilities. These cases illustrate how the principle of sustainable development operationalizes established norms like the prevention principle, the duty to cooperate, and environmental impact assessments. Despite its “soft law” characterization in many instances, the principle’s acceptance in customary international law demonstrates its significant influence on international legal frameworks. Its integration into procedural and substantive obligations reflects the international community’s acknowledgment of its importance for addressing global challenges. *Weeramantry* and *Sands* underscore its transformative potential, noting its role as an *erga omnes* principle and its embeddedness in the corpus of international law.⁵⁵⁸

The analysis of substantive elements has highlighted key principles that remain central to sustainable development. The principle of intergenerational equity emphasizes the responsibility to preserve natural resources and en-

⁵⁵⁸ See Chapter 1.1.1 on Substantive Elements of Sustainable Development, discussing Judge Weeramantry’s separate opinion in the *Gabčíkovo-Nagymaros* case and P. Sands’s analysis of sustainable development as a principle of customary international law.

vironmental integrity for future generations. This principle is complemented by intragenerational equity, which stresses fairness and inclusivity in resource distribution and decision-making within the present generation. The integration of environmental protection and economic development—a cornerstone of sustainable development—has been shown to require balancing economic ambitions with ecological sustainability. The principle of sustainable utilization of natural resources further reinforces the necessity of prudent and responsible resource management to ensure long-term availability and minimize environmental harm. These principles, as articulated in foundational documents such as the *Rio Declaration* and the *Stockholm Declaration*, provide a normative framework that guides international and national legal systems in fostering sustainable practices.

Procedurally, this section has illuminated the significance of public participation, access to environmental information, environmental impact assessments, and access to justice in environmental matters. These procedural rights form the backbone of transparent, inclusive, and accountable environmental governance. Instruments such as the *Aarhus Convention* and the *Escazú Agreement* serve as exemplary models for embedding these principles into actionable frameworks, ensuring that stakeholders, including marginalized and vulnerable communities, have a meaningful voice in shaping environmental policies and decisions. Public participation not only enhances the legitimacy of governance processes but also fosters public trust and ensures that policies are informed by diverse perspectives and expertise. Access to environmental information empowers individuals and communities to engage constructively in environmental debates, while environmental impact assessments provide essential tools for anticipating and mitigating potential environmental harms. Access to justice ensures accountability, enabling citizens to challenge decisions that contravene environmental laws or undermine sustainable development objectives.

Over the decades, the international community has progressively deepened its understanding of sustainable development, influenced by key conferences, declarations, and strategic action plans. Beginning with the foundational principles laid out at the 1972 Stockholm Conference and culminating in the adoption of the 2030 Agenda for Sustainable Development, these initiatives have systematically incorporated sustainable development into a unified framework for addressing global priorities. Milestones such as the 1987 Brundtland Report and the 1992 Rio Conference have solidified sustainable development as a vital approach to reconciling economic advancement with

environmental preservation. Subsequent initiatives, including the Millennium Development Goals and the SDGs, have transformed these principles into measurable objectives, fostering international collaboration to tackle critical challenges like poverty, gender inequality, and climate change. However, the implementation of sustainable development remains fraught with challenges. Despite the significant progress achieved, persistent issues such as funding shortfalls, uneven implementation across regions, and disparities in technological capacity hinder the realization of the SDGs. The need for inclusive, equitable, and enforceable frameworks is particularly pressing as global crises like the COVID-19 pandemic and climate change exacerbate vulnerabilities, particularly in developing countries.

