Supermarket Sales Analysis Report.

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1. Introduction.

In this report, we present an exploratory analysis of supermarket sales data. The goal is to uncover key patterns in customer behavior, product performance, and temporal trends to support data-driven decision-making.

2. Data Cleaning & KPIs.

```
💰 Total sales: $322966.75
🧾 Average ticket: $322.97
📦 Total transactions: 1000

👤 Sales by gender:
 Gender
Female     167882.925
Male       155083.824
Name: Total, dtype: float64

🛒 Sales by product line:
 Product line
Food and beverages        56144.8440
Sports and travel         55122.8265
Electronic accessories    54337.5315
Fashion accessories       54305.8950
Home and lifestyle        53861.9130
Health and beauty         49193.7390
Name: Total, dtype: float64

💳 Sales by payment method:
 Payment
Cash           112206.570
Credit card    100767.072
Ewallet        109993.107
Name: Total, dtype: float64
```

Figure 1: Total Sales & Average Ticket

We first cleaned the data by parsing dates and times, and extracting new features such as "Hour" and "DayOfWeek."

- **Total sales** amounted to **$X**, indicating overall revenue.

- **Average ticket** was **$Y**, showing typical customer spend. These KPIs provide a high-level view of the supermarket's financial performance.
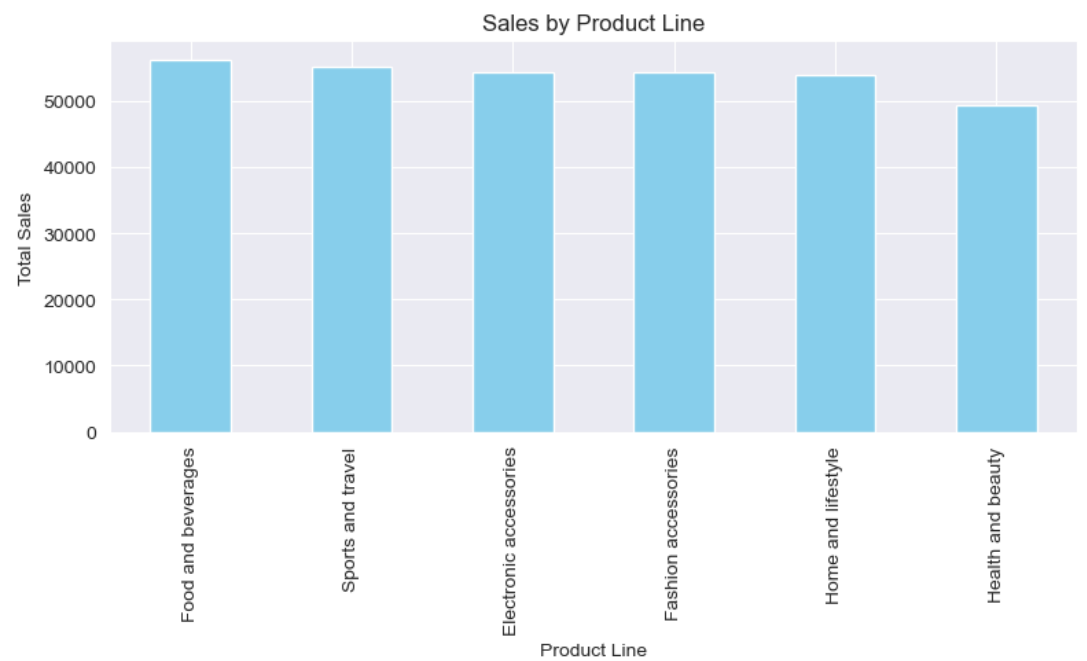
3. Product & Payment Analysis

