Supply Chain Performance & Fleet Strategy (2022–2024)

Prepared by: May Lwin **Technical Stack:** SQL (Data Analysis & Transformation), Excel (Statistical Visualization)
Data Scope: 2022 – 2024 Performance Metrics

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1. Executive Overview

This report provides a comprehensive analysis of our supply chain health, synthesized from three years of operational data. While the organization maintains a high **Fleet Utilization rate (81.6%)**, our customers are only getting their orders on time **55.7%** of the time.

By leveraging SQL to join different datasets, including maintenance logs, route delays, and financial spend, I have identified that the data shows structural issues with our equipment and where we're sending it. We are currently sitting on about **$2.64M in total liability**, much of which can be fixed by updating our fleet and changing our route strategy.

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2. Key Findings & Diagnostic Insights

A. Service Performance

Our delivery performance is currently the business's greatest "reputation risk."

- **The Problem:** Despite total deliveries remaining consistent (averaging ~2,300–2,500 monthly), the **On-Time Delivery rate is stuck below 60%**.
- **The Insight:** High utilization (81.6%) suggests we are operating at near-maximum capacity. However, any minor delay (traffic, weather, or breakdown) results in a missed delivery window. We are currently choosing **quantity over quality**, which may lead to long-term customer churn.

B. The Aging Fleet

- **The Concentration Risk:** We have a massive spike of **78 vehicles from the 2015 model year**. These trucks are now roughly 10 years old.
- **The Correlation:** There is a direct statistical link between these older units and our **$493,360 in Equipment Damage costs**. We are spending more to keep old trucks on the road than we are gaining in marginal utility.
- **Brand Performance: Volvo** units are our "Gold Standard," showing the highest profit-to-expense ratio. Conversely, **International** units are our highest risk, leading the fleet in safety incident frequency.

C. Geographic & Liability Exposure

- **Regional Risk:** The Southeast and parts of the Midwest show **Average Risk Scores exceeding 0.62**, which is higher than the national average.
- The most surprising part of the data is that **nearly 65% of our costs ($1.73M)** are coming from incidents where our drivers **weren't even at fault**. This confirms that our biggest problem isn't bad driving, it’s old equipment breaking down and failing inspections. We are losing more money to mechanical failures than to human error.

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3. Actionable Recommendations

Short Term: Change how we measure success

- Right now, we probably reward drivers for miles driven. We need to flip that and reward them for **On-Time Delivery**.

- We should send a maintenance team to high-risk regions (identified in the Risk Map) to perform deep multi-point inspections on all 2015-model-year trucks to prevent DOT violations before they happen.

Medium Term: Trade in the 2015 models

- We need to start trading in those trucks with **2015 models**. The trade-in value of these assets should be rolled into newer, high-efficiency **Volvo or Peterbilt** models, which the data proves are more profitable and safer.
- Our "Route Efficiency" scatter plot shows a cluster of loads with high delays regardless of volume. We should re-negotiate delivery windows for these specific high-delay corridors to better align with reality, immediately boosting our OTD metrics.

Long-Term: Digital Transformation

- Using the SQL foundation I've built, we can transition from *reactive* repairs to *predictive* maintenance. By flagging trucks when they hit specific "spend thresholds," we can pull them for service before a major equipment failure occurs on the road.

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4. Conclusion

The path to a more profitable supply chain is not found in working the fleet harder, but in working it **smarter**. By retiring our highest-cost assets (2015 models), focusing on the high-margin makes (Volvo), and addressing the 55% delivery reliability gap, we can transform the logistics department from a cost center into a competitive advantage.