

# DIGITAL INDIA

## Promises, perils, and inspiration for the Global South.

At the heart of India's ongoing digital transformation lies a 'perfect storm' of pivotal elements: a robust telecom industry, groundbreaking digital technologies, an evolving payments ecosystem, and widespread smartphone adoption. Together, these elements have redefined connectivity, communication, and financial transactions, positioning India as a leader in the digital age.

This dramatic change in India's digital landscape has not only democratized access to digital services but also fostered a competitive environment that spurs innovation and economic inclusion in the country.

As India's digital ecosystem matures, potential consolidations in sectors like digital payments and ride-hailing could occur. Continued investment in infrastructure, digital literacy, and sustainable practices will be essential to sustain the country's current digital growth trajectory.



There has been a very positive perfect storm taking place in India's digital stack—

a digital revolution that is testament to the remarkable confluence of four pivotal elements: the telecom giants, groundbreaking digital technologies, a thriving payments ecosystem, and affordable smartphones. Each of these elements plays a defining role in redefining connectivity, communication, online transactions, and digital interactions.

The telecom industry has ushered in an era of widespread accessibility to high-speed Internet. In tandem with this advancement, impressive digital technologies such as the Unified Payments Interface (UPI), which streamlines online transactions by offering convenience and security, have been developed. This has boosted e-commerce and other digital payment-driven services, creating a booming payments ecosystem. Finally, smartphones have become all-pervasive gateways to this digital realm, empowering users with limitless access to information and services.

The ingredients are all set in place to build India's digital stack. What else is needed to orchestrate this perfect convergence of elements that will continue to grow and offer opportunities?

### THE FOUR PIVOTAL ELEMENTS OF INDIA'S DIGITAL STACK

The digital disruption, whether initiated by the Indian government or other entities, presents numerous social challenges. Despite this, India has embraced and expedited digital disruption to maximise its economic and social inclusion benefits, rather than slowing down to address these challenges.

#### Telecom industry: Reaching every corner

The telecom sector has revolutionised the way people in India live, work, and communicate. Today, India is the world's second largest telecom market, worth almost US\$49 billion, and projected to exceed US\$76 billion by 2029.<sup>1</sup> A joint report by Google, Temasek, and Bain & Company states that the value of India's Internet economy, in the range of US\$155-US\$175 billion in 2022, is expected to register six-fold growth and reach US\$1 trillion by 2030. The expansion has mainly been driven by e-commerce. The report adds that B2C (Business-to-Consumer) e-commerce is expected to grow at least five times to US\$350-US\$380 billion by 2030 from US\$60-US\$65 billion in 2022, while B2B (Business-to-Business) e-commerce is expected to grow 13 to 14 times from around

US\$8-US\$9 billion in 2022 to at least US\$105 billion over the same period.<sup>2</sup>

As of February 2024, there were about 636 million urban and 529 million rural mobile subscribers in India.<sup>3</sup> Rural subscriber growth has also outpaced that of urban subscribers with a 43-percent increase since 2014, compared to the 19-percent rise for urban subscribers for the same period.<sup>4</sup> This trend highlights a quicker expansion in rural areas, where subscription levels are inching closer to those of urban areas.

Several key factors have driven the expansion of the Indian mobile network. To begin with, in contrast to Western countries, fixed line or cordless phones are less prevalent in India, making mobile phones the primary communication tool for many people. Second, while mobile phones were relatively expensive to begin with, they rapidly became affordable for middle-income individuals—particularly post-2016, when telecom giant Reliance's entry with its highly economical Jio product truly disrupted the Indian mobile network market. Jio's aggressive pricing strategy, including free outgoing voice calls and cheaper data plans, led to a steep decline in mobile data prices and average prices per GB of data dropped from INR 152 (US\$1.80) to INR 10 (US\$0.12).<sup>5</sup> Jio thus made data accessible and affordable, expanding the reach of the Internet to entirely new segments of society for the first time. It onboarded 108 million customers

in just 170 days in an entirely paper-free manner, relying solely on mobile technology.<sup>6</sup> Such a streamlined approach reduced customer acquisition costs to less than US\$1 per customer from the previous industry average of US\$25.<sup>7</sup> This level of affordability likely drove increased smartphone adoption for Internet access. Today, India enjoys some of the most affordable data tariffs globally. For instance, Jio offers data and voice services at US\$0.04 per day.

