Chapter 14
Optimizing Reverse Logistics in Retail Sector

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ABSTRACT

Reverse Logistics (RL) has become a critical challenge in supply chain management, especially for retail and e-commerce. With online shopping growth, product returns have increased due to sizing issues, quality concerns, and unmet customer expectations. This study analyzes return causes in online apparel shopping and proposes cost optimization strategies. Our findings show that understanding return drivers—fit issues, quality mismatches, and delivery delays—helps businesses reduce returns and enhance customer satisfaction. The research emphasizes adopting AI, blockchain, and IoT technologies to improve reverse logistics efficiency. Recommendations include implementing centralized return centers, automating supply chains, and educating customers to minimize costs. The study highlights RL's role in sustainability through recycling, refurbishment, and waste reduction

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practices. This research provides valuable insights for students, academics, and industry professionals seeking to address RL challenges and enhance supply chain sustainability in the apparel industry and beyond.

INTRODUCTION

Reverse Logistics (RL) is the extension of Supply Chain Systems and Closed-Loop Systems. They assist in the return of products or materials (Camilleri, 2025). The RL approach affirms that end-of-life products are effectively gathered and re-absorbed into the production cycle. RL works in the opposite way as a traditional supply chain. So, the products flow from the point of consumption (final destination) back to the origin for reclamation, refurbishment, or disposal (Mishra et al., 2023). It creates a circular flow of materials rather than a linear path to disposal. RL comes into the picture when a customer who received a product is unsatisfied and applies for returns. Some key factors driving reverse logistics growth are (Aryee & Adaku, 2024; Vintimilla Alvarez & Alarcón Valero, 2025):

1. Expansion in e-commerce markets
2. Tightened environmental regulations and legislation
3. Focus on Corporate Social Responsibility
4. Increased focus on sustainability and circular economy (CE)
5. Increased technological integration
6. Increased competitiveness and opportunities
7. Opportunity to improve organizational reputation, competitiveness, and brand image (Attia, 2025)

RL also has applications in industries beyond e-commerce, such as seafood (Trung et al., 2024), photovoltaic systems (Spellmeier et al., 2025), and military supply chains (Melchers, 2024). RL is also a vital link in the supply chain of the secondhand market (Shahrjerdi, 2024).

Background

Product returns are a growing problem and have financial and environmental impacts (Frei et al., 2020). The fashion sector often has high return rates. Understanding the reasons for apparel returns is crucial for retailers to improve product quality, enhance customer satisfaction, and optimize return policies, ultimately reducing costs (thereby improving profits) and increasing brand loyalty (Stöcker et al., 2021). Figure 1 gives a glimpse of various reasons for apparel return.