

# The Impact Of E-Commerce On Logistics: Challenges, Opportunities And Future Trends

E-commerce has grown rapidly in the last decade as more consumers buy products digitally. It is bound to impact logistics in more ways than one, writes **Devanantham Ilavazhagan**, Product Manager – Ramco Logistics Software, Ramco Systems

continues to grow, logistics providers face challenges and opportunities in adapting to this new reality.

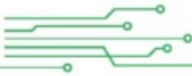
## ECOMMERCE LOGISTICS IN INDIA

The India E-commerce Logistics Market size is estimated at USD 4.42 billion in 2025 and is expected to reach USD 7.85 billion by 2030, at a CAGR of 12.18 per cent during the forecast period (2025-2030). The market is witnessing unprecedented technological integration and automation across the logistics value chain. Logistics providers are increasingly adopting advanced technologies such as warehouse management systems, automated sorting solutions, and real-time tracking capabilities to enhance operational efficiency and meet growing consumer demands for faster delivery times.

Traditional retailers and brands are rapidly adapting to the e-commerce logistics ecosystem, with established offline brands experiencing a remarkable 34 per cent surge in online businesses, reaching USD 2.5 billion between 2019 and 2023. This transformation has been accelerated by the

**W**ith over 33 per cent of the world's population shopping online, e-commerce is a USD 6.8 trillion industry in 2025 and will reach the USD 8 trillion mark by 2027. In e-commerce, shipping makes up nearly 90 per cent of total order fulfilment costs, and last-mile delivery represents the biggest part of it. Between 2018 and 2023, the share of last-mile delivery costs out of total shipping costs has increased to over 50 per cent, pushing couriers to introduce other collection options as alternatives to home delivery of single parcels. 50.6 per cent of people shop online because of free shipping, making it crucial to keep the logistics costs as low as possible to improve profitability. As online shopping





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## FUTURE TRENDS IN E-COMMERCE LOGISTICS

**01. Sustainable Logistics**

AI-powered analytics improve demand forecasting, optimize delivery routes and reduce inefficiencies.

eco-friendly packaging, green warehouses and carbon-neutral transportation are becoming industry priorities.

**02. Advanced Analytics & AI**

AI-powered analytics improve demand forecasting, optimize delivery routes and reduce inefficiencies.

**03. Blockchain Technology**

Blockchain ensures transparency and security in the supply chain, reducing fraud and improving traceability.

**04. Robotics and Automation**

Automated warehouses and robotic sorting streamline operations, improving speed and efficiency.

**05. Omnichannel Fulfillment**

Integrating online and offline channels enables seamless inventory management and faster deliveries.



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COVID-19 pandemic, which shifted consumer behaviour significantly toward online shopping over physical stores. Innovative service models have emerged alongside this shift, such as the introduction of an online order fulfilment solution offering comprehensive logistics services through a single window at a flat per-order rate. These developments are reshaping the competitive landscape and driving the adoption of integrated logistics solutions.

### CHALLENGES IN E-COMMERCE LOGISTICS

With the growth of ecommerce, many new challenges have come up for logistics providers. For instance, increased demand for speed and efficiency. One of the most significant challenges posed by e-commerce is the heightened demand for speed and efficiency in delivery services. Consumers now expect their orders to be delivered within a matter of days if not hours. This expectation has led to the rise of same-day and next-day delivery services, which

require logistics providers to optimise their operations to meet these tight deadlines. Currently, some e-commerce giants are providing 10-minute deliveries, even for products like smartphones. Achieving this level of efficiency often involves significant investments in technology, infrastructure, and workforce.

### COST MANAGEMENT

When ordering online, customers have the choice of selecting a quicker delivery over a longer but cheaper delivery. As quicker deliveries increase transportation costs, it is a constant challenge for operators to ensure cost-effectiveness. Moreover, many operators offer only one or two shipping options, making it difficult to stay up in the market as customers want more flexibility in their choice of options. Offering multiple shipping options and diversifying carriers can help manage costs and enhance customer experience. E-commerce brands can rein in those costs by diversifying their shipping carriers or outsourcing their order fulfilment process to a 3PL partner that can offer discounted service across multiple carriers.

### THE COMPLEXITY OF LAST-MILE DELIVERY

Last-mile delivery, the final leg of the delivery process from the distribution centre to the customer's doorstep, is often the most challenging and costly part of the logistics chain. Urban environments, with their traffic congestion and

## OPPORTUNITIES IN E-COMMERCE LOGISTICS

E-commerce logistics is a rapidly evolving field with numerous opportunities for growth and innovation. The following opportunities can help logistics providers to excel.

