A STUDY ON EFFECTIVENESS OF INBOUND & OUTBOUND WAREHOUSE OPERATIONS AT DELHIVERY PVT LTD

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Abstract: The logistics sector in India has experienced significant evolution, largely driven by the rapid expansion of the e-commerce industry. Delhivery Pvt Ltd, a prominent logistics and supply chain service provider, plays a key role in this transformation. The company has developed a robust warehousing system to meet the dynamic needs of the supply chain. This study focuses on evaluating the effectiveness of inbound and outbound warehouse operations at Delhivery Pvt Ltd. Inbound operations include receiving, quality checks, and storage, whereas outbound processes comprise order picking, packing, and dispatch. The research aims to analyze operational efficiency, identify areas for improvement, and suggest strategic interventions to optimize performance. Through a combination of primary data from site visits and secondary data from industry reports, the study provides actionable insights into enhancing warehouse operations to ensure timely deliveries and customer satisfaction.

Keywords: Warehouse Operations, Inbound Logistics, Outbound Logistics, Supply Chain, Delhivery Pvt Ltd

INTRODUCTION

Warehousing is an essential function in the supply chain, bridging the gap between production and consumption. Efficient warehouse management ensures that goods are received, stored, and dispatched in a timely and organized manner. Inbound operations at Delhivery involve receiving goods from vendors or distribution centers, inspecting them for quality and quantity, and placing them in designated storage locations. Outbound operations include picking items based on customer orders, packaging, labeling, and shipping them to the final destination. The performance of these processes directly impacts customer satisfaction, inventory accuracy, and overall operational efficiency. Delhivery operates numerous fulfillment centers across India, leveraging technology and data analytics to optimize logistics. However, despite automation and standard operating procedures, challenges like inventory discrepancies, delayed dispatches, and peak season bottlenecks persist. This study investigates the root causes of these issues and explores potential solutions. The first mile refers to the initial stage of the logistics process, where goods are picked up from the seller or manufacturer and transported to a warehouse, distribution center, or sorting facility. This stage is critical as it sets the foundation for the entire supply chain. The mid mile involves the transportation of goods from warehouses or distribution centers to local hubs or fulfillment centers closer to the customer. It serves as the bridge between the first and last mile and plays a key role in maintaining delivery timelines and inventory availability. The last mile is the final and most visible stage of the delivery process, where goods are transported from a local hub to the end customer's doorstep. This stage directly impacts customer satisfaction and brand reputation. It is often the most complex and costly segment due to factors like traffic, delivery window constraints, and inaccurate customer information.

Reverse Logistics:

Reverse logistics refers to the process of moving goods from the end customer back to the manufacturer, retailer, or a designated location for purposes such as returns, repairs, recycling, or disposal. This process is essential for managing product returns, warranty repairs, and recycling programs. Efficient reverse logistics helps companies reduce waste, recover value from returned items, and improve customer satisfaction by providing hassle-free return experiences. It requires careful planning, tracking, and coordination to handle returned goods efficiently while minimizing costs and environmental impact.

Return Logistics:

Return logistics specifically focuses on the management and handling of returned products from customers. This includes the processes of receiving, inspecting, restocking, refurbishing, or disposing of returned items. Effective return logistics is critical for e-commerce and retail businesses, as it directly affects customer loyalty and operational costs. Implementing streamlined return policies, clear communication, and advanced tracking systems can improve return handling efficiency, reduce processing time, and recover product value while enhancing the overall customer experience

OBJECTIVES OF THE STUDY

- To identify operational bottlenecks affecting inventory accuracy and dispatch timelines.
- To examine the impact of technological tools like Warehouse Management Systems (WMS) on workflow.
- To suggest process improvements for better performance and reduced turnaround time.

NEED FOR THE STUDY

The logistics industry is evolving rapidly with increased e-commerce penetration, and customer expectations are higher than ever. Delhivery must enhance its operational resilience and responsiveness to remain competitive. By studying first and last mile inefficiencies, this research contributes actionable insights to improve delivery speed, reduce cost per shipment, and ensure high customer satisfaction.

- Rising customer expectations demand faster and more reliable deliveries.
- Growing e-commerce and retail sectors increase the pressure on logistics performance.

LITERATURE REVIEW

Warehouse management has garnered significant attention in logistics literature. According

- Bowersox et al. (2021), effective warehouse operations reduce lead time and improve order accuracy.
- Chopra and Meindl (2019) emphasize the role of automation and layout optimization in boosting efficiency.
- Nair (2020) and Singh (2018) highlight that poor inbound operations can cause ripple effects throughout the supply chain, while outbound delays can severely impact customer satisfaction.
- These studies underscore the need for continuous process audits and technological integration in warehouse operations.

Delhivery's approach to logistics includes data-driven insights, AI-based forecasting, and real-time tracking, yet challenges remain due to fluctuating demand and human dependencies. This study builds on prior research and applies these principles in the context of Delhivery's warehouse systems.

RESEARCH METHODOLOGY

The research design refers to the plan for conducting the research. It includes the type of research, the research questions, the data collection methods, and the data analysis techniques. The research design should be carefully planned and tailored to the specific research question being addressed.

It outlines the structure, framework, and procedures for collecting and analysing data to address research questions or objectives effectively. Research design encompasses various elements, including the type of research (e.g., qualitative, quantitative, mixed-methods), the selection of research participants, the sampling strategy, the data collection methods, and the data analysis techniques. A well-defined research design ensures that the study is conducted systematically, rigorously, and in accordance with the goals of the research, allowing researchers to generate meaningful findings and draw valid conclusions

This study employs a descriptive research design to systematically evaluate warehouse operations.

