

Lead Time Variability & Bullwhip Effect Analysis

Introduction

Goal:

To analyze historical procurement data and identify patterns, causes, and sources of lead-time variability using statistical and visual techniques.

Key Definitions:

- Lead Time: Time between placing and receiving an order.
- Lead Time Variability: Fluctuations from expected delivery time.
- Bullwhip Effect: Amplified variability in orders due to small demand changes.

Simple Question Answers

Simple Questions & Answers:

1. Which supplier has the highest average lead time?

Answer: GammaCorp

2. What transportation mode has the lowest average lead time?

Answer: Air

3. Which month shows the highest average delays in delivery?

Answer: January

4. What type of disruption leads to the longest average delay?

Answer: Customs

5. Which product category experiences the shortest average lead time?

Answer: Electronics

Lead Time Variability & Bullwhip Effect Analysis

Complex Question Answers

Complex Questions & Answers:

1. Which mode of transportation contributes most significantly to delays?

Answer: Sea

2. Are there seasonal patterns affecting lead times?

Answer: Yes. Lead times are generally longer in January and March, indicating possible seasonal disruptions.

3. Compare monthly customer demand vs. order quantities. Do you observe amplified variability (Bullwhip Effect)?

Answer: Yes. Variability in order quantities is higher than in customer demand, confirming the Bullwhip Effect.

4. How does increased variability in order quantities correlate with increased variability in lead times?

Answer: There is a weak positive correlation. High variability in orders tends to slightly increase lead time variability.

Summary & Metrics

Additional Metrics Observed:

- Average Lead Time: 14.86 days
- Standard Deviation of Lead Time: 2.72 days
- Average Order Quantity: 114.00 (Std Dev: 21.36)
- Average Customer Demand: 115.90 (Std Dev: 10.38)

These values support the analysis and are visualized in the Excel file with pivot tables, charts, and calculations.