Diffusion of power and multiplexed governance: evolving networks and clusters for global governance of AI infrastructures

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Global governance consists of recognized institutions and charters, explicit global rules and implicit collective understandings among global actors.[1] Patterns of global governance have been historically explained in various International Relations theories through global distribution of material resources in which hegemonic powers constrain or expand options;[2] national and international governance agendas respond to market and other actors,[3] or capitalist ideologies;[4] or global actors champion norms through intense socialization.[5] These explanations posit clearly identified outcomes such as the presence of a global liberal order or the presence of international norms traceable to socializing agents. One of the contentions of this article is that global governance is not easily captured as a simplified outcome, such as a global hierarchy of powers or a liberal international order (LIO), or even a dependent variable

[1] James N. Rosenau and Ernst-Otto Czempiel, *Governance without government: order and change in world politics* (Cambridge, UK: Cambridge University Press, 1992).

[2] Daniel W. Drezner, *All politics is global: explaining international regulatory regimes* (Princeton: Princeton University Press, 2008); Henry Farrell and Abraham L. Newman, 'Weaponized interdependence: how global economic networks shape state coercion', *International Security* 44: 1, 2019, pp. 42–79, https://doi.org/10.1162/isec_a_00351.

[3] Mark W. Zacher and Brent A. Sutton, *Governing global networks: International regimes for transportation and communications* (Cambridge, UK: Cambridge University Press, 1996); J. P. Singh, *Negotiation and the global information economy* (Cambridge, UK: Cambridge University Press, 2008).

[4] Robert W. Cox with Timothy J. Sinclair, *Approaches to world order* (Cambridge, UK: Cambridge University Press, 1996); J. P. Singh, 'Critical International Political Economy: critical theory and its critique of liberalism', in Cameron G. Thies, ed., *Handbook of International Relations* (Cheltenham: Edward Elgar, 2025).

[5] Martha Finnemore and Kathryn Sikkink, 'International norm dynamics and political change', *International Organization* 52: 4, 1998, pp. 887–917, https://doi.org/10.1162/002081898550789; Stefano Guzzini, 'A reconstruction of constructivism in International Relations', *European Journal of International Relations* 6: 2, 2000, pp. 147–82, https://doi.org/10.1177/1354066100006002001.

specified statistically as a vector in a matrix. To demonstrate its claims, the article's evidence attends to perhaps the most important infrastructural and global governance issue of our times, namely artificial intelligence (AI).

This article examines how national and international actors coordinate their activities in important emergent issue areas such as AI infrastructures. We liken this situation to a diffusion of power in which no single actor can dictate governance outcomes. How does a diffusion of power across multiple actors and regions weaken both the material and socialization capabilities of hegemonic actors? Analogously, how does this diffusion lead to new forms of geographic clusters and networks that offer international actors multiple and interlocking sets of governance outcomes?

We provide evidence from global AI infrastructures worldwide which showcase networks and clusters among national and international policy actors as well as both uniformity and divergence in infrastructural rollouts. These outcomes are different from several characterizations of global orders. The empirical evidence shows that the infrastructural rollouts in AI are not easily categorized as rival global orders (capitalist versus non-capitalist, for instance), competition among rival great power blocks or the product of socialization through international actors. If anything, the evidence presented below contains elements of all these international processes, which leads us to characterize the global governance outcomes as 'multiplexed'.[6] Amitav Acharya's formulation of 'multiplexity' follows multiplex theatres that offer a variety of services, including movies, vendors and video games. Similarly, the global AI outcomes described in this article show that actors draw from a menu of choices that both intersect and diverge from those of others. While appreciating the diversity of interlocked outcomes, this article's use of 'multiplexed' as a verb calls attention to multiplexity as a variable process, rather than just a fixed characteristic, much as we may distinguish between a network and a networked process.

While the emerging 'networks and clusters' centred around a menu of sub-issue areas among AI infrastructures conform to Amitav Acharya's notion of multiplexed forms of governance, multiplexity can be understood as a world order outcome that describes emerging patterns of governance and demands an explanation regarding its origins. Therefore, scholars working on multiplexity and similar frameworks such as 'interlocking regional works' have noted the importance of regional and intersecting networks, and the trickle-up of local and regional epistemes and values.[7] Most of these ontologies are theoretical but descriptive, though recent work has begun to use network analysis.[8] This article uses computational models to highlight the convergences and diver-

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[6] Amitav Acharya, Antoni Estevadeordal and Louis W. Goodman, 'Multipolar or multiplex? Interaction capacity, global cooperation and world order', *International Affairs* 99: 6, 2023, pp. 2339–65, https://doi.org/10.1093/ia/iiad242; Amitav Acharya, 'After liberal hegemony: the advent of a multiplex world order', *Ethics & International Affairs* 31: 3, 2017, pp. 271–85, https://doi.org/10.1017/S0892679417000020X.

[7] Nora Fisher-Onar and Emilian Kavalski, 'From trans-Atlantic order to Afro-Eur-Asian worlds? Reimagining international relations as interlocking regional worlds', *Global Studies Quarterly* 2: 4, 2022, https://doi.org/10.1093/isagsq/ksac080.

[8] Acharya, Estevadeordal and Goodman, 'Multipolar or multiplex?'.

gences among AI networks. Such analyses feature interlocking and divergent pathways that do not conform to simple linear explanations that describe outcomes shaped through distribution or weaponization of capabilities, or the socialization of actors around some preponderant norms or ideologies.

The article locates the explanation for multiplexity outcomes in the shift from a hierarchical distribution of power to a flatter diffusion of power in which systemic interactions can be top-down, bottom-up or horizontal. A diffusion of power across multiple actors and regions weakens the material and socialization capabilities of hegemonic actors. Global AI infrastructures and policies are emerging when top-down enforcement capabilities of powerful nation-states to order the world to their liking continues to break down or be challenged. In the meantime, the material and socialization capabilities of non-hegemonic actors continue to increase.

This article examines national AI policies and selected United Nations AI reports for the multiplexity outcomes. Arguably the most impactful technology of the twenty-first century, AI's rapid global rollout is taking place in an era that is often characterized as deglobalizing and less multilateralist than in the postwar twentieth century. AI policies are, therefore, an important case for examining complex global governance processes in a diffusion of power. These AI infrastructural outcomes can be now briefly defined. They result from the processing or manipulation of large datasets with machine-learning algorithms. Although AI was identified (or coined as a term) in the 1950s, it is only in the last decade that states have begun formulating national strategies for AI infrastructures, and international organizations (IOs) are often involved in trying to shape AI infrastructures through directives and reports. These policy outcomes include security and regulatory issues for data and algorithms, benchmarks and standards, workforce training, human rights issues, innovation and competitiveness. This article uses computer science methodologies to examine how actors' expectations converge or diverge around norms, rules and decision-making procedures embedded in national AI infrastructures or fostered through UN organizations.[9]

While this article analyses AI policies from national governments and IOs, it brings to fore the prioritizations and expectations from a host of other actors that include societal stratifications (labour, class, gender, youth, etc.), occupations (commerce, health, education, transportation), civil society (NGOs, human rights groups, data privacy organizations), businesses (start-ups, big tech, commercial organizations), and educational and research organizations. The analysis of the state also shows the involvement of various agencies, ministries and regulatory organizations.

Our explanation, centred on diffusion of power, is not dismissive of the counterfact, the hierarchical capabilities among states or IOs in terms of leading or influencing other states or IOs. In fact, our computational methodologies

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[9] The last sentence draws from regime theory in global governance. See Stephen D. Krasner, ed., *International regimes* (Ithaca, NY: Cornell University Press, 1983).

