4. Promises and Pitfalls of India's AI Industrial Policy

by Jyoti Panday and Mila T Samdub

In the last few years, the Indian government's commitment to AI has been on a steady ascent, evident in increased infrastructural investments, financial backing, and media attention directed toward AI initiatives.[287] Generally, Indian policymakers view technology as a critical tool for achieving economic and development priorities and a pathway for India to leapfrog to a leadership role on the global stage.

Although it taps into these aspirations, India's foray into AI development is more reactive than strategic, with ad hoc responses tailored to the prevailing geopolitical landscape. Amidst U.S.–China trade tensions, India is eager to position itself as a trustworthy ally and a regional tech powerhouse. Yet its quest to integrate into global AI supply chains is hindered by resource constraints, particularly in computing power and large-scale models. Balancing global aspirations with domestic priorities, the government navigates a complex AI development agenda,

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[287] Government of India, *Budget 2023–2024: Speech of Nirmala Sitharaman, Minister of Finance*, February 1, 2023, https://www.indiabudget.gov.in/doc/bspeech/bs2023_24.pdf.

resulting in fragmented approaches to AI across various sectors.[288] Under the banner of sovereign AI, India is attempting to boost chip manufacturing and cloud compute capacity. At the same time, influenced by the apparent success of Digital Public Infrastructures (DPIs) over the past decade, India's AI industrial policy prioritizes data platforms and AI applications for socioeconomic development. A concurrent focus on ethical and responsible regulation enables India to grab headlines and project moral leadership while serving as a strategic maneuver that enables greater government control over AI development.

Sovereign AI

"We are determined that we must have our own sovereign AI," India's Minister of State for Electronics and Information Technology Rajeev Chandrasekhar[289] recently stated:

> We can take two options. One is to say, as long as there is an AI ecosystem in India whether that is driven by Google, Meta, Indian startups, and Indian companies, we should be happy about it. But we certainly don't think that is enough.[290]

Such statements reframe both "sovereignty" and AI.[291] According to Chandrasekhar,

> with sovereign AI and an AI compute infrastructure [...] the government is not looking to just compete with the generative AI type of model. It also wants to focus on real-life use cases in healthcare, agriculture, governance, language translation, etc, to maximise economic development."

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[288] Several agencies are promulgating different kinds of policy. This chapter focuses on two of the most important: NITI Aayog, the successor institution to the Planning Commission, which attempts to set the agenda through principles and strategies; and the Ministry of Electronics and Information Technology, which is taking the lead on policy and regulatory interventions.

[289] A former Intel semiconductor engineer and a telecom billionaire, Chandrasekhar has been MoS for Electronics and Information Technology since 2021.

[290] Soumyarendra Barik, "India Is Building Its Own 'Sovereign AI'. What Does It Mean?" *Indian Express*, December 1, 2023, https://indianexpress.com/article/explained/explained-sci-tech/india-sovereign-ai-meaning-9048436.

[291] For a formal exploration of an expansive view of AI sovereignty in a context similar to India, see Luca Belli, *To Get Its AI Foothold, Brazil Needs to Apply the Key AI Sovereignty Enablers (KASE)*, Carnegie Endowment for International Peace, November 29, 2023, https://carnegieendowment.org/2023/11/29/to-get-its-ai-foothold-brazil-needs-to-apply-key-ai-sovereignty-enablers-kase-pub-91081.

As Chandrasekhar's statements reveal, India is attempting to define sovereignty in a way that moves beyond the hyper-technical focus on compute and large-scale models that has dominated on the global stage. India's championing of "Sovereign AI" appears bold, yet this strategy sidesteps key power dynamics in the current AI landscape.

The Doctrine of Self-Reliance

"Sovereign AI" is an extension of the current government's doctrine of self-reliance. The National Democratic Alliance government, which has been in power since 2014, believes that economic prosperity and national security require India to reduce its dependence on other countries.[292] This vision of "Atma Nirbhar Bharat," or "Self-Reliant India," is rooted in its state-centric approach to managing important domestic industries and is motivated by global aspirations and a larger geopolitical agenda. In the IT sector, self-reliance is chiefly promoted through two programs: Digital India, which aims for universal digital infrastructure; and Make in India, which pushes for indigenous production of IT hardware.

In AI, the call for self-reliance and sovereignty has been linked to efforts to promote manufacturing, including semiconductors, with generous incentives. Another goal is to encourage big cloud-computing providers to build more Indian data centers, where AI models are trained, and possibly to buy USD 1.2 billion worth of GPUs.[293] Although India is leading with a sovereignty-based approach to AI development, each AI system operates within a unique supply chain, influenced by industry sectors, specific use cases, stakeholders, and their decisions regarding system development and accessibility. Consequently, the pursuit of self-reliance across AI supply chains is challenging.

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[292] The National Democratic Alliance is the ruling coalition led by the Bharatiya Janata Party (BJP) under Narendra Modi. It currently controls the central government and several state governments. It is worth noting that self-reliance has been a major principle guiding Indian industrial policy and technology development since the 1950s.

[293] Ameen Jauhar and Abhishek Gupta, "AI for AI – Developing Artificial Intelligence for an Atmanirbhar India," Vidhi Centre for Legal Policy (blog), February 23, 2021, https://vidhilegalpolicy.in/blog/ai-for-ai-developing-artificial-intelligence-for-an-atmanirbhar-india; Parminder Jeet Singh, "An 'Atmanirbhar' AI Will Benefit India. Here's Why," *Hindustan Times*, April 25, 2023, https://www.hindustantimes.com/opinion/india-must-prioritize-strong-ai-governance-for-data-sovereignty-and-promote-indigenous-innovation-parminder-jeet-singh-and-sharad-sharma-101682435000316.html; and "Welcome to the Era of AI Nationalism," *Economist*, January 1, 2024, https://www.economist.com/business/2024/01/01/welcome-to-the-era-of-ai-nationalism.

