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Digital Transformation and the Reconfiguration of Trade and Commerce in India: Infrastructure, Consumer Behaviour, Policy Architecture, and Future Pathways

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Abstract

India's digital commerce transformation display case the country's shift from a cash-based, informal business system to a global digital economy. Before 2010, only 5% of small and medium-sized enterprises (SMEs) used digital commerce, and most bookkeeping and paper work were done manually. Between 2010 and 2025, a positive shift was detected, and since 2015, the Digital India plan, demonetization, UPI launch, and COVID-19 have fast-tracked this transformation. Digital payments and e-commerce have become an essential part of daily life. By 2025, 120 billion transactions are projected to be conducted via UPI. The e-commerce market was valued at $133 billion in 2024 and is estimated to reach $325 billion by 2025. Currently, digital marketing platforms like Amazon and Flipkart hold a 90% market share. JioMart, with its hybrid model, and Meesho, through social commerce, empower sellers in Tier 2 and Tier 3 cities. SMEs contribute 30% to the GDP, a noteworthy portion of which is driven by women entrepreneurs. ONDC aims to connect 10 million SMEs to digital platforms. Value for money, price affordability, review-based quality, after-sales service, and rural broadband availability play a decisive role in consumer welfare. The 1.4 million cyber occurrences last year and only 55% digital standardization in logistics are major challenges. Government policies such as the IT Act 2000, PDP Act, and ONDC build trust among businesses and consumers. In the future, AI, global value chains, and green commerce will be key players in the digital platform scenery. An inclusive digital ecosystem will make India a knowledge-based superpower, provided we can overcome challenges related to the digital divide, cybersecurity, and standardization.

Keywords: Digital Transformation, e-Commerce Growth, UPI Payments, SME Empowerment, Cybersecurity.

Introduction

The India's digital transformation is the world's biggest success story. In the last few years, the lives of Indian citizens and their daily practices have entirelyre

formed. Tasks that were previously enormously labor-intensive have become much easier and much time-saving. Difficult tasks are now completed with a single click. Whether it's government work, paying various bills, sending money to someone, or buying anything from the smallest item to the largest machinery, everything has become possible through digital platforms. The word "digital" has now become an essential part of Indian life.

Currently, before buying any new item, an Indian citizen searches for it on their mobile phone, checks its utility, market price, and availability, and then checks the item on various shopping sites. They then decide whether to buy the item from a local shopkeeper or through an online platform, making the payment digitally and even tracking their order through a digital app. Transport companies also obtain information about the goods they ship through digital platforms, and the entire transaction is completed using this data. Currently, government services have also become mostly digital or online, such as credentials through Aadhaar, giving subsidies and benefits digitally through beneficiary's bank accounts, filing direct and indirect tax returns through e-filing system, and uploading various personal and official documents digitally. These digital procedure of working are not only much easier but also save time and cost effective too.

Digital transformation in India has emerged as a transformative change. Today, it is no longer limited to technology but has become the foundation of our social and economic life. In a very short time, digital connectivity and digital infrastructure have completely changed the way we work. Where digital tools were once merely supplementary, they have now become the primary means of accomplishing tasks.

Today, consumers investigate products and their utility through social media platforms, viewing reviews of previous users, and online platforms before making a purchase decision. At this intervening time, producers of goods and service providers are able to produce higher-quality commodity at lower costs with the help of different digital tools. This has not only made work easier but has also saved time and money both.

The biggest reason for this digital transformation is the rapid increase in affordable data in India. After 2010, the Indian telecom market witnessed a significant drop in data prices. This directly led to a rapid increase in internet usage, making digital services accessible to the common man. Different kind of smartphones, IT equipment and the high-speed internet have now reached not only urban area but also remote rural habitants.

It is estimated that by 2026, India will have 880 million plus internet users ((TRAI, 2026). This places India in the list of which countries who have largest digital populations worldwide. Along with this, India's digital economy is also growing rapidly.

This contains online services, online work platforms, online and digital payments, online technology-based supply chains system, and e-commerce and trade. Today, the digital economy is not only enhancing trade and commerce but also generating new employment opportunities and strengthening the country's economic structure along with some challenges.

Here we explore four key points to understand the direction and structure of digital commerce in India. These include studying the

- Structural development of the digital economy in India,

- The changing consumer behaviour towards digital business models

- Inspecting the practices and technologies that administrate the digital economy

- Analyzing the challenges and opportunities accompanying with developing a sustainable and strong digital economy.

