

# The Stack and the State: India's Digital Governance Model as Technopolitical Power

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## ABSTRACT

Since 2014, India has made digital infrastructure central to its governance and diplomacy, positioning itself as a model for the Global South through platforms such as Aadhaar, UPI, and India Stack. This paper argues that India's digital transformation constitutes a distinct form of technopolitical power: one that consolidates authority domestically while projecting modernity and self-reliance internationally. Tracing continuities between earlier techno-scientific statecraft and contemporary Digital Public Infrastructure (DPI), the paper shows how efficiency and rationality are mobilised as political ideals that obscure questions of exclusion, surveillance, and accountability. Drawing on secondary data across sectors such as health and education, it highlights how digital systems reshape welfare delivery, bureaucratic discretion, and citizen participation, producing uneven outcomes and new modes of resistance. Internationally, India's export of DPI and AI partnerships reflects both an assertion of sovereignty and a dependence on foreign computational infrastructures. The paper situates these tensions within broader debates on technocratic governance, democratic backsliding, and digital sovereignty, arguing that India's model exemplifies how states use infrastructure to mediate legitimacy, power, and global influence in the algorithmic age.

**Keywords:** Digital governance; Technopolitical power; India Stack; Digital public infrastructure (DPI); AI and sovereignty; State capacity and legitimacy

## La pila y el Estado: el modelo de gobernanza digital de la India como poder tecnopolítico

### RESUMEN

Desde 2014, India ha hecho de la infraestructura digital un elemento central de su gobernanza y diplomacia, posicionándose como

modelo para el Sur Global a través de plataformas como Aadhaar, UPI e India Stack. Este artículo argumenta que la transformación digital de India constituye una forma distintiva de poder tecnopolítico: uno que consolida la autoridad a nivel nacional a la vez que proyecta modernidad y autosuficiencia a nivel internacional. Al rastrear las continuidades desde la política tecnocientífica anterior hasta la Infraestructura Pública Digital (IPD) contemporánea, el artículo muestra cómo la eficiencia y la racionalidad se movilizan como ideales políticos que oscurecen cuestiones de exclusión, vigilancia y rendición de cuentas. Basándose en datos secundarios de sectores como la salud y la educación, destaca cómo los sistemas digitales reconfiguran la prestación de asistencia social, la discreción burocrática y la participación ciudadana, generando resultados desiguales y nuevas formas de resistencia. A nivel internacional, la exportación de IPD e IA por parte de India refleja tanto una afirmación de soberanía como una dependencia de infraestructuras computacionales extranjeras. El artículo sitúa estas tensiones dentro de debates más amplios sobre la gobernanza tecnocrática, el retroceso democrático y la soberanía digital, argumentando que el modelo de la India ejemplifica cómo los Estados utilizan la infraestructura para mediar la legitimidad, el poder y la influencia global en la era algorítmica.

**Palabras clave:** Gobernanza digital; Poder tecnopolítico; India Stack; Infraestructura pública digital (IPD); IA y soberanía; Capacidad y legitimidad del Estado

## 堆栈与国家：作为技术政治力量的印度数字治理模式

### 摘要

自2014年以来，印度已将数字基础设施置于其治理和外交的核心地位，并通过Aadhaar、UPI和India Stack等平台将自身定位为全球南方国家的典范。本文认为，印度的数字化转型构成了一种独特的技术政治权力形式：它既巩固了国内的权威，又向国际展现了现代化和自力更生的形象。本文追溯了从早期科技治国方略到当代数字公共基础设施(DPI)的延续性，揭示了效率和理性如何被动员为政治理想，从而掩盖了排斥、监控和问责等问题。本文利用卫生和教育等领域的次级数据，着重阐述了数字系统如何重塑福利供给、官僚自由裁量权和公民参与，从而导致结果不均和新的抵抗模式。

在国际上，印度对DPI和人工智能合作的输出既体现了其对主权的维护，也反映了其对外国计算基础设施的依赖。本文将这些矛盾置于更广泛的、关于技术官僚治理、民主倒退和数字主权的辩论框架下进行探讨，并指出印度的模式体现了国家如何在算法时代利用基础设施来调和合法性、权力和全球影响力。

关键词：数字治理，技术政治权力，印度堆栈，数字公共基础设施(DPI)，人工智能与主权，国家能力与合法性

**A**round the world, governments are turning to artificial intelligence not just to modernise public services, but to reshape how authority is exercised. In the United States, the declaration that a second Trump administration would be “artificial intelligence (AI)-first” reflects a trend where emerging technologies are seen less as tools for reform and more as instruments of centralised control (Metcalf and Young 2025). This turn is driven in part by the hype that surrounds digital innovation: the belief that data systems, automation, and platforms can deliver frictionless, efficient governance while bypassing the messiness of politics. Rather than emphasising public deliberation or institutional accountability, digital governance agendas often privilege speed, scale, and executive control. While national trajectories differ, the global convergence around digital systems raises critical questions about how states construct legitimacy, manage dissent, and reshape citizen–state relations in the digital age.

Since 2014, India has expanded its digital infrastructure in governance, accompanied by a broader political shift toward centralised leadership

and majoritarian rhetoric. This digital transformation of governance has become a defining feature of Prime Minister Narendra Modi’s tenure, both in terms of domestic policy and in how India presents itself on the global stage. This paper focuses on citizen-facing infrastructural layers, such as Aadhaar, Unified Payments Interface (UPI), and India Stack<sup>1</sup> as the programmable substrate through which the Indian state performs rule (i.e., identity authentication, payments, and data flows).<sup>2</sup> Initiatives such as “AI for All” and the international promotion of India Stack reflect how digital infrastructure and private-sector innovation are framed as tools for inclusive development. This export of governance models and technical expertise is increasingly central to India’s diplomacy, positioning itself as an alternative to Silicon Valley’s corporate-driven platforms, Europe’s regulation-first approach, and China’s highly centralised, surveillance-oriented model of digital governance.

