

Supermarket Sales Behavior Analysis Report

1. Project Overview

Analysis of 10,000 supermarket transactions to uncover insights into revenue patterns, customer behavior, product performance, and payment trends using Python, SQL, and Power BI.

2. Dataset Summary

- Rows: 10,000
- Columns: 18
- Features: Customer details, product line, unit price, quantity, tax, revenue, payment type, ratings.
- Only 1 missing value in Tax_INR.

3. Exploratory Data Analysis (Python)

Explored demographic patterns, product trends, revenue metrics, payment behavior, and customer ratings.

Data Loading: Imported the dataset using pandas.

- Initial Exploration: Used df.info() to check structure and .describe() for summary statistics.

#	Column	Non-Null Count	Dtype
0	Invoice_ID	10000 non-null	object
1	Date	10000 non-null	object
2	Branch	10000 non-null	object
3	City	10000 non-null	object
4	Customer_Type	10000 non-null	object
5	Gender	10000 non-null	object
6	Product_Line	10000 non-null	object
7	Unit_Price_INR	10000 non-null	float64
8	Quantity	10000 non-null	int64
9	Tax_Rate_pct	10000 non-null	int64
10	Tax_INR	9999 non-null	float64
11	Subtotal_INR	10000 non-null	float64
12	Total_sales_INR	10000 non-null	float64
13	COGS_INR	10000 non-null	float64
14	Gross_Income_INR	10000 non-null	float64
15	Gross_Margin_pct	10000 non-null	float64
16	Payment	10000 non-null	object
17	Rating	10000 non-null	float64

dtypes: float64(8), int64(2), object(8)
memory usage: 1.4+ MB
None

Feature engineering included revenue, gross margin, and date-based fields. Finding total sales

10000 rows x 18 columns]																	
	Invoice_ID	Date	Branch	City	Customer_Type	Gender	...	COGS_INR	Gross_Income_INR	Gross_Margin_pct	Payment	Rating	Unit_Price				
995	INV2024040406253	04-04-2024	B - Delhi	New Delhi	Member	Male	...	1051.79	571.91	35.22	Credit card	7.1	773.19				
996	INV2023051404685	14-05-2023	C - Bengaluru	Bengaluru	Normal	Female	...	111.58	115.78	50.92	Ewallet	5.4	96.34				
997	INV2023122301732	23-12-2023	C - Bengaluru	Bengaluru	Normal	Female	...	2447.86	1459.78	37.36	Credit card	6.3	620.26				
998	INV2025051404743	14-05-2025	A - Mumbai	Mumbai	Normal	Female	...	7052.53	4487.15	38.88	Credit card	9.8	3663.39				
999	INV2023041404522	14-04-2023	A - Mumbai	Mumbai	Normal	Female	...	146539.88	126670.42	46.36	Cash	10.0	46306.83				
995	INV2025091105735	11-09-2025	A - Mumbai	Mumbai	Normal	Female	...	256.49	273.42	51.60	Credit card	10.0	252.34				
996	INV2025051905192	19-05-2025	A - Mumbai	Mumbai	Normal	Male	...	456.57	611.98	57.27	Credit card	8.8	318.02				
997	INV2024110205391	02-11-2024	B - Delhi	New Delhi	Normal	Male	...	412.92	301.59	42.21	Ewallet	10.0	75.69				
998	INV2023010800861	08-01-2023	B - Delhi	New Delhi	Normal	Male	...	561.51	362.18	39.21	Credit card	9.3	103.09				
999	INV2023111307271	13-11-2023	C - Bengaluru	Bengaluru	Normal	Female	...	181.08	123.40	40.53	Credit card	7.7	144.99				

4. SQL Data Analysis

- Revenue by Gender

Result Grid Filter Rows:	
	gender revenue
▶ Male	15555627.179999983
Female	15348562.44999999