The growth in subscribers also reflects the country's insatiable appetite for data. Mobile data traffic per device in India is skyrocketing. Average usage per device was 21.4 GB in 2022, and is expected to reach nearly 50 GB per month by 2027.<sup>8</sup> The growing popularity of online streaming and gaming along with the adoption of the latest fifth-generation (5G) mobile network technology have contributed to this. 5G offers faster download and upload speeds, encouraging data-intensive activities like HD (High Definition) streaming and online gaming. Online streaming services like Netflix and Amazon Prime Video are further driving increased data use, while popular mobile games like PUBG Mobile and Call of Duty require significant data for downloads and online play.

In 2024, Reliance Jio remains the leader of India's telecom market, with a strong presence in both rural and urban areas. It has the highest market share of rural subscribers due to its aggressive pricing strategy and wide network coverage.



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#### Innovative digital technologies: Facilitating financial inclusion

In 2008, India's central bank, the Reserve Bank of India (RBI), and the Indian Banks' Association (IBA) set up National Payments Corporation of India (NPCI),<sup>9</sup> a non-profit company promoted by 10 major banks, to establish a strong and secure electronic payment and settlement ecosystem in the country. In 2010, NPCI further introduced the Immediate Payment Service (IMPS), which offered an instant, round-the-clock interbank electronic fund transfer service between mobile phone users.

#### Aadhaar: The national digital ID programme

In 2010, the government also issued the 'Aadhaar' card, a universal digital form of identification that captured personal details, including biometric and iris scans, and stored it digitally. Aadhaar was a groundbreaking initiative for India as it significantly facilitated digital inclusion. Companies used to spend considerable time and resources to collect basic customer details. Now, with data available on the Aadhaar Portal, they were able to access personal information through Aadhaar authentication using the registered mobile numbers. Aadhaar was also a great facilitator of financial inclusion and economic growth, enabling instant, secure, and accessible transactions. In 2014, the Pradhan Mantri Jan-Dhan Yojana (PMJDY) was launched by the Indian government. Considered the world's largest financial inclusion initiative, it offered basic savings

bank accounts that could be opened with zero balance. As of June 2024, there were about 525 million PMJDY accounts with about 67 percent of these account holders living in rural and semi-urban areas.<sup>10</sup>

#### Enter UPI

The introduction of UPI in 2016 was another game changer. An instant payment system and a protocol developed by the NPCI, UPI facilitates interbank peer-to-peer (P2P) and person-to-merchant (P2M) transactions. Regulated by the RBI, it is used on mobile devices to instantly transfer funds between two bank accounts, and runs as an open-source application programming interface (API) on top of the IMPS. With UPI, India has maintained its position as the global leader in instant payments, accounting for 46 percent of all global instant payment transactions in 2022.<sup>11</sup> The platform had over 300 million monthly active users in India as of October 2023,<sup>12</sup> and had enabled over 2,300 transactions every second in 2022.<sup>13</sup> According to data from the NPCI,

12.2 billion UPI transactions worth US\$222 billion were processed in January 2024, representing a 42-percent increase in transaction value compared to that for January 2023.<sup>14</sup> As of 2024, UPI transactions accounted for 75 percent of all digital payments.<sup>15</sup>

**The surge in trust and adoption of digital transactions in India can be attributed to their secure nature and traceability.**

The exponential growth of UPI can be attributed to several factors. One significant reason is the prevalent savings culture in India, which has resulted in a higher number of debit card holders compared to credit card users. Consequently, the transition to UPI transactions, which are similar to debit card transactions, encountered less resistance and substitution effects than say countries in the West, where credit card usage is more common.

In 2024, the UPI ecosystem comprised 605 banks,<sup>16</sup> and a large number of UPI-supporting apps such as PhonePe, Paytm, Google Pay (GPay), MobiKwik, Uber and SBI Pay, besides bank account holders and merchants.

#### Payments ecosystem: Users, merchants, and banks

The way Indians pay for their shopping has changed over the years. In 2017, cash accounted for 72 percent of POS ('point-of-sale', typically retail) transactions, followed by debit cards (11 percent), credit/charge cards (nine percent), and other payment methods (eight percent). However, by 2022, the proportion of cash payments had declined to 27 percent, while that for digital payments (e-wallets, prepaid cards, etc.) had grown to 37 percent. The proportion of credit and debit card payments meanwhile remained relatively stable, accounting for about 18 percent of POS transactions over the past five years.<sup>17</sup>

Meanwhile, the volume of UPI payments to merchants (P2M) has surpassed that of person-to-person (P2P) transactions in India, accounting for a remarkable 56 percent of all UPI transactions in 2023.<sup>18</sup> This shift is being driven by several factors, including the Indian government's mandate for merchants to accept UPI payments and the inherent convenience of the platform. With a few taps on their smartphones, customers can make payments without having to carry cash or cards.