Yet India’s use of technology as a tool of governance is not new. From the nuclear program to the Green Revolution, to Aadhaar and now, to AI For All, the Indian state has relied on

techno-scientific expertise to shape its development while projecting its technological ambitions globally. The post-2014 period is thus not distinguished by the presence of tech governance, but the consolidation of digital infrastructure as a central instrument of both domestic administration and global export. Platforms such as Aadhaar, UPI, and the India Stack (a suite of interoperable digital infrastructure layers) are increasingly positioned as models of efficient governance and form the core of India's exportable Digital Public Infrastructure (DPI) initiative. Where earlier phases of South-South cooperation focused on showcasing technical capability, the current moment marks a shift toward the export of complete governance architectures as development templates. This digital self-imagining aligns with the BJP's broader worldview of a self-reliant, globally ascendant India, blending modernist aspirations with nationalist pride. Rather than seeing the Modi-era as a break from the past (Awasthi et al. 2024), we can trace how it intensifies long-standing technocratic traditions while adding a new layer of global digital diplomacy and centralised data power.

This digital turn has intensified anxieties and contestations around what is left out of increasingly automated, data-driven governance. While scholars have long asserted the capacity of technological progress to improve public service delivery (Sindakis 2024), they have also warned that it can flatten pluralism and neuter democratic institutions (Kreps and Kriner 2023). Civil society groups and activists have raised

significant concerns about surveillance, exclusion, and the erosion of democratic deliberation in favour of technical decision-making. Dattani (2020) compels us to look at Aadhaar, India Stack, and strategies of e-governance in continuity with colonial forms of governmentality. In this analysis, digital tools see people not as citizens but grouped into populations that are legible to the state through empirical and behavioural categories, giving officials a set of "rationally manipulable instruments" through which to target policy (Chatterjee 2004). These technologies, she argues, reduce interactions into digital transactions and enable "the weaving of corporate into government" (Dattani 2020). This framework, however, risks us overlooking the lived realities of digital governance: from everyday exclusions and structural violence (Dreze et al. 2017) to the possibilities it opens for participation and contestation (Kulal et al. 2024; Sánchez-Cacicedo 2024).

This paper, then, considers whether the government's use of digital infrastructure accelerates existing tendencies in the Indian state (such as centralisation of authority and bureaucratic opacity) or whether it introduces qualitatively new forms of control through automation, predictive governance, and infrastructural power. I also ask how these domestic dynamics, far from being isolated, are now actively shaping India's international relations. Here, I do not intend to collapse technology and its adoption by the Indian state into mere surveillance, sovereignty, or miracle, but rather to understand the symbolic role that AI, digital gover-

nance, and its accompanying discourses of techno-utopianism<sup>3</sup> play in India's domestic and international leadership. In the process, I build on scholars who show how digital infrastructures in the Global South often serve as instruments of centralised statecraft as well as markers of aspirational modernity (Philip 2016; Irani 2015).

In what follows, I unpack how digital infrastructure in India operates as a domestic technology of rule and a globally exported model of governance. I open by invoking mid-century critiques of technology to show how ideals of efficiency (as a performance ideal) and rationality (as justification for technocratic decision-making) have long served to obscure the political stakes of technological power. I then situate India's contemporary digital turn within a longer history of technocratic statecraft, showing how earlier configurations of planning, statistics, and computational governance laid the groundwork for today's DPI. The next section examines how these systems are unevenly embedded across sectors such as welfare, health, education, and policing, revealing both their enabling potential and their exclusions, as well as the bureaucratic improvisations and civic contestations that shape their implementation. The final section turns outward, analysing India's promotion of DPI and AI partnerships as instruments of diplomatic strategy and norm-setting, particularly within the Global South.

Across these sections, the paper argues that India's digital transformation is not simply a story of techno-

logical progress, but one of political legitimacy, symbolic projection, and assertive geopolitical positioning through digital infrastructure. Domestically, the expansion of platforms like Aadhaar, UPI, and India Stack consolidates authority in the executive branch by embedding data-driven oversight into welfare, policing, and education, often at the expense of institutional checks and democratic deliberation. Symbolically, digital governance is framed as proof of India's modernity and self-reliance, reinforcing the BJP's broader vision of a technologically advanced, globally respected Hindu-majority nation. Digital India's narrative of modernity is intertwined with majoritarian nationalism, where technological prowess is cast as civilisational revival. Internationally, India promotes its DPI as an exportable model for the Global South, aiming to compete with Silicon Valley's corporate platforms and China's state-led surveillance systems, and to position itself as a leader in setting norms for AI and digital development. However, these ambitions face significant constraints. Politically, the centralisation of authority has provoked resistance from civil society groups and exacerbated democratic backsliding. Symbolically, the narrative of inclusive digital empowerment is undermined by persistent exclusions, surveillance concerns, and uneven implementation across states. Globally, India's aspirations are complicated by its reliance on foreign-owned compute power, proprietary AI models, and cloud infrastructure, which expose tensions between sovereign ambition and structural dependency.

I use terms such as AI, DPI, and technoscientific governance to analyse the evolving entanglements between the Indian state, digital systems, and international legitimacy. The term AI suffers from a persistent terminological ambiguity. It is often used as an umbrella term encompassing a broad spectrum of technologies, from rule-based automation and statistical modelling to machine learning and neural networks. In practice, AI can refer to everything from simple decision trees to complex systems trained on large datasets to detect patterns, make predictions, or simulate human reasoning. DPI refers to modular platforms, such as Aadhaar, UPI, and India Stack, that enable identity authentication, payments, and data integration across state services. While often portrayed as scalable tools for development, I approach DPI as both infrastructural and ideological: a socio-technical form that encodes normative assumptions about citizenship, legitimacy, and governance.

