Strategic Product Placement Analysis: Unveiling Sales Impact with Tableau Visualization

Project Report

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Team Size: 4

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1. INTRODUCTION

1.1 Project Overview

Product Placement Analysis is a data analytics project developed to understand how product placement in supermarkets affects sales volume. The project uses a retail dataset containing product categories, store placement positions, consumer demographics, foot traffic, competitor pricing, seasonal demand, and promotions.

The main goal of this project is to generate meaningful insights through interactive Tableau dashboards and stories, which can help supermarket managers make better decisions for placing products in the right store positions to maximize sales.

The Tableau dashboard and story are published in Tableau Public and integrated into a Flask-based web application for easy access.

1.2 Purpose

The purpose of this project is:

- **To analyze the effect of product placement on sales volume.**

- **To identify which product category generates the highest sales.**
- **To study which store location (Aisle, End-cap, Front of Store) gives maximum sales.**
- **To analyze customer demographics and foot traffic impact on sales.**
- **To compare competitor price vs actual product price.**
- **To provide an interactive dashboard and story for visualization-based decision making.**

2. IDEATION PHASE

2.1 Problem Statement

Supermarkets face high competition, and product placement plays a key role in increasing sales. However, deciding where to place products (Aisle, End-cap, Front of Store) is challenging because sales are influenced by multiple factors like foot traffic, promotions, consumer demographics, competitor pricing, and seasonal demand.

Manual analysis is inefficient and does not provide clear insights. Therefore, a visualization-driven system is needed to analyze product placement and help in better decision-making.

2.2 Empathy Map Canvas

User: Supermarket Manager / Retail Analyst

- **Says:**
  "We need to increase sales and customer engagement."
  "Which product category should be placed at the front?"
  "Promotions are not giving expected results."
- **Thinks:**
  "If I place products incorrectly, sales will reduce."
  "I need clear data to make placement decisions."
  "Foot traffic and demographics might affect sales."
- **Does:**
  Checks sales reports

Experiments with placement
Uses promotions and discounts
Observes customer behavior

- **Feels:**
  Confused due to multiple factors affecting sales
  Needs confidence in decision making
  Wants faster analysis and clear insights

2.3 Brainstorming

During brainstorming, the following ideas were discussed:

- **Compare sales volume across product categories.**
- **Analyze impact of product position on sales.**
- **Identify which foot traffic level generates more sales.**
- **Study consumer demographic contribution to sales.**
- **Compare product price with competitor price.**
- **Analyze promotional impact on sales and pricing.**
- **Analyze seasonal demand influence.**
- **Build Tableau dashboard and story to summarize insights.**

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

Step 1: Manager collects sales and product placement data
Step 2: Manager wants to analyze which product category performs best
Step 3: Manager checks which store position provides high sales
Step 4: Manager evaluates demographics and foot traffic impact
Step 5: Manager studies promotion and seasonal sales
Step 6: Manager uses dashboard insights to redesign store layout
Step 7: Improved placement increases customer engagement and sales

3.2 Solution Requirement

The system should:

- **Import dataset into Tableau.**
- **Create charts for sales volume, product placement, and pricing.**
- **Provide interactive filters for category, position, and demographics.**
- **Generate a dashboard containing all key insights.**
- **Create a Tableau story to explain the results step-by-step.**
- **Publish dashboard and story in Tableau Public.**
- **Embed published links into a Flask web application.**

3.3 Data Flow Diagram

Data Flow Explanation:

1. **Dataset is collected from Kaggle**
2. **Dataset is loaded into Tableau Desktop**
3. **Tableau generates visualizations (charts, graphs, tables)**
4. **Dashboard and story are created**
5. **Workbook is published to Tableau Public**
6. **Tableau Public provides embed code**
7. **Flask application embeds dashboard and story**
8. **End user accesses dashboard via web browser**

3.4 Technology Stack

- **Frontend: HTML, CSS**
- **Backend: Python Flask**
- **Visualization Tool: Tableau Desktop**
- **Publishing Platform: Tableau Public**
- **Dataset Source: Kaggle**
- **Browser: Chrome / Edge**

4. PROJECT DESIGN

4.1 Problem Solution Fit

The problem requires quick and accurate analysis of product placement impact on sales. Tableau dashboards and stories provide an interactive way to visualize the dataset and identify sales patterns. The dashboard allows managers to filter and analyze the data easily. Hence, the solution is a perfect fit for retail analytics and decision making.

4.2 Proposed Solution

The proposed solution is an interactive data visualization system that:

- **Displays sales volume performance by product category.**
- **Shows product position vs sales volume analysis.**
- **Visualizes demographics and foot traffic impact.**
- **Compares competitor price and actual product price.**
- **Analyzes promotion and seasonal sales impact.**
- **Provides an integrated dashboard and story for easy understanding.**
- **Allows users to access dashboard and story via Flask web application.**

4.3 Solution Architecture

Architecture Flow:

- **Dataset → Tableau Desktop → Dashboard & Story → Tableau Public**
- **Tableau Public Embed Code → Flask Application → Web Browser Output**

This architecture allows easy publishing, sharing, and deployment of Tableau visualizations.

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

The project was completed in the following phases:

- **Phase 1: Dataset Collection and Understanding**
- **Phase 2: Data Import and Cleaning in Tableau**
- **Phase 3: Visualization Creation (Sheets)**
- **Phase 4: Dashboard Building**
- **Phase 5: Story Creation**
- **Phase 6: Publishing to Tableau Public**
- **Phase 7: Flask Integration**
- **Phase 8: Testing and Documentation**

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Performance testing was done to ensure smooth execution of Tableau dashboard and story inside the Flask web application.