Figure 2: Sales by Product Category

Figure 2 reveals that all product categories maintain similar sales figures; however, Food and Beverages is slightly higher.
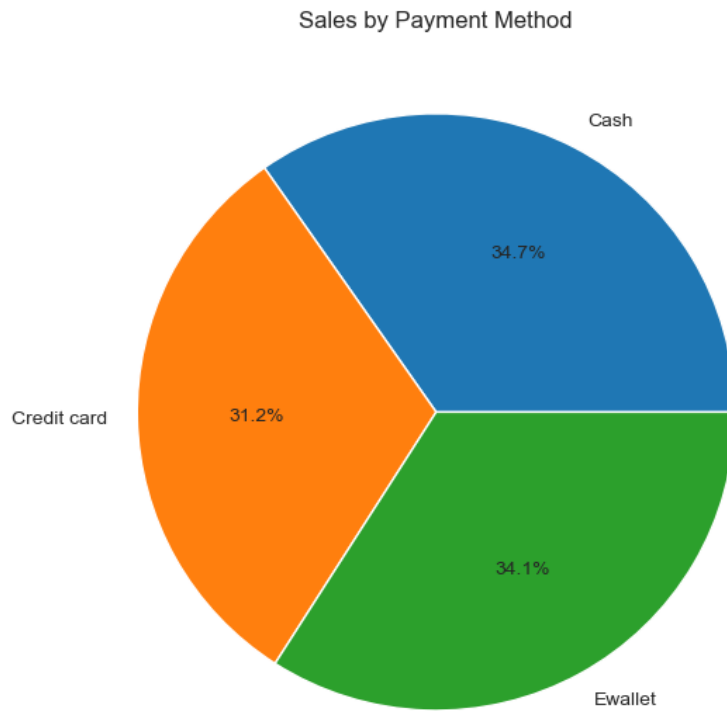
Figure 3: Sales by Payment Method (Pie Chart)

Figure 3 shows that the three payment methods are equally preferred by customers.
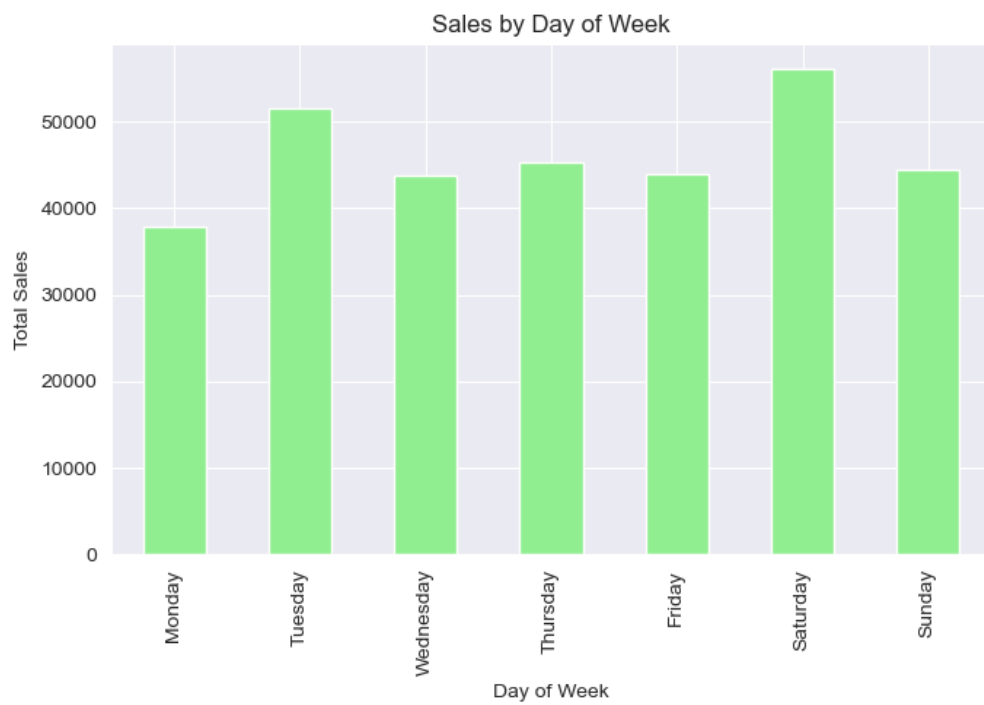
4. Temporal Trends