Terms like AI and DPI are often used interchangeably in policy discourse, but they refer to distinct systems. DPI does not include AI systems per se, but rather the infrastructural layer upon which AI applications may later be built. Without DPI, AI applications in governance often lack the data inputs, institutional access, and interoperable systems they require to function effectively. Conversely, once DPI is in place, it becomes the substrate for integrating AI tools across sectors like healthcare, welfare, policing, and education. This distinction is important: India's global promotion of DPI is not

a direct export of AI capabilities, but of the institutional and technical scaffolding that makes AI deployment at scale possible. Following Jasanoff's (2015) work on sociotechnical imaginaries, I consider how such infrastructures are mobilised to project national visions of modernity and state capacity. Rather than treating these terms as static, this paper attends to how they are translated, adapted, and contested in practice across domestic policy and international diplomacy.

### **Technoscience and the Pursuit of Efficiency**

**A**nxiety and hope about technology's expanding role in the state are rooted in decades of cultural and political storytelling about the rise of autonomous machines. This duality is marked by technology's ability to increase efficiency, which has been touted as a benefit by some and a blindness by others. In the aftermath of World War II, technological advances (such as atomic weapons and tools of mass surveillance) revealed their potential for dehumanisation and authoritarian control. Historian Lewis Mumford (1970) maintained that ideas of tech-centred progress obscured the significant human and environmental cost emerging from its relentless pursuit of productivity. While the practical benefits of technological advancement are widely accepted, he argued that they do not operate towards a social purpose but towards building a bureaucratic-technologic "megamachine" to keep "the corporate apparatus itself in a state of

power-making, profit-yielding productivity” (Mumford 1970, 127).

Following from this prognosis, Jacques Ellul (1973) saw technology not as material artefact, but as deeply entangled with governance and the rationalising logic of technocracy. For Ellul, this is captured in the notion of “technique”: the sum of all rational methods devised to maximise efficiency. His primary concern was that autonomous technology was in the process of removing diversity and pluralistic thought, “subverting and suppressing these values to produce at last a monolithic world culture in which all non-technological difference and variety is mere appearance” (Ellul 1973, 10). “The only thing that matters technically,” he says, is “yield, production.” At the same time, technology’s supposed ability to respond to this capitalist and, in some cases, spiritual desire to be better than human has been crucial to its development. It possesses an almost fantastical, magical, and unknowable quality (Williams 2024). Since the 1940s, for example, AI researchers have worked to create machines that think “like human minds” (Wilson 2011). Early researchers in Dartmouth’s AI team were divided on what functions to prioritise yet agreed that the key was to create “beings of pure rationality” to act as efficient problem task solvers. Yet while ostensibly privileging rationality, developers have often also used the language of magic to refer to AI tools: concealing the power of tech companies and obscuring their infrastructure to conjure and encourage faith in unknowable systems (Nagy and Neff 2025).

At a broader level, these cultural and political anxieties endure: does technology serve democratic and human needs, or does its pursuit of efficiency and control ultimately reinforce extractive economies and authoritarian power? Indeed, where efficiency measures performance, rationality concerns the legitimacy of decisions; conflating the two has historically allowed technological projects to appear both optimal and politically neutral. In postcolonial contexts like India, the line between science and technology often collapses into a state-driven pursuit of techno-scientific legitimacy. To illustrate a global cultural logic here, Nandy (1988) cites Kennedy’s 1962 speech on the space race, where science is presented not as open-ended inquiry but as a spectacular, state-owned technology that ultimately leads to the moon landing. Kennedy’s speech gestures to significant trends in discourses of techno-science: one, it makes the practical pay-off of science connected specifically to technology, and two, it ties this to the aims of the state. Drawing from this, the nuclear program championed by the Indian state in the 1960s became emblematic of how sovereign techno-scientific expertise was positioned as central to India’s identity. The domain of practical expertise in development shifted, “giving technological discourses a public voice more powerful now than at any time since the industrial revolution” (Philips 2016).

Yet competing schools of thought about the relationship between technology and development were influential in post-colonial India, straddling

non-alignment, state-driven poverty alleviation, and the diffusion of international development models. Free-market liberals (and Marxist modernists) favoured the development of large-scale industrial and military technology to teleologically “catch up with the west” (Philip 2015), while Gandhians and revolutionary leftists pursued alternative visions of progress rooted in ecological, local, or vernacular knowledge systems. Eventually, decisions around techno-governance became increasingly insulated from democratic debate, reinforcing a developmental model in which legitimacy was conferred through technical mastery and the pursuit of the digital entrepreneur as ideal citizen-subject.

Indeed, the story of technological development in India is deeply entwined with state-led infrastructure, stretching from early post-independence planning and population science to today’s expansive digital governance initiatives. Madon (2009) identifies two key phases in this shift: first, from Independence to the 1990s, where IT served internal bureaucratic automation; and second, the post-1990s phase, where public and private actors rebranded technology as the engine of “good governance,” improving service delivery to citizens, enhancing transparency, and fostering accountability. In the second phase, Madon critically notes that these initiatives often prioritised technical solutions over addressing the complex socio-political dimensions of governance, sometimes leading to unintended consequences. The following section traces the contours of this history, pri-

marily to illuminate how present-day digital governance draws upon and departs from earlier developmental logics.

### **From Planning to Platforms: Projections of Modernity and Self-Reliance**

India’s digital governance model cannot be understood without its genealogy in mid-century technocratic planning. From the outset, the postcolonial state imagined statistical and computational tools as central to its developmental ambitions, using it to “leapfrog over its historical underdevelopment” (Philips 2015). Soon after Independence, the Indian Statistical Institute (ISI) and its founder, physicist P.C. Mahalanobis, were at the forefront of this vision, forging a political logic in which quantification, expertise, and state capacity became intertwined: an epistemic template that contemporary digital platforms inherited.