The surging popularity of free UPI P2M transactions is beneficial for consumers, merchants, and banks. For consumers, it provides a convenient and secure way to pay for goods and services, with features such as two-factor authentication and biometric authentication providing extra security. For merchants, it opens up a broader customer base and boosts sales. An instant transfer of funds and clear acknowledgement of the status of the transaction encourage merchants to adopt the technology. Banks, meanwhile, benefit from increased transaction volumes and enhanced customer engagement, which can lead to greater retention and cross-selling opportunities. Additionally, the widespread use of UPI reduces cash handling costs and associated risks, further improving operational efficiency for banks. Overall, the surge in UPI P2M transactions is a positive development for India's economy, making it easier for businesses to operate and for consumers to shop, while also promoting financial inclusion by



making digital payments accessible to everyone.

In addition to UPI, other payment systems like Real-Time Gross Settlement (RTGS) and National Electronic Funds Transfer (NEFT) contribute to the diversity of India's financial ecosystem. RTGS is a high-value payment system that processes fund transfers individually on a real-time basis, ensuring immediate transfer of funds. NEFT is a country-wide payment system enabling one-to-one fund transfers. It facilitates transactions from individuals, firms, and corporates from one bank branch to another across participating branches in India. NEFT can be used for transferring any amount without a minimum or maximum limit. Transactions exceeding INR 200,000 are typically processed through RTGS, while smaller transactions, which are primarily for salary payments, are handled by NEFT. As a result, the value of RTGS and NEFT transactions has exhibited steady growth.

Digital payments have also increased the government's efficiency by allowing for the likes of electronic toll payments on highways through the National Electronic Toll Collection system and easily accessible bill payment services through the Bharat Bill Payment System (BBPS). The multiple authentication layers further ensure essential safety.

In another initiative, in 2012, NPCI introduced RuPay (the name is a blend of 'Rupee' and 'Payment'), a first-of-its-kind domestic card payment network in India, with wide

acceptance at ATMs (Automated Teller Machines), POS devices, and e-commerce websites across the country.<sup>19</sup> RuPay offers debit cards, credit cards, prepaid cards, and government scheme cards. It was meant as an alternative to Mastercard and Visa cards, and the government mandated that all merchants in India accept RuPay cards. As of February 2021, there were 628 million RuPay cards across all the categories. These have been issued by more than 1,000 banks, and the cards account for nearly 35 percent of the card market in India.<sup>20</sup>

Furthermore, to lay the foundation for a strong and inclusive digital economy that can propel the nation's digital transformation, India has devised its Digital Public Infrastructure, which consists of five key layers. They are the Identity Layer with Aadhaar, the Consent Layer with Data Empowerment and Protection Architecture (DEPA) that allows individuals to share their data with service providers securely, the Paperless Layer with DigiLocker and eSign, the Payment Layer with UPI and RuPay, and the Transaction Layer with BBPS and Goods and Services Tax (GST) Network.<sup>21</sup> These five layers are designed to work together seamlessly to ensure smooth integration across services. The focus on data security, user consent, and privacy protection promotes financial and digital inclusion, reduces transaction costs, and improves service delivery.