Testing Parameters:

- **Dashboard loading speed**
- **Filter response time**
- **Story navigation performance**
- **Browser compatibility**

Results:

- **Dashboard loads successfully within a few seconds.**
- **Filters work properly without delay.**
- **Story points navigation is smooth.**
- **Output works in Chrome and Edge browsers.**

7. RESULTS

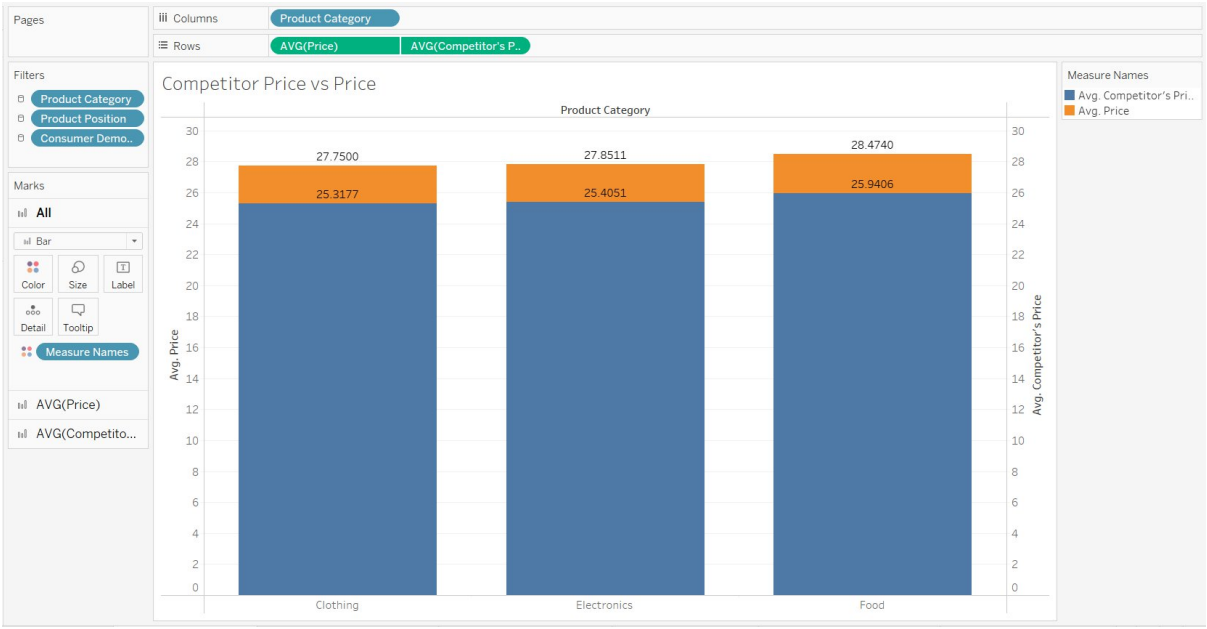
7.1 Output Screenshots

Sheet 1: Avg Sales Volume vs Product Category

- Bar chart showing average sales volume across product categories.

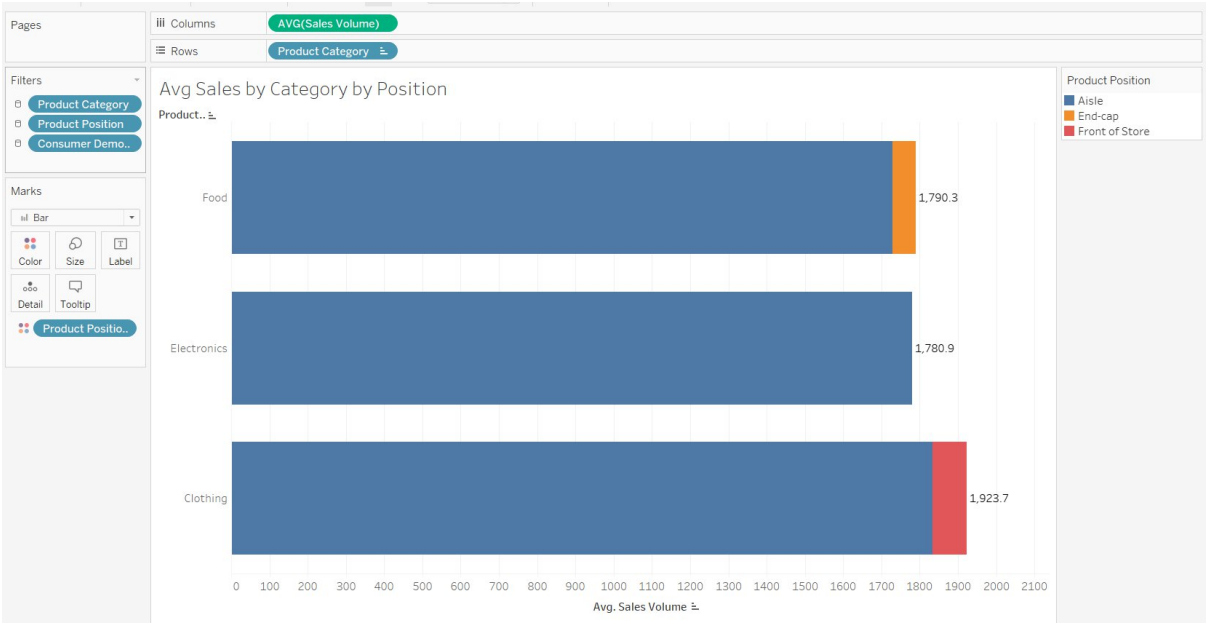
Sheet 2: Competitor Price vs Price

- Comparison between average product price and competitor's price.