In this chapter, digital commerce is not viewed merely as online shopping; it is a broader perspective that includes the use of digital media for determining and adhering to rules related to online product and service search, ordering, payment, after-sales service, and purchase return processes. Thus, it encompasses not only online shopping but also offline purchasing, digital payments, digital stock maintenance, and digital after-sales service systems, and forms a part of a complete digital economy.

Development of Digital Commerce (E-Commerce) in India

- ### Before 2010 (Pre-digital era)

Before 2010, India's trade system was primarily based on cash transactions. This system operated within a fixed framework, where the purchase of daily necessities, from large cities to villages, mostly took place through local shopkeepers, agents, dealers, wholesalers, and marketplaces. Small and wholesale retailers played a crucial role in this entire system, acting as the bridge between consumers and producers.

At that time, Only 5% small businesses use of digital currency, debit cards, and credit cards which was very limited ((World Bank, 2010). Small and medium-sized businesses and producers prepared their business finances manually. The ledgers prepared manually often contained errors and inaccuracies, due to which financial institutions did not receive the necessary business information on time, and they faced delays in obtaining credit or business loans.

The supply chain was also pretty slow and exclusive. Procedures of tracking inventory, managing storeroom stock, managing transportation, and settling payments

transaction were laborious and time-consuming. It consequence, small and medium-sized businesses and industries touched incompetent to Grow quickly.

- **The Digital Revolution of India (2015–2020)**

The year 2015 was a crucial year for transformative policies in digital trade and commerce in India. In 2015, The government decided to digitize the Indian system. Government decided to transform system digitally through the Digital India movement. The objective of Digital India national policy is to empower India digitally and convert Indian economy into a knowledge-based economy. Following the Digital India program, the private sector strengthened basic digital transactions and established digital trails using innovative technologies. This included an emphasis on digital identity, digital payment systems, internet connectivity, and the digitization of documents.

The implementation of the Digital India program gave importance to digital platforms in India, making online marketing, online payment apps, and online delivery services feasible.

This new system proved very beneficial for consumers, traders, and service providers, providing a common digital platform for all to conduct transactions.

During the year 2015 and 2020, weighty investments were made in digital infrastructure. In this period digital infrastructure investment rose by 250% (Padhy et al., 2026). This digital infrastructure created a strong system for e-commerce and financial technology. Key progresses during this period contained within large-scale capital investment in the telecom and communication sector, the extensive acceptance of smartphones, and government care for digital systems.

There were also some important milestones in the success of Digital India, including:

- **Demonetization in 2016:** Demonetization brusquely enforced a speedy adoption of cashless payments, leading to increased use of mobile wallets and digital payment application linked to bank accounts. Even after adequate cash became accessible in the market, consumers and traders had become familiar to and accepted digital payments and transactions.

- **UPI (Unified Payments Interface) in 2016:** UPI enabled near-instantaneous transactions between different banks. QR codes became very useful for small and large merchants. By 2025, the over 120 billion annual transactions conducted through UPI (NPCI, 2025).

- **E-KYC:** Digital identity verification using Aadhaar and electronic KYC has made banking easier, more convenient, and secure, while also facilitating the onboarding of merchants and customers.

Key advantages include easy bank account opening for individual and businesses, faster and accurate verification of commercial transactions, and improved trust in the money transfer arrangement.

- **The COVID-19 Pandemic (2020–2023)**

The impact of COVID-19 has transformed the Digital India movement from a measured change to a speedy transformation. The lockdown caused by COVID-19 made online shopping, door step delivery, and touchless transactions enormously significant. In this situation, digitization emerged as a necessity, and the travel restrictions and social distancing during the lockdown forced ordinary consumers to conduct digital transactions, e-commerce sales jumped by 45% in 2021 (Lingappa, Maheshwari & Mathew, 2026)

The COVID-19 lockdown also compelled sectors that were previously untouched by digital transformation to adopt it. Local traders, referred to as hyper-local businesses, neighborhood grocery stores, and educational institutions were also forced to undergo digital transformation.

The health support system, medicine distribution, and network delivery all became digitized, and this digitization was not limited to metropolitan cities; accepting this digitization became a necessity for ordinary consumers even in villages.

