

Logistics Challenges in E-Commerce: A Study on Delhivery Ltd.

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ABSTRACT

The development of e-commerce in India has transformed consumer behaviour with a huge demand for swift, secure, and scalable logistics solutions. This revolution has put logistics companies such as Delhivery Ltd. at the forefront of online commerce with the need to keep pace with changing technological, operational, and customer-oriented challenges. The purpose of this study is to investigate and examine the critical logistics challenges faced by Delhivery within the context of India's burgeoning e-commerce space. The study uses primary and secondary methods of data collection. The structured survey and interviews conducted among operational personnel and logistics professionals who work in or are affiliated with Delhivery obtained the primary data. Industry reports, company case studies, government policy papers, and research journals provided the secondary data. The study is concerned with operational inefficiencies, technological integration loopholes, communication failure between departments, shortage of manpower, infrastructure inadequacies, and first- and last-mile delivery problems. The findings indicate that although Delhivery has been able to implement cutting-edge technologies such as real-time tracking, automatic sorting, and route optimization, the organization still encounters internal hurdles. These range from inefficient coordination between inbound and outbound teams, inadequate employee training, and peak load hour inefficiencies. Night shift operations are also disadvantaged by shortages in manpower, with inconsistent cross-shift communication. The research also finds that IT integration needs improvement and cross-functional collaboration needs to be tightened. The thesis offers specific suggestions, including enhancing employee training initiatives, expenditure on IT updates, increasing warehouse facilities, and optimizing shift coordination procedures. It asserts that overcoming these challenges will enhance Delhivery's operational efficiency and reinforce its competitive edge in the rapidly expanding Indian logistics market. This research adds insight to logistics management for e-commerce and provides a framework that can be used by other logistics providers wishing to streamline operation in changing market environments.

Keywords: e-commerce, logistics

I. INTRODUCTION

The emergence of e-commerce has changed the way business's function and how customers are engaged with markets. Since the internet, mobile phones, and electronic payment systems have become ubiquitous, buying over the internet has become a part of contemporary consumption patterns. E-commerce websites like Amazon, Flipkart, Meesho, and Snapdeal have transformed the retail sector, bringing convenience, product variety, and cost competitiveness. Yet, under the seamless user interface is a sophisticated web of logistics processes that guarantee timely delivery, effective inventory management, reverse logistics, and

overall supply chain effectiveness. Logistical management in e-commerce involves an entirely different set of challenges from those found in conventional brick-and-mortar retail logistics.

Logistics is the backbone of e-commerce. It encompasses warehousing, inventory management, packaging, shipping, and final delivery to the end consumer. The performance of an e-commerce business greatly depends on the reliability and efficacy of its logistics operations. In the fast-paced and competitive e-commerce environment, delays, inaccuracies, and transparency issues in logistics can lead to customer dissatisfaction, bad word-of-mouth, and potential loss of business. Logistics thus becomes a critical factor in

ensuring customer satisfaction, operating efficiency, and profitability for the business.

One of the key issues in e-commerce logistics is last-mile delivery. It means the last distance of the delivery chain, where a product is moved from the distribution point to the final consumer. Last-mile delivery is usually the most time-consuming and costly phase of the logistics operation. In populated urban cities, traffic jams, small roads, and parking limitations make it challenging for delivery personnel to work efficiently. Poor infra, high distance, and low density of orders in rural and remote locations enhance delivery cost and time. Timely and economical last-mile delivery is a major challenge to be constantly overcome by e-commerce players.

Inventory management is another key area. In contrast to offline retail, where goods are stocked and sold from a physical location, e-commerce businesses have to manage inventories at multiple warehouses and fulfillment centers. There should be real-time monitoring of stock quantities, prediction of demand, and maximizing stockouts or minimizing overstock conditions for efficient operations. Poor inventory management can result in lost business, higher holding costs, and customer dissatisfaction because of delivery delays or cancellations.

Reverse logistics is another segment in which e-commerce logistics are confronted with critical challenges. With free return policies and enhanced customer expectations, a high percentage of e-commerce orders get returned. Processing returns in an efficient manner—collecting the product, checking its condition, restocking, or disposing it off properly—is a challenge in logistics. Further, the return flow may not be in the identical supply chain as that for deliveries, which needs extra resources and planning. Negligence in reverse logistics can add operational costs and damage profit margins.

Technology adoption is as much a solution as it is a problem. Sophisticated logistics applications like warehouse management systems (WMS), transportation management systems (TMS), GPS monitoring, and data analytics play pivotal roles in real-time tracking, route optimization, and process automation. Adopting and maintaining these systems is a heavy investment, requires training, and necessitates regular upgrades. Small e-commerce companies find it difficult to cope with advances in technology, and logistics performance lags behind in such cases.

Scalability and managing peak demand also involve logistical complexities. Orders come in bulks during festive periods, flash sales, or during promotional campaigns. Logistics systems need to be stress-resistant and flexible to maintain such bursts without any dip in delivery time or service standards. Inefficient high-volume management can lead to delay in delivery, customer grievances, and brand reputation loss.