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point out clear 'leaders' in AI infrastructures in terms of their capabilities. However, our analysis shows that leaders do not lead as clearly as once thought, and 'non-leaders' may have many opportunities for empowerment and not just suffer as they must—as Thucydides characterized their fate. This claim is as much about capabilities as it is about global justice. Earlier, we hinted at regime theory in which hegemonic or leading powers often played a pre-eminent role in causing actor expectations to converge. Global actors have not shied away from playing leadership roles, but their activities are not as hegemonic as once imagined. Other hegemonic actors, such as Microsoft or leading universities, also play different roles when assisting with AI efforts on low-resource languages or designing machine learning for development efforts in health, agriculture and education. Second, global actors can be non-hegemonic, and global understandings about AI can arise from leading and non-leading states. Global crowdsourcing platform Ushahid and mobile money-transfer service M-Pesa, both of which now employ machine-learning algorithms, originated in Kenya. These platforms have introduced new understandings in our politics about everyday participation (Ushahidi) and the transactions capacities and velocity of money (M-Pesa).

In the analysis presented below of national AI infrastructures, the leading powers do what they can, but the non-leaders do not suffer as they must. They cluster with others, join complex networks and sometimes even make the great suffer as they must. The diffusion of power in the world today, among complex and interlocking networks and regional or international clusters, is not without sources of power or disruption (such as through weaponization or misinformation, for example), but it is equally about a multiplex world in which international actors draw from a varied menu of choices. The clusters and networks presented in a diffusion of power help us explain these multiplexity outcomes. As we will see, computational methods provide an interlocking way of examining processes and outcomes that we have described elsewhere as 'entangled narratives'.[10]

This article proceeds as follows. The next section posits diffusion of power as a generalized condition leading to multiplexed outcomes in the world. After that, we outline the computational methodology we employ to identify the emergent clusters and networks of global AI governance. Then we present the empirical results before returning to the broad theme of global governance in the concluding discussion.

Diffusion of power and multiplexity

The variability of AI policies covering issues of business, society, politics and regulation is as remarkable as the fact that most of these policies are less than

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a decade old. We attribute the variability to a diffusion of power, while we understand the variable menus available in AI policies as multiplexity. While AI has commanded the attention of data scientists and psychologists since the 1950s, it was not until big tech platforms such as Google, Amazon, Facebook (now Meta), Alibaba and Tencent began using algorithms to process user or consumer data that AI became 'visible' and of concern to policy-makers, regulators, firms and societal actors. These concerns varied from regulations on data storage and flows to boosting skills for economic development and competitiveness. With the ability to manipulate individuals as voters, consumers or activists, challenges have arisen about the ubiquitous presence of AI in political and social realms. For example, 'stovepiping' or channelling groups through ideologically-aligned media can threaten compromise or deliberation that are core to democratic processes.

AI is now an omnipresent global term. Starting with the United States' and Canadian national AI strategies in 2016, more than 70 countries and several UN agencies and IOs have now published strategies and policy recommendations for AI infrastructures. These reports are often aspirations for the future, but they also document existing needs and capabilities. For instance, most developing countries link AI infrastructures to developmental goals in areas such as agriculture and health, while the policies from leading (great) powers in AI are about growing basic science capabilities and maintaining competitive advantage. In past research, we have noted that the policies borrow from a *prix-fixe* menu of options, but that the way the countries borrow from this may depend on a variety of domestic, regional and international factors.[11]

The outcomes to be demonstrated empirically in this article show networks and clusters among official AI policies of states and IOs. Together, these outcomes can be understood as multiplexity in that they offer a menu of policy choices to states and IOs. We have also characterized these outcomes as 'AI wardrobes', with each wardrobe being different; states and organizations cluster and network in interesting ways around these choices.

To explain these outcomes causally, this article makes an important distinction between hierarchical distribution of power versus diffusion of power. Diffusion of power is both material and ontological. The material aspects of diffusion of power point to flattened hierarchies and cross-crossing ties among multiple actors in an international system. The ontological aspects refer to collectively-held beliefs and values that influence or, as posited above, are influenced through infrastructures. Table 1 captures the main elements of diffusion of power as opposed to hierarchical distributions of power.[12]

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[11] J. P. Singh et al., 'Entangled narratives'; J. P. Singh, Amarda Shehu, Caroline Wesson and Manipriya Dua, *The 2023 global artificial intelligence infrastructures report* (George Mason University and Stimson Center, 2023), https://www.stimson.org/2023/2023-global-artificial-intelligence-infrastructures-report. (Unless otherwise noted at point of citation, all URLs cited in this article were accessible on 3 February 2026.)

[12] Adapted from J. P. Singh and Michael Woolcock, 'The future of multilateralism and global development: opportunities for constitutive and functional reform', *Global Perspectives* 3: 1, 2022, https://doi.org/10.1525/gp.2022.57594.

Table 1: Power configurations and outcomes

Characteristic	Diffusion of power	Hierarchy
Dominant world-view	Multiple and intersecting ontologies	Great power ontologies often framed as 'security'
Number of actors (states, IOs, NGOs, multinational corporations)	Multiple	Framed as bilateral, even in pluralistic contexts (e.g. North–South, US–European Union, West–China)
Forms of decision-making	Collective, networked, clustered	Hierarchical
Outcomes	Multiplexity	Simplexity

Hierarchical capabilities of actors in international and national political economies hold some value for explaining the rollout of infrastructural policies, and they remain an enduring explanatory feature of social sciences. In hierarchical environments, instruments such as coercion or socialization will bind non-hegemonic and subaltern actors to obey or adopt top-down prerogatives.[13] As the case of socialization shows, instruments of domination need not be material: they can, equally, be administrative and ideological.[14] Sheer force can solve problems of collective action in a hierarchy and even bind the subaltern into accepting the benefits of public goods.[15] Stephen Lukes shows that the effects of power can be total, in that the subalterns may not even realize that they are being dominated.[16] The political ethnographer James Scott has shown that the modernizing state developed its instruments of domination through an administrative 'cadastral lens': the state developed its habit of domination through its power to count, categorize and then fix subjects in roles (including as recipients of state favours).[17] If a state wants its AI policies to benefit the poor, then it must count and categorize the poor. Similarly, a great power's provision of a public good uses a cadastral lens. Singh argues in *Sweet talk* that the public good of the LIO worked by both including and excluding the developing world, and the instruments of inclusion and exclusion included racialized ontologies that resulted in policies such as 'special and differential treatment' of the developing world.[18]

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[13] Steven Lukes, *Power: a radical view* (Basingstoke: Palgrave Macmillan, 2005); Stephen D. Krasner, *Structural conflict: the Third World against global liberalism* (Berkeley, CA: University of California Press, 1985).

[14] James C. Scott, *Seeing like a state: how certain schemes to improve the human condition have failed* (New Haven, CT: Yale University Press, 1998); Lukes, *Power.*

[15] David A. Lake, *Hierarchy in international relations* (Ithaca, NY: Cornell University Press, 2009).

[16] Lukes, *Power.*

[17] Scott, *Seeing like a state.*

[18] J. P. Singh, *Sweet talk: paternalism and collective action in North–South trade relations* (Stanford, CA: Stanford University Press, 2017).

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Hierarchies work best when they can be imposed, accepted or internalized—a difficult proposition in the case of a diffusion of power. Even in the case of a distribution of power, the weapons of the weak have always entailed challenging or disobeying hierarchy.[19] At a broader level, even if the great make the weak conform, it does not mean that the weak have acquiesced, unless the strong literally kill them—as when the Athenians killed the Melians during the Peloponnesian war. Beyond the world of brutal force—for example, in matters such as data security policies—actors may have an enormous range of options. For example, while many EU states complain about the restrictions of the bloc's data protection policies, other members such as the Czech Republic and Estonia have leapfrogged through these data spaces, developing start-ups and AI providers.