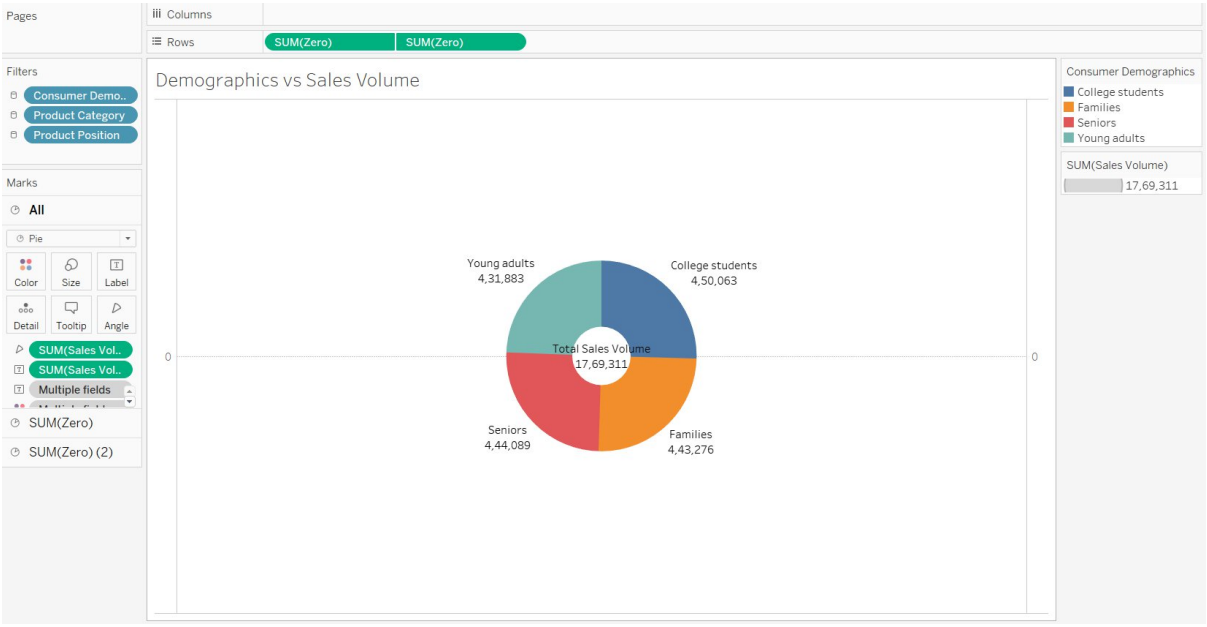
Sheet 3: Avg Sales by Category by Position

- Shows average sales volume for each product category based on placement position.



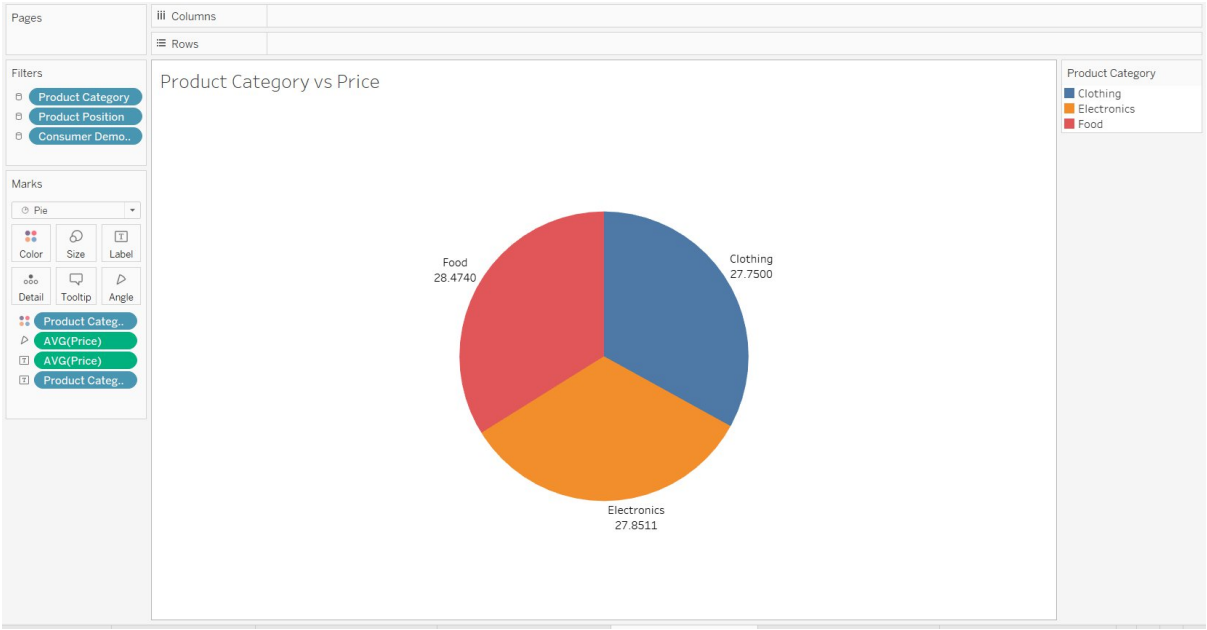
Sheet 4: Demographics vs Sales Volume

- Donut chart representing sales volume contribution from different consumer demographic groups.



