



INDIA'S DIGITAL ECONOMY: GROWTH, INCLUSION AND THE POLICY CHALLENGE OF SHARED PROSPERITY

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ABSTRACT

India's digital transformation has moved beyond information-technology exports to become an economy-wide system of identity, payments, platforms, data and digitally enabled production. This paper evaluates the scale, channels and distributional consequences of that transition using descriptive analysis of secondary data from the Ministry of Electronics and Information Technology, Reserve Bank of India, National Payments Corporation of India, Telecom Regulatory Authority of India, NITI Aayog and other official sources. The evidence indicates that the digital economy contributed 11.74 per cent of national income in 2022–23, supported 14.67 million workers and displayed productivity nearly five times that of the rest of the economy. Its expansion is being accelerated by digital public infrastructure, low-cost mobile connectivity, UPI, platform intermediation and the diffusion of digital tools into finance, retail, education and public services. Yet aggregate gains coexist with rural–urban, gender, skill and enterprise-size divides, while platform concentration, cybersecurity risks, data asymmetry and insecure gig work may weaken inclusive outcomes. The paper argues that India should assess digitalisation not only by transaction volume or subscriber growth, but also by productivity spillovers, quality employment, contestable markets and meaningful access. A policy framework centred on universal connectivity, digital capabilities, interoperable infrastructure, data protection, competition and portable social security can convert digital scale into broad-based development.

KEYWORDS: digital economy; India; digital public infrastructure; UPI; productivity; inclusion; platform work

1. INTRODUCTION

Digitalisation changes an economy through lower search, verification, communication and transaction costs. It also creates new intangible assets—software, data, algorithms and networks—that can be reused at low marginal

cost. India is a distinctive case because private innovation has developed on top of population-scale public rails such as Aadhaar-enabled authentication, bank-account expansion and interoperable real-time payments. The result is not a separate online sector, but a reorganisation of exchange across households, firms and the state.

The central question is therefore economic: under what conditions does digital scale translate into higher productivity and more inclusive welfare? This paper examines the contribution of India's digital economy, identifies its principal growth channels, evaluates labour-market and distributional effects, and proposes priorities for the next phase of policy.

2. CONCEPTUAL FRAMEWORK AND REVIEW OF LITERATURE

The digital economy may be understood in concentric layers. The core comprises information and communication technology services, telecommunications, electronics and software. A second layer contains digital platforms and intermediaries that match buyers and sellers, organise payments, advertise, deliver content or coordinate work. A third layer is the digitalisation of traditional activity: banks using algorithmic credit assessment, retailers selling through online channels, schools delivering hybrid instruction, manufacturers applying cloud systems, and governments providing services through digital portals. This layered definition avoids both underestimation—counting only the ICT sector—and overstatement—treating every activity touched by a phone as wholly digital.

2.1 Economic mechanisms

Four mechanisms connect digitalisation with growth. First, falling transaction costs increase market participation and formalisation. Second, network effects raise the usefulness of payment and marketplace systems as adoption expands. Third, data and software improve matching, logistics, inventory control and credit assessment, thereby increasing total factor productivity. Fourth, digital delivery can extend public and private services without replicating physical infrastructure at every location. These mechanisms can be mutually reinforcing: a verified identity helps open an account; the account enables payments; payment records can support credit; and credit can finance business investment.

The same characteristics can create market failure. Network effects and economies of scale may tip markets toward dominant platforms. Data can reduce information asymmetry for lenders yet generate new asymmetries between platforms and users. Automation can complement skilled workers while substituting for routine work. Access alone does not ensure effective use when devices, language, disability access, digital literacy or trust remain constraints. Welfare analysis must therefore distinguish adoption from capability and efficiency from distribution.

2.2 Research gap and objectives

Public debate often celebrates headline indicators such as UPI transactions or internet subscriptions, whereas economic evaluation requires a combined view of value added, employment, productivity, market structure and inclusion. This paper addresses that gap through four objectives: (i) assess the measured scale of India's digital economy; (ii) explain the infrastructure and sectoral channels driving it; (iii) evaluate employment and equity implications; and (iv) identify a policy framework for inclusive and resilient digital growth.

3. METHODOLOGY

The study uses a descriptive and analytical research design based on secondary data. It synthesises national accounts-based digital-economy estimates, telecom indicators, payment-system statistics, labour projections and statutory or policy documents. Indicators are compared across time where definitions permit. The analysis is interpretive rather than causal: rapid simultaneous changes in infrastructure, regulation, income, smartphone ownership and firm behaviour make it inappropriate to attribute macroeconomic outcomes to a single digital intervention without micro-level identification. Official projections are treated as scenarios, not realised facts.