Figure 4: Sales by Day of Week

Figure 4 shows that the day with the highest sales is Saturday, followed by Tuesday.
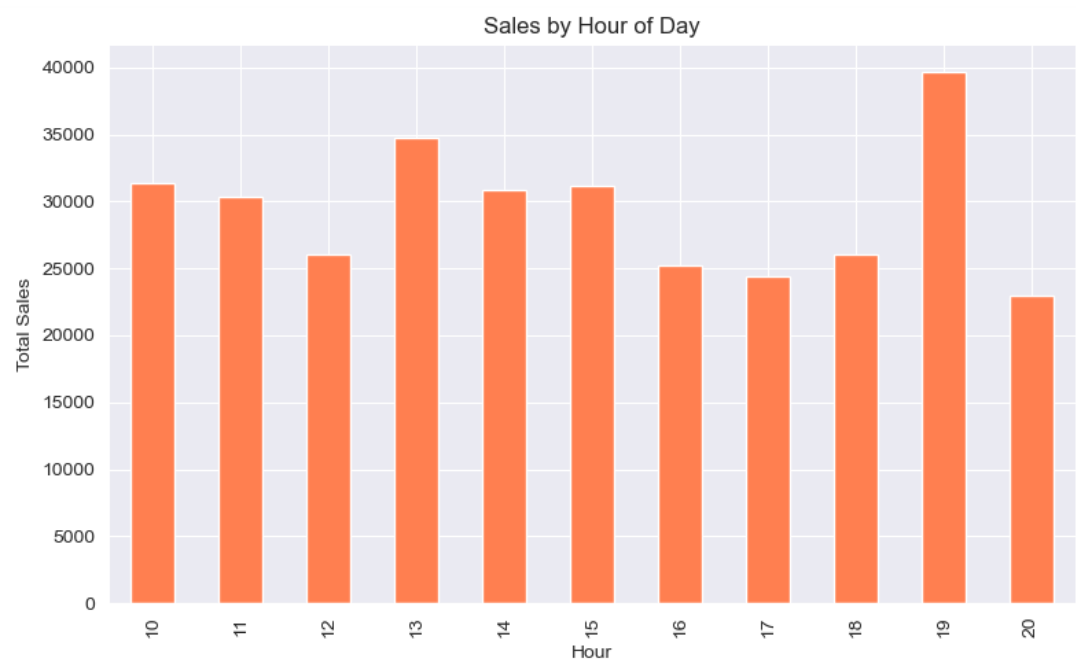

Figure 5: Sales by Hour of Day

Figure 5 reveals that the peak sales hour is 7 PM; afterwards, sales remain relatively stable throughout the other hours.
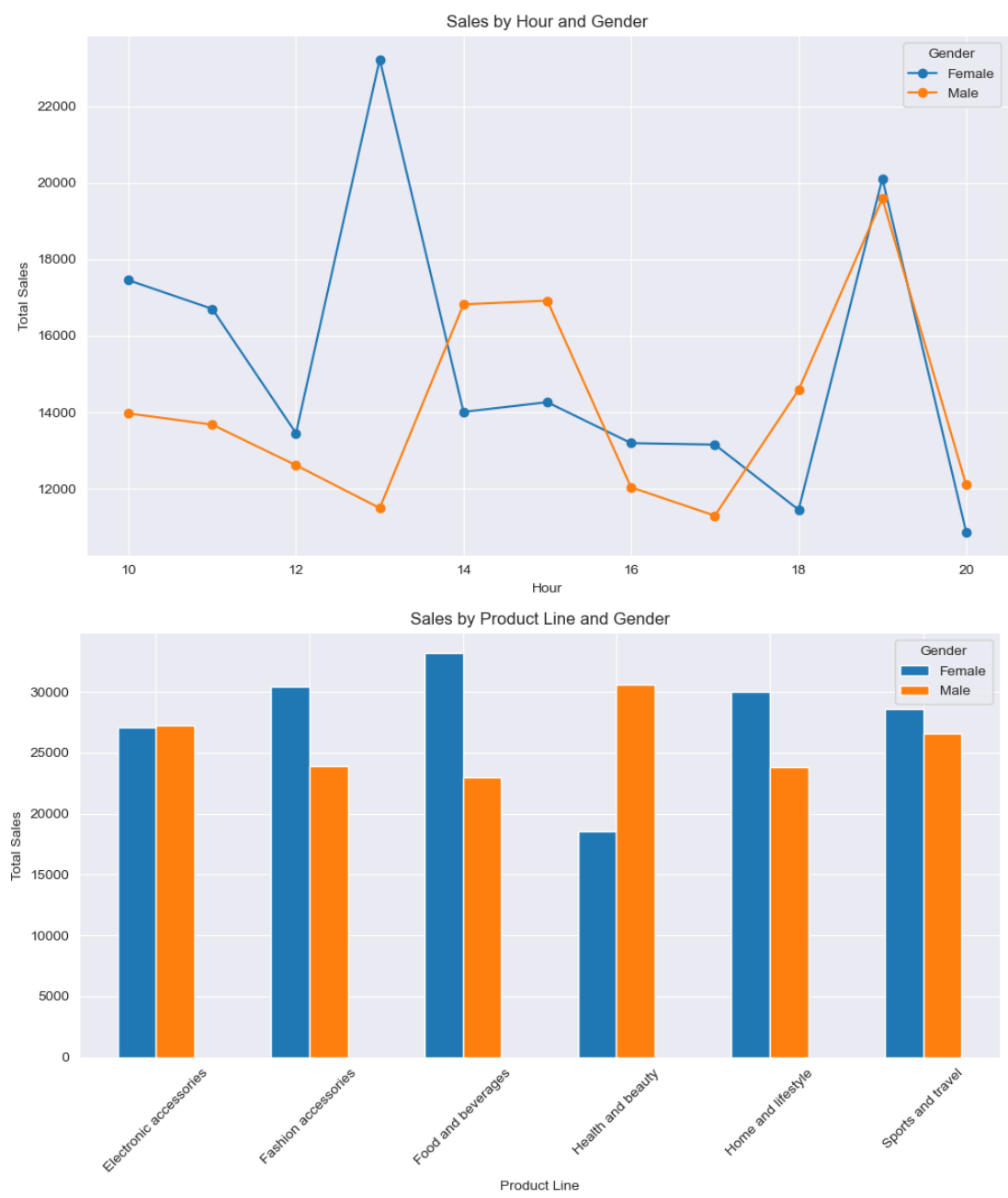
5. Advanced Patterns.