### TECHNOLOGICAL ADVANCEMENTS

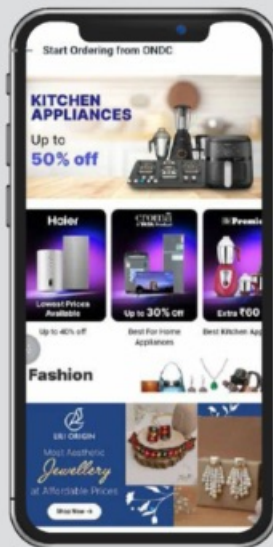
The adoption of advanced technologies presents significant opportunities for enhancing logistics operations. Artificial intelligence (AI), machine learning, and the Internet of Things (IoT) can revolutionise the logistics industry by enabling predictive analytics, real-time tracking, and automated processes. For example, AI-powered algorithms can optimise delivery routes, reducing travel time and fuel consumption. IoT devices can provide real-time data on the location and condition of shipments, improving visibility and transparency in the supply chain.

### EXPANSION OF DELIVERY NETWORKS

The growth of e-commerce presents an opportunity for logistics providers to expand their delivery networks. By establishing more distribution centres and leveraging local delivery partners, companies can reduce delivery times and reach a broader customer base. This expansion can also help logistics providers manage peak demand periods, such as holiday seasons, more effectively. Additionally, partnerships with local businesses can enhance last-mile delivery capabilities and improve customer satisfaction.

### INNOVATIVE DELIVERY SOLUTIONS

The rise of e-commerce has spurred the development of innovative delivery solutions to address last-mile delivery challenges. Drone deliveries, autonomous vehicles, and



locker systems are some of the emerging technologies that can revolutionise the logistics industry. Drones can bypass traffic congestion and deliver packages directly to the customer's doorstep, while autonomous vehicles can operate around the clock, reducing delivery times. Locker systems provide a convenient and secure option for customers to collect their packages at their convenience.

### PERSONALISATION AND CUSTOMER EXPERIENCE

E-commerce allows for greater personalisation in the shopping experience, and logistics providers can leverage this trend to enhance customer satisfaction. By analysing customer data, logistics providers can offer tailored delivery options, such as preferred delivery times and locations. Personalised communication, such as real-time updates on order status and delivery notifications, can also improve the customer experience. Additionally, providing flexible delivery options, such as same-day or weekend deliveries, can cater to the diverse needs of customers.

### GLOBAL MARKET REACH

E-commerce enables businesses to reach customers worldwide, opening new markets and revenue streams. Logistics providers can capitalise on this by offering international shipping solutions and navigating the complexities of cross-border logistics. This includes managing customs regulations, tariffs, and documentation requirements. By providing reliable and efficient international shipping services, logistics providers can help e-commerce businesses expand their global footprint and tap into new customer segments.

complex road networks, pose significant obstacles to timely deliveries. Additionally, the rise of e-commerce has led to an increase in the number of individual deliveries, further complicating last-mile logistics. Logistics providers must develop innovative solutions to navigate these challenges and ensure timely deliveries.

### INVENTORY MANAGEMENT

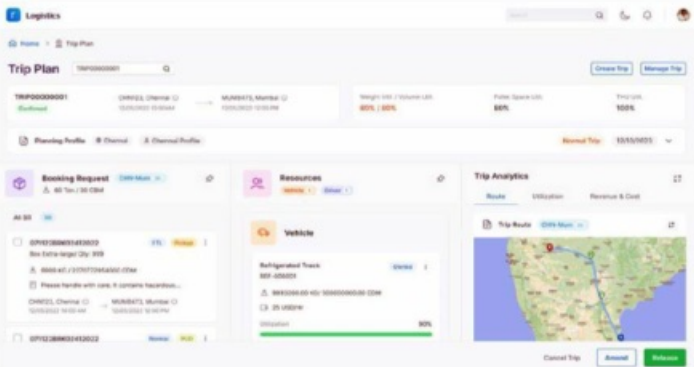
Effective inventory

management is crucial for e-commerce businesses to meet customer expectations. Maintaining accurate and real-time inventory levels is essential to avoid stockouts and ensure that products are available when customers place their orders. This requires sophisticated inventory management systems that can seamlessly integrate with online platforms and physical warehouses. Additionally,

e-commerce businesses must strike a balance between holding enough inventory to meet demand and minimising excess stock to reduce storage costs.

### RETURNS AND REVERSE LOGISTICS

The ease of returning products is a key factor in ensuring customer satisfaction. However, managing returns and reverse logistics can be



complex and costly. Logistics providers must develop efficient processes to handle returns, refurbish products, and restock inventory. This often involves additional transportation, handling, and processing costs, which can eat into profit margins. Moreover, the environmental impact of returns, such as increased carbon emissions from transportation, is a growing concern.

