A Survey of Instruments and Institutions Available for the Global Governance of Artificial Intelligence

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Emerging technologies have always challenged traditional regulatory regimes [1]. This is not new nor is this tension likely to change anytime soon given the increasing speed at which embryonic technologies are emerging into the market [2]. Some of these technologies, such as autonomous vehicles or drones, can be effectively regulated at the national level due to clearly defined jurisdictional boundaries and the existence of relevant national and state/provincial regulatory agencies that oversee their conventional counterparts. While the entry of these technologies into the market will challenge regulators and policymakers and may require tweaking of existing regimes, we argue that these technologies, and the products that they enable, will not require a sui generis response at the national and supranational levels. The same cannot be said for artificial intelligence (AI) and the myriad of interconnected and interwoven applications made possible by AI.

As evidenced by technological unemployment from automation and algorithmic bias in the public and private sectors, AI is already challenging existing national legislative regimes [3]. Moreover, with existing AI applications showing little respect for jurisdictional boundaries, the ability to enforce legislation is limited. We argue that this fissure will only be widened if AI regulation is left solely in the hands of national and/or supranational governments.

This article argues that effective governance of AI will require international coordination and cooperation, underpinned by a flexible and dynamic governance framework. As this article seeks to highlight, there are multiple approaches that could be employed for AI ranging from hard law to various forms of soft law [4]. Based on our analysis of these governance frameworks, we argue that the most robust framework for AI is one that adopts a multistakeholder governance approach: one that is able to continually adapt to emerging AI systems and threats. Moreover, we argue that the development of this governance approach must begin now—not tomorrow, not next year—so as to allow for the necessary iterations that this ubiquitous technology demands. While we do not suggest that the development of such a framework will be simple, given today's political realities, we argue that such a multistakeholder governance approach can be realized if the necessary leadership from across sectors and domains work collectively to do so.

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Public international law

The body of public international law is generally recognized to consist of several sources, predominantly including treaties, customs, and general principles of law. While public international law develops slowly in general, treaties are often most effective at creating new rules and bodies to govern emerging areas such as environmental issues [5].

Multilateral treaties between a large number of states can form rules with high global legitimacy and shift normative stances toward an issue over time [6]. Yet, treaties take years to negotiate and require mediating between multiple interests and states with various capacities. As such, this political reality alone suggests that the possibility of creating a robust and responsive governance framework to effectively govern AI-related technologies seems highly unlikely.

Furthermore, it is important to note that only nation states that commit to being bound by a treaty can be held to account for their actions in relation to the treaty—as arguably well illustrated by the United State's withdrawal from the 2015 Paris Agreement on climate change mitigation (the Paris Agreement) [7]. By definition alone, the private sector falls outside of this area of public international law, meaning that many key stakeholders are not participants and are not captured by the treaty process [8]. Collectively, these represent two of the biggest limitations for public international law in the AI governance space.

Monitoring and enforcing norms from treaties can also pose practical, political, and institutional challenges and may require states to spend additional resources on surveillance and compliance. No existing treaties create specific rules or obligations for AI, and beginning negotiations on such a treaty could be a contested process that would require justifications for why this issue merits more attention for a new multilateral agreement than others.

While current treaty law does not specifically address AI, some established international legal norms may be triggered by this technology's applications. For example, using AI-based weapons in an armed conflict raises questions of humanitarian law, drawing on both treaty and customary norms [9]. Human rights law may apply to algorithmic decision-making and bias through norms on due process, privacy, or nondiscrimination [10]. However, while global institutions can participate in interpreting human rights norms and monitoring compliance, interpretation and enforcement typically occurs at the regional level and varies around the world.

Framework conventions

Framework conventions are a specific approach to creating treaty regimes, where the initial agreement is intentionally broad and nonspecific [11]. Organizations such as the United Nations (UN) and the World Health Organization (WHO) are vested with the power to establish framework conventions. These instruments generally identify issues, goals, general obligations, guiding principles, and institutions to facilitate future international action. Framework conventions often result in parties adopting supplemental agreements to add more specific regulatory norms to the broader framework, though, typically, not all parties must join in the more detailed commitments [12].