The study is limited by measurement challenges. Digital intensity varies within sectors, platform work is frequently informal or multi-homed, and subscriber counts do not equal unique users. Nevertheless, triangulation across authoritative sources provides a robust picture of direction, scale and policy trade-offs.

4. SCALE AND FOUNDATIONS OF INDIA'S DIGITAL ECONOMY

The Ministry of Electronics and Information Technology's 2024 measurement exercise estimated that the digital economy accounted for 11.74 per cent of national income in 2022–23, equivalent to ₹31.64 lakh crore in GDP. It employed 14.67 million workers, or 2.55 per cent of the workforce, and was nearly five times as productive as the rest of the economy. Digitally enabling ICT industries contributed 7.83 per cent of gross value added, while digital platforms and the measured digitalisation of selected traditional sectors each contributed about 2 per cent. The report projects a digital-economy share of 13.42 per cent in 2024–25 and nearly one-fifth of national income by 2029–30 (MeitY, 2025). These figures suggest both high labour productivity and a relatively modest direct employment share, highlighting the need to spread complementary capabilities across the wider economy.

4.1 Selected indicators

Indicator	Observation	Economic significance
Digital economy	11.74% of national income, 2022–23	Large and rapidly diffusing source of value added
Digital employment	14.67 million workers, 2022–23	High productivity, but limited direct employment share
Internet subscribers	969.10 million, March 2025	Broad demand base for digital services
Wireless data use	228,779 PB in 2024–25; +17.46%	Deepening intensity of connectivity
UPI	172.208 billion transactions in CY 2024	Low-cost, interoperable payment adoption
Gig workforce	23.5 million projected by 2029–30	Expanding flexible work and social-protection need

Sources: MeitY/PIB (2025), TRAI/PIB (2025), RBI (2025), and NITI Aayog (2022). Subscriber and worker measures are not directly comparable.

4.2 Connectivity and digital public infrastructure

Connectivity is the first enabling input. Internet subscriptions increased from 954.40 million in March 2024 to 969.10 million in March 2025. Wireless data consumption rose 17.46 per cent during 2024–25, and wireless data

revenue increased 15.49 per cent. Yet rural tele-density stood at 59.06 per cent against much higher urban density, demonstrating that national scale can coexist with spatial inequality (TRAI, 2025). Public investment through BharatNet and last-mile networks can produce positive externalities because private returns are weakest precisely where social returns from connectivity may be greatest.

India Stack illustrates the economic value of interoperable infrastructure. Digital identity, electronic know-your-customer processes, consent-based document exchange and real-time payments reduce fixed costs that otherwise exclude small transactions. Open standards also allow multiple banks and applications to compete on a shared rail. The design principle is important: public or regulated infrastructure should provide common capabilities, while competitive firms innovate at the service layer.

5. PRINCIPAL CHANNELS OF ECONOMIC TRANSFORMATION

5.1 Digital payments, finance and formalisation

UPI is the most visible expression of India's digital public infrastructure. RBI reported 172.208 billion UPI transactions valued at ₹246.83 lakh crore in calendar year 2024, with monthly volume exceeding 16 billion. By August 2026, NPCI's monthly series recorded 24.509 billion transactions valued at ₹29.82 lakh crore across 752 live banks. Payment interoperability lowers merchant acceptance costs, improves settlement speed and makes very small-value transactions economically feasible. For households, this increases convenience and reduces the time and risk of cash handling; for firms, it can improve records and working-capital management.

Digital trails can support formal credit assessment for micro and small enterprises that lack conventional collateral. Platforms such as the Trade Receivables Discounting System also reduce delays in financing accepted invoices. RBI reported that 42.86 lakh invoices worth ₹1.60 lakh crore were financed on TReDS during 2024. However, transaction histories should not become a substitute for fair underwriting or informed consent. Exclusionary algorithms, fraudulent lending applications and over-indebtedness can convert convenience into vulnerability.

5.2 E-commerce, platforms and small enterprises

Digital marketplaces widen geographic reach, reduce consumer search costs and allow small sellers to access logistics, payments and advertising. Social commerce and direct-to-consumer models can lower entry barriers, especially for home-based and women-led enterprises. Government e-marketplaces and open-network approaches can similarly expand procurement access. The productivity effect is strongest when digital selling is accompanied by inventory systems, reliable logistics, customer-service capability and affordable working capital.

Platform markets also involve fees, ranking algorithms, data advantages and dependence on a gatekeeper. A seller may gain national reach but lose bargaining power if a platform controls discovery, customer data and fulfilment. Policy should promote data portability, transparent commercial terms, non-discriminatory access and interoperability. The objective is not to weaken scale economies that benefit consumers, but to ensure that scale remains contestable.

