Designing the Digital Economy: India's DPI-Led Development Model & Its Global Relevance

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Introduction

The phenomenal increase in computing power over the last two decades has unleashed a massive wave of innovations. Technological advances, including high-speed internet, online digital platforms, Blockchain, 3D printing, Artificial Intelligence (AI), and the Internet of Things (IoT), among others, have not only expanded the human imagination but also triggered a wider socio-economic restructuring. On the economic front, this shift has been particularly remarkable as integration of digital technologies across various business processes has given rise to a new economic paradigm, commonly referred to as the "digital economy". In this paradigm, data, networks, and digital platforms function as core inputs to production and consumption. Reflecting the rapid adoption of digital technologies, the digital economy has been growing at an impressive pace. The size of the global digital economy has already reached US$16 trillion, accounting for more than 15% of global GDP.[1] This share is expected to rise further as digital technologies are poised to penetrate across regions and industries.[2]

For developing countries, the rise of the digital economy presents immense opportunities and a formidable challenge. On the positive side, digital technologies are offering unprecedented opportunities to overcome long-standing structural constraints associated with informal economies. They are paving the way to reduce transaction costs, improve service delivery and expand access to information, enabling new forms of economic participation. For example, digital transaction histories and verifiable data trails are creating an opportunity to reduce information asymmetries that have historically excluded informal households and micro, small, and medium enterprises (MSMEs) from formal finance, markets, and state support. Similarly, e-commerce platforms are enabling MSMEs, the backbone of developing economies, to access wider markets without incurring huge sunk costs.

Nonetheless, the benefits of digitalisation for developing countries are not automatic. Most economies of the Global South are constrained by structural factors, including a widespread digital divide, massive skill gaps, limited administrative capacity and limited fiscal space. In addition, ongoing digitalisation, if left to market forces alone, can very much reinforce existing inequalities rather than reducing them. Given the massive economies of scale associated with digital technologies, there is a significant risk that the digital economy may become dominated by a small number of powerful platforms, extracting data and value without building local capacity.

How developing countries pursue digitalisation is therefore central to determining whether the digital economy will become a driver of broad-based development or a source of new structural divides. In this context, India's digital journey assumes particular significance. Instead of leaving the evolution of its digital economy solely to market forces, India has deliberately constructed a layered ecosystem of Digital Public Infrastructure (DPI) to promote an inclusive digital economy. Through platforms such as Aadhaar, the Unified Payments Interface (UPI), DigiLocker, CoWIN, and the Account Aggregator framework,[3] it has demonstrated how digital infrastructure can be designed not merely to digitise existing processes but reconfigure the relationship between the state, markets, and citizens. India's experience challenges the assumption that digital economies must evolve either through dominant private platforms or through heavy state control. Instead, it shows that digital infrastructure itself can be consciously designed as a public good to promote the digital economy without compromising social inclusion and competition. Against this backdrop, this paper outlines India's DPI-led approach to digital transformation, its achievements, and assesses its relevance for the Global South.

Competing Models of Digital Transformation

Different countries, depending on their political and economic systems, have adopted different pathways to build digital economies. On the one hand, advanced Western economies, particularly the United States, has opted for a market-led approach. In this model, large technology firms like Facebook, Google, and Amazon, supported by a well-developed capital market and relatively light regulatory oversight, have been shaping the digital transformation. While this model has delivered extraordinary innovation, scale, and efficiency, it has also generated serious structural challenges, including market concentration, data monopolisation, weakened competition, and the erosion of national digital sovereignty.[4]

Another approach, followed in China and some other countries,

involves strict state control. Under this approach, though private platforms develop the critical digital infrastructure, the government shapes their direction and functioning through tight regulatory oversight and direct intervention.[5] Despite visible success in scaling digital services, this model has received criticism for concerns related to state surveillance, limited market competition, and restrictions on individual freedoms.