By refraining from creating highly detailed rules, framework conventions aim to invite wide participation from many states while laying the procedural and political groundwork to ramp up commitments on the topic [11]. The WHO's Framework Convention on Tobacco Control (FCTC), initiated in response to the global burden of disease created by tobacco products and adopted by the 56th World Health Assembly in 2003 [13], provides, in our view, a success story. The FCTC is narrowly focused, addresses a specific public health challenge underpinned by epidemiological and scientific evidence [14], and allows countries to build on, and shape, their national approaches to tobacco control; such elements appear central to the legitimacy and credibility of the FCTC.

However, framework convention approaches also run the risk of creating shallow regimes which struggle to increase their regulatory requirements over time should influential or large groups of parties resist stronger commitments. A notable example of mixed success comes from the United Nations Framework Convention on Climate Change (UNFCCC), which created general norms about how states should respond to climate change. The UNFCCC was followed by the Kyoto Protocol, which struggled to gain participation from major emitters, and the more successful Paris Agreement.

No multilateral or regional framework convention currently exists for international governance of AI. However, in early 2019, the then Secretary General of the Council of Europe, Thorbjørn Jagland,

raised the possibility of a framework convention for AI in the European Union (EU) [15]. Such a framework convention for AI governance would be regional rather than global, as its members would be limited to EU member states. Despite this geographical limitation, higher regulatory standards in the 27-member block may be a catalyst for an AI governance "race to the top" given the strategic importance of the EU for AI developers, and the ongoing diffusion of EU legislation beyond their own borders [16]. This approach, however, now appears unlikely given the May 2021 announcement of a draft EU regulation on AI [17].

Intergovernmental organizations

Intergovernmental organizations (IGOs) are institutions which can bring together the political or regulatory bodies of various states to facilitate collaboration, expertise sharing, and harmonization of norms. These IGOs can have more or less formal structure and internal organization, ranging from less formal entities such as the G7 or G20 to more autonomous and bureaucratic units including the World Trade Organization [18]. Over time, IGOs offer the potential of aligning different states' interests in the relevant subject matter [19].

The last several years have seen several IGOs begin or accelerate activity on AI. In May 2019, the Organization for Economic Co-operation and Development (OECD), composed of 38 member countries for the purposes of advancing policy cooperation between mostly high-income countries, released a recommendation carrying several guiding principles for states to use in governing AI [20]. The following month, the G20 adopted principles for AI governance which drew substantially from the OECD's proposed norms [21]. The International Medical Device Regulators Forum (IMDRF), an IGO which convenes regulatory bodies from ten large economies, has recently begun discussions of how to best manage AI-based medical devices, anchored in their framework for software as a medical device [22].

While these are positive developments for the governance of AI generally, these initiatives present a number of limitations for addressing a rapidly emerging and ubiquitous technology such as AI. Lower income countries are, for the most part, underrepresented (if present at all) in these forums, being shaped instead by a relatively small, albeit powerful, number of countries who are represented across multiple IGO forums. The recommendations and principles may lack the specificity needed to create interoperability between countries and regions. Furthermore, due to their opt-in nature, norms established by IGOs may lack incentives for state compliance. These limitations have the potential to threaten the long-term reach and legitimacy of these IGO initiatives around AI governance.

Public–private partnerships

Collaborations between public and private actors open new structures and mechanisms for governance. Public–private partnerships (PPPs or P3s) can take many forms and have contested definitions, but generally enable forums for cooperation among public and private actors to provide services and make decisions [23]. Especially at the international level, P3s can take the shape of multistakeholder bodies for discourse and norm setting on issues of public import, potentially blending the legitimacy of the state with private sector expertise to inform measured and responsive policy. Such global governance regimes can promote regulatory harmonization and provide openings for civil society participation. However, multistakeholder P3s also raise notable questions of transparency, accountability, and democratic legitimacy by distributing power between state and nonstate actors [24].

The World Economic Forum (WEF) has advocated for multistakeholderism as a powerful tool for collaborative and effective global technology governance [25]. In May 2019, the Forum, under the leadership of its Center for the Fourth Industrial Revolution, launched six Global Fourth Industrial Revolution Councils (GFIRC) focused on restoring trust in emerging technologies. The six technologies were selected on the basis of pressing need, with one of them being AI (the Global Artificial Intelligence Council). As noted by the WEF at the time of their launch [26], a key objective of the GRIFC's will be to "develop policy guidance and address 'governance gaps' or the absence of well-defined rules for emerging technology." Each council is made up of leading experts from the world with representation from government, industry, NGOs, and academia. Brad Smith, president of Microsoft, and Lee Kai-Fu, Chairman and Chief Executive Officer of Sinovation Ventures, were appointed as the annual co-chairs of the Global Artificial Intelligence Council [26]. While it is still too early to

determine the impact that these councils will have on shaping the global governance landscape for AI and five other technologies, the initiative has the potential to provide credibility and legitimacy to these discussions and provide a powerful platform to advance ideas.