In the Indian context, geography diversity, infrastructural shortcomings, regulatory variances between states, and different consumer expectations further complicate the logistics scenario for e-commerce. Although larger players like Amazon and Flipkart have made extensive investments in creating strong logistics infrastructures, small and medium-sized e-commerce companies are still plagued by these issues.

In spite of the geometric increase in India's e-commerce industry, logistics continues to be one of its most crucial and challenging aspects. With customer demands for quicker, cheaper, and more timely deliveries increasing by the day, e-commerce players are increasingly under pressure to drive efficiency in their supply chain operations. But Indian logistics infrastructure is still in the process of evolving, and most of these companies face major bottlenecks like inefficient last-mile delivery, inventory management, high return rates, and a lack of real-time visibility in logistics operations.

Technology-driven e-commerce specialists such as Delhivery have achieved significant improvements by providing solutions attuned to the requirements of e-commerce. However, logistical inefficiency still exists in the management of delivery schedules, reducing costs, and processing reverse logistics effectively. In addition, the geographical and infrastructural heterogeneity of India—spanning from metropolitan congestion to rural remoteness—increases the complexity of operations.

The absence of standardized systems, limited application of automation for smaller logistics partners, and varying service levels across regions lead to delays, customer unhappiness, and higher operating costs. These issues are further accentuated during peak seasons like festive occasions, flash sales, or national holidays, when logistics networks are under maximum stress.

Thus, the root issue this research solves is:

"How do e-commerce companies, especially in the Indian context, get around last-mile delivery

inefficiencies, poor warehousing facilities, high return volumes, and poor delivery reliability in spite of the availability of third-party logistics players like Delhivery?"

This research aims to examine the most important logistical issues within the e-commerce platform, assess the efficacy of existing solutions offered by players like Delhivery, and suggest practicable measures for improving logistics efficiency and customer satisfaction.

Need for The Study

- To know how the logistics plays a vital role in the success of the e-commerce sector.
- To recognize the key logistics issues confronted by the e-commerce firms operating in India.
- To examine how the logistics service providers like Delhivery cope with challenges like last-mile delivery, reverse logistics, and inventory management.
- To explore the effect of logistics performance on the satisfaction of the customers and business sustainability in e-commerce.
- To research the impact of technological integration in enhancing the efficiency of logistics.
- To evaluate the flexibility and scalability of logistics operations during peak seasons.
- To identify infrastructure and policy gaps that hinder the smooth logistics process in e-commerce.
- To offer insights on how businesses can enhance logistics operations to achieve competitiveness.
- To analyze the environmental impacts of e-commerce logistics and the necessity of sustainable logistics practices.

II. LITERATURE REVIEW

E-commerce growth has been the most crucial change in international retail, and this has spurred a lot of research into logistics issues in this industry. Different researchers and business experts have discussed different aspects of e-commerce logistics, with the emphasis on supply chain management, last-mile delivery, reverse logistics, and technology adoption.

Supply Chain Management and E-Commerce:

Effective supply chain management is essential to manage the flow of goods, information, and money in e-

commerce, as per Chopra and Meindl (2016). The coordination of suppliers, warehouses, and delivery networks minimizes lead times and improves service quality. Research work by Christopher (2011) emphasizes that e-commerce demands flexible and responsive supply chains because of unpredictable patterns of demand and reduced product life cycles.

Last-Mile Delivery Challenges:

Several studies emphasize the last-mile delivery phase as the most complex and costly component of e-commerce logistics. As per Gevaers et al. (2014), last-mile delivery accounts for up to 53% of total logistics costs. The challenge lies in balancing speed, cost, and service quality, especially in densely populated urban areas and remote rural regions. A study by Mangiaracina et al. (2015) recognizes traffic, delivery density, and availability of customers as key limitations impacting last-mile efficiency.

Reverse Logistics in E-Commerce:

Reverse logistics is a more important field of research due to the greater return rates of e-commerce compared to retail. Rogers and Tibben-Lembke (2001) define reverse logistics as taking products from the user back to the manufacturer or seller for repair, return, or disposal. Effective reverse logistics minimizes cost and improves customer satisfaction. Govindan et al. (2015) conducted new studies on designing cost-saving and sustainable reverse logistics systems based on e-commerce returns.

Technology Adoption in Logistics:

Advances in technology have been identified as one of the important facilitators for addressing logistics challenges. GPS tracking, warehouse management systems, automated sorting, and route optimization software are extensively reviewed in the literature. It is argued in Davis's Technology Adoption Model (1989) that perceived ease of use and usefulness of technologies like these play a crucial role in their adoption by logistics companies. Research by Hsiao et al. (2018) demonstrates how machine learning and data analytics enhance route planning and demand forecasting in e-commerce logistics.

