**🧾 Supermarket Sales Analysis Project Report**

**Abstract**

The objective of this project is to analyse supermarket sales data to understand customer purchasing behaviour, evaluate product performance, and derive actionable strategies for slow-moving and overstocked items. Using structured data analysis, visualization, and business intelligence tools, the study identifies trends in sales, branch performance, and customer preferences.  
The insights gained are used to recommend inventory optimization strategies and data-driven decision-making techniques that improve profitability and reduce excess stock.

**Introduction**

Retail businesses generate large volumes of transactional data daily, which, if properly analysed, can reveal key insights into operational efficiency and customer trends.  
This project focuses on analyzing a **Supermarket Sales dataset** containing details such as product line, sales value, branch, gross income, and customer type.

The aim is to:

1. Understand overall sales and profit distribution across product categories.
2. Identify **slow-moving and overstocked** items affecting profitability.
3. Suggest strategic actions to improve stock turnover and sales performance.

By integrating **SQL for data extraction and Power BI for visualization**, this project demonstrates how business analytics can drive smarter retail management and enhance customer experience.

**Tools Used**

| **Tool** | **Purpose** |
| --- | --- |
| **SQL (MySQL Workbench)** | Data import, cleaning, and executing analytical queries. |
| **Microsoft Power BI** | Creating interactive dashboards and visual reports. |
| **Microsoft Excel** | Initial data validation and CSV formatting. |
| **Python (Pandas, Matplotlib)** | * Exploratory data analysis and charting. |

**Steps Involved in Building the Project**

**1. Data Collection**

* The dataset “supermarket\_sales.csv” contains **1,000 transaction records** from three supermarket branches.
* Each record includes details like product line, unit price, total, gross income, and customer feedback ratings.

**2. Data Cleaning and Preparation**

* Loaded data into **SQL Workbench** using CSV import commands.
* Cleaned inconsistent column names and data types.
* Ensured that the “Date” column was in correct DATE format for time-based analysis.
* Removed duplicate or null entries.

**3. Data Analysis using SQL**

Executed queries to extract key insights:

* **Total Sales per Product Line**

SELECT `Product line`, SUM(Total) AS total\_sales FROM supermarket\_sales GROUP BY `Product line`;

* **Branch-wise Profit Analysis**

SELECT Branch, SUM(`gross income`) AS gross\_profit FROM supermarket\_sales GROUP BY Branch;

* **Monthly Trend**

SELECT MONTH(Date) AS month, SUM(Total) AS total\_sales FROM supermarket\_sales GROUP BY month;

**4. Visualization using Power BI**

* Imported cleaned data into Power BI.
* Built interactive dashboards with KPIs for:
  + **Total Sales**, **Gross Profit**, **Average Rating**, and **Profit Margin %.**
  + Charts showing **Sales by Product Line**, **Branch Performance**, and **Payment Preferences.**
* Added filters for **Month**, **Branch**, and **Product Line** to explore trends dynamically.

**5. Insight Generation**

* **Top Performers:** “Food and Beverages” and “Sports and Travel” had the highest contribution to sales.
* **Slow Movers:** “Health & Beauty” and “Home & Lifestyle” showed lower turnover.
* **Overstock Indicators:** High stock-to-sales ratio in “Home & Lifestyle” category.
* **Customer Insights:** Member customers spent more; Cash was the most preferred payment method.

**6. Strategic Recommendations**

* **For Slow-Moving Items:** Introduce bundle discounts and periodic promotional offers.
* **For Overstocked Items:** Implement data-driven reorder thresholds to avoid surplus.
* **For Growth:** Strengthen loyalty programs and cross-sell high-margin items at checkout.

**Conclusion**

The supermarket sales analysis successfully identified patterns in customer behaviour, branch profitability, and product performance.  
The findings revealed that certain categories underperformed despite high stock availability, indicating inefficient inventory management.

By applying data-driven strategies—such as bundling, demand forecasting, and dynamic pricing—the supermarket can reduce overstock levels and improve profitability.  
This project highlights the significance of combining **SQL-based analytics** with **Power BI visualizations** to make informed and actionable business decisions.