### SUSTAINABILITY CONCERNS

The environmental impact of e-commerce logistics is a pressing issue. The increase in deliveries has led to higher carbon emissions, while the use of packaging materials has contributed to waste. Consumers are becoming more environmentally conscious and are demanding sustainable practices from businesses. Logistics providers are under pressure to adopt eco-friendly practices, such as using recyclable packaging materials, optimising delivery routes to reduce emissions, and investing in electric delivery vehicles.

### HIGH CUSTOMER EXPECTATIONS

Ecommerce businesses might lose business to their competitors if delivery service is poor. If there are any mishaps, customers would complain to the e-commerce vendor; if these complaints persist over a period, the vendor might end their partnership with the unreliable logistics provider. Even minor issues are often amplified, influencing the perceptions of other customers. Customers expect best-in-class service even for free deliveries.

### SECURITY AND FRAUD PREVENTION

Security and fraud prevention plays a vital role in customer satisfaction. There are many cases of security and fraud during transportation, which have led to financial losses, loss of customer trust and reputational damage for the transporter. By protecting transactions, customer data, and shipments, businesses can ensure a safer and more reliable shopping experience for their customers.

### CROWD-SOURCED DELIVERY ISSUES

Crowd-sourced delivery is prevalent with many ecommerce operators as it is cheaper than employing people to deliver throughout all the vast geographies. With increased purchases during festive seasons or discount sale offers, it becomes very difficult to uphold delivery commitments, due to the challenges in managing and monitoring each delivery when using crowd-sourced delivery agents.

### FUTURE TRENDS IN E-COMMERCE LOGISTICS

As e-commerce continues to evolve, several trends are likely to shape the future of logistics. Sustainability will remain a key focus for logistics providers. Companies will invest in eco-friendly practices, such as using electric delivery vehicles, optimising delivery routes to reduce emissions, and adopting recyclable packaging materials. Additionally, logistics providers will explore ways to minimise the environmental impact of returns and reverse logistics, such as refurbishing and reselling returned products.

The use of advanced analytics and AI will become increasingly prevalent in logistics. Predictive analytics will enable logistics providers to forecast demand more accurately and optimise their operations accordingly. AI-powered algorithms will enhance route planning, inventory management, and warehouse operations, improving overall

The screenshot displays a software interface for managing truck assignments. At the top, a 'TRUCK' form is visible, showing 'Planned Quantity' and 'Actual Quantity' both set to 2. Below this, there are sections for 'Assignment Type' (with 'Standard Dimensions' selected), 'Other Details' (including dimensions and weight), and 'Select Vehicle'. The 'Select Vehicle' section contains a table with columns for 'Vehicle ID', 'Service Type', and 'Sub-Service Type', listing various vehicles and their statuses.

store pickup, or purchases a third-party marketplace, an omnichannel fulfilment strategy ensures they enjoy the same level of service across all channels. In today's fast-paced digital environment, businesses need to meet customer expectations across all touchpoints. Omnichannel e-commerce and retail fulfilment empower companies to connect with consumers wherever they shop. By integrating inventory management, order processing, and shipping, omnichannel fulfilment ensures that products reach customers efficiently, regardless of the channel. Adopting an omnichannel approach allows businesses to meet evolving customer expectations, foster loyalty, and enhance brand reputation.

efficiency and reducing costs. Additionally, AI-driven chatbots and virtual assistants will enhance customer communication and support.

Blockchain technology has the potential to revolutionise logistics by providing greater transparency and security in the supply chain. By creating a decentralised and immutable ledger of transactions, blockchain can enhance traceability and reduce the risk of fraud. Logistics providers can use blockchain to track the movement of goods, verify the authenticity of products, and streamline customs processes. This technology can also facilitate secure and efficient cross-border transactions.

The adoption of robotics and automation will continue to transform logistics operations. Automated warehouses, equipped with robotic pickers and conveyor systems, will increase the speed and accuracy of order fulfilment. Autonomous delivery vehicles and drones will further enhance last-mile delivery capabilities. Additionally, robotics and automation will help logistics providers manage labour shortages and reduce operational costs.

Omnichannel fulfilment is a strategic approach that enables businesses to meet customers wherever they shop. Whether a customer buys a product online for home delivery, opts for in-

### A PROFOUND IMPACT

The impact of e-commerce on logistics is profound, presenting both challenges and opportunities. As consumer expectations for speed, efficiency, and sustainability continue to rise, logistics providers must adapt and innovate to stay competitive. By embracing advanced technologies, expanding delivery networks, and adopting innovative solutions, logistics providers can navigate the evolving landscape and meet the demands of the modern consumer. The future of logistics in the e-commerce era is bright, with endless possibilities for growth and improvement. **CV**