India is Not Competitive in Compute

With AI being promoted across diverse sectors—from healthcare and finance to agriculture and manufacturing—India's AI ambitions are linked to having access to cutting-edge compute. At the 2023 Global Partnership on Artificial Intelligence Summit in New Delhi, Prime Minister Modi announced the launch of an India AI Mission.[294] A key aim of the AI mission is "to get AI compute power which will help startups and innovators."[295] Compute refers to the combination of hardware and software that powers all kinds of AI today.[296]

Such highly publicized moves to build domestic compute capacity should be understood in two contexts: improving the international competitiveness of Indian firms towards integrating India into the global compute supply chain, and building domestic compute resources for Indian startups to access. A survey of the state of the industry and the proposed interventions reveals the former to be a distant dream and the latter to be difficult to achieve without dependence on foreign companies.

Chips

India's foray into chip manufacturing is linked to its AI ambitions by both policymakers and in the media.[297] Seeking to break its dependence on imports and facilitate the development of new high-value industries, India's National Semiconductor Mission is seeking to build a domestic chip industry and turn the country into a "Semiconductor Nation," notably through over $10 billion of "production-linked incentives" intended to jumpstart chip manufacturing.[298] A

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[294] Adding to a general atmosphere of confusion around Indian AI policy, this new mission appears to be distinct from a preexisting National AI Mission which was launched in 2018 by the PM's Principal Scientific Advisor.
[295] "India to Launch AI Mission to Help Startups with Compute Power: PM Modi," MoneyControl, December 13, 2023, https://www.moneycontrol.com/news/business/startup/india-to-launch-ai-mission-to-help-startups-with-compute-power-pm-modi-11894211.html.
[296] Jai Vipra and Sarah Myers West, "Computational Power and AI," AI Now Institute, September 27, 2023, https://ainowinstitute.org/publication/policy/compute-and-ai#a0d31d2f-e17a-41c8-8001-7e2fd35e79f9-link.
[297] "Welcome to the Era of AI Nationalism," The Economist, January 1, 2024, https://www.economist.com/business/2024/01/01/welcome-to-the-era-of-ai-nationalism.
[298] As part of the government's broader aim to incubate an electronics industry (see National Policy on Electronics 2009), it has announced $10 billion as an incentive for building chip manufacturing and assembly, testing, and packaging (ATP) plants in India. This incentive will support up to 50 percent of the expenditure for setting up a plant. For a survey of India's current chipmaking efforts, see Sankalp Phartiyal, "India Chip Strategy Makes Progress With $21 Billion in Proposals," Bloomberg, February 26, 2024, https://www.bloomberg.com/news/articles/2024-02-26/india-chip-strategy-makes-progress-with-21-billion-in-proposals. The effectiveness of India's incentives-led industrial policy has been critiqued by many, including former Reserve Bank governor Raghuram Rajan. Smriti Mishra, "'Is India Really Manufacturing Mobile Phones?': Former RBI Governor Raghuram Rajan on PLI scheme," *Business Today*, May 31, 2023, https://www.businesstoday.in/latest/in-focus/story/is-india-really-manufacturing-mobile-phones-former-rbi-governor-raghuram-rajan-on-pli-scheme-383469-2023-05-30.

recent India visit by Nvidia CEO Jensen Huang was portrayed as a sign of "the country's AI chip making ambitions."[299] Most recently, Liu Young-way, the CEO of Foxconn has been conferred with the Padma Bhushan, India's third-highest civilian honor.

However, even by IT minister Ashwini Vaishnaw's admission, India is far from having the capability to manufacture the Graphics Processing Units, or GPUs, that have become the bedrock of AI development.[300] The manufacturing currently envisioned under the government's incentives scheme is limited to producing less sophisticated legacy chips like dynamic random-access memory (DRAM) chips, smartphone chips, car chips, and display panels. Even here, the scheme has been a nonstarter: not a single fabrication plant has been set up yet.[301] Despite splashy news that India is incubating a domestic AI chip industry, India's recent success in incubating electronics manufacturing does not extend to GPUs, which require sophisticated facilities, decades of experience, and large amounts of capital.

The historic trajectory of the Indian tech industry has focused on services rather than manufacturing, facilitating the emergence of a chip design sector in the last twenty years. Although 20 percent of the global chip design workforce is located in India, it almost exclusively works for international companies like Intel, Advanced Micro Devices (AMD), and Nvidia.[302] As far as chip design is concerned, the state has signaled its goal of creating more IP in India by funding more domestic AI design startups.[303]

[299] Adam Clark, "Nvidia CEO Heads to India. It's a Sign of the Country's AI Chip-Making Ambitions," *Barron's*, September 5, 2023, https://www.barrons.com/articles/nvidia-stock-ceo-jensen-huang-india-modi-chip-manufacturing-72345daf.

[300] Derek Robertson, "Davos and the Global State of Quantum," *Politico*, January 17, 2024, https://www.politico.com/newsletters/digital-future-daily/2024/01/17/davos-and-the-global-state-of-quantum-00136164.

[301] A highly publicized collaboration between Indian mining and oil conglomerate Vedanta and Taiwanese electronics manufacturer Foxconn fell through after Foxconn left the deal. In September 2023, construction began on a chip ATP plant owned by Micron. Ben Blanchard, Munsif Vengattil, and Aditya Kalra, "Foxconn Dumps $19.5 Billion Vedanta Chip Plan in Blow to India," Reuters, July 11, 2023, https://www.reuters.com/technology/foxconn-pulls-out-india-chip-jv-with-vedanta-2023-07-10. In February 2024, three chip plants were approved under the government's investment scheme: two set up by India's Tata Group, a third as a Japanese-Thai collaboration with an Indian company called CG Power. Jagmeet Singh, "India approves $15B in semiconductor plant investments," *TechCrunch*, February 29, 2024. https://techcrunch.com/2024/02/29/india-semiconductor-investments-fab-facility/.

[302] Konark Bhandari, "Is India 'Ready' for Semiconductor Manufacturing?" Carnegie Endowment for International Peace, May 23, 2023, https://carnegieindia.org/2023/05/23/is-india-ready-for-semiconductor-manufacturing-pub-89814; and Akhil George and Sujit John, "Intel's India engineers seek to beat Nvidia in gen AI chips," *Times of India*, August 9, 2023, https://timesofindia.indiatimes.com/business/india-business/intels-india-engineers-seek-to-beat-nvidia-in-gen-ai-chips/articleshow/102558826.cms.