In conceptualizing hierarchical distributions of power, technology adoption is often a categorical variable to be switched on or off. In such conceptions, IOs succeed in making states conform to their *diktats*,[20] or powerful ideologies socialize actors into adopting policies and practices.[21] In the latter world, big tech companies produce almost complete ideological systems, where the material extractions and dominations are not immediately obvious. Kate Crawford shows that AI depends on highly exploitative and material economies of resource extraction.[22] Similarly, recent concerns about the negative environmental and energy impact of big tech has shown that 'AI' has material roots.[23]

Liberal international theory has always attributed more agentic power to actors than allowed in hierarchical conceptions of politics. For example, liberal theory shows that technology diffusion can result from a variety of processes including competition, learning, emulation and coercion.[24] Liberal conceptions of world order come closest to the diffusion of power processes described below. However, liberalism often takes its ontology as given, rather than being dynamically constructed or changing as technologies evolve.

Diffusion of power could be seen in the LIO of the past but goes beyond it, in according more agency to non-dominant actors and, as noted above, to technologies themselves.[25] Liberal conceptions often rest on idealized models

[19] James C. Scott, *Weapons of the weak: everyday forms of peasant resistance* (New Haven, CT: Yale University Press, 1985).

[20] Michael N. Barnett and Martha Finnemore, 'The politics, power, and pathologies of international organizations', *International Organization* 53: 4, 1999, pp. 699–732, https ://doi.org/10.1162/002081899551048.

[21] Edward Comor, 'The role of communication in global civil society: forces, processes, prospects', *International Studies Quarterly* 45: 3, 2001, pp. 389–408, https://doi.org/10. 1111/0020-8833.00206.

[22] Kate Crawford, *The atlas of AI: power, politics, and the planetary costs of artificial intelligence* (New Haven, CT: Yale University Press, 2021).

[23] Dustin W. Edwards, Bridget Gelms and Rich Shivener, 'Infrastructural storytelling: a methodological approach for narrating environmental (in) justice in technical and professional communication', *Technical Communication Quarterly* 32: 3, 2023, pp. 242–53, https://doi.org/10.1080/10572252.2023.2210198.

[24] Beth A. Simmons and Zachary Elkins, 'The globalization of liberalization: policy diffusion in the international political economy', *American Political Science Review* 98: 1, 2004, pp. 171–89, https://doi.org/10.1017/S0003055404001078; Beth A. Simmons, Frank Dobbin and Geoffrey Garrett, 'Introduction: the international diffusion of liberalism', *International Organization* 60: 4, 2006, pp. 781–810, https://doi.org/10.1017/S0020818306060267.

[25] For example, the ability to manipulate vast amounts of data about users and then stovepipe their actions through recommender algorithms is a peculiar quality of AI infrastructure. As science, technology and society scholars have long argued, technological infrastructures themselves have agentic power. They embody past values and priorities and shape future ones: Langdon Winner, 'Do artefacts have poli-

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of market exchange where agentic behaviour results in beneficial or pareto-optimal outcomes for many. Such ideals have in fact been critiqued as ideologies. In the words of Karl Polanyi, *laissez-faire* was invented to increase the power of capitalism.[26] Such critiques notwithstanding, material or ideological power is seldom so totalizing as not to allow for any deviation or variability in outcomes.[27] Along with scholars of multiplexity, this article's evidence, presented later, shows that the presence of complex and variable outcomes are more regular than those of hierarchy. Importantly, multiplexity and hierarchy are not binaries, but coexistent. For example, the presence of local values favouring forms of patriarchy does not make gender relations less hierarchical, even when global human rights norms favour gender equality. Gender relations are varied and multiplexed. Therefore, our argument for multiplexity need not be taken to mean emancipatory possibilities unless multiplexity opens spaces for inclusion, deliberation or contestability from a variety of actors. Imposition of autocratic and hierarchical practices in a multiplex world are exactly that. For instance, we will go on to show that Chinese AI policies are not predicated towards dialogues and human rights concerns as compared to AI policies in pluralist states. Nevertheless, both types of states have also encouraged basic science capabilities and are locked in a competitive game in obtaining the greatest number of patents in AI. Taken together, multiplexity allows one to see a more complex and bigger picture of convergences and divergences among political actors.

The evidence for multiplexity

The complex patterns of global governance are now illustrated through our empirical methodology that points to multiple entangled outcomes and clusters of states with similar outcomes. We can spell out the expectations about these outcomes. First, the counterfactual: in a distribution of power, a set of powerful actors—nation-states acting by themselves or through IOs—can shape outcomes conforming to their interests. With a diffusion of power, we can expect multiple and interlocking clusters with granular level outcomes that are differentially shared or spelled out.

To illustrate the interlocking patterns and granularities, we use a computer science technique known as latent Dirichlet allocation (LDA) to find topics or themes in documents, in this case national and international AI policies. We are interested in seeing how states and IOs emphasize different things from a menu of choices available to them and LDA analysis is well suited for this purpose. The methodology can find more than one topic in a document, and a topic

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tics?', *Daedalus* 109: 1, 1980, pp. 121–36; Marieke de Goede and Carola Westermeier, 'Infrastructural geopolitics', *International Studies Quarterly* 66: 3, 2022, https://doi.org/10.1093/isq/sqac033. To make the connection with policies and regulations, AI infrastructures have foregrounded concerns such as privacy, surveillance and cybersecurity as a result of the ability to manipulate vast amounts of data.

[26] Karl Polanyi, *The great transformation: the economic and political origins of our times* (London: Penguin, 2024; first publ. in 1944).

[27] J. P. Singh, 'Critical International Political Economy'.

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may be shared in a probabilistic way with documents from other countries, which allows us to see how countries might share topics.

Methodology

In order to illustrate the existence of multiplexity, we need a methodology that finds a finite number of topics, which can be understood as priorities, among different national and international organizations' AI policies. Further, we need to be able to show that the priorities are related to a diffusion of power, meaning the priorities arise from the interests of various actors and are not just reflective of some international systemic influences (e.g. great power or IO pressures). The LDA methodology specified below meets all these conditions.

The methodology extracts topic-based representations of any text—in our case national and international AI documents—via concepts and techniques that reside at the intersection of machine-learning and natural language processing. The underlying framework is probabilistic in that it presents a topic as a probability distribution over jointly-occurring words. Specifically, the methodology we employ builds over the LDA algorithm, which operationalizes the probabilistic framework and so builds probability distributions; each document is represented as a probability distribution over identified topics, and each topic is itself represented as a probability distribution over the words in the vocabulary built over the entire corpus of documents.

We selected LDA for our methodology because it faithfully extracts information from a given corpus without inventing content, unlike newer generative models such as ChatGPT, which are known to 'hallucinate' or produce plausible-sounding but fabricated information.[28] However, as in many probabilistic frameworks (and computational methods), key decisions are presented to the user. In LDA, these concern the number of topics and two hyperparameters that control the shape of the Dirichlet distributions (that the algorithm builds for documents—over topics—and topics—over words). Therefore, the methodology we employ here explores the (configuration) space of these three parameters, building thousands of LDA models (each with their own topics) and then effectively merges highly similar models, with our STAR-LDA model explained later, to identify reliable topics and corresponding probability distributions that are not dependent on arbitrary user decisions.