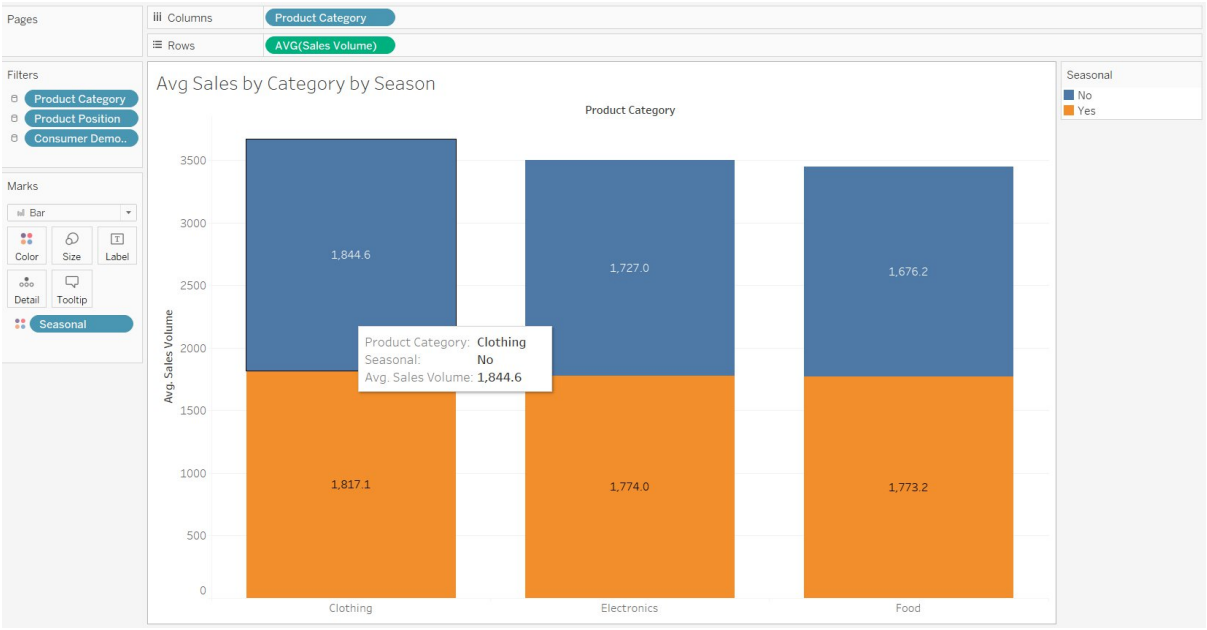
Sheet 5: Product Category vs Price

- Pie chart showing average product price distribution across categories.



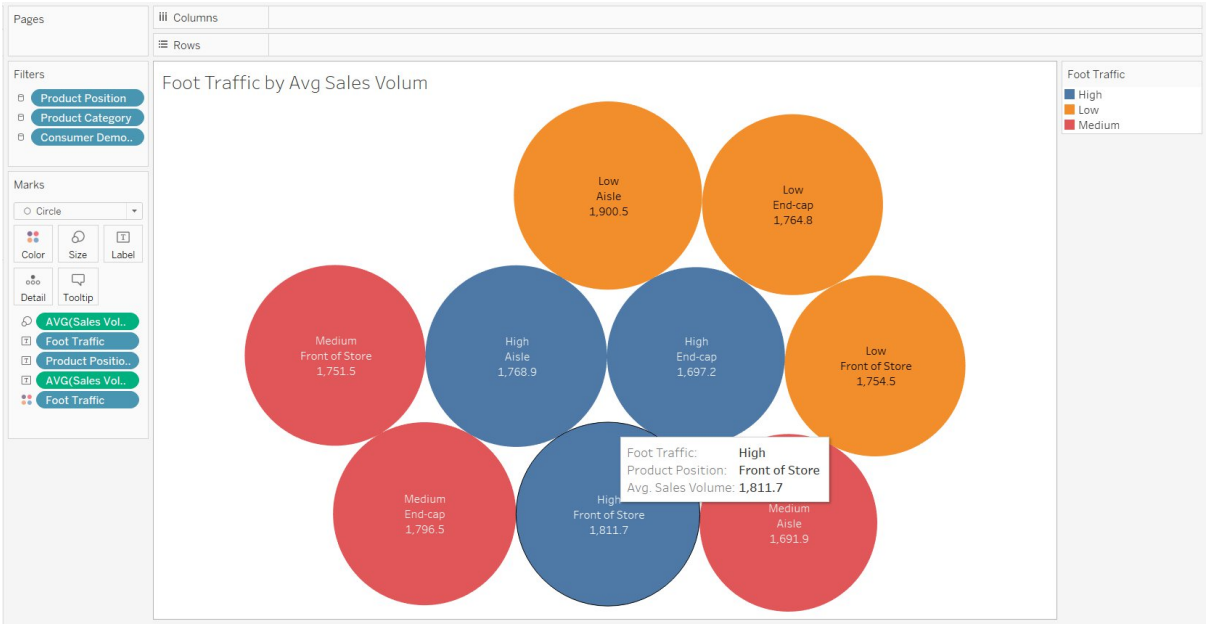
Sheet 6: Avg Sales by Category by Season

- Stacked bar chart showing sales comparison for seasonal vs non-seasonal products.



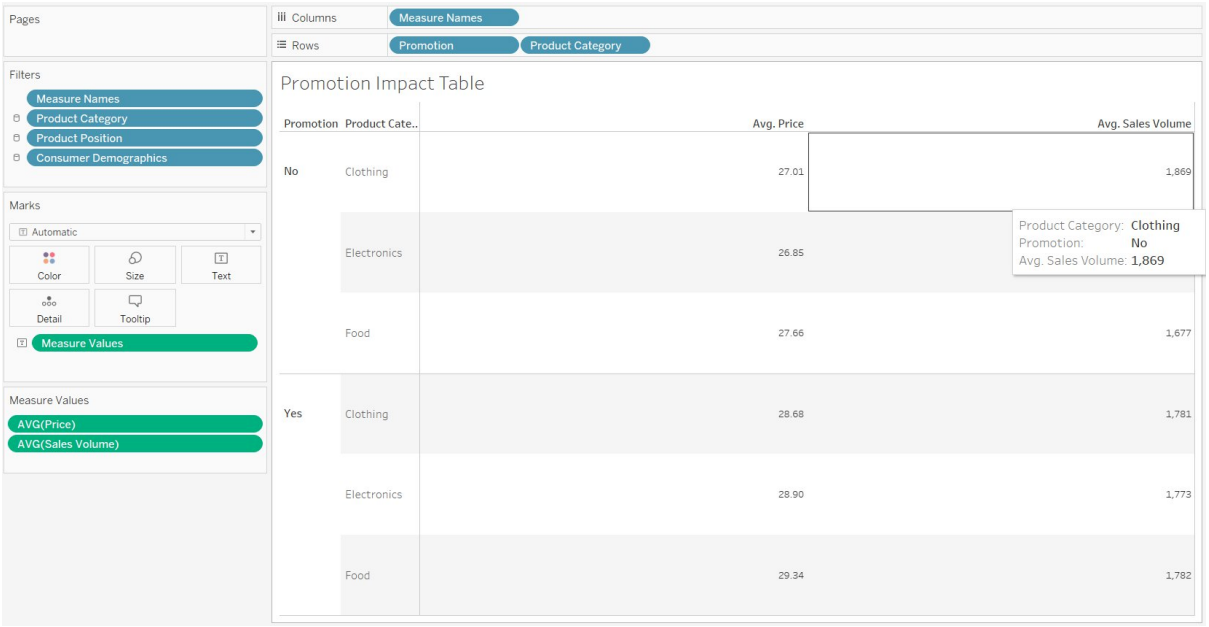
Sheet 7: Foot Traffic by Avg Sales Volume

- Bubble chart showing how foot traffic impacts sales volume for different positions.