[303] The Prime Minister made a strong pitch to global investors at the SemiconIndia 2023 conclave. The India Semiconductor Mission's Design Linked Incentive (DLI) Scheme reimburses up to 50 percent of expenditure for integrated circuits (ICs), chipsets, system on chips (SoCs), and systems and IP cores, hoping to grow twenty Indian chip R&D startups with a turnover of over Rs1,500 crore in the next five years. MeitY, *Gazette of India* CG-DL-E-21122021-232049, December 21, 2021, https://d2p5j06zete1i7.cloudfront.net/Cms/2022/May/05/1651757254_notification_dli.pdf.

Cloud Resources

India's aspiration toward digital sovereignty through the creation of DPIs includes a focus on increasing access to compute resources to spur innovation.

In 2023, the Indian government launched the AI Research Analytics and Knowledge Dissemination Platform (AIRAWAT), an AI-specific cloud computing infrastructure built by the government to provide compute to startups, academics, and researchers.[304] Following the model of Japan's AI Bridging Cloud Infrastructure (ABCI), the government built AIRAWAT in a centralized facility, rather than using a commercial cloud solution, in an attempt to avoid dependence on providers like Amazon's AWS or Microsoft's Azure. Built using Nvidia GPUs by Indian company Netweb, the AI supercomputer is housed at the Centre for Development of Advanced Computing in Pune.

While AIRAWAT's capabilities have been hyped by the government and media, its 656 GPUs pale in comparison with the supercomputers used by Meta and Microsoft to train their models, which contain more than ten thousand GPUs.[305] Although it may not have the capacity to support the development of large-scale models, AIRAWAT's pricing is currently competitive with that of comparable cloud providers, and it offers a discount to Indian startups.[306] More important, in a market where demand massively outstrips supply, it may provide an avenue for Indian companies to access compute at all, potentially providing a fillip to Indian startups engaged in AI development.

Recognizing the need for more compute, India's IT Ministry has put out a proposal to set up a cluster of twenty-five thousand GPUs through a public-private partnership model. Providing access to domestic startups and companies, the

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[304] AIRAWAT is an acronym for "Artificial Intelligence Research, Analytics and knoWledge Assimilation plaTform." It was first proposed in NITI Aayog, January 2020, https://www.niti.gov.in/sites/default/files/2023-03/AIRAWAT-Establishing-an-AI-Specific-Cloud-Computing-Infrastructure-for-India.pdf.

[305] James Vincent, "Meta Has Built an AI Supercomputer It Says Will Be World's Fastest by End of 2022," *Verge*, January 24, 2022, https://www.theverge.com/2022/1/24/22898651/meta-artificial-intelligence-ai-supercomputer-rsc-2022. In May 2023, it was ranked as the seventy-fifth fastest supercomputer in the world.

[306] "Charges," AIRAWAT PSAI (web page), accessed February 13, 2024, https://airawat-psai.cdac.in/airawat/charges; CloudOptimizer (web page), accessed February 13, 2024, https://cloudoptimizer.io/?gpus%5B%5D=NVIDIA%20A100&gpus_max=1&isGpu=true; and Sergey Karayev and Charles Frye, "Cloud GPUs," The Full Stack, October 30, 2023, https://fullstackdeeplearning.com/cloud-gpus.

platform is pitched as a move that would bolster sovereignty.[307] However, this partnership model is likely to leave existing distributions of power largely in place.[308]

Data Centers

Globally, the cloud market is dominated by players like Microsoft's Azure, Amazon's AWS, and Google's GCS, which use Nvidia chips. In India, the major conglomerates Reliance and Tata have partnered with Nvidia, enabling them to build cloud data centers using Nvidia's latest chips.[309] Recently, the data center provider Yotta, part of the Hiranandani real estate empire, announced $1 billion worth of GPUs on order from Nvidia.[310] Domestic and foreign companies are currently vying for this segment of the AI supply chain in India.[311]

Large-Scale Models

Large-scale models have become the bedrock of AI development over the past five years. Recently, Ola (India's Uber rival) launched Krutrim, a family of multilingual AI models that is touted as "India's first full-stack AI solution"; however reports indicate that Krutrim may be a repackage of OpenAI's API.[312] Most Indian efforts to develop indigenous large-scale models do not hope to directly compete with US- and China-developed models, but rather to exploit the niche of Indian languages. These are covered in more detail in the section on "Social Inclusion and Economic Development."

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[307] MeitY, "Working Group 6: IndiaAI Future Labs Compute", *IndiaAI 2023* (128–155), October 2023, https://indiaai.s3.ap-south-1.amazonaws.com/docs/IndiaAI+Expert+Group+Report-First+Edition.pdf.
[308] See critiques of the US government's similar proposal to set up a National AI Research Resource. AI Now Institute and Data and Society Research Institute, "Democratize AI? How the Proposed National AI Research Resource Falls Short," AI Now Institute, October 5, 2021, https://ainowinstitute.org/publication/democratize-ai-how-the-proposed-national-ai-research-resource-falls-short.
[309] Munsif Vengattil and Dhwani Pandya, "Nvidia Strikes Deals with Reliance, Tata in Deepening India AI Bet," Reuters, September 8, 2023, https://www.reuters.com/technology/nvidia-reliance-partners-develop-ai-apps-india-2023-09-08. Ironically, Nvidia has characterized these partnerships as a move to bolster India's sovereign AI; Sarvesh Mathi, "Working with Indian Government, Companies to Build Sovereign AI Infra: Nvidia Earnings Call," Medianama, November 23, 2023, https://www.medianama.com/2023/11/223-nvidia-earnings-call-q3fy24.
[310] Aditya Kalra, "Exclusive: India data centre firm Yotta's Nvidia AI chip orders to reach $1 bln -CEO," *Reuters*, January 11, 2024, https://www.reuters.com/technology/india-data-centre-firm-yottas-nvidia-ai-chip-orders-reach-1-bln-ceo-2024-01-11.
[311] On the concentration of power in the hands of politically connected big business, see Harish Damodaran, "From 'Entrepreneurial' to 'Conglomerate' Capitalism," Seminar, 2020, https://www.india-seminar.com/2020/734/734_harish_damodaran.htm; and Jairus Banaji, "Indian Big Business," *Phenomenal World*, December 20, 2022, https://www.phenomenalworld.org/analysis/family-business.
[312] Siddharth Jindal, "Why Ola's Krutrim is Showing OpenAI as its Creator", *Analytics India*, February 28, 2024, https://analyticsindiamag.com/why-olas-krutrim-is-showing-openai-as-its-creator.