5.3 Public services and human capital

Digital delivery can reduce leakage and administrative burden in transfers, taxation, certificates and benefit applications. Telemedicine, online learning and digital agricultural information can supplement scarce local

capacity. Their welfare value depends on assisted access and grievance redressal. A portal that is technically available but unusable in a local language, inaccessible to persons with disabilities or difficult to navigate on a low-cost device may shift administrative cost from the state to the citizen.

5.4 Innovation, manufacturing and services exports

India's established strengths in IT and business-process services provide skills, foreign-exchange earnings and enterprise capabilities for cloud, cybersecurity, software-as-a-service and artificial intelligence. Electronics manufacturing and data infrastructure can deepen domestic value chains. Yet sustainable gains require movement from routine services and assembly toward research, design, intellectual property and high-value components. Digitalisation should also improve productivity in manufacturing, agriculture and logistics, not remain concentrated in a few metropolitan service clusters.

6. EMPLOYMENT, SKILLS AND INCLUSION

6.1 Labour-market effects

Digitalisation changes both the number and composition of jobs. It creates high-skill employment in software, analytics, cybersecurity and electronics, while platforms generate flexible opportunities in transport, delivery, care, household services and professional freelancing. NITI Aayog estimated 7.7 million gig workers in 2020–21 and projected 23.5 million by 2029–30, equal to 4.1 per cent of total livelihoods. Such projections indicate scale, but not necessarily job quality.

Platform work can reduce entry costs and allow workers to choose hours, yet income may be volatile and shaped by opaque allocation and rating systems. Workers often provide vehicles, devices, fuel and waiting time, so gross receipts overstate net earnings. Classification outside conventional employment can limit access to insurance, paid leave, pensions and collective representation. The Code on Social Security, 2020 recognises gig and platform workers and provides a framework for registration and welfare schemes. Effective implementation requires portable benefits linked to the worker rather than a single platform, simple contribution rules and transparent dispute resolution.

6.2 Digital divide as a capability divide

India's access expansion is remarkable: 95.15 per cent of villages had 3G or 4G connectivity by April 2024, and rural internet subscribers reached 398.35 million in March 2024. Yet coverage is not equivalent to regular, meaningful use. In March 2025, rural tele-density was 59.06 per cent compared with urban tele-density of 131.45 per cent. Differences in device ownership, electricity, affordability, language, literacy, disability access and safety shape who converts connectivity into economic opportunity.

Gender deserves specific attention. Shared-phone access, lower control over household resources, online harassment and weaker digital skills can restrict women's participation even where networks are available. Policies should measure individual ownership and use, not only household access. Community digital centres, women-focused training, affordable smart devices, local-language interfaces and strong mechanisms against online abuse can yield high social returns.

6.3 Education and enterprise capability

The skills challenge is two-sided. Advanced sectors need engineers, data specialists and managers, while the larger productivity gain depends on ordinary workers and microenterprises using digital tools confidently. Training should therefore combine foundational literacy, cybersecurity awareness, bookkeeping, e-commerce, data interpretation and occupation-specific applications. Short modular credentials, apprenticeship and employer-linked programmes can respond faster than degree systems alone.

For micro, small and medium enterprises, adoption costs include software selection, staff time, data migration, compliance and fear of fraud. Shared cloud services and digital accounting may lower long-run costs, but initial assistance is often necessary. Credit and technology-support schemes should reward verified improvements in productivity rather than the purchase of technology itself.

6.4 Distribution of productivity gains

Because digital technologies are complementary to skills, capital and organisational quality, early gains may accrue disproportionately to larger firms and educated workers. Inclusive policy must widen access to complements: reliable infrastructure, finance, capabilities, competitive markets and social insurance. Otherwise, rapid aggregate productivity growth can coexist with wage polarisation and regional concentration.

7. RISKS, GOVERNANCE AND RESILIENCE

7.1 Data protection, trust and cybersecurity

Trust is productive infrastructure. Fraud, identity theft, service outages and misuse of personal data increase the perceived cost of digital participation. The Digital Personal Data Protection Act, 2023 establishes principles for lawful processing, notice, consent, correction and grievance redressal. Its economic success depends on clear rules, proportionate compliance and effective enforcement. Small firms need standardised tools and guidance, while large data fiduciaries should face strong accountability where risk is systemic.

Cybersecurity has the characteristics of a public good: one weak participant can impose costs on others. Payment providers, government systems and critical infrastructure require security-by-design, independent audits, rapid incident reporting and tested recovery. Consumer protection should include quick freezing of fraudulent transfers, multilingual support, liability clarity and public education that does not shift all responsibility to victims.