Mahalanobis launched the National Sample Survey (NSS) to generate detailed demographic and economic data and spearheaded the Second Five-Year Plan, which emphasised heavy industrial investment guided by continuous statistical adjustment. In this context, statistics emerged as India’s first state-backed techno-science, used both to measure and manage the economy. The state also invested significant funds in training engineers, developing the Indian Institutes of Technology in collaboration with the Soviet Union, Germany, and the United States (Philip 2015). By the 1980s, the “economic

miracle of computing” (Samdub 2025a) had begun to proliferate beyond the central bureaucracy into regional and local governments. With the adoption of relational database management systems, state officials increasingly became data workers, tasked with recording and managing growing volumes of information (Hasan 2023). Over time, much of this data-related work was contracted out, and the management of information systems became more fragmented but also more embedded in routine governance. These early data regimes prefigured the later pursuit of data-driven governance: where the ISI sought to render the economy legible through statistics, today’s DPI renders the citizen legible through code. Planning’s promise of rational mastery has become the platform state’s promise of algorithmic efficiency.

Economic liberalisation, driven by the International Monetary Fund (IMF)’s loans in the 1990s, transformed India’s technological landscape, heralding a telecommunications revolution and the rise of its IT sector. Policies promoting deregulation and foreign investment spurred the rapid development of digital infrastructure, and urban centres like Bangalore became an iconic part of India’s global IT prowess, celebrated as the “Silicon Valley of India.” During a visit to Bangalore, political commentator Thomas Friedman noted fantastically that he found “brain power, software, algorithms, knowledge workers, call centers, transmission protocols, [and] breakthroughs in optical engineering—the sources of wealth in our day” (Friedman 2006). The Aad-

haar project, born within the nexus of corporate innovation and state authority, exemplifies this shift (Belorgey and Jaffrelot 2024). Conceived by private IT firms and spearheaded by tech entrepreneur Nandan Nilekani, Aadhaar is a biometric identification system launched by the Indian government in 2009 that assigns a number to residents based on their fingerprints, iris scans, and demographic data, and serves as the foundational layer for accessing a wide range of public and private services. It was promoted as a solution to bureaucratic inefficiencies and corruption, claiming to deliver governance that was simultaneously more efficient and more inclusive. In his book *Rebooting India* (2015), Nilekani describes the state as a platform: “[W]e are talking about radically reimagining government, its purpose, its role and the way it carries out its functions, with technology at its core.” His overarching vision for Aadhaar reflected this belief: that software and digital infrastructures should permeate all levels of governance.

Aadhaar’s implementation depended on an unprecedented partnership between the state and private technology firms. The government sought to scale the system to India’s vast population, and private companies (such as Nilekani’s Infosys) contributed the technical expertise and infrastructure. Economically, proponents argue that Aadhaar has facilitated the growth of a data-driven economy, reducing costs for financial institutions and enabling new forms of financial inclusion (Awasthi et al 2024). However, its broader economic benefits remain contested,

with some viewing it as a speculative bubble rather than a transformative innovation (Belorgey and Jaffrelot 2024). For many, Aadhaar has not facilitated welfare delivery but instead created barriers to food rations, healthcare, and even basic recognition by the state (Khera 2019). At the same time, Aadhaar's data-driven infrastructure has raised profound concerns about privacy and surveillance. Weak regulatory safeguards and a series of data breaches have left citizens vulnerable, while the centralisation of biometric information has granted the state unprecedented surveillance capabilities (Lyon 2014).

While the BJP strongly opposed Aadhaar when it was spearheaded by the Congress–UPA government, they embraced it as part of their core mandate once they gained power in 2014. Under the Modi administration, the Digital India initiative launched in 2015 further sought to modernise governance through the aggressive adoption of digital tools. Framed as a vision of “minimum government, maximum governance,” the initiative emphasized innovation and public–private partnerships. The government's rhetoric situates technology as a depoliticised intermediary capable of “bridging gaps between government and the people” (Digital India 2021), with AI in particular “turning into the biggest means of shaping our new future” (PIB 2023). In promoting Digital India, Prime Minister Modi has invoked technology as a universal solution, embedding computational logics at the heart of statecraft: “We can build an entire ecosystem of technology-based solutions to address

the challenges faced by humanity. All it needs from us are the four Cs—Conviction, Commitment, Coordination, and Collaboration” (Singh 2023).

The promises are vast: Digital India focuses on building robust digital infrastructure to facilitate efficient public service delivery. Aadhaar provides a biometric identification system aimed at streamlining welfare distribution and reducing corruption. Meanwhile, AI for All seeks to harness AI to address challenges in sectors like agriculture, education, and healthcare, positioning it as another tool for inclusive growth. The 2018 National Strategy for Artificial Intelligence (NSAI) by the NITI Aayog formalised India's ambitions to leverage AI across key sectors. At the core of this governance model is a growing reliance on modular digital infrastructures, called Application Programming Interfaces (APIs), developed for specific public domains: identity, payments, health records, agriculture, and mobility. As Samdub (2025b) notes, these discrete systems form an interoperable composite infrastructure managed by a unified digital backbone. Collectively, they are branded as “India Stack,” and have become central to India's international reputation as a provider of DPI. Unlike previous phases in which technology supplemented governance, the current moment positions digital systems as governance itself.

## **Digital Governance in Practice: Centralised Authority and Resistance**

Over the past decade, platforms like Aadhaar, UPI, and the broader India Stack have been framed not only as tools of domestic administration, but as exportable models for inclusive development. This narrative positions India as a digital leader, offering a public interest pathway distinct from Silicon Valley's corporate-led model, Europe's regulation-heavy model, and China's state-centric surveillance infrastructure (Matthan 2023). The idea of DPI is increasingly promoted in global forums as a democratic, replicable alternative to proprietary digital ecosystems. However, DPI is loosely defined and often functions more as an aspirational framework than a settled institutional model (Samdub 2025b). While it is praised for its openness and technical adaptability, such language tends to obscure the political, economic, and legal architectures through which these infrastructures are assembled and contested.