Data as a National Asset

The Indian government's approach to AI cannot be divorced from its approach to data.[313] Enabling access to data and reducing data silos to create integrated large-scale data-driven platforms has been a major focus of Indian digital efforts over the past ten years, from the Aadhaar biometric identification project through the Unified Payments Interface to the current focus on DPIs. Data localization laws that restrict or create conditions for access to data have been a critical tool in India's efforts to exert control over data.

India is attempting to jumpstart AI development by building data platforms mediated and promoted by the state. Some technocrats have emphasized, data is more important than models for AI innovation in India. Nandan Nilekani, for example, advocates for organizing data in a model-agnostic manner, harnessing open-source models and the use of smaller models, fine-tuning them with high-quality and relevant indigenous data.[314] Government documents constantly stress the importance of building a data ecosystem for Indian AI development and highlight India's scale and diversity as giving it a natural data advantage. Despite the consensus on this data-driven approach, efforts have been fragmented.

The National Data Governance Framework Policy published by the Ministry of Electronics and Information Technology (MeitY) in 2022 emphasized that data collected by the government is a "public good."[315] Though this "public goods" approach has yielded results in identification and payments systems, it is not clear what it has to offer AI.

Data Platforms to Facilitate AI Development

With a decade of experience building various databases linked by APIs enabling private and public access—most prominently, the set of platforms called IndiaStack—integrated data systems have become India's default orientation

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[313] Divij Joshi, "The Legal, Institutional and Technical Architecture of ADMS in India," AI Observatory, n.d., accessed February 13, 2024, https://ai-observatory.in/context.

[314] Carnegie India, "Global Technology Summit 2023 | Day 1," YouTube video, 4:55:41, December 4, 2023, https://www.youtube.com/watch?v=JJ_XGtWlWVI. Nandan Nilekani is the billionaire cofounder of Infosys, the architect of India's Aadhaar biometric identification platform, and a major figure in Indian IT. His not-for-profit People+ai is at the forefront of pushing for the application of DPIs to AI.

[315] MeitY, *National Data Governance Framework Policy (Draft)*, May 2022, https://www.meity.gov.in/writereaddata/files/National-Data-Governance-Framework-Policy.pdf.

toward its digital needs. Not surprisingly, building platforms and applications to enable sharing of datasets across stakeholders is a key component of India's approach to AI development. The government is also engaging with industry stakeholders and academia[316] to shape policies and guidelines around data sharing for AI development.

In 2019 an expert working group at MeitY proposed developing a National AI Resource Platform (NAIRP) as an "Open Data and Knowledge-cum-Innovation Platform" to enable training, research, projects by startups, and commercial development of AI for socioeconomic good.[317]

The India Datasets Platform is "a unified national data sharing exchange" program to manage access, licensing, and the standardization of data, metadata, artifacts, and APIs hosted by various government departments. The platform brings together datasets of anonymized personal data and creates an interface for data consumers to access and use data without compromising stakeholders' "business or social goals, or [...] privacy, security, and other concerns."[318] Data consumers are primarily imagined as "research institutions, startups, or organizations that utilize the data provided by government departments for application building, innovation, or research purposes."[319]

Although, as currently described, the stated goals of the system are to improve governance and decision-making through AI, the platform will facilitate the monetization of data held by the government. Considering Chandrasekhar has said that the platform would only be accessible to Indian startups, it might also be viewed as a potential industrial policy instrument that will enable the government to leverage access to Indian data to promote domestic AI development.[320] MeitY has proposed funding a National Data Management Office to independently operate the platform and whose remit will cover "govern[ing] data collection, management, processing, storage and access as well as conducting audits and making

[316] India Data Commons is an effort by the Robert Bosch Center for Data Science and Artificial Intelligence to highlight India-specific data in Data Commons knowledge graph. India Data Commons features datasets published by Indian ministries and governmental organizations and provides it through Data Commons knowledge graph. See India Data Commons, accessed February 13, 2024, https://datacommons.iitm.ac.in/about; and Robert Bosch Center for Data Science and Artificial Intelligence, accessed February 13, 2024, https://rbcdsai.iitm.ac.in.

[317] MeitY, *Report of Committee on Platforms and Data on Artificial Intelligence*, July 2019, https://www.meity.gov.in/writereaddata/files/Committes_A-Report_on_Platforms.pdf.

[318] MeitY, *India AI 2023*, October 2023, https://www.meity.gov.in/writereaddata/files/IndiaAI-Expert-Group-Report-First-Edition.pdf.

[319] MeitY, "Working Group 2: India Dataset Platform" in *IndiaAI 2023*, October 2023.

[320] Aditi Agrawal, "Monetise Govt's Non-Personal Databases, Recommends Working Group," *Hindustan Times*, October 15, 2023, https://www.hindustantimes.com/india-news/monetise-govt-s-non-personal-databases-recommends-working-group-101697307098365.html.

standards," in effect combining the functions of both an exchange and a regulator.[321]

Other proposals include the National Data Platform, a "complete data marketplace ecosystem" being developed by the National Informatics Centre; and the National Data and Analytics Platform to enable access to open government data being developed by the National Institution for Transforming India (NITI) Aayog.

Chandrasekhar has also stated that integrating AI will be part of the "innovation journey of India Stack."[322] Nilekani has tied AI to India Stack by suggesting that the adoption of DPIs like India Stack provides the bedrock for building AI-first systems from the ground up.[323] Generating vast amounts of data across its various use cases, the stack may provide training data for AI development as well as a new consumer base for AI solutions.