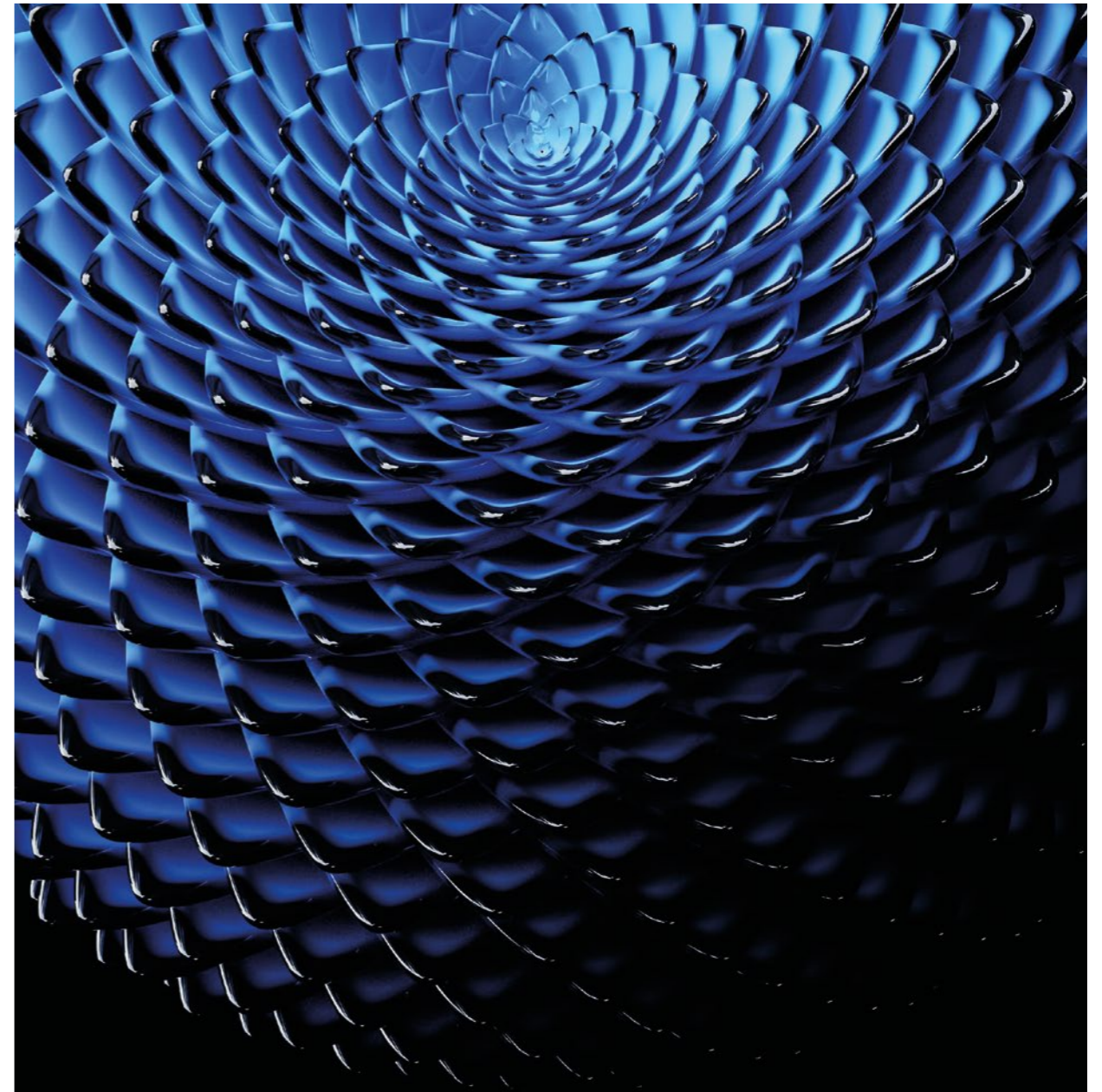
Overall, the surge in trust and adoption of digital transactions in India can be attributed to their secure nature and traceability. Unlike cash transactions, digital

transactions leave a digital footprint, making them easier to track and reducing the incidence of fraud. This transparency fosters trust in the system, thereby encouraging the widespread adoption of digital payment methods. Besides, the government's focus on digital infrastructure, including Aadhaar for identity verification and electronic Know Your Customer (e-KYC) processes, has significantly contributed to strengthening this trust.

#### **Smartphones: Offering affordability and improved connectivity**

The growth of smartphone usage in India is remarkable. Just a decade ago, only 34 million people in India had smartphones; by 2024, that number has grown to over one billion. This expansion is expected to continue, with estimates suggesting there will be 1.55 billion smartphone users in India by 2040.<sup>22</sup>

The proliferation is driven by several factors. As disposable incomes increase, more people in India have been able to afford smartphones. The Indian government has also made significant investments in improving Internet connectivity. Some key initiatives under its Digital India Programme include the BharatNet Project, which aims to provide high-speed Internet to rural areas; the Jan Dhan-Aadhaar-Mobile (JAM) initiative for improving Internet usage; and the electronic delivery of public services to make them more accessible. These efforts have not only increased Internet accessibility



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and improved the quality of Internet access across the country, but also made it easier for people to use their smartphones to access online content and services. Moreover, smartphone manufacturers are now offering a wide range of affordable smartphones that are well-suited to the needs of Indian consumers.

