📦 Inventory & Supply Chain Management Dashboard – Power BI Project

🔍 Project Overview

In this Power BI project, I designed and developed a fully interactive dashboard to analyze key inventory and supply chain metrics. The goal was to simulate real-world logistics operations and provide clear, data-driven insights into performance across areas like stock levels, warehouse utilization, lead times, and order fulfillment.

This was a hands-on, end-to-end project that involved everything from cleaning and transforming raw data to building a user-friendly dashboard and uncovering actionable business insights.

🛠️ Step 1: Understanding the Data

The dataset included detailed transaction-level records with fields like:

- **Date, Region, Category, Supplier**
- **Units Sold, Inventory Level, Warehouse Capacity**
- **Transportation Cost, Order Status, Lead Time**
- **Order Accuracy, COGS, Backorder status**

Right away, I recognized the potential to track not just performance metrics but also supply chain bottlenecks and operational inefficiencies. The first step was to bring structure and consistency to this data.

🧹 Step 2: Data Cleaning & Preparation

Using Power Query in Power BI, I:

- Fixed formatting issues (especially in the Date column)
- Removed duplicates and nulls
- Converted data types to ensure smooth aggregations (e.g., numbers, Booleans)
- Created new calculated columns like Inventory Days (based on turnover rate)

I also built a proper **data model** with dimension tables for Region, Category, Supplier, and Warehouse, ensuring the final dashboard could support filtering and drill-down analysis.

📊 Step 3: Data Modeling & DAX Calculations

I structured the model in a star schema, which made it easy to relate fact tables to lookup tables and improved performance for visuals and slicers.

Some of the key **DAX measures** I created included:

- **Inventory Turnover Ratio**: Units Sold / Avg Inventory
- **Inventory Days**: 365 / Turnover Ratio
- **Warehouse Utilization**: % of total warehouse capacity used
- **Average Lead Time by Category**
- **Units Sold by Year** using time intelligence
- **Transportation Costs by Region & Category**
- **Order Fulfillment Metrics**: Fulfilled, Pending, and Canceled counts

These metrics formed the foundation of the dashboard and helped tell the full supply chain story.

📈 Step 4: Dashboard Design

The dashboard was built with a clean, professional layout and focused visuals. Some key elements:

- **KPI Cards** for top-line metrics like Inventory Days, Turnover, and Utilization
- **Bar Charts** to compare Transportation Costs and Inventory Levels by Region/Category
- **Donut Chart** showing average lead time across categories
- **Line Chart** displaying Units Sold over time
- **Order Status Visual** to monitor fulfillment performance
- **Slicers** for Region and Product Category to allow dynamic analysis

Colors were intentionally kept muted (greens, neutrals) to suit a supply chain/logistics theme and ensure accessibility.

📊 Step 5: Key Insights Uncovered

From this dashboard, I was able to extract several valuable insights:

- **Warehouse Utilization** was just 34%, suggesting underused capacity.
- **Inventory Days** averaged 15.56, indicating healthy stock movement.
- **Electronics and Furniture** had the highest transportation costs in the **West region**.
- **Accessories** had the highest lead time (26+ days), possibly pointing to supplier inefficiency.
- **Backorders** were mostly fulfilled (838), but 248 were still pending—this flagged a process gap worth investigating.
- Units sold jumped from 1K in 2021 to nearly 198K in 2024, showing rapid growth.

🧰 Tools & Skills Used

- **Power BI Desktop**
- **Power Query (ETL)**
- **DAX (Advanced Metrics)**
- **Data Modeling (Star Schema)**
- **Dashboard Design**
- **Supply Chain & Inventory Domain Knowledge**

✅ What I Gained from This Project

This project really sharpened my skills in transforming raw business data into powerful visual insights. I gained deeper experience in data modeling, DAX optimization, and how to approach real-world supply chain problems through a BI lens.

It also taught me how to design dashboards that not only look professional but help stakeholders make informed decisions quickly—whether it's identifying a warehouse efficiency issue or improving supplier lead time.