From our methodology, each document is characterized by multiple topics, weighted by their prominence in that document. Each topic, in turn, is characterized by a set of words, weighted by how central they are to that topic's meaning. While the outputs are quantitative, they can be visualized through data visualization techniques, as we do in this article. For instance, a topic,

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[28] Ziwei Xu, Sanjay Jain and Mohan Kankanhalli, 'Hallucination is inevitable: an innate limitation of large language models', *ArXiv*, 22 Jan. 2024, https://api.semanticscholar.org/CorpusID:267069207. AI produces probabilistic predictions from underlying data and texts; it may produce faulty predictions when the data sets are large or biased, which can be controlled in an LDA environment with limited texts and supervised learning.

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while a probability distribution over words, can be visualized as a word cloud, with the words rendered in font sizes that reflect the probabilities. A document, while a probability distribution over topics, can be visualized as a 'heat' vector, and doing this for all documents produces a 'heat map' in which the probability of a topic in a country is related to a grade of colour, within a scheme that is gradated to show low to high probabilities. Such a colour scheme, in grayscale, is shown in figure 1.

Figure 1: The gradation scale used in the heat maps
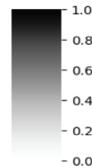
Our methodology identifies 18 core topics over many LDA models, with a combined 2,400 potential topics. We discarded topics that appeared unstable (topics that emerged in some analytical runs but not in others, suggesting they were artifacts of how the algorithm started rather than genuine patterns in the data). We merged highly similar topics, yet allowed for topic overlaps to obtain a rich and nuanced picture. We used the STAR–LDA model to select stable topics.[29] Stability means that through multiple LDA runs, these topics are likely to be formed over and over again. These stable topics were used to generate the document topic matrix/heat map. From the latter, we removed topics that did not have at least one document with a topic probability of 0.1 (threshold = 0.1, or 10 per cent). We chose this threshold to ensure that each topic we retained appeared prominently in at least one document (accounting for at least 10 per cent of that document's content). Generally, a higher threshold yields fewer topics, while a lower threshold yields more topics. We retained as many topics as possible, hence the low threshold, since this retains maximum information: we did this to not eliminate any potentially important topics by mistake. After obtaining our stable topics, we moved on to a second selection process, where we eliminated the topics that are not as relevant for the analysis. Through this iterative process, we obtain 18 topics from 2,400 using STAR–LDA.

We draw a distinction here between 'training' and 'testing', common terms in machine-learning literature. Our methodology identifies topics by 'training' LDA models over a training dataset of documents. Each document in the dataset can be viewed as a probability distribution over the identified topics. However, the identified topics can additionally be 'tested' over a different dataset. Any document not included in the training dataset can be reformulated as a probability distribution over topics identified in a separate dataset. This approach has allowed us to investigate interesting hypotheses: for instance, what is the

[29] Manpriya Dua, *Machine learning-enabled unraveling, organizing, and enriching of AI strategies*, PhD diss., George Mason University, 2025.

potential presence of topics identified in (that is, resulting from models trained over) set A in a different set (B) of documents (serving as a testing dataset).

It is worth noting that a topic may appear with different probabilities in different documents. Topics may also be related to one another. Our analysis of the quantitative findings additionally allows us to see the correlation among topics because of common features (shared, highly-probable words). For example, topics in the German and US national plans, as we present below, are related because of their emphasis on federal processes and national standards or benchmarking agencies. We present potential topic overlaps through a heat map, where the overlap/similarity between two topics is computed using two different similarity measures that are well suited for comparing sets: the Jaccard similarity index and rank-biased overlap.[30] Using these measures, the topic similarity is computed as an average based on the word-probability distribution of each topic's top 20, 50 and 100 words.
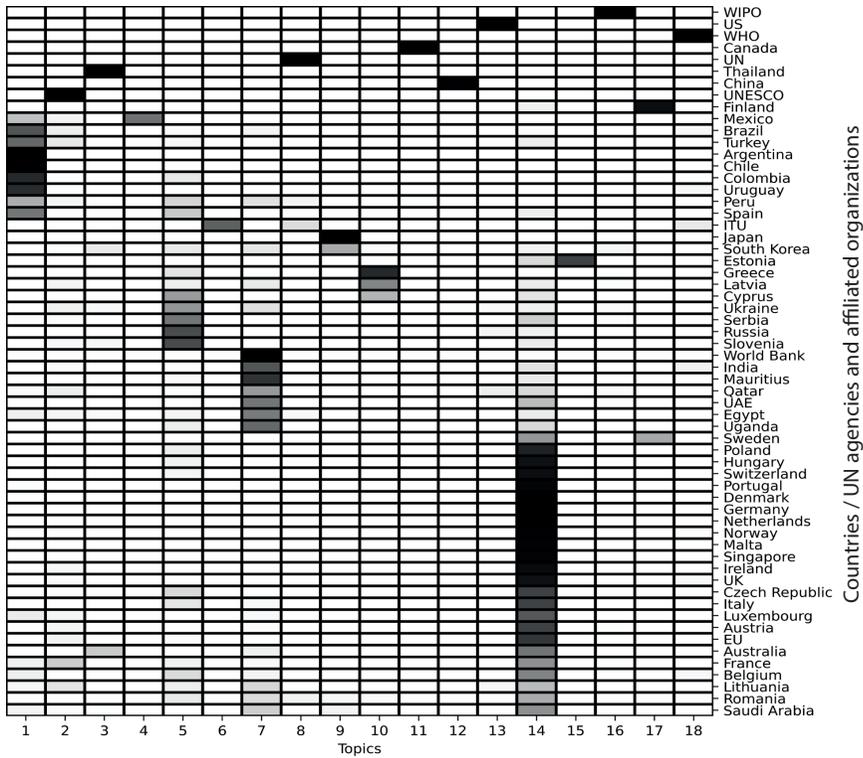
Results

We now present two sets of findings. Our first set of findings presents the topics we found in reports from national and international agencies (figures 2 and 3). Documents from these agencies are collected in a corpus; the methodology trains LDA models and identifies topics. The national corpus of documents deals with national-level AI strategies for broad comparison among countries. For the UN or European Union documents, we used reports or directives that were in the form of guidelines or meant to provide a broad coverage of issues for all member states. All documents published by the same UN agency are combined in one larger document. Each document in the training dataset is then available as a probability distribution over topics. Our second set of findings deals solely with international-level agencies (figure 5). In this setting, we focus only on the UN or UN-related documents. The latter are not categorized and combined by UN agency as in the first set of findings, but are kept separately in the training dataset so as to obtain a potentially rich and diverse landscape of topics. However, in the testing dataset the documents are combined for each UN agency, and each is analysed as a probability distribution over the identified topics.

At a broad level, our findings show that except for the EU, international reports are not heavily correlated with national plans. However, the international reports are instructive for understanding how priorities are being set in global governance. The lack of a high degree of correlation among the plans from UN or international agencies will lead us to conclude (see below) that these agencies develop distinct areas of competence. Not surprisingly, the World Health

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[30] Mika V. Mantyla, Claes Maelick and Umar Farooq, 'Measuring LDA topic stability from clusters of replicated runs', in *ESEM '18: Proceedings of the 12th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement* (Oulu, Finland: Association for Computing Machinery, 2018); Amin Hosseiny Marani and Eric P. S. Baumer, 'A review of stability in topic modeling: metrics for assessing and techniques for improving stability', *ACM Computing Surveys* 56: 5, 2023, pp. 1–32, https://doi.org/10.1145/3623269.

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Organization (WHO) has emphasized patient- and provider- centred strategies, while the World Bank showcases a market-oriented development focus.