During this period, local traders who were previously operating offline also started online transactions with limited technical resources, such as receiving orders on WhatsApp, sending catalogs and price lists via WhatsApp status, accepting payments via QR codes, and providing home delivery to customers through local delivery systems.

Many shopkeepers collaborated with local delivery systems and e-commerce platforms like JioMart, and through a semi-online system, they started online digital business, albeit in an unorganized manner.

This period also saw the rise of digital assistant marketing, where consumers who were not proficient in digital shopping and marketing were assisted by other family members or store assistants, thus overcoming the barriers to online marketing.

The Current Landscape of Digital Commerce

- **E-Commerce expansion and platform concentration**

Expansion of e-commerce and platform consolidation - In the last decade, the availability of low-cost data, the rising income of the middle class, improved logistics systems reaching even remote areas, and increasing competition among e-commerce platforms have propelled e-commerce to new heights in the Indian market. According to the IBF 2025 survey, the Indian e-commerce turnover was in the $133 billion by 2024 and is projected to reach a new level $325 billion by 2030. In this system, digital commerce has become a huge market segment, not just a "new solution."

Three components are crucial for the security of digital commerce:

- Large marketing companies like Amazon and Flipkart have created a large online market system by combining several business segments.

- A semi-online, semi-offline market, where local customers are connected to local vendors through technological input on the JioMart concept, integrating supply chain and delivery systems.

- Social commerce and reseller models, where business platforms like Meesho have provided assistance to entry-level vendors in contacting customers, receiving payments, etc.

Ranka et al. (2026, as cited in the prompt) highlight a 300% growth from 2021 to 2025, digital commerce spread from Indian metropolitan cities to villages, leading to significant growth in digital entrepreneurship. Even as demand and platform power may remain concentrated.

- **FinTech and digital payments: the UPI effect**

Fintech and digital payments, particularly UPI payments, demonstrate India's global digital success. In various countries, the consumer online market is fragmented due to card payments and e-wallets run by different companies. In contrast, India has established UPI as a universally accessible bank-linked payment system, accepted equally by small and large businesses. Currently, UPI volume and transactions, along with digital lending, have been significant in 2025.

- UPI annual volume (2025): $2.4 trillion
- UPI transactions (2025): 120 billion (NPCI, 2025)
- Digital loan disbursements: $220 billion (RBI, 2025)

These figures show two important changes: Firstly, the economy is becoming more traceable, meaning data is traceable, which strengthens credit underwriting, tax compliance, and consumer protection. Secondly, along with payments, loan, insurance, and investment facilities are now available on the same digital platforms.

Currently, youth participation on online platforms has increased significantly ((Agal et al., 2026). In e-commerce, this culture reduces the time and cost of investment, savings, product acquisition, and credit consumption, enabling the fulfillment of immediate demands.

- **The emergence of digital supply chains and home delivery systems**

The logistics and courier transport system plays a vital role in online trade and commerce. In a country like India, with its outmoded logistics structure, this is an tremendously complex job. The uneven warehousing system, irregular and uneven road connectivity across different regions of country, limited air transport services, and

frequent delays train transportation further make a complicated the procedure. Inter-state transactions also caused delays in many instances.

Currently, for goods transport, logistics data systems, automation, and optimization tools being used by companies have reduced both delivery time and costs. The Industries 4.0 technologies in perishable supply chains reduced spoilage by 20%–25% and improved traceability (Ghosh et al. 2026). The implementation of GST has facilitated inter-state trade transactions, which has increased consumer trust in online platforms.

Policy and Institutional Ecosystem

- ### Digital governance: building public rails for markets

The most significant factor in India's digitization has been that instead of creating a single integrated 'government digital system', the Indian government emphasized building a system where private institutions could also expand their services and establish their own networks. This government policy led to rapid investment in the telecommunications sector and provided opportunities for continuous change and improvement, while government control helped maintain minimum quality standards.

The following three schemes of the Indian government support the advancement and expansion of digital platforms:

- The National Digital Communication Policy, implemented in 2018, aimed to provide better communication facilities with affordable connectivity across the country.

- The Startup India Policy, implemented since 2016, helps new industries realize their innovative ideas as businesses. It provides business guidance and investment to young entrepreneurs.

- The Open Network for Digital Commerce Policy of 2022, which aims to make the digital retail market highly accessible to the public and ensure the entry of new and small traders without difficulty, so that digital commerce does not remain the power of a few.