Sustainability and Green Logistics:

The sustainability issue of e-commerce logistics has emerged as an important area for research. Researchers

such as McKinnon (2010) promulgate the use of green logistics methods such as optimized routes, green packaging, and electric vehicles to minimize carbon footprints. More recent studies by Dekker et al. (2012) emphasize the balancing act between economic and environmental considerations in supply chain management, particularly with the exponentially increasing volumes of e-commerce.

Indian E-Commerce Logistics Context:

India-specific research identifies infrastructure limitations, regulatory challenges, and geographic disparity as the key challenges. Kumar and Saini (2019) observe that fragmented logistics networks and last-mile connectivity issues tend to lead to delays and inflated costs. Yet, organizations such as Delhivery are leading the way with innovative solutions through technology integration and large delivery networks to address the challenges.

III. RESULTS & DISCUSSION

This chapter includes the analysis and interpretation of the data gathered through primary as well as secondary research. The primary purpose of such analysis is to investigate and comprehend the most important logistics issues confronting the e-commerce sector, specifically from Delhivery's point of view. The data gathered through structured questionnaires was summarized, classified, and analyzed both quantitatively and qualitatively to establish useful conclusions.

With e-commerce growing exponentially in India, logistics becomes a determining factor in sustaining customer satisfaction as well as competitive edge. Delhivery is one such company that is at the very centre of this supply chain, connecting digital shopfronts to consumers. The industry is also plagued by various hurdles like last-mile delivery inefficiencies, reverse logistics, high return-to-origin rates, and technological constraints. Uncovering these systematically, this study gathered inputs from both customers and logistics professionals dealing with Delhivery.

Chapter findings are demonstrated using graphs, tables, and explanations to capture participant feedback on delivery schedules, tracing accuracy, customer care quality, technological resources, and operational issues. A focus is placed on seeking repeated patterns or major deviations among respondent perceptions. The methodology enables the demonstration of a precise

perception of expectations, gaps, and potential areas of improvement in Delhivery's logistics operations.

In addition to this, secondary data sources like industry reports, company publications, and academic research have also been employed to reinforce and authenticate the findings derived through the primary survey. This integration of data sets facilitates a comprehensive understanding of the prevailing condition of logistics issues in the Indian e-commerce industry.

Interpretation Summary:

According to the 29 respondents' survey answers about the most common logistics issues affecting Delhivery, warehouse and inventory mismanagement stands out as the top issue, mentioned by 62.1% of the respondents. This suggests that warehouse inefficiencies in storage, stock handling, and order fulfillment processes are having a considerable effect on operating effectiveness. Subsequent to this, manpower deficiencies were noted by 34.5% of respondents, implying that insufficiencies in properly trained delivery staff and warehouse labour represent an increasing issue, particularly in busy times. Inaccuracy in order tracking and delay in delivery were cited by 24.1% each, demonstrating significant deficiencies in real-time tracking systems and timely delivery performance—both of which are imperative for sustaining customer satisfaction among e-commerce clients. Also, last-mile delivery inefficiencies were cited by 20.7% of respondents, indicating ongoing difficulties in reaching customers cost-effectively, especially in rural or under-mapped regions. Reverse logistics complexity was identified by 10.3% of respondents, indicating while it is a difficulty, perhaps it is not as urgent as some. Finally, 6.9% of the respondents chose the "Other" category, indicating that there may be other underlying factors not mentioned in the question options, perhaps such as technology failures or regulatory barriers.

IV. CONCLUSION

The fast growth of the Indian e-commerce sector has transformed consumer purchasing behaviour, pushing for strong and agile logistics networks. This thesis analysed different logistics issues associated with the e-commerce business, using Delhivery—a top logistics and supply chain service provider in India—as the case company. The research was intended to determine operational inefficiencies, infrastructural bottlenecks,

technology integration problems, and labour-related issues in Delhivery's logistics system and suggest viable suggestions for improvement.

By way of primary research techniques, such as logistic professionals' and staff members' survey responses, and secondary data taken from industry reports and case studies, the research revealed critical observations into Delhivery's logistical operations. Some of the principal problems that were identified include a lack of departmental coordination, inadequate training, poor communication during shift changes, and an inadequacy of manpower during peak hours. Technological systems exist but are not always properly integrated with ground operations, and this causes delays and tracking problems. Additionally, first-mile and last-mile operations, which are most important for customer satisfaction, tend to be disrupted because of miscommunication and inappropriateness. Nonetheless, the research also pointed out Delhivery's positives, including its extensive reach, technology-enabled infrastructure, and flexibility in a changing e-commerce landscape. Future trends indicate that investment in automation, AI-based logistics planning systems, green delivery schemes, and blockchain-based transparency systems can drive Delhivery towards improved efficiency and satisfaction. The thesis finds that while Delhivery has contributed meaningfully to the Indian e-commerce logistics industry, there are a number of internal and external challenges that have to be managed strategically. Through internal team alignment, employee training, IT upgradation, and infrastructure scalability, Delhivery can improve its operational performance and continue to maintain its competitive advantage. This research provides the strategic blueprint for future growth and highlights the key role logistics will play in the success of the overall e-commerce ecosystem.

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