Project Report

Supermarket Sales Performance Dashboard using Power BI

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INTRODUCTION

In today's competitive retail environment, data-driven decision-making has become crucial for maintaining profitability, improving customer satisfaction, and optimizing operations. Supermarkets generate extensive transactional data daily, yet without effective analysis, this data remains underutilized. Our client, a multi-branch supermarket chain, recognized the need to transform raw sales data into actionable insights.

The purpose of this project was to develop a centralized and interactive Power BI dashboard that visualizes supermarket performance across various dimensions—sales trends, customer demographics, product line analysis, payment preferences, and operational efficiency. The dashboard aims to empower managers with real-time, self-service analytics for strategic and operational decision-making.

PROBLEM STATEMENT

In a fast-paced retail environment, our client—a supermarket chain—faced significant challenges in making timely, data-driven decisions. While the company collected valuable transactional data, it lacked a unified, visual platform to track sales trends, monitor branch performance, analyze customer behavior, and optimize business operations.

Managers struggled with:

- Fragmented reporting across branches
- Limited visibility into product and payment preferences
- No centralized method to track KPIs like revenue, margin, or transaction volume
- Difficulty identifying peak business hours and high-performing areas

ABSTRACT

This report details the development of a Supermarket Sales Performance Dashboard using Power BI. The solution integrates static transactional data into a highly visual, interactive tool for business users. By leveraging DAX, Power Query, and advanced visuals, the dashboard provides deep insights into revenue drivers, customer behavior, and operational performance across all branches. The final deliverable supports data exploration, performance monitoring, and decision-making in real time. The solution helps executives and branch managers make smarter, faster decisions.

SOLUTION - Power BI Sales Performance Dashboard

To address the business challenges, we developed a robust, visually rich, and multi-layered Power BI Sales Performance Dashboard tailored specifically for supermarket operations. This dashboard centralizes all business-critical metrics and KPIs into an intuitive and interactive platform that allows users to drill into branch, product, and customer-level data with ease.

The dashboard enables:

- Real-time access to sales performance and key business metrics
- In-depth comparisons across branches, customer segments, and product lines
- Time-series analysis of sales and operational trends
- Customer demographic and satisfaction analysis
- Revenue and operational insight segmentation by payment method, time, and geography

Dashboard Goals:

- Unify all key sales data and performance metrics into one interactive platform
- Enable branch and product line comparisons to identify top and underperformers
- Visualize operational trends such as tax impact, feedback, and quantity sold
- Analyze customer behavior across gender, membership status, and ratings
- Drive smarter decisions through intuitive filters, drill-downs, and tooltips

POWER BI DEVELOPEMNT PROCESS

1. Data Understanding & Cleansing:

The initial step involved understanding the structure, completeness, and quality of the raw transactional data. The data source was a CSV file containing over 1,000 rows of supermarket sales records, with fields such as Invoice ID, Product Line, Gender, Branch, Date, Time, Payment Method, Quantity, Unit Price, and Rating.

Using **Power Query Editor**, the following transformations were applied:

- Standardization of Date & Time:
    - Converted Date and Time fields into appropriate formats
    - Extracted Hour, Weekday, and Month for advanced temporal analysis
- Data Cleaning
    - Removed duplicates and nulls
    - Verified consistency in categorical fields such as Branch, City, Payment Method, and Product Line

2. DAX Measures:

To unlock the full analytical capabilities of the dashboard, a set of custom DAX (Data Analysis Expressions) measures were developed. These measures formed the backbone of all KPIs and interactive visuals:

1. Financial Metrics:-
    - Total Sales = Unit Price * Quantity
    - Gross Income = Total * 5% (Tax)
    - Profit = Total - Cost (where applicable)
    - Margin % = Gross Income / Total

2. Customer Metrics:-
    - Avg Rating = AVERAGE(Rating)
    - Avg Quantity = AVERAGE(Quantity)
    - High Rating Count = COUNT(Rating > 8)

3. Operational Metrics:-
    - Avg Transaction Total = AVERAGE(Total)
    - Total Revenue by Payment = SUM(Total) GROUP BY Payment Method
    - High Rating Count = COUNT(Rating > 8)

These DAX measures enabled flexible slicing, dicing, and deep-drill analytics across all visuals.

3. Multi-Page Report Design:

The report was designed with a focus on usability, aesthetics, and executive-level storytelling. Each page followed a 16:9 layout optimized for widescreen presentations and dashboards.