Neither of the two models mentioned above is ideal for developing countries. A private-platform-led model requires deep capital markets, strong competition regulators, and high consumer purchasing power to succeed, conditions that are missing in most of the developing countries. Consequently, digital markets can quickly become dominated by a small number of foreign platforms, extracting data and value without building local digital capacity. Conversely, state-centric digital models demand high levels of administrative coordination, technological expertise, and huge fiscal resources, all of which are difficult to sustain in low- and middle-income settings.

Between these two extremes lies a third pathway, a hybrid model built around DPI. The core principles of DPI include public ownership of foundational systems, interoperability through open standards, modular design, and competition at the application layer.[6] By embedding these principles into digital architecture, DPI prevents early monopolisation, reduces entry barriers, and aligns digitalisation with development objectives. For the Global South, DPI offers a way to harness the benefits of digital technologies while avoiding the structural risks associated with dominant platform ecosystems. India represents the most comprehensive and influential example of this approach.[7]

India's DPI-Led Approach to the Digital Economy

India's DPI-led model can best be understood through the "India Stack" framework.[8] It is a layered digital architecture that treats identity, payments, and data governance as foundational public infrastructure. India Stack is not a single platform or program, but a design philosophy that separates infrastructure from applications.[9] In this design, the foundational system remains publicly governed and interoperable, while private firms and public agencies are allowed to innovate at the application layer. This separation prevents competition at the infrastructure level while enabling scale.

India Stack has three broad layers. The foundational layer of the India Stack focuses on addressing the absence of verifiable identity, which is the most important constraint to inclusion in a large, diverse and informal economy like India. The rollout of Aadhaar, a universal digital identity system, provided reliable and portable identification to over 1.4 billion Indians,[10] enabling authentication services and geographies. Digital identity was then paired with financial access through the Pradhan Mantri Jan Dhan Yojana and with widespread mobile connectivity. Together, Aadhaar, bank accounts, and mobile phones formed the JAM trinity, creating the foundational infrastructure for large-scale digital inclusion.

Once authentication, financial inclusion and connectivity were in place, India introduced the second layer of the India Stack, the Unified Payments Interface (UPI). It transformed the JAM-enabled population of India into active participants in the digital economy. UPI was

deliberately designed as an open, interoperable protocol rather than a proprietary platform. It enabled licensed banks and fintech firms to offer payment services on common public rails, ensuring competition at the application layer. This design choice proved critical. It has enabled rapid adoption of digital payment and massive fintech innovation by preventing early concentration at the infrastructure level. It has transformed India's transaction economy by enabling instant, low-cost, account-to-account transfers at a population scale.

Subsequently, India constructed what is described in simple words as the "data and governance" layer of the India Stack,[11] although in practice this layer encompasses multiple distinct institutional functions. This layer brought together systems for paperless documentation through DigiLocker.[12] It reduced administrative friction, lowered transaction costs, and curtailed discretionary gatekeeping and administrative inefficiencies. The Account Aggregator (AA) framework further extended this architecture by enabling consent-based, interoperable data sharing. By separating data ownership from data custody and placing users at the center of data flows, the framework allowed financial data to be shared securely and purposefully without centralising control. In doing so, the AA framework completed the evolution of India Stack from a set of digital platforms into a coherent institutional ecosystem for a data-driven economy.

Developmental Outcomes & Economic Impact

India's DPI-led approach has generated significant developmental outcomes by reshaping how welfare is delivered, how markets function, and how firms interact with the state. Transformation of the welfare delivery system has been one of the most immediate impacts of DPI. The first layer of India Stack alone enabled the Indian government to fundamentally transform welfare delivery and financial inclusion by embedding digital infrastructure directly into the core of public delivery systems. The introduction of Aadhaar-enabled Direct Benefit Transfers (DBT) enabled social benefits to be transferred directly into beneficiaries' bank accounts, thereby reducing leakages and improving targeting.[13] The elimination of millions of duplicate and ineligible beneficiary records has generated substantial fiscal savings while significantly enhancing the efficiency and credibility of public service delivery.[14]