Regional approaches to sustainable development have become pivotal in addressing the global challenges of climate change, economic resilience, and social equity. The European Green Deal serves as a benchmark, demonstrating how comprehensive strategies can align climate action with economic growth and social justice. With its focus on areas such as renewable energy, biodiversity conservation, and zero pollution, the EGD provides a roadmap for achieving climate neutrality by 2050. Similarly, the African Union's Agenda 2063 and Green Recovery Action Plan emphasize regional priorities, such as climate finance, resilient agriculture, and renewable energy. However, despite their ambitious scope, these regional initiatives face significant challenges. The non-binding nature of "green deals" often results in limited enforcement and inconsistent implementation. Financial and institutional constraints, particularly in regions like Africa, further impede progress. Moreover, the environmental impact of technological solutions, requires careful governance to ensure alignment with sustainability objectives. The success of regional green deals hinges on effective integration of diverse stakeholder groups, robust governance mechanisms, and international cooperation. Leveraging advanced technologies, while addressing issues of equitable access and infrastructure development, can significantly enhance the efficiency and impact of these strategies. Strengthening the financial and technical capacities of Member States is equally critical, particularly in regions facing systemic vulnerabilities.

Part I has also laid the groundwork for understanding the interplay between sustainable development and emerging technologies, particularly AI. The inclusion of AI in these efforts represents both an opportunity and a challenge. AI has emerged as a transformative force in achieving the SDGs. AI's potential to optimize resource management, enhance climate ac-

tion, and improve disaster preparedness underscores its importance in advancing sustainable development. Projects like Climate TRACE and digital twins demonstrate how AI can contribute to monitoring and mitigating environmental impacts. However, the environmental footprint of AI systems, along with concerns about data privacy, ethical governance, and global inequalities, calls for robust regulatory measures to ensure that AI development aligns with sustainability principles. As explored in Part I, the integration of principles such as intergenerational and intragenerational equity, the precautionary principle, and the sustainable utilization of natural resources into AI governance is essential to mitigate these impacts and to contribute positively to environmental and societal well-being.

Building upon the foundational principles of sustainable development explored in Part I, Part II has examined the intricate interplay between AI and the legal frameworks that seek to govern its development and application. Over the past 65 years, AI has evolved from a theoretical concept to a powerful tool driving innovation and societal change. Its rapid advancements demand robust regulatory frameworks that align with the principles of public international law, environmental protection, and human rights.

Public international law, while historically reactive to emerging technologies, offers foundational principles like precaution, “do no harm,” and intergenerational equity, which can guide the responsible deployment of AI. Existing frameworks such as the UNFCCC and the Paris Agreement provide a basis for integrating AI into climate action, yet they lack AI-specific provisions, emphasizing the need for adaptive and forward-looking legal mechanisms. In the realm of human rights, AI intersects with fundamental freedoms, equality, and justice, presenting both opportunities and risks. The emerging recognition of the right to a clean, healthy, and sustainable environment further reinforces the need to embed human rights considerations into AI governance. Ensuring transparency, accountability, and fairness in AI systems is essential to safeguarding these rights while leveraging AI’s potential for societal benefit.

The analysis of several non-binding instruments that could shape future regulations, including the UN Global Digital Compact, OECD Principles on Artificial Intelligence, the UNESCO Recommendation on the Ethics of Artificial Intelligence, and the reports of the Global Partnership on Artificial Intelligence was conducted. All these documents emphasize a human-centered approach that integrates the protection of human rights and fundamental freedoms, such as data privacy and human dignity, with core principles of in-

ternational environmental law, including the do-no-harm principle and the precautionary principle.

The UN has taken steps toward shaping a global framework for the governance of AI, leveraging its universal reach and capacity for multilateral cooperation. Through the *Roadmap for Digital Cooperation*, the *Principles for the Ethical Use of AI in the UN System*, and the recent *Global Digital Compact*, the UN has emphasized the transformative potential of AI while addressing the legal, ethical, and societal challenges it poses. These efforts underscore the organization's commitment to promoting an inclusive, responsible, and human-centered approach to AI development and deployment. Despite these advancements, the current UN framework remains non-binding, with many initiatives serving as guiding principles rather than enforceable regulations. The establishment of the High-level Advisory Body on AI and the adoption of the *Global Digital Compact* represent critical milestones in fostering international cooperation and aligning AI governance with the SDGs and human rights. Key proposals, such as the creation of an Independent International Scientific Panel on AI and a Global Dialogue on AI Governance, reflect a growing recognition of the need for agile and interdisciplinary approaches to AI regulation. However, significant challenges persist. The absence of a legally binding framework, coupled with fragmented regional and national efforts, highlights the difficulty of achieving global consensus on AI governance. Additionally, critiques of the *Global Digital Compact*—including its broad agenda, lack of enforceable mechanisms, and potential exclusion of diverse cultural and technical perspectives—underscore the complexities of developing a universally accepted regulatory structure.