The most important of these has been the Open Network for Digital Commerce 2022, which has transformed digital commerce from a 'platform-centric' system to a 'network-centric' system. Today, various digital apps are available to sellers and consumers, allowing them to purchase goods of their choice at reasonable prices. This has increased the ability of small traders to reach customers and reduced costs. It has also reduced the dependence of small traders on large companies.

- ### Legal and regulatory framework

The Information Technology Act, 2000, implemented by the Government of India, provided legal protection and regulation to the digital commerce sector. The

secure Information Technology Act granted authorized recognition to electronic documentation and electronic signatures. This law defined cybercrimes, and also defined consumer protection acts, mediator guidelines, cybersecurity rules, and data protection, as well as privacy violations. These measures have significantly strengthened the confidence of ordinary consumers in digital platforms.

The Digital Personal Data Protection Act, implemented in 2023, protects individual privacy. This law prevents the processing of personal information without the individual's consent, defines the rights of users regarding data processing, and clarifies the provisions for penalties in case of privacy violations. This law becomes highly effective when its rules clearly explain all the facts. However, in a country where digital transactions are taking place on a very large scale, implementing this completely seems somewhat difficult.

- **Public–private collaborations and capacity building**

Digital transformation is not possible through technological empowerment alone. Digital transformation requires awareness of these technologies among the general public and the development of digital skills among people. Keeping this need in mind, the government has launched digital literacy campaigns in collaboration with private companies. Large tech companies and online payment networks conduct digital skills programs in rural and semi-urban areas. Such training programs train people to conduct digital transactions safely.

According to NASSCOM Report (2026) by 2026, 67% of small and medium-sized businesses will be using at least one digital tool. These businesses are managing payments, inventory management, accounting, and after-sales service through digital means. The definition of these tools is very broad, but it indicates that the Indian business system is gradually moving away from paper-based processes and becoming digitized.

Socio-Economic Impacts

- **Empowering SMEs and market access expansion**

According to data from the Ministry of Micro, Small and Medium Enterprises (MSME), small and medium-sized enterprises (SMEs) contribute 30% to the Indian economy (MSME ministry summaries). Digitalization offers these industries even better business opportunities.

  - It allows them to reach national and international consumers with their products, transcending local geographical boundaries. Furthermore, through integrated online marketplace platforms like Amazon and Flipkart, or social commerce platforms like Meesho, small and medium-sized sellers and manufacturers have been able to supply goods internationally.

- Due to digitalization, it has become possible to exchange goods, make and receive payments, and acquire technical expertise at a lower cost. Digital catalogs, customer feedback, and comparative price studies make digital shopping easier and boost sales.

- The Open Network for Digital Commerce (ONDC) aims to onboard 10 million SMEs by 2027. While current achievements are far from this target, it clearly indicates the ambition.

Currently, digital exports by SMEs through digital platforms have increased significantly. This increase in sales is particularly significant for handicrafts, low-cost products, and B2B components. Digital channels facilitate the marketing of goods in cross-border markets. Thus, digital platforms are not only a powerful tool for SMEs but have also become a foundation for globalization.

- **Women and rural entrepreneurship**

Digitalization has proven to be a boon for women entrepreneurs engaged in small and micro-sized businesses. Previously, women could only make their products available locally. Now, due to digital platforms, home-based micro-enterprises are able to operate on a larger scale. Women are selling ready-made garments, beauty products, household items like tiffin services, and local services through digital platforms from their homes. Traditional barriers for women entrepreneurs have become negligible due to digital platforms, and lack of mobility, inability to access physical markets, and the need for investment in retail infrastructure are no longer obstacles. Women entrepreneurs can now operate locally and internationally without any physical store or inventory. This is working by targeting remote consumer communities. A 2025 McKinsey-style estimate digital trade could add $700 billion to GDP by 2030, Micro-enterprises contribute up to one-third of India's GDP, with women making a significant contribution.

Women entrepreneurs are participating in acquiring, mobilizing, and developing skills for their businesses through smartphones. Platforms like UPI and JioMart facilitate sales from home. This positive trend, coupled with digitalization, can bring about a revolutionary change.