Lessons may also be drawn from the International Council for Harmonization of Technical Requirements for Pharmaceutical for Human Use (ICH), which was established in 1990 by the pharmaceutical regulatory agencies in Japan, the United States, and Europe, in partnership with their pharmaceutical industry associations [27]. The resulting P3 provided a platform to innovate within the field of pharmaceutical science and harmonize their national regulatory frameworks. The ICH strives to promote global public health by encouraging common (yet not identical) safety and performance standards across jurisdictions [28], serving public and private interests by speeding both market entrance and patient access. By orchestrating multiple regulators with expert industry input, the ICH has yielded "neither a strengthening nor a weakening of national standards" while rendering "national government regulation more efficient and effective" [27].

These initiatives, along with others such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (the Global Fund) and the Global Partnership for Sustainable Development Data, highlight that success may be achieved by grounding the development of AI governance in a multistakeholder approach. We argue in this article that a global P3 for AI, grounded in multistakeholder approaches, could result in similar benefits to national and supranational regulatory efforts while inviting industry and civil society actors to participate and contribute their technical expertise to governance and harmonization projects.

Standards

Though at the "softer" end of the legal spectrum, voluntary transnational instruments may also play a significant role in the global governance of AI [29]. These include technical standards issued by standards-setting bodies such as the International Organization for Standardization (ISO) or the IEEE Standards Association (IEEE SA). Technical standards can package regulatory norms as definitions or as design or manufacturing specifications, which can provide a common language or basis for measuring the performance of a new technology. While compliance by firms is not legally required—unless the standard is incorporated into domestic or international law—it may become desirable to facilitate international trade and reputational status in markets impressed by standard compliance [30]. However, these benefits come primarily from global standards, as multiple conflicting national standards can complicate trade and regulatory orchestration.

Standards can be used to create and adjust regulatory norms more quickly than through government action, though with a process that may lack transparency and democratic legitimacy. By operating under consensus-based models where representatives from around the world can participate in deliberative norm creation, standards gain legitimacy through their support from diverse groups and stakeholders rather than from a legal mandate or state sovereignty [31].

However, "pay for play" models which require interested parties to pay fees to participate can jeopardize this legitimacy by excluding public, private, or civil society stakeholders without the means to afford fees [32]. Kica and Bowman [32] point to *TC229—Nanotechnologies* as a case-in-point. The technical committee was established in 2005 in response to the increasing public and private sector investment in nanotechnologies and nanosciences, and the increasing development of standards by national and subnational bodies in response to this activity. Despite significant investment in fundamental research and development activities by most states and Fortune 500 companies [33], and the pressing need for standard harmonization, the work of TC229 is being driven by—as of 2021—39 participating members, the largest of which is the United States [34]. That is not to say that their work output, which now includes 95 published ISO standards as of November 2021, is not impressive and that what they do is not of fundamental importance to the development of the platform technology. But, the drafting and establishment of these standards is being undertaken by a limited number of players, many of whom are key actors in shaping the governance of nanotechnologies in other global forums.

Transnational standard-setting bodies have already begun work on various technical aspects of AI. In 2017, the ISO and International Electrotechnical Commission's Joint Technical Committee 1 on information technology formed a new subcommittee 42 (ISO/IEC JTC 1/SC 42) to craft and guide AI

standards [35]. As of November 2021, the subcommittee has finalized nine technical standards and involves 33 member states, with many large states from TC229 also participating in JTC 1/SC 42. One published standard covers "trustworthiness in artificial intelligence" by evaluating how AI design can modulate qualitative measures of AI performance such as "transparency, explainability, [and] controllability" [36]. The IEEE SA has also begun standardization efforts for various AI elements through 14 working groups [37]. Notably, the IEEE SA project explicitly seeks to promote "societal benefit" from AI by examining "the intersection of technological and ethical considerations." By considering ethical and normative dimensions of AI, both JTC 1/SC 42 and the IEEE SA have postured themselves as institutions which can or should influence public or private governance of AI.