### RAGING AHEAD: PROMISES AND CHALLENGES

India's digital transformation has created an environment where technological innovations can thrive. Digital infrastructural investments have multiplier effects across nearly all sectors of the economy. For instance, in finance, digital payments enhance efficiency and reduce operational costs, while in the transport sector, simplified fare transactions lead to better operational transparency. Moreover, such investments foster the creation of sustainable and efficient digital ecosystems in infrastructure and the environment. The government and society must together set the stage through policies and the promotion of digital channels to increase financial inclusion. There is a need for policies that are stable and conducive for businesses to ensure that digital financial services are accessible to nearly all individuals, thus bridging the financial gap and rapidly fostering economic growth.

The Indian government has substantially expanded its Digital Infrastructure Investment, which goes beyond the area of payment systems and fintech, to innovation across numerous areas such as

tax systems (for example, GST), public services (like healthcare and insurance), logistics, and food delivery. All these sectors have interoperability in their payment systems due to common frameworks like e-KYC and Aadhaar, which help reduce costs and enhance efficiency. This inclusive growth will allow the benefits of digital advancements to seep down to all strata of society.

India's digital journey has seen explosive growth in smartphone usage as the main tool for accessing digital services. The telecom industry's robust infrastructure, including the expansion of fourth-generation (4G) networks and the 5G rollout, ensures that digital services reach even the most remote regions, leading to a digitised nation. UPI has been a game changer for the financial sector, and India's market model, which focuses on lower prices aimed at higher quantities, aligns perfectly with the digital revolution. This approach is evident in the pricing strategy of mobile data and UPI transactions. By keeping prices low and affordable, the adoption rate increases, leading to higher transaction volumes. The government's support in subsidising digital infrastructure costs ensures that the fixed costs of maintaining systems like UPI are manageable, allowing the benefits to be passed on to consumers.

For UPI to go global, maintaining an open ecosystem is critical, as it will allow seamless integration with international financial institutions through open APIs. Looking ahead, perhaps monetising UPI through transaction charges can create the necessary revenue for continuous

improvements and technological advancements within the system. This revenue can help UPI remain at the forefront of global technology, security, and user experience. Another crucial aspect of UPI's future preparedness is recognising the potential impact of tech giants on the financial landscape. UPI's user-friendly interface has inspired tech giants like Google and Amazon to develop their products on top of the UPI framework. This trend is likely to continue and could enable these tech giants to replicate their successes in the global West, posing a substantial challenge to traditional financial giants like Mastercard and Visa.

We also note that India's economic strategy is shifting from cost minimisation to technology development, thereby promoting new business models and enhancing competitiveness on the global stage. Historically known for low-cost outsourcing, India is now investing in high-tech innovation to stay competitive globally. This shift necessitates new educational policies to create tech talent, with updated curricula in Artificial Intelligence, Machine Learning, and the Internet of Things, ensuring the future workforce is prepared for a tech-powered world. Financial innovation, particularly through digital payment modes like UPI, has significantly impacted the bottom of the pyramid by bringing financial services to the unbanked and promoting economic inclusion. The large number of unicorns in the fintech and e-commerce space is a testament to the huge potential and continued impact that digital

innovation is going to have on India. To sustain and enhance this growth trajectory, it is imperative to strengthen infrastructure, improve digital literacy, and focus on skills development. This momentum needs to be maintained through continued investment, regulatory support, and a commitment to evolving digital ecosystems. Emphasising sustainable practices will ensure that this growth is not only robust but also responsible, with innovation and sustainability going hand in hand into the future.

Finally, innovation in India, driven by intense competition, has led to significant advancements across various sectors. However, as markets mature, sustainability becomes more nuanced, with early signs of potential consolidation in sectors like ride-hailing. Similarly, the success of GPay and PhonePe in establishing dominance over the digital payments market in India indicates competition dynamics and the possibility of consolidation within the UPI ecosystem. Backed by Google and Walmart, these firms have captured early-mover advantages in the country through their user-friendly interfaces and can create less frictional payment processes. As the market matures, a more competitive and fragmented market will possibly result in strategic consolidations driven by the need for sustainable business models, regulatory challenges, and market saturation. Such consolidations can benefit from operational efficiencies, reduce duplicate competition, and direct resources to fuel technological advances and service enhancements, instead of stifling innovation. 



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