- **Consumer welfare, inclusion, and the digital divide**

Digital marketing platforms offer several advantages to consumers. Price comparison becomes easier, leading to lower prices due to competition. The number of intermediaries and brokers is reduced. Reading consumer feedback and reviews helps in ensuring product quality, and it becomes easier to order rare items not available in the local market from anywhere. Furthermore, if there are any issues with after-sales service, it becomes easier to enforce consumer protection laws.

Similarly, in digitalization, internet connectivity acts as a medium that connects consumers to the market and delivers goods to the consumer's doorstep. If internet connectivity is poor, the digital platform becomes useless, and consumers in remote areas will not be able to avail the benefits of digitalization. Therefore, policymakers and the government should ensure robust internet connectivity even in remote areas.

Challenges in the Digital Transformation Journey

- **Cybersecurity and data privacy**

In digital commerce, user trust is as important as the money involved in transactions. In India, a total of 14lakh cybercrime incidents occurred in 2025 ((CERT-In), indicating the digital attacks taking place on digital commerce platforms. The increase in cyberattacks is due to weak security systems of users, with sharing OTPs being a major reason. In this context, the weak cybersecurity systems of SMEs, supply chain risks, and breaches of the confidentiality of stored data are major concerns. Although attacks on digital commerce in India may be less significant in terms of monetary losses, they can have a detrimental impact on attracting new customers.

- **Digital divide and capability gap**

India has seen a significant reduction in data costs and improvements in connectivity. However, disparities still exist across regions, genders, age groups, and income levels. This divide extends to both internet connectivity and usage capabilities. Addressing various types of online fraud, preventing scams, and building confidence in digital payments have become our top priorities. The government needs to invest in digitization, cybersecurity, and facilities such as rural hotspots, starting at the school level.

- **Regulatory fragmentation and compliance complexity**

In digital commerce, consumers and sellers transact goods, services, or digital products across state and national borders. This means both consumers and sellers face different regulations related to payments, data, taxation, and consumer protection in different geographical areas. This fragmented regulatory landscape presents challenges. Vague regulations put pressure on SMEs with high operating costs, and uncertainty persists in cross-border transactions; therefore, a uniform national digital law is needed.

- **Infrastructure and logistics standardization gaps**

Currently, only a 55% percentage of logistics operations meet the ideal standards of digital platforms ((CRISIL, 2025). Interoperable standards for digitalization, including barcodes, QR codes, real-time tracking, and warehousing, require revolutionary changes and investments. Without these, delivery reliability and

reverse logistics become expensive for consumers, leading to dissatisfaction among both sellers and consumers with digital platforms.

The Future of Digital Commerce and Trade

- **Integration with global digital value chains**

India's digital services offer highly competitive pricing globally. India is considered one of the world's largest startup ecosystems. In the coming years, digitalization will provide a global context, enabling effective international digital transactions and value transfers. These global digital value chains will connect Indian markets to global markets. SMEs, in particular, will see an unprecedented increase in their market share in handicrafts, software, and agricultural products.

UNCTAD estimates that by 2030, cross-border e-commerce from India will reach $200 billion dollars. This will require certain specific planning, such as:

- International-level logistics and reverse logistics handling systems
- Product certification and quality standardization
- Digital certification and evaluation of documents
- Creation of a mutually trustworthy environment

These efforts will enable even small-scale producers in India to present their products internationally.

- **Industry 5.0 and AI-driven commerce**

The use of AI in e-commerce transforms the entire process from an experience-based approach to a prediction-based approach. Existing recommendation search engines make product discovery accurate and simple. Now, AI-generated advertisements collect customer-centric product information and analyze products according to customer preferences. While this system is beneficial, protecting against deepfakes and other malicious technologies remains a challenge. Therefore, using AI in e-commerce will also require an AI-based monitoring system.

- **Sustainable and ethical digital commerce**

Sustainability in e-commerce is no longer an 'optional objective' but a business strategic necessity. The next phase of e-commerce will also be green commerce (Yambal et al. 2026).

- Digital tools will make carbon footprint tracking more effective.
- Digital certification systems will track and standardize reporting of carbon emissions in the supply chain.
- Last-mile delivery optimization will measure fuel savings.
- Demand forecasting will prevent overproduction.

- Logistics and reverse logistics will be utilized through resale and refurbishment markets.

It will be necessary to track and minimize the additional carbon emissions generated by e-commerce.

These trends indicate that the future of e-commerce in India is very bright. We need to address the challenges and implement robust regulations that maintain consumer and seller confidence in e-commerce.

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