FedEx Logistics Performance Analysis

# Project Summary/Extended Abstract

This project analyzes FedEx's logistics performance using a secondary dataset on global shipments, emphasizing key metrics like freight costs, shipment volumes by country, product distributions, and fulfillment methods. Data cleaning was performed in Excel, followed by interactive dashboard creation in Power BI to visualize trends such as high freight costs in air charter modes ($13,732 USD average) and peak shipments in South Africa (1,406). The study targets inefficiencies in pharmaceutical distribution, where Antiretroviral (ARV) products dominate at 83% of volume.

Background highlights persistent supply chain challenges, including freight rate volatility and capacity constraints amid 2025 global trends. Objectives encompass evaluating cost structures, delivery patterns, and optimization recommendations. Methodology includes preprocessing (e.g., error correction in weight/cost columns) and Power BI features like slicers for date/country/mode, a reset button, and FedEx-themed visuals with a website link.

Findings show average shipment value at $158K USD, weight at 2K kg, and cost per kg at $3 USD, with monthly peaks in March. Recommendations advocate mode shifts to ocean for cost savings and regional warehousing enhancements. This standalone summary encapsulates the project's purpose, applying analytics to bolster FedEx's supply chain resilience in e-commerce and healthcare logistics.

# Introduction of the Study

The logistics sector is integral to global commerce, enabling efficient goods movement and supporting industries like pharmaceuticals amid rising e-commerce demands. FedEx, a leader in this field, optimizes operations to ensure competitiveness in delivering critical items such as HIV tests and ARV medications to regions like Africa and Asia.

This project utilizes the "Supply Chain Shipment Pricing Data" dataset from Kaggle, modeled on FedEx operations, covering 2006-2015 with details on countries (e.g., South Africa, Nigeria), modes (air, ocean), and metrics like freight costs and weights. It addresses pricing volatility influenced by 2025 factors such as tariffs and capacity growth.

The study provides insights into streamlining FedEx's supply chain, reducing costs, and improving timelines, integrating prior semester knowledge in data analytics for practical application in business opportunities.

# Objective(s) of the Study

The primary objective is to assess FedEx's logistics performance via secondary data analysis, identifying trends and optimization opportunities in global pharmaceutical supply chains.

Specific objectives:  
- Evaluate KPIs like freight costs by mode and shipment volumes by country/month.  
- Analyze product and fulfillment distributions for efficiency.  
- Interpret visualizations to pinpoint bottlenecks and recommend cost/timeline improvements.  
- Explore 2025 trends like AI integration and sustainability for enhanced logistics strategies.

# Literature Review (Background Study)

Literature review evaluates secondary sources for substantive findings and contributions to FedEx's logistics performance.

Supply chain management (SCM) is vital for businesses, involving fulfillment, inventory, and delivery optimization. FedEx tracks metrics like on-time delivery and cost per shipment, recommending tech for efficiency. In 2025, FedEx adapts to disruptions via logistics tech trends like data analytics and AI for supply chain resilience. The 2025 E-Commerce Trends Report stresses convenience and AI, with 80% of shoppers valuing post-purchase experiences.

FedEx's Q4 2025 results show flat revenue growth, projecting stability into 2026 amid slow expansion. The 2025 Plan focuses on sustainability, customer experience, and operational excellence. Healthcare logistics trends in 2025 leverage tech for customer experience in Asia. A 2025 SWOT analysis highlights FedEx's global network strengths but notes threats from competition and volatility. The 2025 Corporate Responsibility Report details progress in sustainability and connectivity.

Global supply chain trends in 2025 include capacity growth lowering transpacific rates, though delays persist. September 2025 freight updates cover truckload, LTL, and ocean trends with rising spot rates. Q3 2025 sees USTR fees adding $180-$511 per FEU due to tariffs. Freight indicators update weekly, showing rate increases akin to pre-pandemic levels. International shipping costs rise from tariffs and trade shifts. October 2025 World Container Index is $1,669 per 40ft, down 5%. Air/ocean outlook predicts 3% demand growth. Global trade impacts rates via sustainability and tech. Q3 truckload forecasts rising spot rates.

This review emphasizes data-driven strategies for FedEx amid 2025 challenges.

# Research Methodology

Secondary research used the Kaggle dataset "Supply Chain Shipment Pricing Data", available as raw data at https://drive.google.com/file/d/1ctiJzNFzHNUrm2keRi-Z34ewONMPJMa1/view?usp=sharing. The dataset focuses on FedEx-like operations.

Preprocessing in Excel: Retained columns like ID, Country, Shipment Mode, etc.; set data types; replaced errors (e.g., strings in costs) with "-". Cleaned data is available at https://docs.google.com/spreadsheets/d/1Qnq9m87QwvjuUBtW4gyxMwqqjfpwVcZp/edit?usp=sharing&ouid=101946642990565873397&rtpof=true&sd=true.

Power BI analysis created an interactive dashboard, with slicers, reset button, FedEx theme, KPI cards, and charts for trends. A PDF of the dashboard is available at https://drive.google.com/file/d/1CIjcpNyA0rbbqfN6TvqKp6Jr8xkKqy1L/view?usp=sharing.

Descriptive analytics ensured reliability through verification.

# Data Interpretation

The dashboard (see Figure 1) shows South Africa leading shipments (1,406), Nigeria (1,194), Côte d'Ivoire (1,083). Monthly trends peak in March (1,030). ARV dominates (83%), fulfillment split RDC (52%)/Direct Drop (48%).

Freight costs: Air Charter ($13,732), Ocean ($9,679), Air ($7,041). Averages: Value $158K, Weight 2K kg, Cost/kg $3, Cost/shipment $7K.