At its core, DPI in India is not “meaningfully public” (Samdub 2025a). It is in practice shaped by contingent relationships between regional bureaucracy, the state, private technology firms, and global philanthropy. It was initially promoted by the think tank iSPIRT (Indian Software Products Industry Roundtable) to give the private sector access to state platforms and, as of now, many India Stack platforms are run by private companies that elide public accountability (Samdub 2025a).

More recently, the National Informatics Centre (NIC) has made deals with private firms to manage and improve the government's cloud services, adding to the questionable control that private companies can exert over data and governance (Economic Times 2023). Regardless, India has managed to rally global support for its DPI, leading to strong financial and symbolic commitments from the UN, World Bank, Gates, and Rockefeller Foundations to export it.

What distinguishes post-2014 governance, then, is not simply the extent of technological adoption, but the way digital infrastructure has been consolidated as a core instrument of political authority and global ambition. While earlier decades framed technology primarily as a tool for planning and development, the current phase deepens and extends its use toward continuous datafication to brand and export a model of governance. Platforms such as Aadhaar and UPI have become central not just to welfare delivery or administrative reform, but to India's diplomatic narrative as a modern, efficient state. These technologies are increasingly portrayed as universally applicable, even as they are introduced within a political environment marked by growing executive power and weakened democratic oversight.

The deepening centralisation of power, declining transparency, and erosion of democratic institutions in India since 2014 complicate the celebratory story of digital empowerment. This matters when we consider how

digital systems operate across different domains of governance, domestically and internationally. While the broader governance narrative foregrounds efficiency and inclusion, the actual effects of technology vary sharply across sectors. Crucially, these variations are not reducible to technological design. They are shaped by the broader architectures of power in which these systems are embedded, and vary according to institutional capacity, accountability mechanisms, political incentives, and histories of exclusion. In some cases, digital systems have enabled new forms of participation or grievance redress; in others, they have amplified exclusion and opacity.

Despite sectoral differences, the following variations in implementation and experience are all scaffolded by the shared technological architecture of DPI, which standardises how data is collected, identities are verified, and services are delivered across domains. As previously mentioned, the use of Aadhaar in welfare distribution has led to well-documented exclusions, where biometric mismatches and authentication failures have prevented access to essential subsidies such as food rations or pensions, particularly for marginalised groups (Khera 2019). Local ration dealers, facing pressure to meet digital targets, have sometimes denied food to those unable to authenticate themselves, including the elderly and manual labourers with worn fingerprints (Shagun 2024).

In education, the National Digital Education Architecture (NDEAR) and

platforms like DIKSHA (also founded by Nandan Nilekani) illustrate both the promise and contradictions of DPI. Designed to standardise curriculum delivery and teacher training across India, DIKSHA integrates lesson repositories, learning analytics, and real-time dashboards for monitoring performance. The breadth is impressive: more than 250 bilingual teachers, and 30 private and public organisations, including NGOs and state governments, have collaborated to develop curriculum materials and training resources under the supervision of national boards of education (Verma et al. 2024). Yet state-level adoption has been uneven, in large part due to the proven digital divide i.e., the gap in digital access, literacy, and infrastructure across region, gender, caste, class, and religion (Chaudhuri 2024). These platforms have been more successful in states with strong public schooling networks and active teacher engagement, such as Kerala and Himachal Pradesh (India Report on Digital Education 2020). In Rajasthan and Bihar, by contrast, limited internet access, scarce technical support, and gendered digital divide constrain uptake (Verma et al. 2024). Even when awareness is high, registration hurdles and data-entry errors routinely disrupt use.

These challenges are not purely technical. Gujarat has instituted a Command-and-Control centre (a term often reserved for military operations) that monitors and tracks students' and teachers' enrollment, test scores, attendance, and real-time movement through GPS, extending the DPI-logic of data-driven oversight into everyday

pedagogy. The data is even used to predict which students are at risk of dropping out and which teachers are failing to maintain student test scores (Sharma 2022). While officials present this as evidence-based management, teachers describe it as intrusive and demoralising. The other part of this story, however, is that teachers can also exercise agency and sustain pedagogical autonomy through non-state digital tools, reportedly using social media (such as Facebook, WhatsApp etc) independently to communicate with students and share pedagogical practices (India Today 2022). This creates a paradoxical situation where global tech platforms (e.g., Google, Meta) offer more flexibility and autonomy than bureaucratic state systems while being deeply extractive, profiting from user data, and reinforcing corporate monopolies.

In healthcare, the eSanjeevani telemedicine platform has facilitated over 276 million consultations, improving access for patients in remote areas and representing one of Digital India's most celebrated successes (Dastigar et al. 2024). Like outcomes within the education sector, telemedicine has been more effectively embedded into primary healthcare in states like Kerala and Tamil Nadu (Ummer 2021; Jose et al. 2024), where public health systems have greater institutional capacity. In contrast, in Uttar Pradesh and Bihar (Anand 2014; Singh et al. 2023), platform uptake has been patchy, hindered by weak digital literacy among patients and inadequate staffing at health centres. These discrepancies underscore how digital health solutions are more

likely to succeed where they are layered onto robust pre-existing service delivery ecosystems. In moving more specifically to AI in service delivery, autonomous AI tools are being trialled in diagnosing chest X-rays, spine MRIs, and detecting diabetic retinopathy (Dey et al. 2025; Subramanian et al. 2025a, 2025b). Bihar's state health department has launched an intensive AI-driven tuberculosis screening program and state hospitals have begun to offer orthopaedic robotic surgery (Times of India 2025), while Telangana is piloting AI-based cancer screening (Vadlapatla 2025). For the most part, these have been welcomed as innovations that augment overstretched systems. The developmental framing, coupled with anonymisation of medical data, has made health-based AI less politically fraught. Yet they also expose dependence on proprietary algorithms and cloud infrastructures owned by foreign firms, resulting in a layered system where local innovation coexists with global dependency.

