**Summary of findings:**

**Key findings and patterns**

* Lead Times by Supplier: Suppliers D and A exhibit the longest average lead times, at 10.82 days and 10.67 days, respectively.
* Late Deliveries by Category: The Food category has the highest percentage of late deliveries, with 39.22% of orders arriving past the expected date. This is followed by Furniture (27.08%), Toys (26.53%), Electronics (24.49%), and Clothing (15.09%). Collectively, all categories report a 26.40% late delivery rate, suggesting a systemic issue that may benefit from improved supplier coordination or forecasting.
* Stockouts by Warehouse: Dallas and New York report the highest average stockout rates per product, at 26.31% and 20.00%, respectively. San Francisco follows closely at 19.71%, while Chicago maintains the lowest rate at 10.44%. Across all locations, there were 47 stockouts out of 250 product instances, resulting in an overall stockout rate of 18.8%.
* ROP for categories:
  + Electronics: Has the highest daily usage of 75.6 units and a moderate lead time of 9.3 days. It also has a high std deviation of 118.6. Demand changes a lot
  + Clothing: Daily demand of 29.6 on average and a lead time of 10.64 days. Lower std deviation.
  + Food: Daily demand of 45.2 units and a lead time of 10.11 days
  + Furniture: Daily demand of 35.91 and lead time of 10.20 days
  + Toys: Daily demand of 36.28 and lead time of 9.65
* Late Deliveries Suppliers: Supplier D has the latest deliveries with a rate of 32%, followed by Supplier B with 29%, Supplier A with 28% and Supplier C with 17%. All suppliers have a high late delivery rate.

1. **recommendations to improve supplier or inventory strategy**

* Track closely suppliers: Improve delivery times and reduce delays
  + Some suppliers, like D and A, are often late and take too long to deliver.
  + Create a supplier scorecard to track performance.
  + Give more orders to reliable suppliers, and ask poor performers to improve or risk losing business.
* Add extra stock at risky warehouses: Reduce stockouts
  + Dallas, New York and San Francisco seem to run out of products more often
  + Add more stock to those warehouses to have less stockouts
* Adjust Inventory
  + Demand for electronics and food changes a lot. Fix ROP so that it matches the changes in demand

**What you'd do if you were the Supply Chain Manager?**

* Prioritize supplier accountability by introducing monthly performance scorecards and joint improvement plans.
* Digitize demand planning with dynamic forecasting tools to adjust ROP in real time, especially for volatile categories.
* Implement a regional risk buffer strategy, using predictive analytics to proactively respond to disruptions at the warehouse level.