Project 1: Sales Data Analysis and Dashboard (Excel/Power BI)

Problems and Background

The retail industry thrives on data, yet many organizations fail to fully leverage it for decision-making. Our company's historical sales data presents an opportunity to uncover insights that can improve revenue growth, cost management, and customer retention.

Key challenges observed:

- **Lack of Visibility:** Sales performance across categories, segments, and regions is scattered, making it hard to align strategies.
- **Profitability Concerns:** Discounts, returns, and shipping inefficiencies reduce margins despite steady sales.
- **Customer Behavior Gaps:** Heavy reliance on a small set of customers creates risk, while repeat purchase behavior is not well understood.
- **Operational Inefficiency:** Delivery durations and high shipping costs in certain states highlight logistics challenges.
- **Data Fragmentation:** Without a unified dashboard, stakeholders rely on siloed reports, slowing decision-making.

The problem is not just analyzing sales figures, but transforming them into actionable insights that guide leadership, sales managers, finance teams, and marketing toward smarter, data-driven strategies.

Solution

- Collect and clean sales, returns, and shipping data for accuracy.
- Define key KPIs: Total Sales, Gross Profit, Return Rate, Average Delivery Duration, Average Order Value, Customer Lifetime Value (CLV).
- Create interactive dashboards in Excel and Power BI with slicers, drill-downs, and comparative visuals.
- Analyze sales trends, category performance, return behavior, and logistics costs.
- Apply business concepts such as Pareto Principle (80/20), customer segmentation, and profitability analysis.
- Provide stakeholders with narrative insights and recommendations for profitability, retention, and operational efficiency.

Project Scope

Objective

To analyze historical sales data and design a retail dashboard that identifies revenue drivers, profitability risks, and customer insights.

Process

- Data collection, cleaning & preparation.
- KPI selection and metric design.
- Dashboard development (Excel → Power BI).
- Insight generation and storytelling.
- Documentation and final presentation.

Data Collection

- **Source:** Public dataset from Kaggle (Retail Sales, Returns, and Shipping) – dataset link.
- **Files Used:** Orders, Returns, and Shipping datasets covering product categories, customer information, regional sales, and delivery details.
- **Scope of Data:** 4 years of transactions, 10K+ rows across different regions and customer segments.

Data Cleaning

1. **Handling Missing & Invalid Values:**
    - Filled missing delivery durations using median values.
    - Removed rows with incomplete transaction IDs or customer IDs.
2. **Standardization:**
    - Converted date columns to a consistent YYYY-MM-DD format.
    - Standardized categorical labels (e.g., "CA" → "California").
3. **Deduplication:**
    - Removed duplicate sales and return entries to avoid double counting.

Data Preparation

1. **Integration:** Merged Orders, Returns, and Shipping datasets into a single relational model.
2. **Feature Engineering:** Created calculated fields for Profit Margin %, Return Rate, and Avg. Shipping Cost, and Customer Lifetime Value (CLV).
3. **Pre-Aggregation:** Built PivotTables and summary tables to validate numbers before importing into Power BI.

Stakeholders

- **Executives (CXOs):** Strategic alignment.
- **Sales Managers:** Product and regional performance.
- **Finance:** Profitability, discounts, returns.
- **Logistics:** Shipping cost & delivery duration.
- **Marketing:** Customer segmentation and retention insights.

Methodology

- **Data Modeling:** Integration of Orders, Returns, and Shipping datasets.
- **Data Cleaning:** Removal of duplicates, handling null values, and standardizing date formats.
- **Analytics:** Created calculated fields (DAX/Excel formulas) for KPIs.
- **Visualization:** Used Power BI and Excel to design interactive visuals (bar charts, matrices, trend lines, Pareto analysis).
- **Iterative Review:** Regular reviews ensured alignment with stakeholder needs.

Goals and KPIs

- **Revenue Growth:** Total Sales ($2.3M).
- **Profitability:** Gross Profit ($286.4K), Profit Margin %.
- **Efficiency:** Average Delivery Duration (3.96 days), Avg. Shipping Cost per Order ($45.05).
- **Returns Management:** Return Rate (15.97%), Sales Lost to Returns ($180.5K).
- **Customer Value:** CLV (if calculable), Sales by Segment & Region, Top 20% Customer Contribution.

Technical Processes

- **Tools:** Excel, Power BI, DAX, PivotTables.
- **Features:** Drill-down reports, dynamic slicers, KPI cards, trend analysis.
- **Datasets:** Orders, Returns, Shipping Cost.
- **Outputs:** 5-page dashboard covering Overview, Sales Analytics, Return Analytics, Shipping Efficiency, and Customer Insights.

Business Concepts Used

- **Pareto Analysis (80/20 Rule):** The Top 20% customers contribute the majority of sales.
- **Customer Segmentation:** Consumer, Corporate, and Home Office analyzed separately.
- **Return Analysis:** Linking categories/products with profitability erosion.
- **Discount Analysis:** Impact of discounts on margin and revenue leakage.

- **Operational Efficiency:** Shipping cost and delivery time optimization.

Recommended Analysis

- **Sales:** Technology ($836K) leads sales, but Furniture and Office Supplies are close contributors. Balanced strategy needed.
- **Returns:** 800 total returns, concentrated in California & New York, with furniture driving losses. Targeted return-reduction required.
- **Shipping:** California incurred $54K shipping costs, mostly Standard Class. Opportunity to renegotiate logistics contracts.
- **Customers:** Top 20% customers drive >70% sales. Repeat purchases are low, requiring loyalty campaigns.
- **Profitability:** Aggressive discounting and high returns dilute profit margins; focus should shift from volume to margin optimization.

Conclusion

This project demonstrates how sales data, when structured into a unified dashboard, can transform raw transactions into an actionable strategy. Key challenges such as returns, discounting, and shipping costs must be tackled to protect margins. Customer retention emerges as a critical growth lever, as dependence on a small customer base creates risk.

By equipping stakeholders with interactive dashboards and clear insights, the business is better positioned to make data-driven decisions that enhance profitability, improve customer experience, and streamline operations.

Live dashboard: Power BI Report Link