Figure 2: UN and national AI infrastructures: heat map relating UN organization/countries to topics
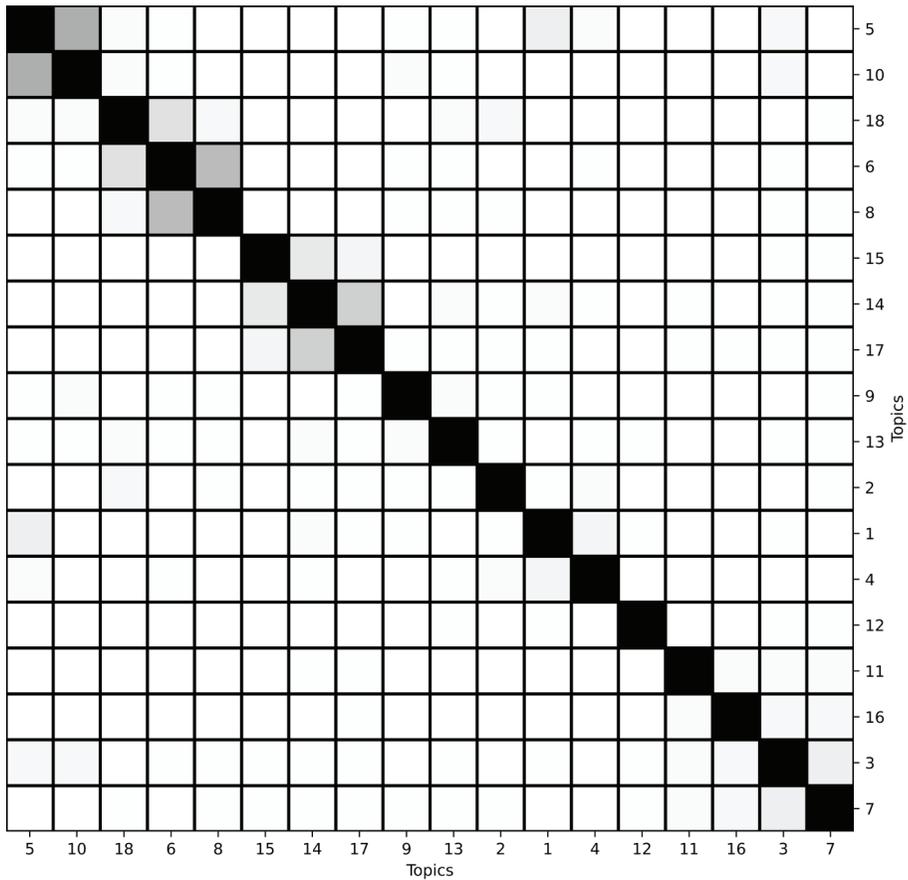

Notes: As mentioned earlier, the grayscale scheme used in this figure visually conveys low to high (light to dark) probabilities of topics in a given country or UN agency. UAE stands for United Arab Emirates.

We will now describe the results in detail, beginning with our findings from the first setting as described above. Figure 2 shows the documents/topics heat map, plotting topics on the X-axis and countries/IOs on the Y-axis. The identified topics are presented as word clouds in figure 3. Figure 4 relates topic similarities and overlaps. This setting analyses a total of 60 documents from 53 countries as well as the EU and six UN agencies or UN-associated organiza-tions. Multiple documents published by the same UN agency may be merged. UN agencies or associated organizations are the UN Secretariat, the Interna-tional Telecommunications Union (ITU), the UN Educational, Scientific and Cultural Organization (UNESCO), the WHO, the World Intellectual Property Organization (WIPO) and the World Bank. The EU is included because of its connections with the AI policies of its member states. Its own AI strategies preceded those of many member states, which have been drafted at the request of Brussels in the period since 2019.

Figure 3: UN and national AI infrastructures: topic word clouds

Note: The font size of each word in a word cloud visually conveys the probability with which it is found in a given topic, with larger font sizes denoting higher probabilities.

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Figure 4: UN and national AI infrastructures: heat map relating topic similarities and overlaps

Note: This heat map compares every topic to every other topic. Each cell shows how similar two topics are based on the words they contain, with darker shading indicating greater similarity (topics that share many characteristic words) and lighter shading indicating less similarity (topics that are more distinct from one another). Topics are listed on both axes, which is why the diagonal from top-left to bottom-right is uniformly dark: each topic is identical to itself. Readers can use this map to identify clusters of related topics or to see which topics stand apart as distinct themes.

The policies analysed in the 60 sets of documents comprise national AI strategies and the top-level or macro policy reports or recommendations from UN-associated agencies as of December 2024. For instance, the dataset includes ethics guidelines and regulatory considerations, as well as the WHO's digital health strategy. At UN level we include the AI Advisory Body's interim report. Our LDA-based methodology outlines 18 major topics across these 60 sets of documents. Of these 18 topics, five seem to be exclusive to the UN, while 14 are found across countries' national plans.

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Table 3 (placed at the end of the article) lists the topics/themes in the national or top-level IO plans. The first column provides the topic number and a descriptive label. We used ChatGPT as a computational technique to generate concise labels by asking it to summarize each topic based on its word cloud (the collection of most prominent words, shown in figure 3). The second column lists the states or the international organizations where the top-level documents contain this topic are more prominently present (at higher probabilities).

There are five findings at the national and international levels that validate our thesis regarding multiplexity. These findings present cross-cutting priorities across states and IOs in terms of uniformity, diversity and clusters that are enhanced further through a close examination of topics themselves as they relate to these five findings. The broad features of this multiplexity are explained as follows.

- *Uniformity*: While this may not be readily obvious when looking at the different word clouds for each topic, there is uniformity across countries on some of the main features that occur in different ways in different countries/organizations. These include policy and regulatory concerns such as those centred on algorithms, data, harm and liability. Further shared concerns relate to start-ups, education and training.
- *Heterogeneity*: Heterogeneity follows from the uniformity: the way countries prioritize and shape the main features and issues mentioned above varies. Another form of heterogeneity is the depth or probability with which a topic may be shared among countries. The darker the shade in a cell, the more prominent that topic is in that country's policy. Topic 1 (defined in table 3 as 'incorporation of labour & freedom / start-up schemes / productive axis & inclusion / instrument evolution & transformation') is important for many Latin American states and for Spain. While Mexico is included in this group, topic 1 is less important for Mexico than topic 4. Similarly, Japan and South Korea share topic 9, but whereas topic 9 is almost the only topic that appears in Japan's national plans, topics 7, 5 and 3 also appear in South Korea's national strategy.
- *Clusters*: AI priorities for groups of countries can be located around several clusters or topics. This clustering around topics shows groups of countries borrowing from the same menu and is therefore illustrative of multiplexity. Interestingly, the clusters make intuitive sense for reasons of history or political economy. Computer scientists refer to this as external validity (of a methodology's findings). As we have seen, the topic 1 cluster includes many Latin American states and Spain. Topic 14 is most present in EU member states as well as the EU itself. Topic 7 is shared between the World Bank and many developing countries, though curiously most such countries have a history rooted in British colonial rule. The latter feature may be accidental: outside Latin America, many developing countries with a national-level AI strategy also experienced British colonialism in the past. While this article does not explore in depth the flow of influences between ex-colonial states and their

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former colonies, the Latin American cluster in topic 1 also includes the ex-colonial power of Spain. Another finding about clusters refers to differences among pluralist and non-pluralist states. Therefore, the topic for the EU and United States shows concern for federal and democratic processes that are missing in China (topic 12) or Russia, Serbia and Ukraine (topic 5) clusters. Japan and South Korea also showcase societal concerns but they seem to be more dirigiste (topic 9) with words like 'nurture' and 'diversity', as opposed to words like 'dialogue' in the EU strategies (topic 14).