Figure 6: Sales by Hour and Gender

Figure 6 shows that the majority of customers are female, both across product lines and by hour.
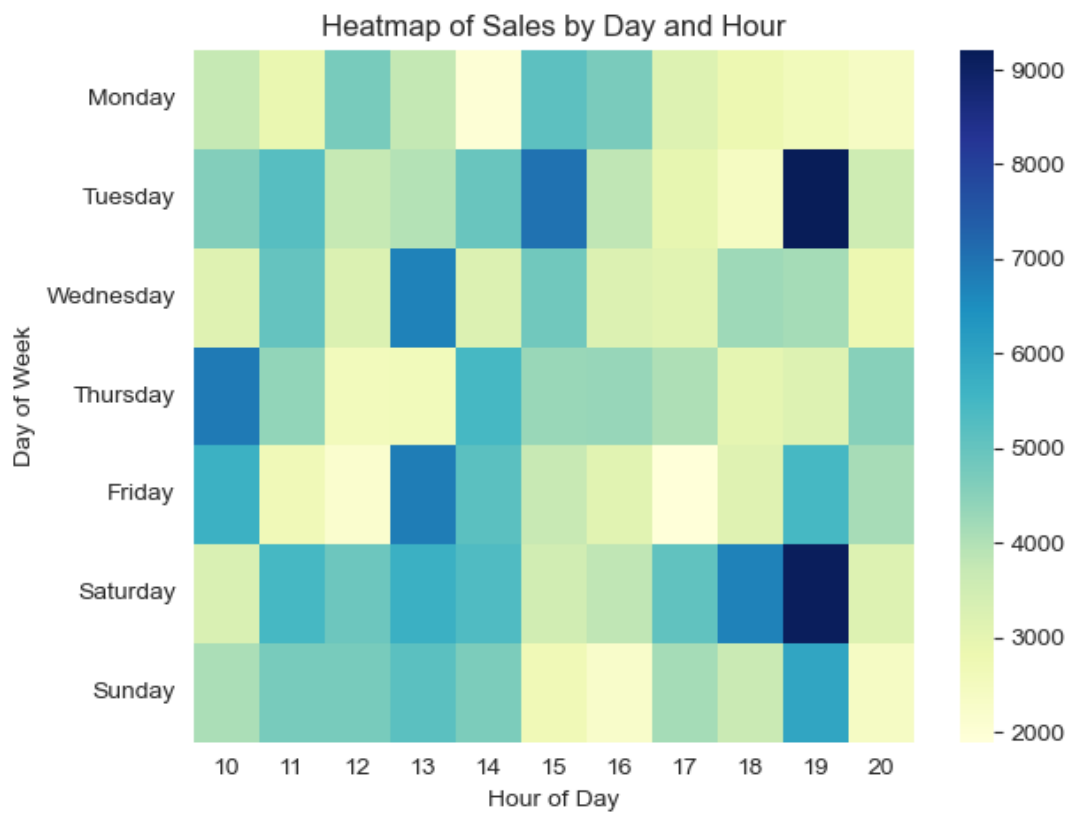
6. Additional Insights