Sheet 8: Promotion Impact Table

- Text table showing average price and sales volume for promotion vs no promotion.



Dashboard Description

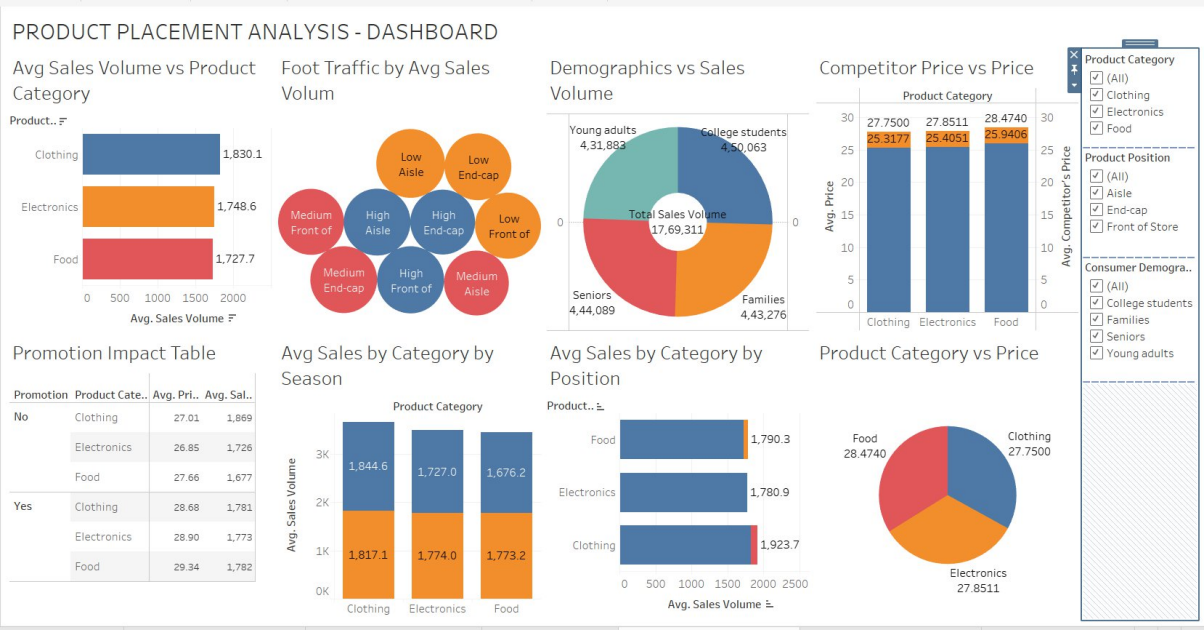
A dashboard titled **“Product Placement Analysis Dashboard”** was created by combining all the sheets. The dashboard provides a complete overview of:

- category performance,

- placement impact,
- seasonal sales,
- demographic contribution,
- competitor pricing, and
- promotional impact.

Interactive filters were added for:

- Product Category
- Product Position
- Consumer Demographics



Story Description

A Tableau Story titled **“Product Placement Analysis Story”** was created with multiple story points to explain insights step-by-step. The story helps understand:

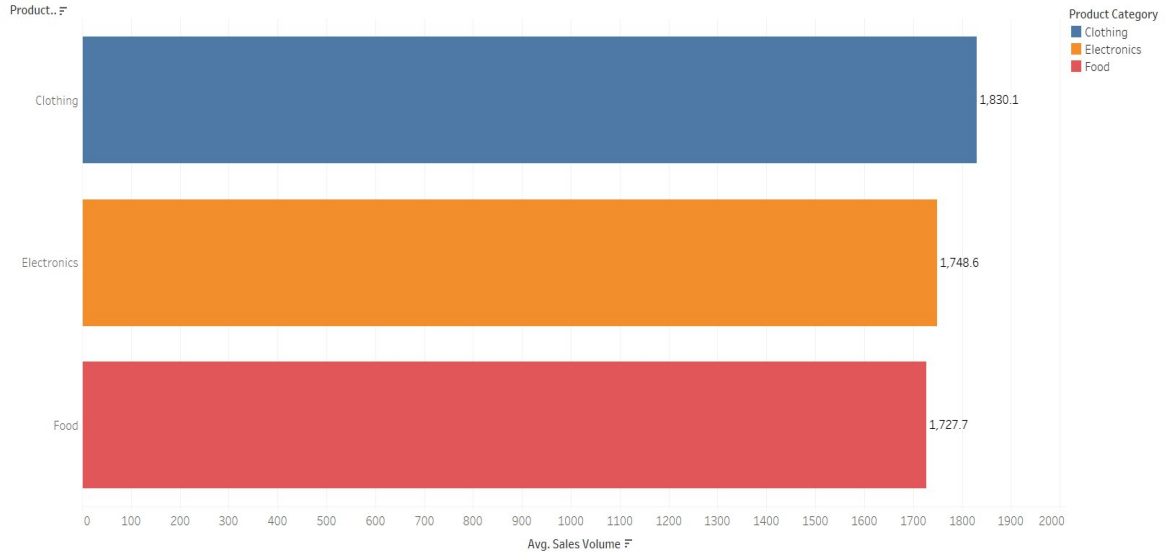
- which category performs best,
- which position is most effective,
- which placement strategy gives maximum sales.

PRODUCT PLACEMENT ANALYSIS - STORY

The Product Category Clothing has highest Average sales volume.

The Product position at the Front of store has high sales volume and high foot traffic.

The Product Category clothing at front of store has highest avg sales volume.