Primary Data: Collected through direct observation at Delhivery's warehouse, structured interviews with warehouse managers, and surveys from 30 warehouse employees.
Secondary Data: Sourced from industry reports, Delhivery's internal documentation, and academic journals.

Sampling Technique: Purposive sampling was used to select individuals with relevant roles in warehouse operations.

Tools Used: Questionnaires, performance audit checklists, and time-motion studies.

SAMPLING TECHNIQUES

1. Convenience Sampling (Survey-Based Data Collection)

This non-probability sampling method involves selecting respondents based on their availability and willingness to participate. Since the data will be collected through Google Forms from the Frist mile and second mile logistics space in team at the company, convenience sampling is a suitable choice due to easy access to the respondents.

2. Systematic Sampling (Historical Data Analysis)

In this study, past practical and efficient method to monitor and enhance both first mile and last mile logistics operations. When used appropriately, it allows logistics managers to maintain high service standards, identify inefficiencies, and support continuous improvement without the time and cost of inspecting every shipment or delivery

QUESTIONNAIRE DESIGN:

In this study, data was collected using a structured questionnaire as the primary instrument to gather both quantitative and qualitative information. This method was chosen due to its efficiency in reaching a targeted group of industry professionals and collecting standardized responses that are easy to analyse. The questionnaire was administered via Google Forms, allowing for digital distribution and real-time data collection.

- **Section A: Demographic Information:** This section collects basic background information about the respondents. It helps categorize responses based on role, experience, and geographic location, which allows for better analysis of patterns and performance based on job function or area.
- **Section B: Warehouse Operations:** This section focuses on collecting data about the initial stage of the delivery process, which includes parcel pickup from vendors/sellers and transportation to hubs or warehouses.
- **Section C: First & Last Mile Operations:** This section is designed to explore the final delivery stage from the last hub to the customer. It is often the most cost-intensive and challenging part of logistics.
- **Section D: Technology and Efficiency:** This section evaluates how technology and digital tools are used to support both first mile and last mile logistics. It also captures feedback on training and process changes.

LIMITATIONS OF THE STUDY:

This study provides valuable insights into the operational efficiency of first mile and last mile logistics at Delhivery, there are several limitations that must be acknowledged. These limitations may affect the scope, generalizability, and depth of the findings, The study relied on a relatively small sample of Delhivery employees for the questionnaire survey.

- This limited the depth of secondary data analysis, especially in relation to metrics like delivery times, failure rates, or routing efficiency. The organizational regulations limiting the sharing of sensitive or confidential data limited access to significant data. This limitation could have resulted in inadequate data sets, reducing the comprehensiveness of the conclusions.
- The research was conducted within a limited timeframe, which restricted the ability to perform conduct in-depth interviews with multiple levels of management and field staff.

DATA ANALYSIS AND INTERPRETATION

1. Efficiency of Inbound Operations

- 68% of respondents rated operations as "Very Efficient," and 24% as "Efficient."
- Only 8% were neutral, with no negative responses.
- This indicates an exceptionally high level of satisfaction (92%) with inbound logistics.

2. Delays in Receiving Goods

- 48% reported delays occur "Rarely," 42% "Occasionally," and only 10% "Frequently."
- The majority experience minimal delays, reflecting good supplier coordination and scheduling.

3. Use of Appropriate Tools During Unloading and Storage

- 62% stated tools are "Always" used and 32% said "Often."

- With 94% using tools consistently, this showcases operational maturity and resource availability.

4. Warehouse Layout Optimization

- 58% find it "Very Well" optimized; 40% rate it as "Moderate."
- Only 2% perceive poor layout, highlighting strong warehouse design with minor room for refinement.

5. Software/Warehouse Management System (WMS) Usage

- 44% use WMS fully integrated, 46% partially.
- 90% adoption rate overall suggests strong digital transformation, although partial users may benefit from full integration.

FINDINGS

➢ Overall warehouse operations are well-regarded, with 92% of respondents expressing satisfaction.
➢ Inbound operations, space utilization, and inventory management are strong performers.
➢ Technology adoption is high, but partial integration limits potential.
➢ Outbound challenges like packing delays and miscommunication affect nearly 88% of respondents.
➢ Occasional training and infrequent errors highlight room for consistency and standardization.

SUGGESTIONS

1. Enhance Full WMS Integration

 * Transition partially integrated systems to full functionality to improve data transparency and process automation.

2. Optimize Packing and Communication Protocols

 * Introduce standardized SOPs and digital dashboards to minimize packing delays and miscommunication.

3. Review and Upgrade Warehouse Layout

 * Conduct periodic audits to ensure layout remains responsive to volume changes and process flows.

4. Increase Frequency and Uniformity of Training

 * Implement regular, mandatory training programs to eliminate operational variability across shifts.

5. Invest in Receiving Efficiency

 * Automate check-in processes or allocate dedicated receiving teams to reduce time in the inbound phase.

CONCLUSION

The analysis of warehouse operations at Marwin reveals a high-functioning system with well-established practices in place. However, targeted improvements—especially in outbound packing accuracy, staff training, and WMS integration—can elevate performance even further. Prioritizing these refinements will not only streamline daily operations but also reinforce long-term supply chain resilience and customer satisfaction.

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