Policing presents a starker contrast. Predictive policing initiatives (i.e., "smart policing") have been trialled in cities like Hyderabad to make the police more "efficient and omnipresent" and have drawn criticism for targeting Muslims and oppressed caste groups (Sonavane et al. 2023). Unlike health, where digital systems interface with citizens as beneficiaries, policing technologies operate with opacity and coercive power. These sectoral variations stem not only from technical features but illustrate how digital governance reinforces different forms of legitimacy:

in health, as technocratic competence; in welfare, as managerial control; and in policing, as coercive surveillance. These distinctions underscore the political stakes of modular infrastructure beyond questions of efficiency. The centralising logic of digital surveillance is amplified in such domains, with fewer counterweights from civil society or institutional oversight.

These effects are mediated not just by institutions, but by the people who translate and implement digital systems in practice. Bureaucrats, often working with limited resources and high expectations, are central to adapting digital infrastructures to local realities (Madon 2009). Far from being passive enforcers, many negotiate competing demands from political leaders, consultants, and citizens, while trying to make new technologies usable within the constraints of existing state machinery. In several states, bureaucrats have adapted digital tools to enhance citizen feedback and accountability. These result in often invisible acts of repair, negotiation, and discretion that challenge the idea of a rigid, top-down technocracy. For instance, Rajasthan's Jan Soochna Portal (launched in 2019) proactively discloses real-time data on welfare schemes at the village level. Civil society groups like the Mazdoor Kisan Shakti Sangathan (MKSS) worked with officials to co-design the platform, which helps citizens verify entitlements such as MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act, 2005) wages and food rations (Singh 2024). In Madhya Pradesh, local bureaucrats and officers often reinterpret official mandates

and selectively implement digital monitoring tools not only to meet targets, but also to maintain trust with communities (Sharma 2024). While national systems required computerised data on beneficiary attendance and savings, some field officers maintained parallel manual records to ensure that women who missed meetings due to illness or work were not unfairly penalised. In some regions, state governments and NGOs have held digital literacy camps specifically for women-led self-help groups to adopt UPI and QR-based transactions (Women's World Banking 2024). Among street vendors, gig workers, and women entrepreneurs, UPI enabled economic transactions in the absence of physical mobility, especially during and after the COVID-19 lockdowns (Dhanush and Swathi 2023).

These instances of adaptation and grassroots innovation reveal how digital systems are constantly negotiated on the ground, but they exist alongside growing concerns about how the same infrastructures are used to suppress dissent. Over the years, civil society-based groups have fought to protect citizen rights in the digital sphere, running advocacy campaigns against executive orders and proposed legislation to impose internet censorship, shutdowns, and secret surveillance (Pandey 2023). Digital-rights collectives such as the Internet Freedom Foundation, SFLC.in, and MKSS have contested DPI's opacity through litigation and public campaigns, challenging mandatory linkage of welfare to Aadhaar, filing petitions on internet shutdowns, and organising digital literacy workshops. These

micro-acts of contestation expose how civil society re-politicises the technical.

This fight for digital liberties is particularly urgent as the government increasingly censors activist organisations from online platforms, watches critics, and imprisons dissenters—to the point where private corporations such as Meta and Twitter have pushed back in defence of user rights (Freedom House 2022). India has recorded more internet shutdowns than any other country for six consecutive years (Access Now 2024), often justified on grounds of “public order” but used to silence protests such as those against the Citizenship Amendment Act and the farmers’ movement. Amendments to the Information Technology Rules (2021) empower government agencies to demand removal of content deemed “false or misleading” (Ministry of Electronics and Information Technology 2022) and require platforms to appoint local grievance officers, giving the state unprecedented leverage over intermediaries. Journalists and digital-rights activists have faced arrests under anti-terror and sedition provisions, while reports of Pegasus spyware surveillance on opposition leaders and human-rights lawyers have intensified fears of a digitally enabled police state (Amnesty International 2023). These examples complicate the image of India as a “digital democracy,” raising questions about whether the systems it promotes internationally uphold the values it claims to represent.

Rather than treating digital governance as a uniform or monolithic

force, we need to understand how their meanings, uses, and effects are shaped by the local contexts in which they are embedded. As DPI systems become sites for AI deployment (automated eligibility checks, biometric authentication, diagnostic tools) the risks escalate. AI tools, when layered on already-fragile DPI systems, can amplify exclusions, encode bias, and further depoliticise welfare by turning claims-making into a matter of technical legibility. Across sectors, the promise of efficiency masks deep asymmetries of capacity and accountability. Acts of resistance—whether teacher improvisation, bureaucratic repair, or rights-based litigation—do not stand outside digital governance but actively reconstitute its contested terrain.

Indeed, efforts to institutionalise Indian models of digital governance globally carry with them the weight of older anxieties around technological power. While early critics like Mumford and Ellul warned of centralised infrastructures eroding pluralism under the guise of efficiency, those fears are refracted today through the rise of modular systems branded as democratic and open. DPI is not simply a platform for development, but one that mediates legitimacy and sovereign leadership in the international arena. This is especially relevant at a time when India’s digital transformation is increasingly linked to its global influence and soft power. The authority of these governance models depends not only on their technical scalability, but also on the normative values they encode and the social realities they produce. Indeed, while such

digital platforms enhance India's ability to project power, they also expose gaps in sovereignty and resource asymmetries that limit India's global leverage.

### **Exporting Governance: Straddling Sovereignty and Dependence**

**A**s India expands its digital diplomacy, AI has emerged as the next frontier in its projection of technological leadership. This ambition aligns with India's broader geopolitical strategy to expand its influence within the G20 and other international forums, and is evident through substantial investments, strategic collaborations, and policy initiatives aimed at fostering a robust DPI and AI ecosystem. As Modi noted at an NDTV World Summit in 2024, "India is powered by two AIs. For the world, it is Artificial Intelligence but in India, it's Aspirational India plus Artificial Intelligence. When the two meet, it accelerates India's growth" (NDTV 2024). Yet despite its burgeoning AI ecosystem, India occupies a peripheral position in the global hierarchy with limited computational infrastructure. Unlike DPI, which India has largely developed in-house, AI development exposes sharper asymmetries: balancing aspirations to sovereignty and leadership within a global architecture of technological dependence.