At the regional level, both the EU and the CoE have demonstrated leadership in this domain, with instruments such as the EU's AI Act and the CoE's Framework Convention on Artificial Intelligence, Human Rights, Democracy, and the Rule of Law playing a pivotal role in shaping AI regulation through distinct yet complementary frameworks to govern AI development and deployment. These frameworks aim to balance innovation with accountability, prescribing mechanisms for risk assessment, transparency, and oversight throughout the AI lifecycle. While these instruments address critical issues such as algorithmic bias, data protection, and fairness, their environmental provisions remain underdeveloped.

The EU's *Artificial Intelligence Act* represents a landmark effort to establish harmonized rules for AI systems, setting a global benchmark for AI governance. With its focus on risk-based regulation, transparency, and account-

ability, the Act aims to ensure the safe and ethical use of AI while fostering innovation and competitiveness. However, the Act has faced criticism for insufficiently addressing environmental sustainability and the right to a healthy environment. Proposals to strengthen these aspects during the drafting process were ultimately excluded from the final version, highlighting missed opportunities to align AI governance with the EU's broader environmental and climate objectives. This gap highlights the urgent need for reforms that explicitly integrate sustainability goals into regional AI governance. The EU also needs to review existing legislation and adopt sector-specific regulations to address challenges such as climate-related data sharing. Importantly, a significant portion of legal acts within the EU should take the form of regulations to prevent fragmentation of norms among Member States.

The CoE's Framework Convention on Artificial Intelligence, Human Rights, Democracy, and the Rule of Law marks a significant milestone as the first international treaty dedicated to AI. Grounded in a human rights-based approach, the Convention emphasizes transparency, accountability, and inclusivity, providing a robust framework for managing the risks and impacts of AI systems. While the Convention offers indirect pathways to address environmental considerations through its overarching principles, explicit recognition of environmental rights and the right to clean, healthy and sustainable environment remains limited. The Convention's flexibility and its openness to non-European states signal its potential for broader international influence.

Both frameworks underscore the importance of stakeholder engagement, iterative risk management, and multi-level governance to address the complex challenges posed by AI. However, they also reveal persistent gaps, particularly in integrating environmental sustainability and aligning AI governance with SDGs. The voluntary initiatives within the EU, such as the Climate Neutral Data Centre Pact, illustrate the potential of soft-law approaches to complement binding regulations, but their long-term effectiveness will depend on integration into formal legislative frameworks.

Part II has demonstrated that AI governance requires a holistic and adaptive approach that integrates environmental, ethical, and societal considerations. By leveraging existing legal frameworks while addressing their gaps, the international community can ensure that AI serves as a catalyst for sustainable development rather than a source of new inequalities or environmental degradation. As technological advancements continue to shape our world, the principles of human rights, democracy, and the rule of law must

remain at the core of AI governance, guiding its evolution toward a more equitable, resilient, and sustainable future.

In conclusion, this monograph has illuminated the path forward for harnessing the transformative potential of AI while addressing its inherent risks. It underscores the need for a cohesive and adaptive legal framework that integrates AI governance with the principles of sustainable development and international law. By embracing this vision, the international community can ensure that AI contributes to a future that is not only more intelligent but also more equitable, sustainable, and resilient. As humanity navigates the twin challenges of environmental degradation and technological innovation, this study serves as both a call to action and a roadmap for achieving a harmonious balance between progress and preservation.

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