The state construction of software data platforms is an industrial policy intervention that sees the state taking on the cost and burden of constructing a so-called "public good" that can spur the broader development of an industry. But such platforms have come with significant costs when it comes to citizens' rights and state power. Where the model has been successful, it has facilitated the emergence of a domestic market subsidized by government spending.[324] Because such platforms require continued government subsidization, at best they may facilitate import substitution for the Indian market. But they have little hope of success in international markets that lack such a controlled and subsidized environment.[325]

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[321] MeitY, *National Data Governance Framework Policy (Draft)*, Section 6.
[322] "India Stack 2.0 to Be More Nuanced, Intelligent: Rajeev Chandrasekhar," *Business Standard*, January 26, 2023, https://www.business-standard.com/article/technology/india-stack-2-0-to-be-more-nuanced-intelligent-sophisticated-rajeev-ch andrasekhar-123012600253_1.html.
[323] Nandan Nilekani and Tanuj Bhojwani, *Unlocking India's Potential with AI*, International Monetary Fund, December 2023, https://www.imf.org/en/Publications/fandd/issues/2023/12/POV-unlocking-india-potential-with-AI-Nilekani-Bhojwani. iSPIRT, "Open House on DPI for AI #4: Why India is best suited to be the breeding ground for AI innovation!" Product Nation, December 20, 2023, https://pn.ispirt.in/open-house-on-dpi-for-ai-4-why-india-is-best-suited-to-be-the-breeding-ground-for-ai-innovation.
[324] It should be noted, however, that India's government-subsidized DPIs are considered much more profitable than they actually are. The same will likely be true of any implementation of AI that is integrated with DPIs.
For a thorough critique of the data platform model, see Jyoti Panday, "India Stack: Public-Private Roads to Data Sovereignty," Internet Governance Project, August 31, 2023, https://www.internetgovernance.org/research/india-stack-public-private-roads-to-data-sovereignty.
[325] Peter Drysdale and Rojan Joshi, "Import Substituting Industrial Policy Threatens India and Indonesia's Development Success," East Asia Forum, November 5, 2023, https://www.eastasiaforum.org/2023/11/05/import-substituting-industrial-policy-threatens-india-and-indonesias-development-s uccess.

AI Applications for Social Inclusion and Economic Development

"To [unlock] India's potential with AI," Nilekani recently stated, "the trick is not to look too hard at the technology but to look at the problems people face that existing technology has been unable to solve." Chandrasekhar has referred to AI as a "kinetic enabler" for India's digital economy.[326]

As these statements suggest, the idea that economic development and social inclusion can be achieved simultaneously is one of the guiding principles shaping AI development and policy in India.[327] The most populous country in the world is largely rural, lacks access to quality healthcare, and has high rates of illiteracy—all issues that form part of the agenda for technological development, in AI as well as in other domains.

India's national AI strategy, #AIForAll, published by NITI Aayog in 2018, is distinct in its emphasis on economic growth combined with social inclusion.[328] It focuses on AI applications, creating a roadmap to adopt AI in sectors like healthcare, agriculture, education, smart cities, and smart mobility. Other major themes in the report include upskilling and the safe and responsible use of AI. The ministerial declaration adopted at the December 2023 GPAI Summit in New Delhi, for example, "embrace[d] the use of AI innovation in supporting sustainable agriculture as a new thematic priority."[329]

The pursuit of these goals manifests in efforts to make private firms find profitable solutions to entrenched socioeconomic problems. There are signs that the private sector is buying into the vision of social inclusion and economic development. Microsoft, for example, advertises that its Jugalbandi chatbot enables rural Indians

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[326] Government of India, "AI Will Be Kinetic Enabler of India's Digital Economy, Make Governance Smarter and More Data-Led: MoS Rajeev Chandrasekhar," press release, Press Information Bureau, April 14, 2023, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1916645.
[327] This is in contrast to many definitions of AI for social good, which "often differentiate between economic impact and the societal impact and advantages." Doaa Abu-Elyounes and Karine Gentelet, "A New AI Lexicon: Social Good," AI Now Institute, November 4, 2021, https://ainowinstitute.org/publication/a-new-ai-lexicon-social-good-2.
[328] NITI Aayog, "National Strategy for Artificial Intelligence: #AIForAll," June 2018, https://indiaai.gov.in/documents/pdf/NationalStrategy-for-AI-Discussion-Paper.pdf.
[329] Global Partnership on Artificial Intelligence, *GPAI Ministerial Declaration*, 2023, https://gpai.ai/2023-GPAI-Ministerial-Declaration.pdf.

to gain easier access to government services.[330] And Google proudly states that it is "supporting changemakers deploying AI to improve agriculture outcomes."[331] But such declarations should also be understood as ways for firms—especially large foreign firms—to align themselves with the government.

Calls for AI for social inclusion and economic development are also a means to assert global leadership and provide a distinct model of development, particularly in Global South countries, which may provide markets for solutions incubated in India. A key call of NITI Aayog's AI national strategy is a recognition that India is behind in the "AI race" and that it should aim to become an "AI garage for 40% of the world," referring to the Global South, whose needs India hopes to fulfill.[332]

Linguistic Diversity as India's Strength

One of the key domains in which the Indian government has trumpeted its advantage in AI is in the linguistic diversity of the country, with 122 major languages.

Hoping to capitalize on this, MeitY has set up the Bhashini program as a DPI for linguistic data under the National Language Translation Mission. The Bhashini project is envisioned as providing startups and companies with linguistic data to develop AI tools for vernacular languages—a largely untapped market.[333] The government is also working on AI4Bharat, focusing on developing open-source language models like IndicBART and IndicBERT for Indian languages. The Reserve Bank of India has announced the introduction of AI-based conversational payments into United Payments Interface (UPI).[334] Given low literacy rates in India and a huge potential market, voice-based interfaces for AI in vernacular languages are likely to become a strategic focus in India.