• *Leaders*: Countries often regarded as AI leaders display topics that are largely unique to them, which may reflect distinctive national strategies or competitive advantages that set them apart. Leading AI states have very high basic science capabilities, and world-class educational institutions that produce PhDs in relevant disciplines (mathematics, physics, statistics, computer sciences). We see stark differentiations. Topic 11 is associated exclusively with Canada, topic 12 with China and topic 13 with the United States, while topic 9 speaks mainly to Japan and, to some extent, South Korea. An exception might be topic 14, which includes the EU as well as leading AI countries (and EU member states) such as France and Germany. The EU itself can be taken to be an AI leader, and terms like the 'Brussels effect' capture the influence of the EU on the rest of the world.[31]

• *International organizations*: Like leaders, the UN-affiliated organizations analysed here tend to feature unique topics in their documents. This is not surprising: these organizations have specific priorities, whereas national plans are much broader. The World Health Organization's topic 18 is mostly about health, while topic 2 from UNESCO is mostly about the organization's concerns such as inclusion, social stratifications, and journalism and media. The exception is topic 6 for the World Bank, which, with its focus on development, also shares features with the national plan documents of several developing countries, especially those which experienced British colonialism. As explained in the next paragraph, the topics for the UN also offer a degree of counter-intuition. The specificity of the UN's specialized agencies is understandable. However, the UN Secretariat and the ITU have taken broader stances and have sought to play a leadership role within the UN system: therefore, their plans might be expected to intersect with national strategies. This is not the case, and the uniqueness of their topics might also speak to the limits of international influences. A minor, yet interesting, finding is that topic 2, associated with UNESCO, also appears in the French national strategy. The close connection between France and UNESCO, which is headquartered in Paris, has been the subject of a great deal of literature.[32]

[31] Anu Bradford, *The Brussels effect: how the European Union rules the world* (New York: Oxford University Press, 2020).
[32] J. P. Singh, *United Nations Educational, Scientific, and Cultural Organization (UNESCO): creating norms for a complex world* (Routledge, 2011).

- *Unexpected lack of clusters*: This point follows from the one above. UN–affiliated organizations do not cluster with other countries (except for the World Bank). Further, these organizations' AI strategies do not overlap or correlate to each other to any significant degree. Figures 5 to 7 provide evidence for this. The topic heat map for UN documents reveals that unique topics are associated with three of the six UN–affiliated organizations: namely, the World Bank, WIPO and UNESCO. The overlaps are for topic 7 for the ITU and UN, which reflects the close coordination between the UN Secretariat and the ITU. The latter organizes the annual AI for Good global summit for the UN system in Geneva each year. ITU documents also refer to topic 4, which also appears in WHO documents. This is not surprising, since many of the ITU and WHO documents on health are jointly written.

Figure 5: UN AI infrastructures: heat map relating how UN agencies and affiliated organizations cluster around topics
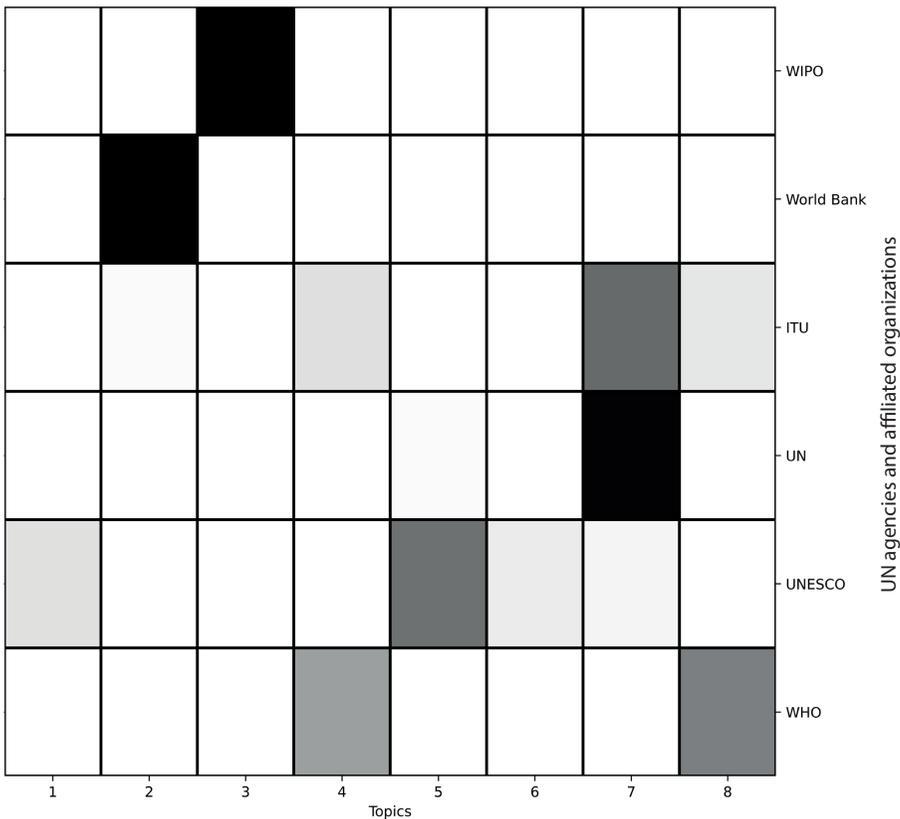
Note: The grayscale scheme used in this figure visually conveys low to high (light to dark) probabilities of topics in a given agency.

Figure 6: UN AI infrastructures: topic word clouds

Note: The font size of each word in a word cloud visually conveys the probability with which it is found in a given topic, with larger font sizes denoting higher probabilities.

Figure 7: UN AI infrastructures: heat map relating topic similarities
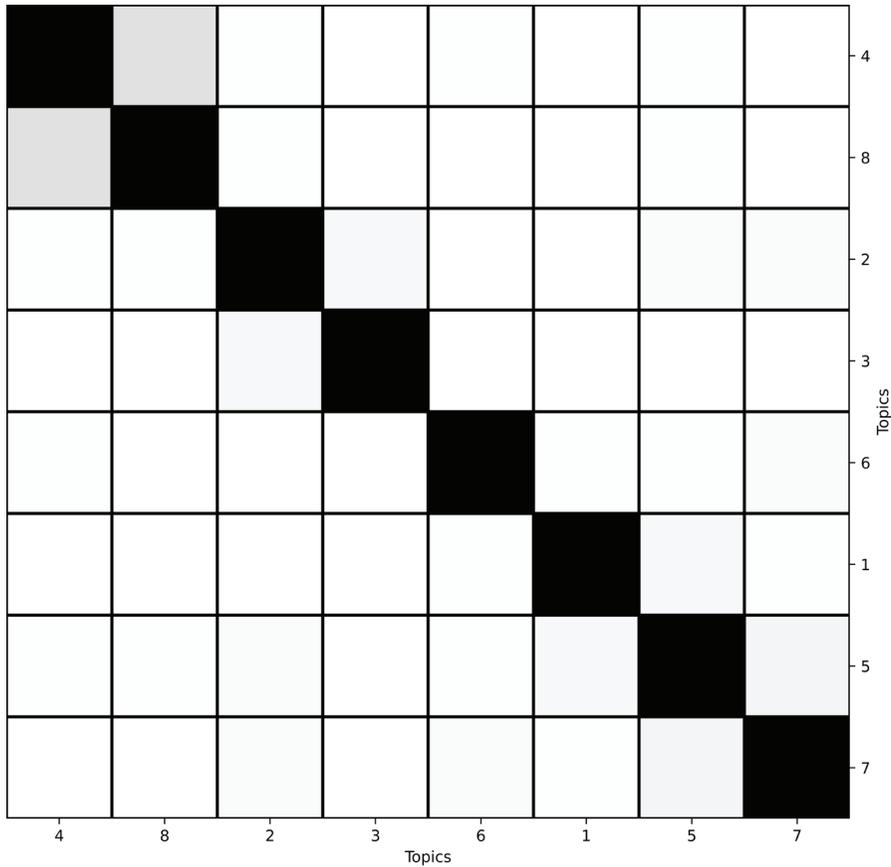
Note: This heat map compares every topic to every other topic identified in UN documents. Each cell shows how similar two topics are based on their shared vocabulary, with darker shading indicating topics that use many of the same words (suggesting related themes) and lighter shading indicating topics with little vocabulary overlap (suggesting distinct concerns). Topics appear on both the horizontal and vertical axes, which is why the diagonal running from top-left to bottom-right is uniformly dark: each topic is identical to itself. Readers can use this map to see which UN topics are thematically related and which stand apart as distinct priorities.