Discussion

Many complex policy issues created by AI will transcend jurisdictional boundaries and challenge existing national and supranational-level regulatory institutions. A cooperative and inclusive global response should therefore provide a more effective, efficient, and legitimate governance regime than through the efforts of individual states or private actors. The underlying "pacing problem" and dynamic social values on AI will require a flexible and responsive governance framework to maximize its capacity to respond to shifting risks and problems [1]. Assessing the strengths and weaknesses of available tools for AI global governance, guided by experience with other emerging technologies, will be critical to building an effective, robust regime.

While public international law is a classic tool for global governance, the slow and political process of creating international agreements has increasingly complicated the use of treaties for other emerging technologies. While the Cartagena Protocol created treaty law on the import, export, and containment of genetically modified organisms (GMOs), large states including Canada, the United States, and Australia have not ratified the treaty. Furthermore, fewer than 50 states have become parties to the Cartagena Protocol's supplementary agreement defining liability and response norms [38]. For nanotechnologies, despite calls for a framework convention or other multilateral agreement to manage the potential health and environmental concerns [12], little hard law has crystalized. Instead, hard international law has only manifested within the EU and New Zealand for very specific applications [39].

Though a framework convention on AI may eventually arise, experience with previous emerging technologies suggests that an international agreement on AI would struggle to receive broad participation and will likely lack the agility to respond to current and near-term governance gaps. States could instead form IGOs or use existing ones such as the IMDRF to address AI governance. Yet, the narrower subject matter focus of many IGOs (e.g., medical device safety and performance) will restrict the ability of these institutions to pivot and move with agility to engage on complex issues spanning multiple sectors such as technological unemployment. Limited participation from lower-income states in IGOs could also jeopardize their legitimacy and accountability in responding to politically fraught issues such as algorithmic bias.

Rather than classic multilateral arrangements, P3s and multistakeholder institutions, including the International Congress for the Governance of AI, appear to offer more promise for the global governance of these technologies, at least in the near term. The pharmaceuticals space has already had a degree of success with multistakeholder bodies in the ICH and Global Fund, which have promoted regulatory harmonization and resource coordination at the global level for a highly technical subject matter [27]. Managing the uncertain advantages and risks surrounding AI may benefit from similar multistakeholder approaches, where private expertise and public interests could combine to create more effective and orchestrated norms and decisions. Forgoing "hard law" as a tool for establishing regulatory norms offers advantages as well for the rapidly emerging applications of AI, as the softer norms often wielded by multistakeholder bodies retain more flexibility and agility than treaty law.

Organizations such as the GFIRC body focused on AI governance hold early promise here [26], however these institutions must take caution to avoid perceived failures of democratic governance principles [24]. Transparency about how multistakeholder bodies make decisions about AI, who votes, and what discussions lead to decisions will play a role in bolstering perceived legitimacy. The ICH has made steps in this direction by publishing

some documents or summaries of its proceedings [40], and multistakeholder bodies in AI can strive for transparency with similar or greater measures.

Transnational, consensus-based standards were the most significant tool to fill governance gaps for nanotechnologies, ultimately influencing national-level policymaking around the world [41]. Standard-setting bodies will similarly play an important role in the governance of AI, through harmonization across technical areas—including, for example, terminology, nomenclature, privacy, and security—critical to the deployment of AI across industries and jurisdictions. Once published, such standards are likely to be incorporated into national and supranational legislation and policies, inform the work of multistakeholder initiatives, and, over time, be incorporated into multilateral agreements, framework conventions, and other instruments of public and private international law. Already, the ISO/IEC 27701 standard on data privacy and its predecessors have had global impact, with national and supranational legislatures adopting principles and practices from the standard, while still tailoring regulation to local concerns and policy priorities [42]. Furthermore, transnational standards more directly targeting AI should similarly enable global coordination while leaving room for local policy concerns.

As evidenced by ISO *TC-229—Nanotechnologies*, standard-setting bodies may exert their influence by moving beyond purely technical concerns, including by considering health and environmental issues, and extending recommendations to policymakers on consumer and societal dimensions including, for example, product labeling [43]. Similarly, the JTC 1/SC 42 and IEEE SA working groups have begun to evaluate ethical and normative issues in AI and may be well positioned to influence national and supranational policy.

