

Challenges of Last-Mile Delivery in E-Commerce Logistics

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1. Introduction:

The e-commerce industry has seen exponential growth over the past decade due to increased internet penetration, digital payment systems, and changing consumer preferences. A critical component of e-commerce success is **logistics**, particularly **last-mile delivery**, which refers to the final leg of the delivery process when a package reaches the end customer. This phase is often the most **complex, expensive, and time-consuming** part of the entire supply chain.

Despite advancements in technology and logistics, last-mile delivery continues to face **numerous challenges**, especially in densely populated urban areas and remote rural locations. This project explores the **core challenges faced by e-commerce companies in last-mile logistics** and suggests potential **strategies to overcome them**.

2. Objectives of the Study:

- To understand the **concept and significance** of last-mile delivery in e-commerce.
- To identify the **key challenges** faced during the last-mile delivery phase.
- To evaluate the **impact of last-mile inefficiencies** on customer satisfaction and business performance.
- To examine **case studies** of leading e-commerce companies and their last-mile strategies.
- To provide **recommendations** for improving last-mile delivery in India and globally.

3. Scope of the Study:

The study is focused on the logistics operations of **e-commerce companies**, particularly in **urban, semi-urban, and rural areas** of India. It includes the perspectives of **logistics providers, delivery agents, e-commerce managers, and end-customers**. The scope also extends to the **technological, infrastructural, and operational aspects** of last-mile delivery.

4. Research Questions:

- What are the **major operational and infrastructural barriers** in last-mile delivery?
- How do **customer expectations and behaviors** influence last-mile logistics?
- What role does **technology** (AI, GPS, drones, route optimization, etc.) play in addressing last-mile issues?
- What are the **cost implications** of last-mile delivery failures or inefficiencies?
- How do **leading e-commerce companies** (like Amazon, Flipkart, etc.) handle last-mile delivery?

5. Key Challenges in Last-Mile Delivery:

1. **High Delivery Costs:** The last-mile can account for up to 53% of total delivery costs.
2. **Traffic Congestion & Urban Constraints:** Especially problematic in metro cities.
3. **Lack of Accurate Address Systems:** Common in India's rural and semi-urban areas.
4. **Failed Deliveries:** Due to customer unavailability or incorrect address.
5. **Customer Expectations:** Demand for same-day or one-day delivery increases pressure.
6. **Returns & Reverse Logistics:** Adds to operational complexity and cost.
7. **Limited Delivery Infrastructure:** Especially in tier-2, tier-3 cities and remote areas.
8. **Manpower Issues:** High attrition rates, skill gaps, and lack of motivation among delivery personnel.
9. **Environmental Concerns:** Growing need for sustainable and green delivery solutions.

6. Research Methodology:

- **Type of Research:** Exploratory and descriptive.
- **Data Collection:**
 - **Primary Data:** Surveys and interviews with logistics managers, delivery personnel, and customers.
 - **Secondary Data:** Articles, white papers, company reports, and research journals.
- **Sampling Method:** Stratified sampling across various e-commerce platforms and geographical areas.
- **Tools of Analysis:** SWOT analysis, comparative charts, and statistical tools like SPSS/MS Excel.

7. Significance of the Study:

This study provides valuable insights for:

- **E-commerce companies** to optimize their logistics.
- **Startups and logistic providers** looking to innovate in last-mile delivery.

- **Policy makers and urban planners** to support better infrastructure.
- **Consumers** to understand the constraints behind delivery delays and costs.

8. Expected Outcomes:

- A detailed understanding of last-mile delivery challenges.
- Practical solutions and recommendations for optimizing last-mile operations.
- A comparative analysis of best practices followed by top e-commerce players.
- A framework for **tech-driven last-mile solutions** suited to the Indian context.

9. Limitations of the Study:

- Data availability may be limited due to company confidentiality.
- Results may vary depending on regional, economic, and infrastructural differences.
- The dynamic nature of the logistics industry might make findings time-bound.

10. Conclusion:

Last-mile delivery is a **crucial determinant** of customer satisfaction and operational success in e-commerce. Despite its importance, it presents **significant logistical and financial challenges**. With the rise of **digital tools, better infrastructure, and innovative delivery models**, e-commerce companies have the opportunity to transform last-mile delivery into a competitive advantage. This project aims to shed light on these challenges and contribute to the ongoing evolution of smarter logistics solutions.