📌 Project Title:

Supply Chain & Sales Analytics for Multi-Warehouse Retail Business

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📝 Problem Statement:

A multi-location retail business sources products from multiple vendors, stores them across several warehouses, and sells to a diverse customer base through online and offline channels. The business wants to **optimize inventory, improve vendor performance, and maximize sales and revenue** while ensuring customer satisfaction.

Currently, the company faces the following challenges:

1. **Inventory inefficiencies:** Stockouts, overstock, and inconsistent stock aging lead to lost sales and increased holding costs.

2. **Vendor variability:** Inconsistent delivery times and reliability issues affect fulfillment and increase operational costs.

3. **Sales analysis gaps:** Lack of consolidated insights on sales trends, product performance, and customer behavior across regions and channels.

4. **Customer segmentation issues:** Insufficient understanding of repeat purchases, churn, and segment contribution reduces targeted marketing effectiveness.

5. **Forecasting limitations:** No predictive insights for sales and inventory, limiting proactive decision-making.

🎯 Project Objectives:

1. **Sales & Revenue Analysis:**

   ○ Track total sales, profit, and margins.

   ○ Analyze sales by product, category, region, and channel.

   ○ Evaluate discount impact, return rate, and top-performing products.

2. **Inventory & Stock Optimization:**

○　Monitor stock-on-hand, safety stock, and reorder levels.

　　○　Identify fast-moving vs slow-moving products.

　　○　Reduce stockouts, overstock, and warehouse underutilization.

3. **Vendor Performance:**

　　○　Evaluate on-time delivery, lead times, and reliability scores.

　　○　Calculate return ratios and vendor contributions to revenue.

　　○　Segment vendors based on performance, region, and risk.

4. **Customer & Segment Insights:**

　　○　Analyze total customers, lifetime value, repeat purchase rate, and churn.

　　○　Identify preferred product categories and regional sales trends.

　　○　Assess segment contribution and marketing ROI.

5. **Forecasting / Predictive Analytics:**

　　○　Predict future sales by product and region.

　　○　Forecast inventory requirements to minimize stockouts/overstock.

⚙️ Technology Stack

- **Analysis & Modeling:** Python (Pandas, NumPy, Scikit-learn, Prophet)
- **Data Storage:** SQL(MYSQL) for relational data queries
- **Visualization:** Tableau for interactive dashboards
- **Version Control:** Git/GitHub