Key design features included:

- Consistent UI/UX Layout:
    - Uniform placement of slicers (Branch, Product Line, Date, etc.)
    - Matching color palette and theme across all visuals
- Page-by-Page Modular Insights:
    - Separate pages for Sales Overview, Trends, Product Analysis, Customer Behavior, Payments, and Operational KPIs
    - Logical flow from high-level summaries to detailed analytics
- Interactivity:
    - Drill-through pages (e.g., right-click on a branch to explore its specific data)
    - Dynamic tooltips that display contextual KPIs on hover

REPORT STRUCTURE AND KEY INSIGHTS

Page 1: Sales Overview

- Showcases KPIs like Total Sales, Gross Income, Profit, and Margin %
- Donut and bar charts reveal gender-based and branch-wise performance
- Product line contributions to revenue are visualized through bar charts

Insight: Branch C and the "Food & Beverages" category are top revenue contributors.

Page 2: Sales Trends & Peak Times

- Line charts illustrate day-to-day and month-over-month revenue growth
- Area charts and heatmaps highlight time-of-day and weekday traffic peaks

Insight: Saturdays between 1–4 PM consistently showed the highest sales volume.

Page 3: Product Line Analysis

- Combines clustered charts and combo visuals for Avg Unit Price vs Quantity
- Margin % and Avg Rating allow profitability vs customer satisfaction comparison

Insight: "Health & Beauty" had the highest margins, while "Electronic Accessories" led in volume.

Page 4: Customer Demographics

- Slicer-controlled comparison between Member and Normal customer behavior
- Visuals highlight purchase patterns, satisfaction (rating), and gender breakdowns

Insight: Members made higher average purchases and rated experiences better.

Page 5: Payment Insights

- Donut chart for payment method popularity
- Clustered columns for Avg Revenue per Method
- Stacked bars for payment preference by branch

Insight: E-wallets dominated in usage, particularly in Branch B, indicating tech-savvy customers.

Page 6: Operational Insights

- Column charts for Tax vs Unit Price impact by Product Line
- Matrix for feedback insights, and bar charts for high-rating feedback by branch

Insight: Branch A had the highest number of customer ratings above 8; Tax constituted ~5% of all final prices.

RESULTS AND FINDINGS

The dashboard demonstrated excellent technical performance across all user scenarios. Each section of the report uncovered actionable insights for the client's operational and strategic planning:

1. **Sales Overview:** Branch C outperformed other locations in both revenue and gross income. The "Food & Beverages" product line was the leading revenue contributor across branches.
2. **Sales Trends:** Line and area charts showed that the highest sales volume occurred during weekends, particularly between 1 PM and 3 PM. This insight supports informed staffing and promotional decisions.
3. **Product Line Analysis:** The "Health & Beauty" segment had the highest average unit price and margin percentage, suggesting a focus opportunity for premium targeting. Conversely, "Electronic Accessories" had high volume but lower margins.
4. **Customer Demographics:** Members consistently spent more and provided higher ratings, making them the most valuable customer segment. Gender-based analysis showed near-equal sales contributions, confirming a balanced marketing approach.
5. **Payment Insights:** E-wallet emerged as the most popular payment method, especially in Branch B, where tech adoption appeared higher. This suggests a push for digital payment promotions in other branches.
6. **Operational Insights:** Branch A recorded the highest frequency of high-rating feedback (ratings > 8), indicating superior customer service and potential for internal benchmarking. Tax analysis revealed a 5% addition to total pricing, offering clarity on net vs gross pricing strategy.

Based on the visual analytics, several strategic insights were revealed:

1. Members are high-value customers: They spend more and rate their experiences higher, suggesting that expanding loyalty programs could significantly boost revenue.
2. Customer feedback can guide branch performance: Branch-level rating data revealed quality disparities, enabling focused improvements in staff training and customer service.

3. Digital payments are on the rise: The popularity of E-wallets indicates a customer shift toward cashless transactions. Promoting these options in underperforming areas could improve efficiency and satisfaction.
4. Time-based behavior drives operational decisions: Understanding peak hours enables optimized staffing, better queue management, and timed discount campaigns.
5. Product strategy should prioritize profitability over volume: While some products sell more, others like “Health & Beauty” offer higher margins and satisfaction—ideal for upselling and promotions. Findings and Insights
6. Members VS Normal Customers: Members provide higher value than normal customers in both revenue and satisfaction.
7. Branch-level rating feedback can be used to improve training and operations.
8. Electronic payments are increasing and should be promoted where usage is low.
9. Time-based insights support smarter staffing and promotion strategies.
10. Health & Beauty offers strong margin opportunities despite moderate sales volume.

RECOMMENDATIONS

1. Promote high-margin product lines with targeted campaigns.
2. Shift staffing based on identified peak hours using the heatmap.
3. Expand membership program incentives to drive loyalty and higher spending.
4. Promote preferred payment methods (E-wallets) across underperforming branches.
5. Leverage branch-level rating data for employee recognition and training focus.
6. Promote high-margin product lines with targeted campaigns.
7. Shift staffing based on identified peak hours using the heatmap.
8. Expand membership program incentives to drive loyalty and higher spending.
9. Promote preferred payment methods (E-wallets) across underperforming branches.
10. Leverage branch-level rating data for employee recognition and training focus.