However, as with nanotechnologies, legitimacy troubles may follow should "pay for play" or other processes lead to inadequate participation or exclusion of public and civil society organizations [32]. The ISO, and other standards setting bodies such as the European Committee for Standardization and the Standardization Administration of the People's Republic of China should work to ensure that their processes of setting and interpreting norms for AI are transparent and open to participation from interested stakeholders to build public legitimacy and design more robust norms [31].

Future of global AI governance

Taken together, these lessons from other technological spaces suggest that multistakeholder bodies and transnational standards may provide optimal institutions and instruments for the early global governance of AI, where legitimacy and participation concerns can be meaningfully addressed. This conclusion reflects both a normative determination based on the potential effectiveness of these instruments and institutions in the immediate term (relative to other options) as well as a pragmatic determination that these mechanisms will provide the most politically achievable options in the short-to-medium term.

Based on the ideas presented in this article, we suggest here that the next five to ten years of global AI governance will likely be characterized by an increase in the volume and influence of transnational standard-setting and multistakeholder body activities around AI. The use of transnational standard-setting bodies as mechanisms for diffusing norms on AI to national and supranational governments would follow the empirical trends observed around nanotechnologies [41], while engaging multistakeholder P3s appears likely given the preference of large private actors to operate through forums such as the ICH or WEF. As various influential actors distill norms for AI governance, such as the OECD and G20 principles [20], standard-setting institutions and multistakeholder bodies will likely act as primary mechanisms for dispersing these norms around the world [44]. The predominance of these institutions would create a significant role for softer legal norms in advancing early global governance for AI.

While the EU has recently proposed supranational regulation for AI, establishing a comprehensive and risk-based regulatory framework [17], this push toward hard law likely reflects a development that will remain unique to Europe in the shorter term. The notably precautionary postures toward risk and technological uncertainty in the EU, existing supranational infrastructure, and greater regulatory resources generally available in high-income jurisdictions all provide conditions that collectively allow EU states to place AI higher on their agendas. While other states may express interest in hard international law for AI, the difficulty of achieving the political conditions to place these issues on the agenda, combined with the significant resource demands for doing so, will likely restrict the success of such efforts in at least the next

five to ten years. A potential exception here may come from military applications of AI, which could quickly rise to international political prominence should a conflict involving autonomous weapons occur or be threatened. Existing humanitarian law may already capture autonomous weaponry, potentially enabling a faster crystallization of hard legal interventions in this domain [9].

Anticipating a system of global AI governance defined by primarily softer legal interventions in the short-to-medium term has significant implications for policy analysis and research over this period. The likelihood of standard-setting and multistakeholder institutions as predominant sites of early global AI governance should prompt analysts to identify and closely evaluate the values and interests of particular "global governors" that may arise from this regime [45]. This is especially true for those bodies driven by a pay-to-play model which have the potential to unfairly disadvantage certain jurisdictions. Technical assessments of multistakeholder models and transnational standards must be qualified by examinations of the specific institutions which actually perform global governance functions for AI. While offering great theoretical potential by blending private expertise and public interest, each individual institution has particular constellations of values and constituencies that should receive critical attention as they act as conduits for determining and dispersing AI regulatory norms around the world. Future research and policy efforts should assess the dynamics within and around specific institutions, including their inclusiveness and the voices they represent—or exclude—as they conduct governance activities in real time.

Similarly, the potential legitimacy, transparency, and accountability issues that can accompany multistakeholder and standard-setting bodies wielding or coordinating soft law should be empirically evaluated in the particular contexts that appear as value conflicts inevitably arise over AI. As specific standard-setting or multistakeholder institutions make decisions to resolve these value conflicts, attention should be drawn to the underlying structures, values, and interests that may impact their role and preferences in advancing global governance for AI. Special attention may be required around the transparency of decision-making bodies and the actual potential of interested public and nonstate actors to participate in decision-making [32].

These calls for future analysis should not discount the real potential of standard-setting and multistakeholder bodies applying softer legal norms to bring about an effective framework for AI governance. Yet, as the world enters this first phase of global AI governance over the next five to ten years, it will become ever more critical to ensure that the institutions and instruments deployed actually do promote human dignity, wellbeing, and privacy, as AI continues to have real impacts around the world. ■

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