A central component of its strategy is the pursuit of "Sovereign AI," aligning with the BJP's broader doctrine of self-reliance. This approach seeks to reduce dependence on foreign

technologies by bolstering domestic capabilities in AI development, including efforts to promote AI solutions tailored to local needs. As a part of this, the Ministry of Education's "Make AI in India, Make AI Work for India" campaign has established several Centres of Excellence devoted to AI research (ET Education 2025), while the AI Research Analytics and Knowledge Dissemination Platform (AIRAWAT) aims to provide AI-specific cloud computing resources. Yet India's current capacity is constrained by limited access to advanced AI chips which are often subject to export restrictions, hindering the development and deployment of advanced AI models. The United States, for instance, has implemented a tiered framework regulating the export of advanced AI chips. India falls into the second tier, which imposes crucial limitations to how many chips India can import. India's outward posture, then, conceals a deeper tension between its domestic constraints and its efforts to shape the rules and standards of global AI systems.

In this context, the export of India Stack functions as both an assertion of self-reliance and a strategic workaround: a means to claim influence in global tech governance despite depending on external platforms, cloud services, and AI tools largely developed by U.S.-based firms. While the foundational components of India Stack are largely domestically developed, its integration with AI services (such as facial recognition in policing or AI-based diagnostics in healthcare) often relies on foreign-owned compute power and

proprietary models. Reports from the Global Technology Summit 2023 (Mohanthy and Sahu 2024) suggest that the Indian government is grappling between using customised, open-source models (which can be tailored and potentially be hosted and managed locally) and using proprietary models that are general-purpose, compute-intensive, and mostly of foreign origin.

Indeed, India's AI ecosystem remains entangled in the ambitions of US-based tech giants: Amazon, Microsoft, Meta, and Google. Big tech companies may advocate for the "democratisation" of AI by making its tools accessible to a broad audience, but by integrating AI into existing industries through products and services, developers are "unknowingly contributing to Big Tech's infrastructural objectives" (van der Vlist et al. 2024). By offering extensive resources, specialised AI training, technical support, and access to AI expertise, Big Tech creates an environment where small players and startups are incentivised to build on their platforms, and dependent on their extensive cloud computing resources (van der Vlist et al. 2024). These companies do not merely provide technical tools; they shape the platforms and data infrastructures that public services increasingly rely upon. Microsoft, for instance, announced a \$3 billion investment over two years to enhance AI and cloud services in India, aiming to train 10 million individuals in AI skills by 2030. Similarly, Nvidia has deepened its partnerships with major Indian firms, including Reliance Industries, while Google has partnered with India to develop AI applications

for healthcare, including models for detecting diabetic retinopathy (Economic Times 2025). This reliance on foreign tech also highlights the potential commodification of anonymised personal data and the risks of data colonialism, wherein foreign entities and large private firms extract economic value from Indian data with limited accountability (Couldry and Mejias 2019; Muralidharan et al. 2021). The 2023 Data Protection Act introduces consent norms, but grants broad exemptions to the state, effectively institutionalising asymmetry between citizen and sovereign. Data-storage localisation and transnational cloud dependencies remain unresolved, underscoring how sovereignty is asserted symbolically but outsourced materially. These concerns underscore the need for stringent data-sharing agreements, increased localisation, and ethical safeguards in international collaborations.

With compute constraints limiting high-end AI innovation, India is leaning on its existing strength: governance infrastructure, institutional interoperability, and a compelling narrative of low-cost scalability. Modi has referred to aspirations to turn India into a "vishwaguru," that is, teacher to the world, offering a low-cost, software-based alternative to China's Belt and Road Initiative (The Economist 2023). Homegrown digital platforms like UPI, ShareChat, and Koo can be seen as part of a broader attempt to insulate India's digital ecosystem from the dominance of US-based firms, particularly since they function both as nationalist counter-platforms and as symbols

of self-reliance. While these platforms do signal growing technical capacity, their significance lies equally in the geopolitical strategy they embody. As Farrell and Newman (2019) argue, global digital networks can be harnessed for weaponized interdependence, that is, a condition where states or firms gain strategic leverage through control over critical informational or infrastructural chokepoints. In response, India's development and export of India Stack represent attempts to reconfigure this asymmetry: not only by insulating its domestic digital ecosystem from external coercion, but by presenting itself as an infrastructural provider rather than a dependent node. At the same time, they serve as vehicles of soft power, positioning India as a provider of replicable infrastructure for the Global South.

India's push to export DPI is not merely rhetorical. Frameworks like DIVOC (Digital Infrastructure for Vaccination Open Certification),<sup>4</sup> originally developed as part of CoWIN for vaccine certification, have been adapted by countries such as Sri Lanka, the Philippines, and Indonesia. The Modular Open Source Identity Platform (MO-SIP), a non-profit initiative hosted by the International Institute of Information Technology, Bangalore (IITB) has been applied in twenty countries and has more than 121 million active users. The World Bank's DPI initiative has also drawn heavily on India Stack's architecture, with Ethiopia and Morocco exploring UPI-style payment systems (Sánchez-Cacicedo 2024). Yet questions remain about the normative content of this model—whether it promotes par-

ticipatory digital governance or simply offers a more state-led alternative to Western platforms. What forms of participation are enabled, and which ones are foreclosed? Who sets the terms of digital legitimacy and who is left to adapt to them? India does not simply export a fixed model but embeds infrastructural templates that are reshaped (and sometimes contested) in their new environments. The success and function of such technologies, then, depend less on technical design than on local capacity and infrastructure.