CONCLUSION

The Supermarket Sales Performance Dashboard developed using Power BI has proven to be an invaluable tool in helping the client turn raw transactional data into meaningful and actionable insights. Through an intuitive interface, modular design, and advanced interactivity, the dashboard has transformed the client's approach to performance monitoring, strategic planning, and daily operations.

The solution bridges the gap between data availability and business intelligence. Managers and decision-makers now have access to real-time metrics that enable them to:

- Evaluate branch-level performance across multiple KPIs such as sales, gross income, transaction size, and customer feedback
- Identify top- and under-performing product lines by profitability and customer satisfaction
- Analyze customer behavior by segmenting data through gender, membership type, and time of purchase
- Understand operational patterns including peak hours, tax impacts, and payment preferences

The centralized platform eliminates the need for manual reporting and fragmented spreadsheets, allowing staff at all levels to confidently base their decisions on accurate, up-to-date information. By empowering business leaders with visual, drill-down capabilities, the dashboard serves as both an analytical and decision-support system.

As the client continues to grow, this dashboard can be expanded to integrate live POS data feeds, introduce predictive analytics for forecasting, and offer automated alerts for threshold breaches (e.g., low sales, declining ratings). With continued use and data refreshes, the solution will evolve from a historical analysis tool into a real-time strategic intelligence ecosystem.

In summary, this project showcases how the thoughtful application of business intelligence tools can elevate operational efficiency, enhance customer understanding, and foster data-driven culture within a retail organization.

APPENDICES

The appendices section provides additional context and resources used in developing the dashboard, including custom DAX measures, visual types, filter configurations, and techniques that contributed to the interactivity and depth of the insights.

Appendix A:- DAX Measures

These custom measures were developed to power dynamic KPIs and visuals across pages:

```
Financial Metrics

Total Sales = SUM('Sales'[Total])

Gross Income = SUM('Sales'[gross income])

Profit = [Total Sales] - [Gross Income]

Margin % = DIVIDE([Gross Income], [Total Sales], 0)


Customer Metrics

Avg Rating = AVERAGE('Sales'[Rating])

Avg Quantity = AVERAGE('Sales'[Quantity])

High Rating Count = CALCULATE(COUNTROWS('Sales'), 'Sales'[Rating] > 8)


Operational Metrics

Avg Transaction Total = AVERAGE('Sales'[Total])

Avg Gross Income = AVERAGE('Sales'[gross income])

Revenue by Payment Method = CALCULATE(SUM('Sales'[Total]),
ALLEXCEPT('Sales', 'Sales'[Payment]))


Temporal Aggregates

Sales by Hour = CALCULATE([Total Sales], ALLEXCEPT('Sales',
'Sales'[Hour]))

Sales by Weekday = CALCULATE([Total Sales], ALLEXCEPT('Sales',
'Sales'[Weekday]))

Sales by Month = CALCULATE([Total Sales], ALLEXCEPT('Sales',
'Sales'[Month]))


Product Performance

Avg Unit Price = AVERAGE('Sales'[Unit price])

Avg Unit Price by Product = CALCULATE([Avg Unit Price],
ALLEXCEPT('Sales', 'Sales'[Product Line]))
```

Appendix B:- Visual Types Used

The following Power BI visuals were used to display and explore the data effectively:

- KPI Cards – Key financial and operational values
- Line Charts – Sales trends over time
- Area Charts – Cumulative and peak hour visualization
- Donut & Pie Charts – Customer breakdowns (e.g., gender, customer type)
- Stacked and Clustered Bar Charts – Payment types, branch comparisons, and product line sales
- Matrix (Heatmap) – Day vs Hour sales and ratings
- Combo Charts – For comparing avg price vs quantity
- Tables – Summary values per branch or customer group.

Appendix C:- Filters and Slicers

Filters and slicers enhanced report interactivity:

- Branch – Compare KPIs and sales by location
- Product Line – Understand profitability by product category
- Customer Type – Analyze behavior of Members vs Normal customers
- Gender – Breakdown performance by demographic
- Payment Method – Isolate trends by transaction type
- Date, Weekday, Month, Hour – For time-based exploration

Appendix D:- Report Navigation & Layout

The dashboard followed a structured 16:9 widescreen layout. Each page was clearly labeled and included:

- Page Titles & Descriptions
- Navigation Buttons for page switching
- Drill-Through Filters for deep-dive analysis
- Slicers arranged for intuitive filtering