PRODUCT PLACEMENT ANALYSIS - STORY

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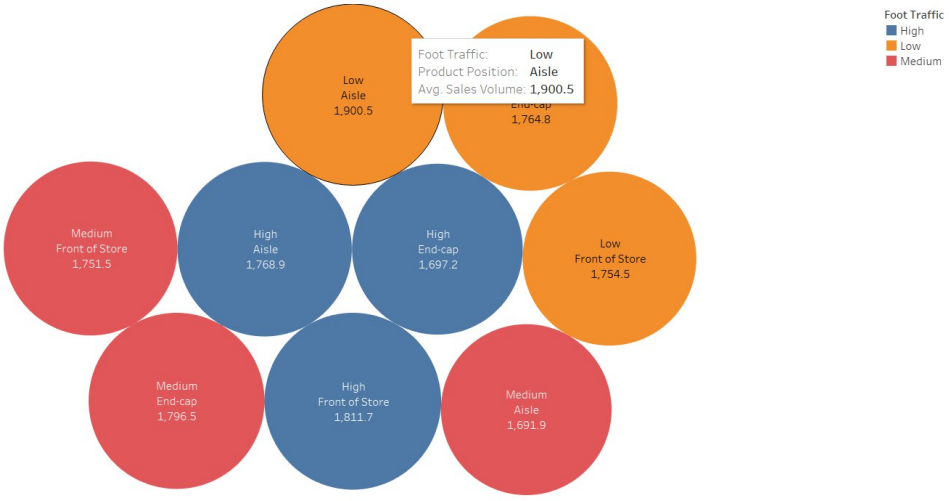
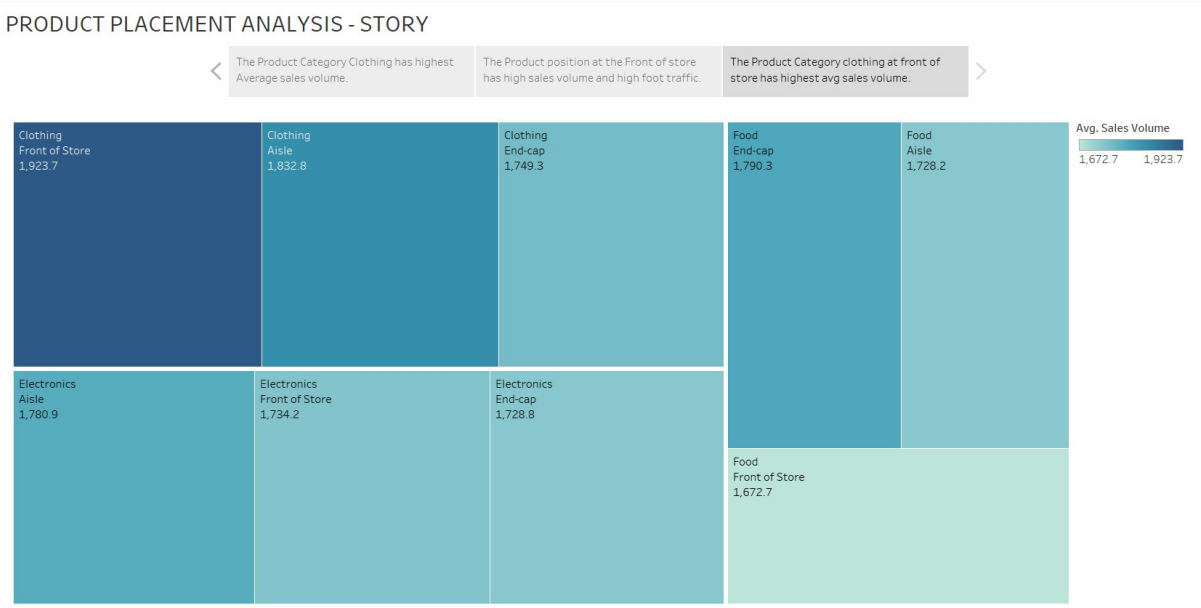