India's digital diplomacy reproduces the logic of its domestic governance model: infrastructures that centralise data authority internally are marketed abroad as efficient, transparent, and easily replicable. This model resonates most strongly with governments that prioritise administrative control and rapid service delivery over participatory oversight—often semi-authoritarian or highly centralised regimes in the Global South. For example, Sri Lanka's adoption of CoWIN infrastructure for vaccine certification reshaped how public health was managed, moving from paper-based consent and community outreach toward biometric identification and centralized data dashboards. In Ethiopia, the proposed introduction of UPI-style systems (facilitated through partnerships with India's Ministry of Electronics and IT and supported financially by the World Bank (World Bank 2025) hinges on building national ID infrastructure first. This sequence of reforms mirrors India's pathway, in which identity infrastructure is treated as prior to (and

enabling of) rights and access. But in settings where citizenship is contested or state presence uneven, this architecture risks reinscribing the exclusions it aims to resolve (Zuboff 2019). Kenya expressed early interest in India Stack and was in discussion with the Indian government and private partners about adapting elements of Aadhaar and UPI. However, adoption has been cautious due to a combination of strong local fintech ecosystems (like M-Pesa), regulatory resistance to centralised ID systems, and pushback from civil society groups concerned about surveillance (Gopaldas 2024). This reflects an important counterpoint: Indian DPI exports may stall or be reshaped where existing digital infrastructures are more decentralised or where governance institutions resist centralisation.

The global circulation of Indian digital models often brings with it infrastructural ambition and normative friction. The interaction between India's domestic and international dynamics, then, is reciprocal rather than parallel. Domestically, DPI consolidates authority within the executive by embedding digital control into welfare, payments, and identification systems. Internationally, this centralising design becomes a selling point: it offers other governments a ready-made template for extending administrative reach while projecting efficiency and modernity. India's DPI diplomacy therefore tends to gain traction in political environments where state capacity and central control are prized (such as in parts of the Gulf and Southeast Asia), rather than in more plural or decentralised democra-

cies. In this sense, India's "stack diplomacy" exports not only software but also a particular theory of the state: one that equates data integration with governance legitimacy. It also aligns with broader global trends in development governance, where centralised digital records and biometric identity systems have become shorthand for "good" policy. These technologies are increasingly treated not as controversial choices, but as best practices and standard components of efficient, modern governance, sometimes at the expense of investing in local institutional capacity or democratic fit. This paper, thus, joins scholars in arguing for a form of DPI that goes beyond software and governance frameworks towards developing the material and social conditions that underpin effective implementation. It also advocates for open, democratic debate about the diverse purposes DPI can serve, rather than treating its goals as singular or predetermined (Samdub 2025b).

### **Conclusion: International Projection and Domestic Illiberalism**

**B**y positioning itself as a normative leader capable of providing replicable governance solutions, India is shaping how tech is imagined and operationalised in the Global South. Partnerships with U.S. government and tech firms (such as the newly established Transforming Relations Utilising Strategic Technologies (TRUST) initiative) and participation in groups like GPAI are more than vehicles for investment

or knowledge-sharing; they are arenas where geopolitical influence is brokered, regulatory models are contested, and sovereignty is redefined. The export of DPI thus reflects an institutional effort to embed Indian infrastructures and frameworks into emerging digital orders, often in direct response to U.S. or Chinese alternatives. As such, India's digital ascent is not just about exportable platforms or AI capabilities; it is about the social, political, and symbolic work that technology performs at home and in the world. It mobilises a vision of national modernity tied to data legibility, compliance, and scalability, all discursively positioned as necessary and benevolent. Attending to these genealogies helps situate India Stack not just as a solution to governance gaps, but as a symbolic and material consolidation of state power through digital means.

As India asserts itself as a digital leader, the gap between its international projection and domestic illiberalism is increasingly stark. Through platforms like Aadhaar and India Stack, the state consolidates authority while projecting a model of efficient, exportable governance. Yet these ambitions are constrained by domestic exclusions, democratic erosion, and international dependencies on foreign tech infrastructure. Understanding India's digital turn requires attention not only to its

technical architecture, but to the political forms and global asymmetries it seeks to reshape. In the 1980s, sociologist Ashis Nandy argued that technology can represent an escape from "the dirtyness [sic] of politics ... a form of social change which ensures a place in the sun for portions of the middle classes whom the democratic process otherwise tends to marginalise, an anxiety-binding agent in the public realm, and often a media-based exercise in public relations" (Nandy 1988). This critique remains relevant. In treating technology as apolitical infrastructure rather than as a site of contestation, we risk overlooking how it legitimises authority and redistributes power, both within and beyond the nation-state.

As scholars, we need to pay attention not simply to accounts of technological capacity or digital ambition, but to how these systems are embedded in political life, how they shape who is seen, who is served, and who is silenced. The fears articulated by Ellul and Mumford—of rationalisation without reflection, and power without participation—are not relics of mid-century techno-critique. They reverberate through today's algorithmic decision systems and exported digital architectures, refracted through newer idioms of efficiency, scale, and "public interest technology."

## Notes

- 1 India Stack refers to a set of modular, open digital infrastructure layers including Aadhaar (identity), eKYC (electronic know-your-customer), UPI (payments), Dig-iLocker (document storage), and eSign (digital signature). These are designed to enable paperless, presence-less, and cashless delivery of services. It serves as the technical backbone of India's Digital Public Infrastructure (DPI) and is promoted as a scalable model for digital governance globally.
- 2 By contrast, the JAM (Jan Dhan-Aadhaar-Mobile) trinity is a political assemblage that uses these tools to route benefits, while MyGov is a participation interface. They are analytically distinct: MyGov and JAM are applications and administrative workflows, whereas Aadhaar, UPI and India Stack are the tools that make machine-verifiable transactions possible at scale
- 3 Techno-utopianism denotes a belief that technological innovation inherently leads to social progress, often downplaying the political and distributive consequences of digital systems.
- 4 DIVOC is an open-source platform developed under India Stack to issue, verify and share digital vaccination certificates, later adapted for other health credentialing systems globally.

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