

# Retail Sales Analysis Project Report

## 1. Introduction

This project involved analyzing a Retail Sales dataset to derive insights related to sales performance, profitability, inventory management, and customer trends. We used SQL for data extraction, Python for analysis, and Power BI for data visualization.

## 2. SQL Analysis

SQL Analysis Steps:

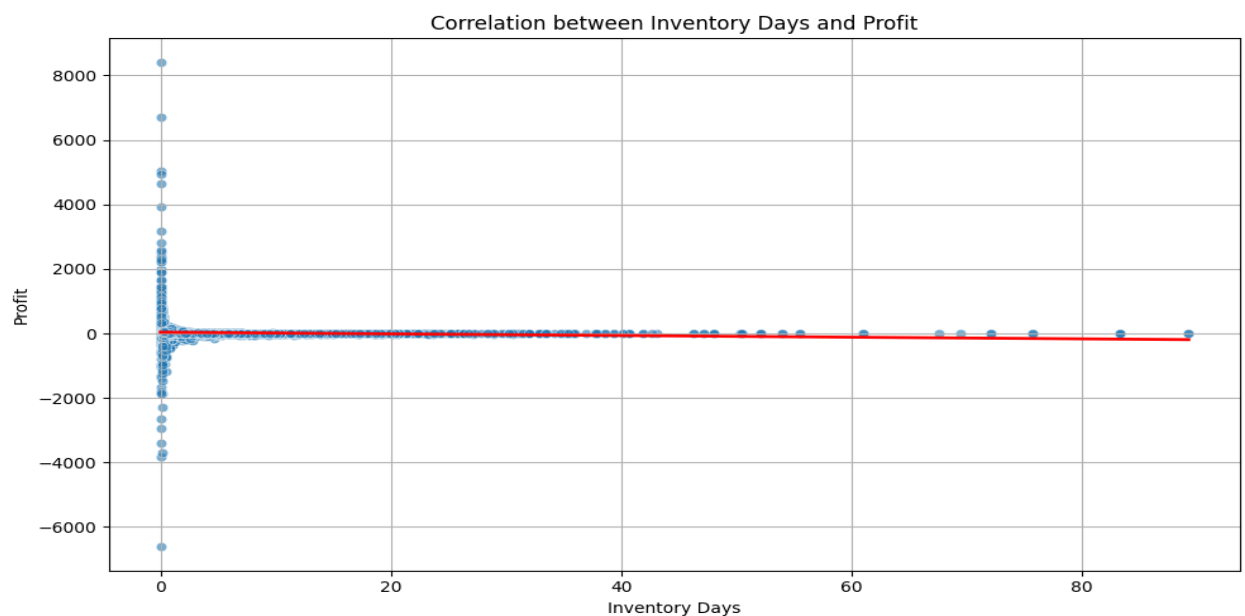
- Created and loaded data into a MySQL table.
- Checked for missing values.
- Calculated total sales, profit, and profit margin percentage by product category and sub-category.

Product_Category	Product_Sub_Category	Total_Sales	Total_Profit	Profit_Margin_Percentage
Office Supplies	Labels	24972.624000000004	11092.508000000005	44.42
Office Supplies	Paper	156958.41199999999	68107.1386	43.39
Office Supplies	Envelopes	32952.804000000004	13928.353400000004	42.27
Technology	Copiers	299056.05999999999	111235.6498	37.2
Office Supplies	Fasteners	6048.559999999998	1899.0364000000002	31.4
Technology	Accessories	334760.63599999924	83873.27139999995	25.05
Office Supplies	Art	54237.58399999984	13055.574000000008	24.07
Office Supplies	Appliances	215064.32199999998	36276.0108	16.87
Office Supplies	Binders	406825.46600000054	60443.526600000085	14.86
Furniture	Furnishings	183410.32800000018	26118.28720000005	14.24
Technology	Phones	660014.1079999971	89031.46119999998	13.49
Office Supplies	Storage	447687.21600000095	42557.65279999998	9.51
Furniture	Chairs	656898.2060000014	53180.33260000005	8.1
Technology	Machines	378477.26199999976	6769.513799999999	1.79
Office Supplies	Supplies	93347.07599999988	-2378.198999999983	-2.55
Furniture	Bookcases	229759.99260000009	-6945.111999999995	-3.02
Furniture	Tables	413931.0639999996	-35450.9622	-8.56

### 3. Python Analysis

Python (Pandas, Matplotlib, Seaborn) Analysis:

- Cleaned and standardized column names.
- Converted date fields to datetime format.
- Calculated Inventory Days using the formula:  
$$\text{Quantity} / (\text{Sales} / 30)$$
- Analyzed the correlation between Inventory Days and Profit.
- Plotted a scatter plot with a regression line to visualize the relationship between Inventory Days and Profit.



### 4. Correlation Insight

- The correlation between Inventory Days and Profit was found to be weak, indicating a low linear relationship between them.
- A **scatter plot** with a regression line was used to visually confirm the trend, showing that higher inventory days do not necessarily correlate with higher or lower profits.
- This analysis supports identifying slow-moving products that may be contributing less to profitability.

## **5. Power BI Dashboard**

Power BI Dashboard Features:

- KPI tiles for Total Sales, Profit, and Profit Margin.
- Regional analysis of quantities sold.
- Profitability analysis by product category.
- Seasonal and yearly sales trends.
- Detailed inventory table highlighting slow-moving and overstocked items.

## **6. Strategic Suggestions**

- Identify and optimize stock for slow-moving items by bundling or discounting.
- Improve marketing focus on high-margin items.
- Plan seasonal promotions based on past seasonal performance.
- Reduce overstocking by refining procurement strategies using inventory analysis.