7.2 Competition and platform power

Digital markets tend toward concentration because users value large networks and data improve services. Concentration is not automatically harmful, but self-preferencing, tying, discriminatory access and strategic control of data can suppress entry. Competition policy should focus on contestability: whether consumers and business users can switch, transfer data, multi-home and access essential interfaces on reasonable terms. Ex ante obligations may be justified for systemically important intermediaries where case-by-case enforcement is too slow.

7.3 Algorithmic accountability and artificial intelligence

Artificial intelligence can improve translation, diagnostics, fraud detection, crop advice and public administration. It can also reproduce bias, enable surveillance and displace routine work. High-impact systems used in credit, insurance, recruitment, health and public benefits should be subject to risk assessment, human review,

documentation and appeal. Public procurement can set standards for accuracy, accessibility and auditability. India also needs investment in compute, research, open datasets with safeguards and local-language models so that AI capability is not restricted to a narrow set of firms or languages.

7.4 Fiscal, environmental and measurement issues

Digital businesses create tax challenges when value is generated across jurisdictions and through intangible assets. Stable and internationally compatible tax rules are preferable to fragmented levies that raise uncertainty. Environmental costs also require attention: data centres consume electricity and water, devices create e-waste, and rapid replacement increases embodied emissions. Renewable power procurement, efficient cooling, repairability and formal recycling should accompany expansion.

Measurement must improve. National accounts should regularly estimate digital value added by layer, while labour surveys should identify platform-mediated work, hours, costs and earnings. Inclusion dashboards should track quality and affordability of access disaggregated by gender, location, disability and income. Without such measures, policy may maximise visible transactions while overlooking welfare, market power or precarious work.

8. POLICY PRIORITIES FOR INCLUSIVE DIGITAL GROWTH

India's next phase should move from digital scale to digital depth. Six mutually reinforcing priorities emerge from the analysis.

Universal, meaningful connectivity. Complete reliable last-mile broadband, improve indoor and remote-area coverage, expand public Wi-Fi where viable, and monitor speed, latency, outages and affordability—not merely nominal coverage.

Capability and local-language access. Embed digital and financial literacy in schools, colleges, skill missions and community programmes. Design services for low-bandwidth devices, Indian languages and persons with disabilities, while retaining assisted and offline channels for essential services.

Open and contestable digital infrastructure. Preserve interoperability in payments and other public rails, encourage portability and open standards, and prevent essential infrastructure from becoming a source of discriminatory private control.

Trusted data and consumer governance. Implement privacy rules predictably, strengthen cybersecurity and grievance redressal, regulate high-impact algorithms proportionately, and publish service-quality and fraud-resolution indicators.

Productive diffusion to MSMEs and regions. Combine finance with advisory support, cloud adoption, digital accounting, e-commerce capability and cluster-based logistics. Evaluate programmes by productivity, sales diversification and survival rather than registrations alone.

A fair transition for workers. Operationalise portable social protection for gig and platform workers, require understandable earnings and allocation information, support reskilling, and strengthen labour-market data on net earnings and working conditions.

9. DISCUSSION

The evidence supports a balanced interpretation. India's digital economy is already macroeconomically significant and is expanding faster than the aggregate economy. Its distinctive advantage lies in population-scale, interoperable public infrastructure that lowers fixed costs and enables private experimentation. The strong productivity estimate is encouraging, but it also signals concentration in capital- and skill-intensive activities. The development objective should be to transmit productivity gains into ordinary firms, workers and regions.

Digitalisation is not automatically inclusive. The same platform that expands market access can extract rents; the same data that enables credit can facilitate exclusion; the same flexible work that offers entry can transfer risk to workers. Institutions determine which outcome prevails. Competition, privacy, labour protection and cybersecurity are therefore not obstacles to innovation; well-designed rules are inputs into sustained adoption and trust.

10. CONCLUSION

India has constructed one of the world's largest digital ecosystems. Official estimates place its digital economy at 11.74 per cent of national income in 2022–23, with the potential to approach one-fifth by 2029–30. Connectivity, digital identity, UPI, platforms and digitally enabled services have lowered transaction costs and opened new markets. The next policy frontier is qualitative: better jobs, wider capabilities, resilient systems and fair competition.

A development-centred strategy should retain the openness and low-cost interoperability that made India's digital public infrastructure valuable, while correcting gaps in access, skills, data governance, consumer protection and worker security. Success should ultimately be judged not by the number of applications or transactions, but by whether digitalisation raises productivity across the economy, strengthens citizen agency and distributes opportunity more evenly.

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