A few notable differences that cut across clusters and states, or IOs, yield patterns that further address multiplexity.

• The leading AI states (China, the US, Japan, South Korea and the EU) prioritize basic science, standards and regulation, and competitiveness calculations but with different weighted priorities Topic 12, associated with China, is much more heavily focused on science, theory and hardware than topics associated with other leaders. Topic 13, associated with the US, balances the science and hardware capabilities with regulatory and societal concerns.

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Topic 14, associated with the EU, is shared with most of the latter's member states and reveals concerns for programmes and organization. The Japanese and South Korean-associated topic 9 also features a focus on high-level capabilities (for example, in mathematics) but is more focused on the use of AI infrastructures for economic and societal purposes.

- Two clusters associated with the global South are of particular interest. The Latin America cluster (topic 1) is focused on evolving from digital to AI infrastructure and includes economic and social objectives. Many of these national plans use the Spanish term *ejes* (axes or pillars) to describe how AI development is organized around multiple interconnected priorities. Topic 7 is present in several other developing countries and the World Bank. This topic is much more focused on traditional development concerns such as the importance given to economic sectors, albeit here with an AI focus (blockchains, fintech, start-ups) and with leading players (such as the International Finance Corporation (IFC) and China).

- Five topics dominate UN-level plans in the combined analysis (figure 2). When we isolate UN documents from national strategies and analyse them separately (figure 5), these five topics persist, but we can now see variation in how individual UN agencies emphasize them. The UNESCO-associated topic 2 in figure 2 is focused on media, journalism, biases and social inclusion. While topic 6 in figure 5 has similar coverage, this figure also provides UNESCO with two additional topics. One of these—topic 5 in figure 5—deals with fairness, inclusion and SDGs in the global South and the world. Thus, while the word clouds for topic 2 in figure 3 and for topic 6 in figure 6 are similar, when UN plans are analysed separately in figure 5, topic 5 is more present than topic 6, suggesting that the latter becomes diluted when UNESCO plans are analysed with national plans. Similarly, when UN plans are analysed separately (figure 5), the WHO topic is split into two (topics 4 and 8) and that associated with ITU (topics 7 and 4).

Table 2 below lists the themes in the plans published by the UN-affiliated IOs. The first column provides the topic number and a broad description (in the compilation of which we again made use of the AI chatbot, ChatGPT). The second column lists the organizations whose top-level documents display this topic more prominently (and at higher probabilities).

Table 2: Topics, corresponding highlighted priorities and associated UN-affiliated organizations

Topic description / highlighted priorities	UN-associated organizations
1: algorithmic journalism & news reporting / cultural narratives & audience engagement / intelligent journalism modules / AI in media discourse	UNESCO
2: IFC investments & blockchain in private sector / smart energy efficiency programmes / international procurement & mobile solutions	World Bank
3: Patent trends & intellectual property (IP) strategies / scientific publications & technological innovation / global IP jurisdictions & growth trends / innovative patent filings	WIPO
4: Medical ethics & patient consent / clinical oversight & health-care regulations / liability in medical practice / transparent medical diagnosis	ITU, WHO
5: Fairness & inclusivity / tech ethics, deepfake detection & civil society / energy, ecosystem & sustainable development	UNESCO
6: Gender equality in science, technology, engineering & mathematics, & workplace / women in the global labour market / gender stereotypes in job automation	UNESCO
7: Sustainability development & global initiatives / multimedia partnerships & public sector engagement / water & energy sustainability / poverty alleviation & economic growth	ITU, UN
8: Clinical validation & medical device standards / health-care benchmarking & regulatory testing / international medical standards / US Food and Drug Administration regulations & health-care metrics	ITU, WHO

The discussion on multiplexity can be extended further to include elements of diffusion of power that were explained theoretically in a previous section. The clusters and networks analysed above collectively point to convergences and differences among or between global AI leaders and other countries. Except for the EU's influence over its member states, global leaders show little evident influence on AI policies in Latin America, Africa, or Asia. Over all, the top-down norm diffusion influence of the UN and its associated IOs is not apparent in these states' AI plans.[33] The World Bank's influence may reflect the historic role it has played in the developing world. However, this influence

[33] Finnemore and Sikkink, 'International norm dynamics and political change'.

appears primarily in countries with British colonial histories and is notably absent among Latin American states.

The diversity of AI themes (presented in tables 2, above, and 3, below) reflects the underlying diversity of national, international, economic, business and societal actors. The main elements of this diffusion of power were presented in table 1. The ontologies are the world-views: those of non-leader states in the sphere of AI do not always intersect with those of countries in other parts of the world, especially in the global South (as we might expect). The most obvious case of influence involves the EU, but the influence is reciprocal and consensual between member states and the EU itself. In the past, organizations affiliated with the UN were pre-eminent champions of global norms;[34] however, IOs may now be seen as informational actors or as orchestrators.[35] The relationship between states and IOs can also be analysed within a principal–agent framework, where states as principals broker their demands through IOs (the agents).[36] As actors that help to spread information or orchestrate solutions, the processes are representative of diffused and collaborative—rather than hierarchical—forms of governance. The shift towards informal modes of governance among international and national actors constitutes a further aspect of this trend[37] and reflects the tremendous growth of informal and regulatory organizations in the international system, allowing for collaboration. We have already cited the example of the AI for Good global summit which is held annually in Geneva, organized through the UN and the ITU.

In a situation of simplexity, powerful states or IOs can influence the AI policies of other states, as well as the topics that might be covered by those policies. The diversity of regional clusters around particular topics, the intersections among their topics (shown through our heat maps) and the distinct lack of intersection with IOs (except for the World Bank) point to multiplexed outcomes.

Conclusion

This article has shown that the intersecting ties of various international actors, along with pluralist ontologies and regionalisms, can lead to multiplexed outcomes. We do not regard the imposition of simplexity (as opposed to multiplexity) as impossible. Simplexity follows from highly hierarchical power distributions. The work of several actors in world politics can allow simplexities to re-emerge: for example, by weaponizing infrastructures to constrain the actions or options available to others. Farrell and Newman call this weaponization

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[34] Sakiko Fukuda-Parr, *Millennium Development Goals: ideas, interests and influence* (Abingdon: Routledge, 2017).
[35] Kenneth W. Abbott, Philipp Genschel, Duncan Snidal and Bernhard Zangl, eds, *International organizations as orchestrators* (Cambridge, UK: Cambridge University Press, 2015).
[36] Darren G. Hawkins, David A. Lake, Daniel L. Nielson and Michael J. Tierney, 'Delegation under anarchy: states, international organizations, and principal-agent theory', in Darren G. Hawkins, David A. Lake, Daniel L. Nielson and Michael J. Tierney, eds, *Delegation and agency in international organizations* (Cambridge, UK: Cambridge University Press, 2006), p. 21.
[37] Charles B. Roger, *The origins of informality : why the legal foundations of global governance are shifting, and why it matters* (New York: Oxford University Press, 2020).

an 'underground empire', with reference to the United States.[38] David Lake offers a more favourable assessment of the hierarchies that the United States has enabled, arguing that American–led international hierarchies have provided stability and facilitated cooperation rather than simply imposing domination.[39] In many circumstances, such simplexity may command little legitimacy among those who must accept the outcomes of weaponization. Nevertheless, simplexity exists. So does multiplexity; and we claim that a diffusion of power allows for its continuation and deepening.