Several private-sector efforts are also focusing on vernacular language models. Indian AI startup Sarvam AI has released OpenHathi, the first Hindi language model

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[330] Chen May Yee, "With Help from Next-Generation AI, Indian Villagers Gain Easier Access to Government Services," Source Asia, Microsoft, n.d., accessed February 13, 2024
https://news.microsoft.com/en-in/features/with-help-from-next-generation-ai-indian-villagers-gain-easier-access-to-government-services.
[331] Sanjay Gupta, "Google for India 2023: Partnering India's Success in a New Digital Paradigm," Google, India Blog, October 19, 2023, https://blog.google/intl/en-in/partnering-indias-success-in-a-new-digital-paradigm.
[332] NITI Aayog, ""National Strategy for Artificial Intelligence.".
[333] A major contributor to Bhashini is Project Vaani, a Google collaboration with the Indian Institute of Science to collect and transcribe open-source speech data from across India. MeitY, "Bhashini's Purpose," web page, accessed February 13, 2024, https://bhashini.gov.in/about-bhashini.
[334] "RBI Announces AI-Powered UPI Payment Features," INDIAai, August 4, 2023, https://indiaai.gov.in/news/rbi-announces-ai-powered-upi-payment-features.

built on Meta AI's architecture. The startup also partnered with KisanAI to fine-tune its base model using conversational data they gathered from a GPT-powered bot engaging with farmers in different languages.[335] In collaboration with Bhashini, Bengaluru-based CoRover.ai has developed an indigenous model named BharatGPT that supports over twelve Indian languages. Tech Mahindra is planning to launch Indus, an open-source LLM for Hindi dialects, in early 2024. Indian software-as-a-service (SaaS) giant Zoho has unveiled a suite of generative AI extensions and integrations for its applications, all powered by ChatGPT, and has announced its plans to build smaller AI models for specific domain problems. Notably, most of these efforts are built atop proprietary large-scale models like Meta's LLaMA and Microsoft's GPT.

The Legacy IT Industry

The scale of consumer digital technology for social inclusion and economic development pales in comparison to India's legacy services exports industry, exemplified by outsourcing. Most private-sector AI development in India is occurring in enterprise services, the country's traditional strength in IT. A recent survey of over seventy generative AI startups, which have collectively raised over $440 million, for example, showed that 30 percent were working in the code and data sector (generating code, crafting documentation, and converting text to SQL); 27 percent were working in audio and video processing; and only 21 percent focused on text and chatbots.[336] The development of Indian AI applications, in other words, appears to be largely focused on software components for enterprise customers.

The large services export firms that continue to dominate the Indian tech sector are integrating AI into their traditional enterprise businesses. Infosys, for example, has signed a deal with Nvidia[337] to integrate its Nvidia AI Enterprise system with Infosys's Topaz to deliver solutions for its enterprise customers in domains like customer service and logistics. Wipro has announced a $1 billion investment in generative AI and plans to train all 250,000 members of its workforce in AI skills.[338]

[335] Arun Padmanabhan, "India's LLM Race Is Heating Up! Here's a Look at Who's Building What," MoneyControl, December 21, 2023, https://www.moneycontrol.com/news/technology/indias-ai-uprising-can-a-challenger-emerge-in-the-llm-marathon-11931681.html.

[336] Inc42, *India's Generative AI Startup Landscape Report*, 2023, https://inc42.com/reports/indias-generative-ai-startup-landscape-report-2023.

[337] "Infosys and NVIDIA Team to Help World's Enterprises Boost Productivity With Generative AI," press release, Nvidia, September 20, 2023, https://nvidianews.nvidia.com/news/infosys-and-nvidia.

[338] "Wipro Limited Q1 FY 2024 Earnings Conference Call," Wipro, July 13, 2023, https://www.wipro.com/content/dam/nexus/en/investor/quarterly-results/2023-2024/q1fy24/q1fy24-earnings-transcript.pdf.

Despite its size, India's enterprise sector has remained largely out of the limelight in discussions around digital policy in India. With its potential to automate various back-office functions, AI represents a major threat to this industry, which experienced a downturn in 2023. Yet India's AI industrial policy has largely lacked explicit engagement with its needs. With the possible exception of vernacular model development, the promise of social inclusion through AI applications is not aligned with the existing structural conditions of business and Indian startups working on AI development and adoption in India.

Regulatory Grandstanding

The Indian government has sought to claim space in the burgeoning global debate on regulating AI by both claiming leadership over issues of equity impacting the Global South and advancing frameworks for the governance of AI. But these efforts have been cursory and often contradictory. For example, in April 2023, Chandrashekhar stated that, to help create an enabling, pro-innovation environment India would not regulate AI.[339] Just two months later, making a U-turn from his earlier position, the minister began advocating for regulations for AI to prevent user harms.

There are multiple, often overlapping policy efforts and approaches to regulating AI. The NITI Aayog, the government's official policy think tank, is advocating for a principles-based, "Responsible AI" approach to address ethical, legal, and societal implications of AI technologies.[340] Centering on harms like misinformation, MeitY has proposed an overhaul of the existing legislative framework governing digital technologies and services in India to align them with the advancements in technology. Various ministries have established task forces and committees to

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[339] "Why India Can Afford to Wait and Watch before Regulating AI," *Economic Times*, July 31, 2023, https://telecom.economictimes.indiatimes.com/news/internet/why-india-can-afford-to-wait-and-watch-before-regulating-ai/102279854.
[340] NITI Aayog, National Strategy for Artificial Intelligence (NSAI) #AIforAll, June 2018, https://www.niti.gov.in/sites/default/files/2023-03/National-Strategy-for-Artificial-Intelligence.pdf

study the implications of and recommend policy measures for AI.[341] Alongside domestic efforts, India is also exploring international partnerships for AI development and governance.[342]

Responsible AI

The political leadership's focus on AI ethics and "responsible AI" development is especially visible on the global stage. Speaking at the Business 20 (B20) Summit, Modi flagged concerns over the challenges of algorithmic bias and its impact on society to call for a global framework to ensure ethical considerations in data collection, processing, and usage of AI across different sectors.[343] At the 2023 UK AI Safety Summit, Chandrasekhar emphasized the need for robustness, safety, and international governance in AI. During this summit, India joined twenty-seven other nations in signing a declaration to work collaboratively to address the risks associated with AI. More recently at the Global Partnership on Artificial Intelligence Summit, Modi emphasized that a large part of the course of AI development will come through "human and democratic values."[344]

In 2021, in collaboration with the World Economic Forum, NITI Aayog released a two-part approach paper on the responsible use of emerging technologies.[345] These responsible AI (RAI) principles cover safety and reliability, equality, inclusivity and non-discrimination, privacy and security, transparency, accountability, and the protection and reinforcement of positive human values. They set out a risk-based framework that proposes self-regulation for low-risk applications and a noncommittal pledge that "the government may mandate responsible AI practices