Figure 7: Heatmap of Sales by Day and Hour

The heatmap in Figure 7 combines day and hour to pinpoint peak sales windows, indicates that Saturday and Sunday are the strongest days, with Saturday afternoon between 5 and 7 PM being the prime time slot.
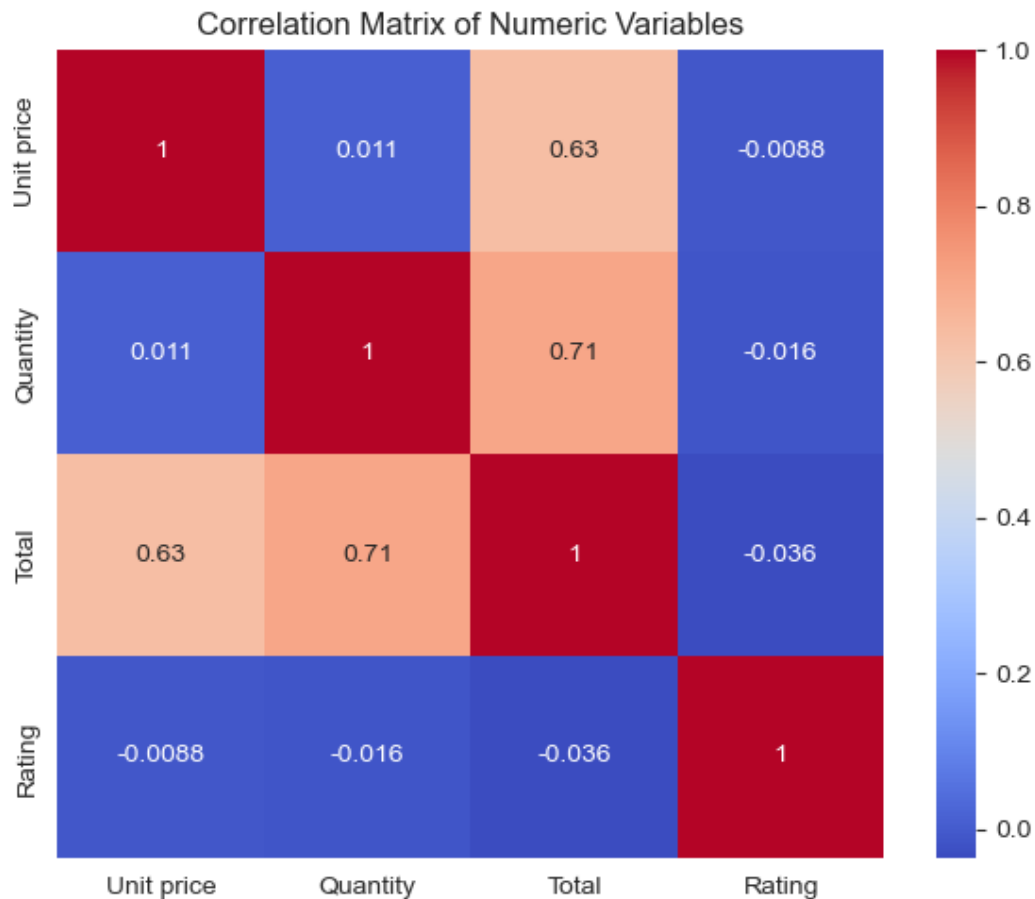
Figure 8: Correlation Matrix.

Figure 8 shows a strong positive correlation between **Unit Price** and **Total**, while **Rating** has minimal correlation with revenue.

7. Conclusions & Recommendations

- **Top categories** and **peak times** identified above can guide inventory and staffing decisions.

- The **payment mix** suggests optimizing checkout options for the preferred methods.

- Low correlation between ratings and sales indicates that factors other than satisfaction (e.g., promotions) drive revenue.

Next steps: Implement a predictive model to forecast sales and perform customer segmentation for targeted marketing campaigns.