Our empirical evidence on clusters and networks among actors—chiefly states and IOs, in our analysis—explains the ways in which national and international AI infrastructures can interlock and diverge. There are leaders and great powers in AI, but the rest are not followers; rather, they are actors in a diffused power scenario in which multiple ontologies about the world coexist. In the empirical language of this article, these ontologies are topics which are shared among states and related to other topics.

Global governance in AI is multilayered. At one level, the collective work of diverse AI infrastructures makes up the heterogeneous global architecture of AI. It is interconnected, but not without posing vulnerabilities and challenges for actors that range from human rights concerns to national security threats. In a hierarchical environment, great powers provide public goods. AI policies, to the extent that they can be characterized as public goods within national and international contexts, need authoritative allocation of resources in institutional contexts. In a multiplexed world, undergirded by a diffusion of power as we posit, the public goods arise from the 'interaction capacities' of states.[40] These interaction capacities reveal the work of networks and clusters.

Max Weber thought of ideal–types as conceptualizations that inform our understandings of the real world. We identify three ideal–types that emerge empirically from our computational modelling and that encompass the evidence provided above. These are pluralist, autocratic and developmental ideal–types. All AI ideal–types balance business, societal and regulatory goals. The pluralist ideal–type may be thought of as offering three variations: 1) *innovative* countries, such as the United States, that feature superior technological capabilities and have supportive policies for businesses to succeed. Societal freedoms exist, but technological prowess dominates policy outlines; 2) *bureaucratic* states, such as the EU, with precautionary regulatory principles and sets of programmes that seek to encourage innovation; and 3) *dirigiste* systems, in countries such as Japan and South Korea, that offer a mix of pro-business innovation but with state-led inclusion of societal actors.

The autocratic ideal–type in countries such as China (and those that are more autocratic-leaning, such as India), also emphasize science and technology.

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[38] Henry Farrell and Abraham Newman, *Underground empire: how America weaponized the world economy* (New York: Henry Holt and Company, 2023).

[39] David A. Lake, *Indirect rule: the making of US international hierarchy* (Ithaca, NY: Cornell University Press, 2024).

[40] Acharya, Estevadeordal and Goodman, 'Multipolar or multiplex?'; Barry Buzan and Richard Little, *International systems in world history: remaking the study of International Relations* (Oxford: Oxford University Press, 2000).

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Societal actors, civil liberties and NGOs are seldom mentioned in their plans. The two prominent variations within autocracies may be electoral autocracies, such as Hungry or India, versus command-based autocracies such as Russia or China. The former tend to feature some human rights concerns in the topics covered by their AI policies, though this language appears alongside more state-centric control mechanisms.

The developmental ideal-type features clusters from Latin America and Commonwealth states and includes IOs such as the World Bank, the ITU, UNESCO and the WHO. The AI development goals for health, education, manufacturing and agriculture feature prominently, as do policies to jump-start the AI–tech sector through sandboxes (experimental regulatory zones for testing innovations) and start-ups.

The methodological contribution of this article lies in providing a computational vocabulary and rich empirical evidence for understanding the overlapping and intersecting topics and ideal-types in global affairs—in our case, in the evolving infrastructures of AI. While our work is primarily computational, we borrow from the language of hypothesis-testing in specifying causal factors and outcomes. Such mixed methodologies may be especially useful for social scientists seeking to combine computational and social science methods.[41] Further, if the world continues to move away from simplexity and towards multiplexity, such computational and probabilistic methodologies will be increasingly needed to puzzle out and analyse international affairs.

Table 3: Topics, corresponding highlighted priorities and UN–associated organizations/countries

Topic description/highlighted priorities	*UN-associated organizations/countries*
Topic 1: Incorporation of labour & freedom / start-up schemes / productive axis & inclusion / instrument evolution & transformation	Argentina, Brazil, Chile, Colombia, Mexico, Peru, Spain, Turkey, Uruguay
Topic 2: Journalism & democracy / algorithmic news & inclusion / global South & civil society / cultural implications & media diversity / journalistic competency & gender equality	UNESCO, France
Topic 3: Strategic plans in entrepreneurship & tourism / agriculture / start-ups & manufacturing	Australia, Thailand

[41] Giuditta Fontana, Argyro Kartsonaki, Natascha S. Neudorfer and Stefan Wolff, 'The multi-stage mixed methods framework: a new research design to combine hypothesis development and hypothesis testing and to embed machine learning and practitioner engagement in the social sciences', *International Political Science Review* 47: 1, 2024, pp. 3–22, https://doi.org/10.1177/01925121241293109.

Topic 4: Freedom of expression & discrimination & federal investigations / United Nations articles on bias / equality & Indigenous rights	Mexico
Topic 5: Digitization & upgrades / tourism & laboratory use / evaluation of justice & certification / medium-term plans / academy	Belgium, Cyprus, Czech Republic, Greece, Peru, Russia, Serbia, Slovenia, Spain, Ukraine
Topic 6: SDGs & multilateral development goals / manufacturer description & COVID-19 response / gender bias in medical devices / multimedia outputs & SDG impact	ITU
Topic 7: IFC investments / emerging markets / blockchain / farmers / start-ups / transportation	World Bank, Egypt, India, Mauritius, Qatar, Uganda, United Arab Emirates
Topic 8: Sustainable Development Goals (SDGs) & development goals / gender gaps / food security & water / lessons from nuclear development	ITU, UN
Topic 9: Mathematical models / disaster response & diversity / labour reform & venture architecture / domestic welfare & food security / inclusion	Japan, South Korea
Topic 10: Digitization & registry upgrades / tourism & short-term contracts / certification in cultural equipment / digital records / cybersecurity measures	Cyprus, Greece, Latvia
Topic 11: Start-ups & AI research centres / deep learning / occupational trends & AI index / university research fellowships / brain research & AI faculty	Canada
Topic 12: Theory / unmanned equipment & military hardware / cluster chain & quantum evaluation / home perception & defence architectures / deep learning / manufacturing	China
Topic 13: Strategy / benchmarking / societal perception & bias testing / understanding defence / effective testbeds / interface leverage / federalism	US

Topic 14: Programs in digitalization / economic affairs & societal trustworthiness / climate dialogue & ministerial initiatives / labour market strategies / action plans in defence	Australia, Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, EU, France, Germany, Hungary, India, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Qatar, Romania, Saudi Arabia, Serbia, Singapore, Sweden, Switzerland, Uganda, UK, United Arab Emirates
Topic 15: AI & liability / expert group in digitalization / specialization in programme management / chatbot sustainability & managerial clarity / obstacles to AI implementation	Estonia
Topic 16: Patents & intellectual property / deep learning in patent applications / global IP jurisdictions / Natural Language Processing	WIPO
Topic 17: Economic affairs & digital use / AI accelerators / start-up trials / societal reforms & labour market themes	Finland, Sweden
Topic 18: Clinical evaluation & medical device validation / regulatory engagement & accountability / accuracy / consent & accountability / clinician diagnosis	ITU, WHO

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