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[341] The Ministry of Commerce and Industry set up this Task force on Artificial Intelligence led by Kamakoti Veezhinathan Professor at IIT Madras to promote the use of AI for India's economic transformation. https://www.aitf.org.in
The Ministry of Defence (MoD), Department of Defence Production (DDP) have set up a multi-stakeholder Task Force under the Chairmanship of Sh. N Chandrasekaran, Chairman, Tata Sons to study strategic implications of AI in national security perspective. PIB Delhi, Task Force for Implementation of AI, March 2022 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1810442
The Ministry of Electronics and Information Technology has constituted four committees four committees to propose action in the areas of Platform and Data for AI, Leveraging AI for identifying National Missions in Key Sectors, Mapping Technological capabilities key policy enablers required across sectors, skilling and re-skilling R&D and Cyber Security, Safety, Legal & Ethical issues. Constitution of four Committees for promoting Artificial Intelligence (AI) initiatives and developing a policy framework, February 2018 https://www.meity.gov.in/writereaddata/files/constitution_of_four_committees_on_artificial_intelligence_0.pdf
[342] Through the Initiative on Critical Emerging Technologies, the United States and India have committed to fostering collaboration across various domains, including AI, high-performance computing, quantum technologies, and enhancing supply chain resilience, particularly in semiconductor cooperation.
[343] "B20 Summit 2023: PM Modi Calls on Ethical Use of Artificial Intelligence," *Mint*, August 27, 2023, https://www.livemint.com/news/b20-summit-2023-pm-modi-calls-on-ethical-use-of-artificial-intelligence-ai-supply-chain-cryptocurrency-11693122849876.html.
[344] Shouvik Das and Gulveen Aulakh, "GPAI Should Help Frame Sustainable AI Rules," *Mint*, December 12, 2023, https://www.livemint.com/ai/artificial-intelligence/gpai-should-help-frame-sustainable-ai-rules-pm-11702401229429.html.
[345] NITI Aayog, *Responsible AI, Part 1*, February 2021, https://psa.gov.in/CMS/web/sites/default/files/publication/Responsible-AI-22022021.pdf; and NITI Aayog, August 2021, https://www.niti.gov.in/sites/default/files/2021-08/Part2-Responsible-AI-12082021.pdf.

for high-risk use cases."[346] However, NITI Aayog does not address the determination of specific AI applications as high- or low-risk.

NITI Aayog's application of the RAI principles framework to the use of facial recognition technology (FRT) in India is instructive as to the impact of such policy.[347] The agency's report focused on the use of FRT in DigiYatra, a biometric identity management ecosystem active in Indian airports. Although NITI Aayog recommended adopting a strong legal framework for personal data protection and a whole-of-government approach to legislation and regulation, in reality these policy recommendations have not percolated down to DigiYatra's implementation. The initiative is being aggressively promoted by the government, and operates without transparency and accountability, even enrolling citizens without their consent.[348]

Legislating Safety and Trust

In 2022, MeitY announced that it is working on replacing the decades-old Information Technology Act with a contemporary legal framework for India's evolving digital ecosystem, the Digital India Act (DIA).[349] Consultations on the DIA by MeitY since March 2023 have been limited to selective stakeholders, excluding civil society, frontline workers, labor organizations, and users of these services. Though a draft has not been made public, the proposed law is being touted as promoting online safety, trust, accountability, and an open internet. In line with recent statements by Modi on the risks of deepfakes,[350] a public presentation on the DIA indicates that it conceives of AI harms primarily in terms of misinformation.[351] The government has indicated that the DIA will be tabled in Parliament after the 2024 general election.[352]

[346] NITI Aayog, *Responsible AI, Part 2*, August 2021, https://www.niti.gov.in/sites/default/files/2021-08/Part2-Responsible-AI-12082021.pdf.
[347] NITI Aayog, *Responsible AI for All: Adopting the Framework – A Use Case Approach on Facial Recognition Technology*. November 2022, https://www.niti.gov.in/sites/default/files/2023-03/Responsible-AI-AIForAll-Approach-Document-for-India-Part-Principles-for-Responsible-AI.pdf.
[348] Jagriti Chanda, "Centre's Digi Yatra Enrolment Takes Off as Airport Security Staff Sign up Flyers without Their Consent," *Hindu,* January 5, 2024, https://www.thehindu.com/news/national/passengers-say-cisf-and-airport-staff-are-collecting-biometric-data-without-consent/article67710134.ece.
[349] The new framework for digital technology regulation will additionally comprise Digital Personal Data Protection Act, Digital India Act Rules, National Data Governance Policy, and IPC Amendments for Cyber Crimes.
[350] Priya Singh, "IPC amendments for Cyber Crimes," *Business Today,* November 22, 2023, https://www.businesstoday.in/technology/news/story/ai-must-be-safe-for-society-pm-modi-expresses-concern-over-deepfakes-at-g20-summit-406739-2023-11-22.
[351] MeitY, Proposed Digital India Act, 2023, Digital India Dialogues, March 9, 2023, https://www.meity.gov.in/writereaddata/files/DIA_Presentation%2009.03.2023%20Final.pdf.
[352] Kamya Pandey, "Digital India Bill to Be Released Post Elections: IT Minister Rajeev Chandrasekhar Says," Medinama, December 1, 2023, https://www.medianama.com/2023/11/223-digital-india-bill-release-after-elections-mos-it.

MeitY is also considering amendments to the Information Technology Rules of 2021 to establish a regulatory framework for the use of AI technologies. Reports suggest that the government may mandate platforms using artificially intelligent algorithms or language models to train their machines to be free of "bias" of any kind.[353]

The limitations of the IT Act has not prevented the government from using it to exert control over companies developing and facilitating use of AI in India. MeitY relies on the IT rules to regulate deep fakes, instructing social media platforms to remove such content promptly. The government has also used IT rules to require platforms that use AI models for their services to ensure they are not hosting prohibited content or content that poses risks to electoral integrity and issue advisories informing users about prohibited content.

Following a recent uproar about Google Gemini making controversial statements about Modi, Chandrasekhar claimed that Gemini's failures were violations of the IT rules and provisions of the criminal code. MeitY issued a strict advisory stipulating that AI models can only be deployed for Indian users with explicit government permission. The advisory elicited criticism and dismay from AI companies and entrepreneurs. Although Chandrashekhar has stated that the advisory primarily targets large platforms and startups would not be subject to the same regulatory scrutiny, the advisory itself doesn't differentiate based on platform size.