The introduction of UPI has marked a structural break in India's transaction economy. It has largely replaced cash-based exchanges with programmable digital payments. The impact of this shift is visible in the scale and speed of adoption. The monthly UPI transactions which were negligible, around 0.09 million ($0.06 million) in July 2016, increased to 7.3 billion ($153.9 billion) by October 2022, and further to 21.6 billion ($321 billion) by December 2025.[15] This expansion did not merely reflect greater convenience; it reorganised the operating environment of the Indian economy around digital settlement. Digital payments now account for over 97% of total payment transactions in India *(Chart 1)*, with UPI alone constituting around 85% of all digital payment transactions.[16] MSMEs have been the most significant beneficiaries of this transformation. Survey evidence from RIS indicates that, prior to the introduction of UPI, only a small fraction of MSMEs were using digital modes for making and
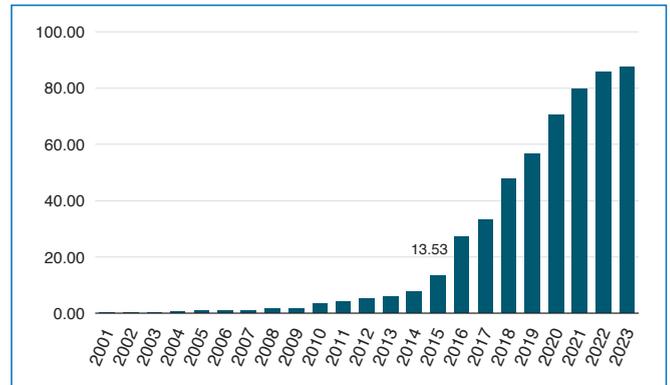
CHART 1
Digital payments as a share of total transactions

Source: Authors' compilation based on Reserve Bank of India Payment Systems Report: Half-Year Ended June 2025
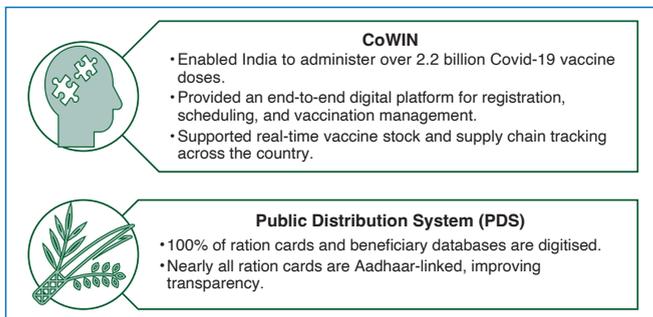
CHART 2
Timeline of digital payment adoption in Indian MSMEs

Source: Based on recently conducted survey by the authors

Examples of India's digital public infrastructure in action

CoWIN
- Enabled India to administer over 2.2 billion Covid-19 vaccine doses.
- Provided an end-to-end digital platform for registration, scheduling, and vaccination management.
- Supported real-time vaccine stock and supply chain tracking across the country.

Public Distribution System (PDS)
- 100% of ration cards and beneficiary databases are digitised.
- Nearly all ration cards are Aadhaar-linked, improving transparency.

Source: Press Information Bureau (2023),[17] Digital Public Infrastructure (DPI), Ministry of Electronics & IT, available at https://www.pib.gov.in/PressReleasePage.aspx?PRID=1894907; Press Information Bureau (2025): since inception, around 191 Crore portability transactions recorded under 'One Nation One Ration Card' plan, Ministry of Consumer Affairs, Food & Public Distribution, available at https://www.pib.gov.in/PressReleasePage.aspx?PRID=2179514

receiving payments *(Figure)*. The launch of UPI in 2016, however, triggered a sharp and sustained acceleration in digital payment adoption among MSMEs, with usage rising from marginal levels to over 70% by 2020 and reaching nearly 87.5% by 2023 *(Chart 2)*.