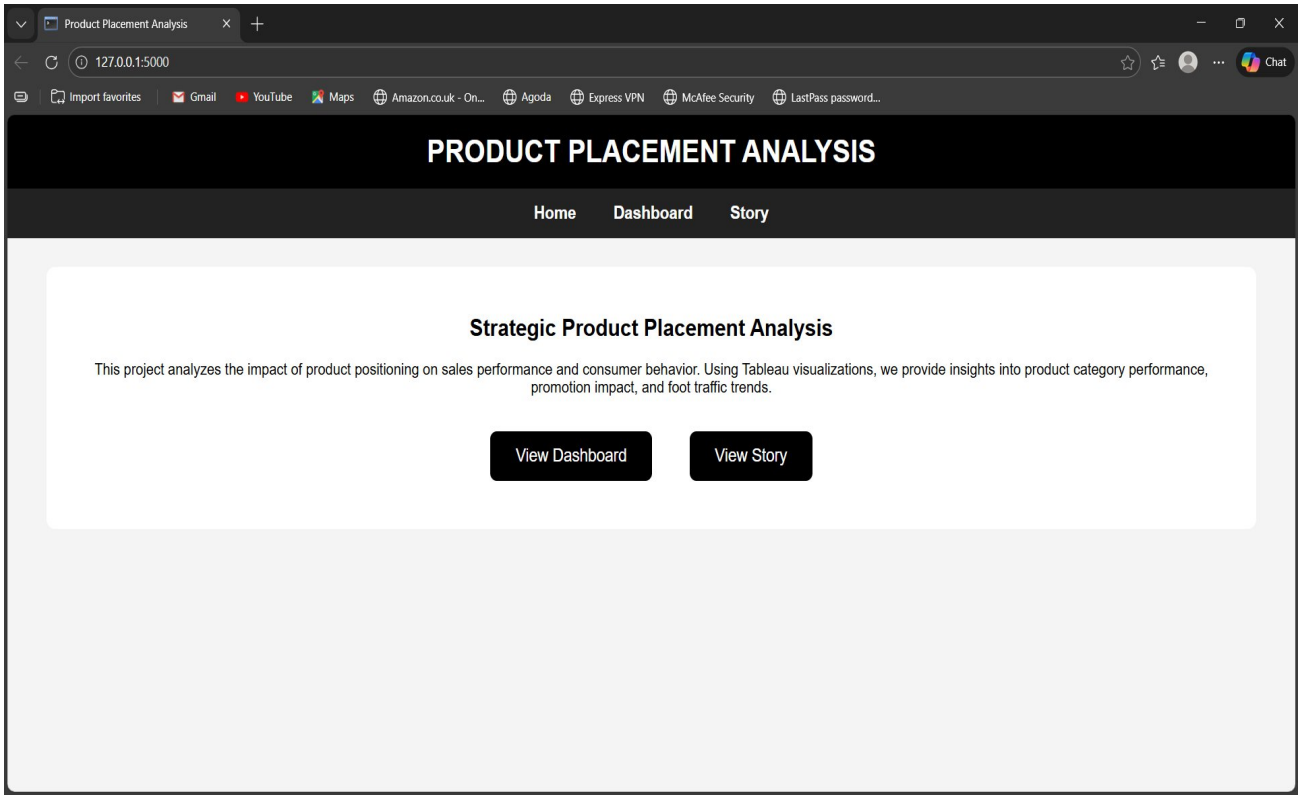


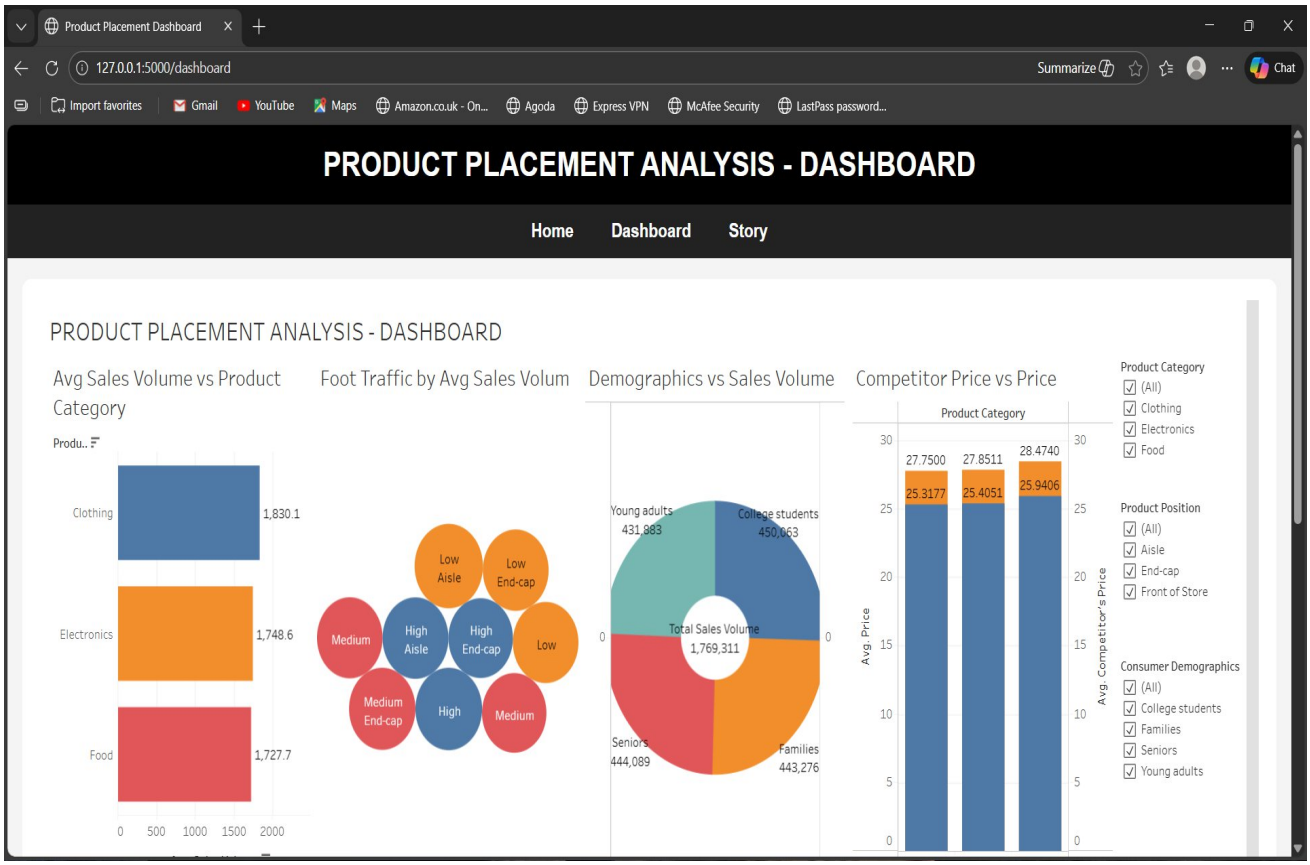
. Deployment

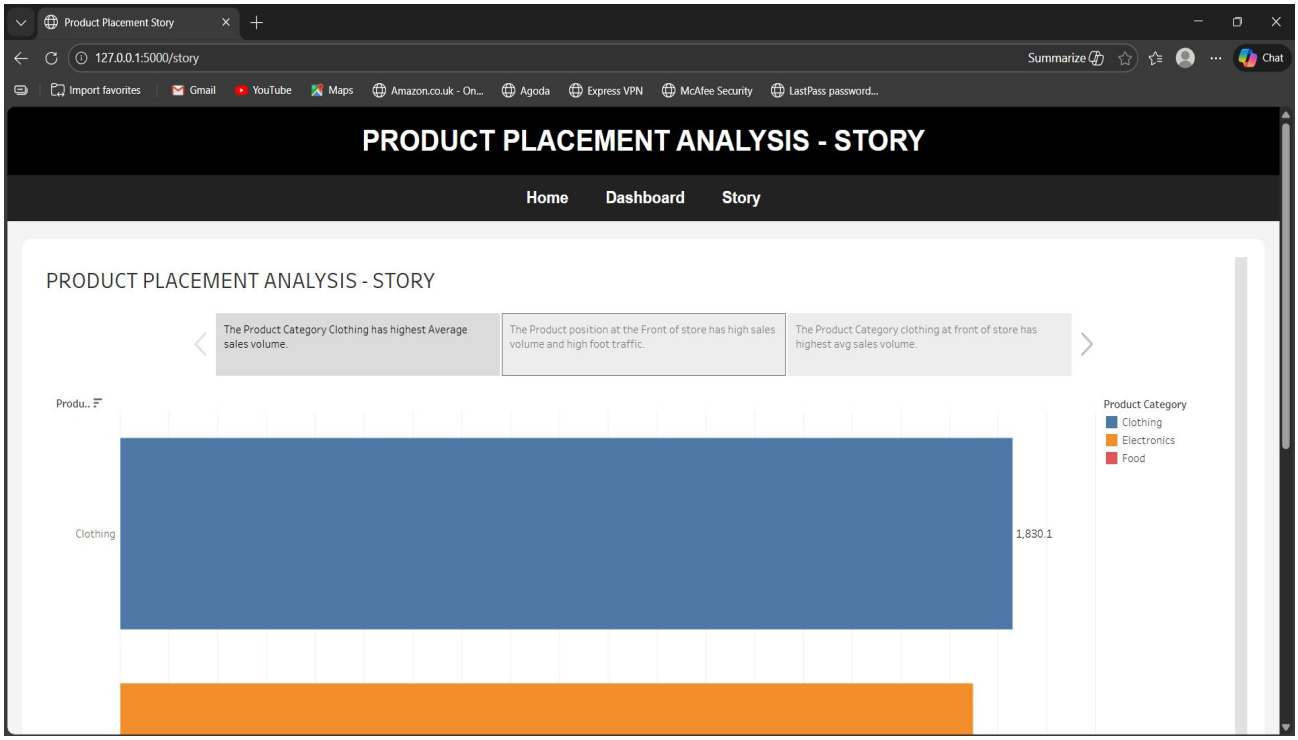
The Tableau dashboard and story were published on Tableau Public. They were embedded into a Flask web application to display the analysis through a browser.

The Flask app provides navigation pages:

- Dashboard Page
- Story Page


Product Placement Analysis
127.0.0.1:5000
Import favorites
Gmail
YouTube
Maps
Amazon.co.uk - On...
Agoda
Express VPN
McAfee Security
LastPass password...
Chat
PRODUCT PLACEMENT ANALYSIS
Home
Dashboard
Story
Strategic Product Placement Analysis
This project analyzes the impact of product positioning on sales performance and consumer behavior. Using Tableau visualizations, we provide insights into product category performance, promotion impact, and foot traffic trends.
View Dashboard
View Story


Product Placement Dashboard
127.0.0.1:5000/dashboard
Summarize
Chat
Import favorites
Gmail
YouTube
Maps
Amazon.co.uk - On...
Agoda
Express VPN
McAfee Security
LastPass password...
PRODUCT PLACEMENT ANALYSIS - DASHBOARD
Home
Dashboard
Story
PRODUCT PLACEMENT ANALYSIS - DASHBOARD
Avg Sales Volume vs Product Category
Clothing
1,830.1
Electronics
1,748.6
Food
1,727.7
0
500
1000
1500
2000
Foot Traffic by Avg Sales Volum
Low Aisle
Low End-cap
Medium
High Aisle
High End-cap
Low
Medium End-cap
High
Medium
Demographics vs Sales Volume
Young adults 431,883
College students 450,053
Total Sales Volume 1,769,311
Seniors 444,089
Families 443,276
Competitor Price vs Price
Product Category
27.7500
27.8511
28.4740
25.3177
25.4051
25.9406
Avg. Price
Avg. Competitor's Price
Product Category
(All)
Clothing
Electronics
Food
Product Position
(All)
Aisle
End-cap
Front of Store
Consumer Demographics
(All)
College students
Families
Seniors
Young adults



8. ADVANTAGES & DISADVANTAGES

Advantages

- **Provides interactive dashboard for quick analysis.**
- **Helps retailers identify best product placement strategy.**
- **Filters make analysis user-friendly.**