The Indian government's attempts to regulate AI technology and data to ensure responsible development and use seem commendable on the surface. However, a closer examination reveals that instead of shielding from potential liability, focusing on ethics, responsibility, safety and trust enables the government to strategically exert control over AI companies and platforms in India. Despite their flawed performances and lack of readiness for widespread use, indigenous LLMs have not faced the same level of regulatory scrutiny as LLMs being developed by global players.[354] There also remains a significant gap between the proposed principles and the actual mitigation of the harms caused by technology implementation. India's extensive IT projects have faced criticism for consequences like compromised security, increased surveillance, and exploitation of citizen data.[355]

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[353] Aashish Aaryan, "Govt May Amend IT Act to Add New Rules for AI, GenAI Models," *Economic Times*, January 4, 2024, https://economictimes.indiatimes.com/tech/technology/govt-may-amend-it-act-to-add-new-rules-for-ai-genai-models/articleshow/106524019.cms.

[354] Anjali Thakur, "Hillary Clinton Defeated Trump In 2014: Krutrim AI's Gaffe Goes Viral," *NDTV*, February 28, 2024, https://www.ndtv.com/feature/hillary-clinton-defeated-trump-in-2014-krutrim-ais-gaffe-goes-viral-5143739

[355] For example, India's large-scale biometric system Aadhaar has been criticized for excluding the most vulnerable citizens from governmental services, increasing government surveillance, and facilitating the extraction of citizens' data for commercial use. See Reetika Khera, Dissent on Aadhaar: Big Data Meets Big Brother (Hyderabad: Orient BlackSwan, 2019), https://orientblackswan.com/details?id=9789352875429; and Aria Thaker, "The New Oil," *Caravan*, May 1, 2018, https://caravanmagazine.in/reportage/aadhaar-mixing-public-risk-private-profit.

Yet such social and economic harms appear to be largely absent from the proposed trust and safety regulation. Similarly, instead of being an aim of governance, trust is conflated with acceptance of AI, and used as a narrative to convince citizens that AI is invariably good.

Streamlining Data Processing and Use

Another strategy of AI governance is encapsulated through policy interventions focused on streamlining access to data by the government as well as the private sector. These interventions should be understood in tandem with the government's ongoing promotion of data platforms.

A 2021 report by a committee of experts led by tech services entrepreneur Kris Gopalakrishnan called for a framework for the governance of non-personal data to include mechanisms for data sharing, rights, and obligations of data custodians and stakeholders. The report situated itself in the context of the data required by AI and machine learning systems and focused its recommendations on creating "a modern framework for creation of economic value from use of data."[356]

India has recently passed the Digital Personal Data Protection Act (DPDPA), which creates a framework for the processing of citizens' data by the state and corporations. Ignoring crucial problems that were flagged by civil society stakeholders over consultations spanning several years, the final, industry-friendly version of the law was passed without any public consultation. Among other concerns, the law has been critiqued for its weak notice requirements, restricted scope of data that is subject to protection, vague permissions for nonconsensual processing of data, and overbroad exemptions for private and government actors.[357] As one civil society commentator observes, rather than a data protection law, it should be thought of as a data processing law.[358]

The regulation of AI is fragmented, and robust mechanisms for ensuring transparency and data governance are absent, rendering government advisories and laws insufficient to effectively tackle AI-related harms and safeguard individual

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[356] Udai Mehta and Amol Kulkarni, "Kahlil Gibran and Data Regulation," *Times of India*, August 28, 2020, https://timesofindia.indiatimes.com/blogs/voices/kahlil-gibran-and-data-regulation.
[357] For a critique of the law, see Anushka Jain and Prateek Waghre, "IFF's first read of the draft Digital Personal Data Protection Bill, 2023," Internet Freedom Foundation, August 3, 2023, https://internetfreedom.in/iffs-first-read-of-the-draft-digital-personal-data-protection-bill-2023.
[358] Justin Hendrix in conversation with Aditi Agarwal, Kamesh Shekhar, and Prateek Waghre, "Assessing India's Digital Personal Data Protection Bill," Tech Policy Press, August 13, 2023, https://www.techpolicy.press/assessing-indias-digital-personal-data-protection-bill.

rights. Indian policymaking on AI also lacks public consultations, resulting in the state and market players predominantly shaping the safety and responsibility agenda, leaving social harms unaddressed, particularly in areas such as workers' rights, exclusion, and bias.

Conclusion

Having hosted the G20 and the GPAI meetings in 2023 and given a broadly favorable geopolitical situation, India stands poised to exert significant influence on global AI development. In the context of an unsustainable global AI arms race that is concentrating capital, data and compute, India's DPI-influenced approaches may look like an attractive alternative.

While social inclusion and economic development are appealing narratives at the global level, on the ground they are accelerating uneven development. Invoking social inclusion and economic development enables the state to take the lead in setting up infrastructures for AI compute and data that will be used for private benefit. Despite the posturing around "Responsible AI", a permissive regulatory apparatus means that the state and companies can collect and process citizens' data with impunity. While India is also investing its resources in plans to promote domestic chip manufacturing and boost compute capacities in the name of sovereignty, in their current form it is not clear that these will provide a meaningful boost to AI development.

In closing, a caveat is in order when analyzing industrial policy in contemporary India. 2024 is an election year and policy in India is always also an act of political branding targeted at Indian voters. Under the present government, technocratic industrial policy is also part of a populist electoral strategy that ties development to a civilizational vision of a transformed India. The national strategy on AI comes hashtagged for viral consumption ("#AIForAll"); India's state-incubated generative AI model is called "BharatGPT";[359] and India's AI supercomputer is named after a divine elephant with four tusks and seven trunks from Hindu mythology

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[359] "Bharat," the name for India in several Indian languages, has been at the center of considerable controversy recently as the government attempts to increase its adoption. "India or Bharat: What's behind the dispute over the country's name?" *Aljazeera*, September 6, 2023, https://www.aljazeera.com/news/2023/9/6/india-or-bharat-whats-behind-the-dispute-over-the-countrys-name.

("AIRAWAT"). Our analysis of India's AI policy in the context of a global resurgence of industrial policy should be read with an awareness of the electoral politics of policymaking in India today.