DPI has also unleashed a startup revolution in India. The availability of open and low-cost digital rails has lowered entry barriers for entrepreneurs, enabling rapid scaling across sectors such as fintech, health tech, ed tech, agri-tech, logistics, and climate technology. This democratisation of innovation has spread entrepreneurial activity to tier 2 and tier 3 cities and generated significant employment. This transformation is clearly reflected in startup recognition data, with the number of startups officially recognised by the Department for Promotion of Industry and Internal Trade (DPIIT) increasing vertically from fewer than 500 in 2016 to over 209,000 by January 2026 *(Chart 3)*. These startups have also become an important source of employment, generating more than 2,100,000 direct jobs over the past decade. These outcomes underscore the role of DPI as a general-purpose enabler of innovation rather than a sector-specific intervention.

### Implications for the Global South & Pathways for Adoption

India's experience with DPI offers important lessons for the Global South, not because it provides a ready-made template, but because it demonstrates how institutional design choices shape digital transformation outcomes. A defining feature of India's DPI is that it has emerged as a response to concrete development constraints, namely widespread informality, limited access to finance, and fragmented service delivery, rather than as an abstract technology strategy. The prioritisation of universal identity, basic banking, and mobile connectivity reflected a deliberate sequencing that addressed the most binding constraints first. For other developing economies, this underscores the importance of grounding digital strategies in domestic institutional realities and development priorities. A second implication lies in the modular and interoperable nature of DPI. Since identity, payments, and data governance function as complementary but independent layers, it allows countries to adopt and sequence components according to their economic realities. This flexibility makes DPI particularly relevant for low- and middle-income countries, which often lack the capacity to implement comprehensive digital systems in a single leap.

For Global South economies, DPI offers a pathway to address persistent challenges related to informality, credit access, MSME growth, and welfare delivery. Enabling verifiable identities, real-time payments, and trusted data flows, DPI can lower transaction costs, expand market participation, and improve service delivery, thereby boosting the digital economy without compromising the developmental interests. These benefits are maximised when investments in digital infrastructure are matched by investments in connectivity, digital literacy, and institutional development.

Finally, India's DPI journey demonstrates the value of international cooperation in digital transformation. While national contexts differ, shared principles of openness, interoperability, and public stewardship provide a basis for cross-country learning and collaboration. India's growing DPI partnerships[18] with several countries, including Japan,[19] illustrate how digital public infrastructure

CHART 3
Number of officially recognised startups in India
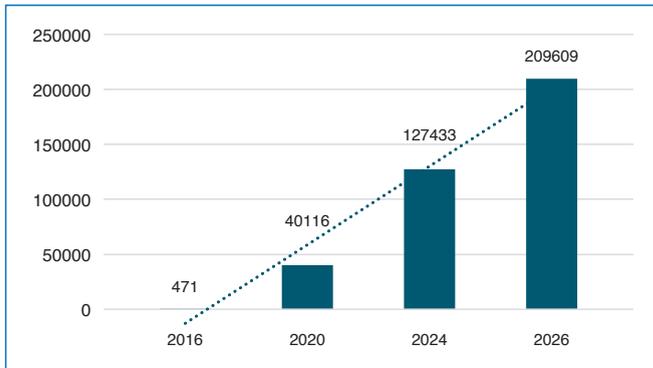
Source: Authors' compilation from data available on the Startup India portal

can evolve into a platform for collective progress across the Global South.

As digitalisation deepens globally, the central question for developing countries is no longer whether to build digital economies, but how to design them appropriately. India's DPI-led approach demonstrates that digital infrastructure can be consciously structured as a public good, interoperable, inclusive, and aligned with national development priorities, rather than emerging as a by-product of either dominant private platforms or heavy state control. For the Global South, DPI offers a viable pathway that balances market dynamism with public purpose. India's experience shows that thoughtful institutional design can align digital transformation with inclusion, competition, and sovereignty. While not a blueprint to be replicated wholesale, it provides compelling evidence that well-designed digital public infrastructure can serve as a foundation for inclusive and resilient development.

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