- **Saves time compared to manual analysis.**
- **Easy to share and access through Tableau Public.**
- **Flask integration makes the dashboard accessible as a web application.**

Disadvantages

- **Tableau Public requires internet connection.**
- **Free Tableau Public may show limitations for private datasets.**
- **Large datasets may increase dashboard loading time.**
- **Tableau dashboard cannot directly perform predictive analytics without additional tools.**

9. CONCLUSION

The Product Placement Analysis project successfully demonstrates how product category, placement position, consumer demographics, foot traffic, competitor pricing, promotions, and seasonal demand influence sales volume. Tableau dashboard and story provide meaningful insights in an interactive manner.

This project helps supermarket managers make data-driven decisions and optimize product placement to improve sales performance and customer engagement.

10. FUTURE SCOPE

The project can be enhanced further by:

- **Adding real-time dataset integration.**
- **Applying Machine Learning models to predict future sales.**
- **Building a recommendation system for optimal product placement.**
- **Creating mobile-friendly dashboard access.**
- **Adding more product categories and more store branch data.**
- **Developing a complete retail analytics portal.**

11. APPENDIX

Dataset Link

(https://www.kaggle.com/datasets/amitvkulkarni/impact-of-product-positioning-on-sales)

Tableau Public Dashboard Link

(https://public.tableau.com/views/ProductPlacementAnalysis_17713332821370/PRODUCTPLACEMENTANALYSIS-DASHBOARD?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link)

Tableau Public Story Link

(https://public.tableau.com/views/ProductPlacementAnalysis_17713332821370/PRODUCTPLACEMENTANALYSIS-STORY?:language=en-US&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link)

GitHub Link

(https://github.com/raghu-05/Strategic-Product-Placement-Analysis.git)

Project Demo Link

(https://drive.google.com/file/d/1eHpiqxCTZ5DOxU3hbJVr2cu3D-rCcguX/view)