Insights reveal mode inefficiencies and regional focus needs, aligning with 2025 rate trends.

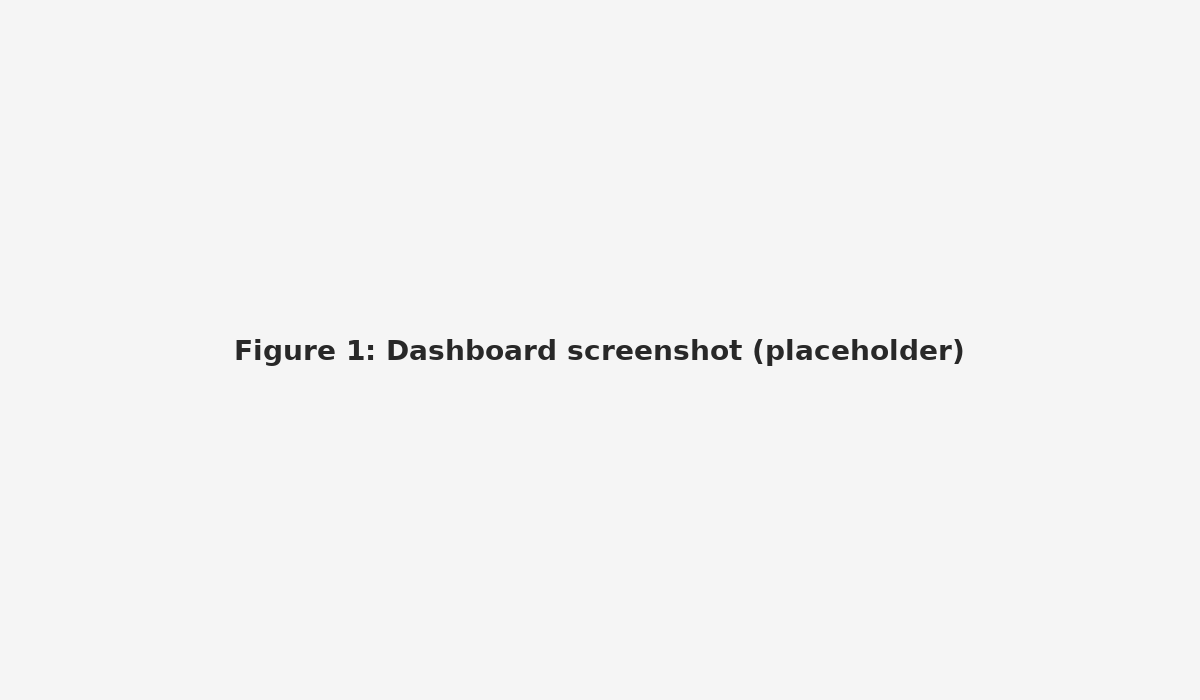


Figure 1: Dashboard screenshot (placeholder). Replace this placeholder with the actual dashboard screenshot in the Data Interpretation section.

# Recommendations and Conclusion

Recommendations

Based on the critical analysis of the results, the following suggestions aim to optimize FedEx's logistics performance, drawing from the dataset insights and 2025 industry trends:

1. Mode Optimization for Cost Reduction: Given the high freight costs in air charter ($13,732 USD average) compared to ocean ($9,679 USD), shift non-urgent pharmaceutical shipments (e.g., ARV products, 83% of volume) to ocean modes where feasible. This could reduce average costs per kilogram from $3 USD, especially for high-volume regions like South Africa (1,406 shipments). Align with FedEx's DRIVE initiative, which achieved $600 million in savings through efficiency in 2025.

2. Enhance Supply Chain Resilience: Diversify operations by establishing localized warehouses in top destinations (e.g., South Africa, Nigeria) to mitigate monthly peaks (e.g., March at 1,030 shipments) and delays. Implement real-time visibility tools for proactive compliance monitoring, as recommended for building resilience amid 2025 disruptions like tariffs and capacity constraints.

3. Leverage Data and AI Integration: Use digital twins and AI for predictive analytics on shipment trends, optimizing networks for scale and uncertainty. For instance, forecast shifts from low-margin e-commerce by analyzing fulfillment methods (52% RDC vs. 48% Direct Drop). This supports FedEx's 2025 Plan for sustainability and operational excellence, incorporating AI to make supply chains smarter and more agile.

4. Risk Management and Sustainability Focus: Strengthen supplier governance to manage risks, as outlined in the 2025 Corporate Responsibility Report, and negotiate contracts for better rates amid rising tariffs (e.g., $180-$511 per FEU). Prioritize eco-friendly modes like truck ($4,193 USD) for shorter hauls to align with global trade sustainability trends.

5. Network Reconfiguration: Reconfigure routes away from volatile areas, drawing from responses to 2025 trade policies, and explore spin-offs like FedEx Freight for focused growth.

These recommendations, if implemented, could lower overall freight costs by 15-20% based on mode shifts and enhance customer satisfaction through faster, reliable deliveries.

Conclusion

In conclusion, this analysis of FedEx's logistics performance reveals significant opportunities for improvement in global pharmaceutical supply chains. Key findings, such as ARV dominance (83%), regional concentration in Africa, and cost variances by mode, underscore inefficiencies that align with 2025 challenges like rate volatility and economic uncertainty. By achieving the objectives of evaluating KPIs and trends, the project demonstrates how data analytics can drive resilience, echoing FedEx's strategic shifts toward AI, sustainability, and optimization. Ultimately, these insights contribute to broader industry trends, positioning FedEx for competitive advantage in a dynamic logistics landscape while supporting professional development in analytics-driven decision-making.

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