- High-Spending Members

Result Grid Filter Rows:	
	product_line average_product_rating
▶ Food	7.83987341772152
Sports	7.793042071197404
Home & Living	7.7920760697305855
Health & Beauty	7.770938897168415
Fashion	7.717797888386122
Electronics	7.710284810126576

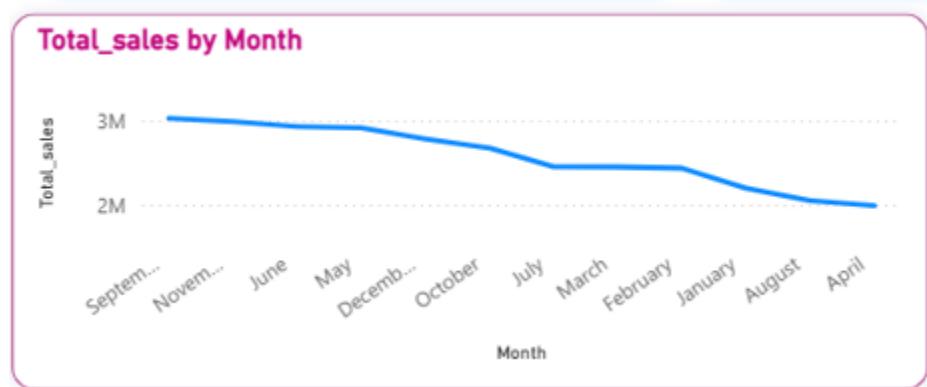
- Payment Type Comparison

Result Grid Filter Rows: Export			
	Customer_Type	total_customer	avg_spend
▶ Member	1201	7809.375004163183	
Normal	2646	8134.969860166273	

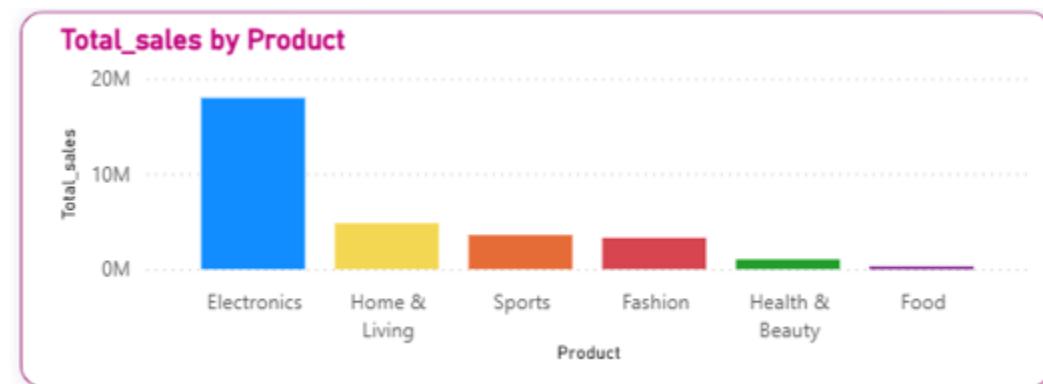
5. Power BI Dashboard

Dashboard pages:

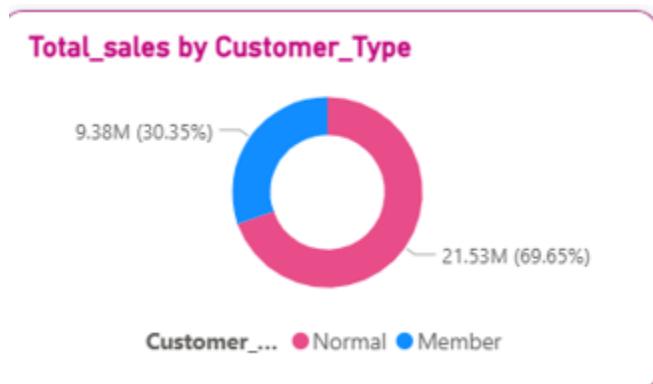
- Sales Overview



- Product Analysis

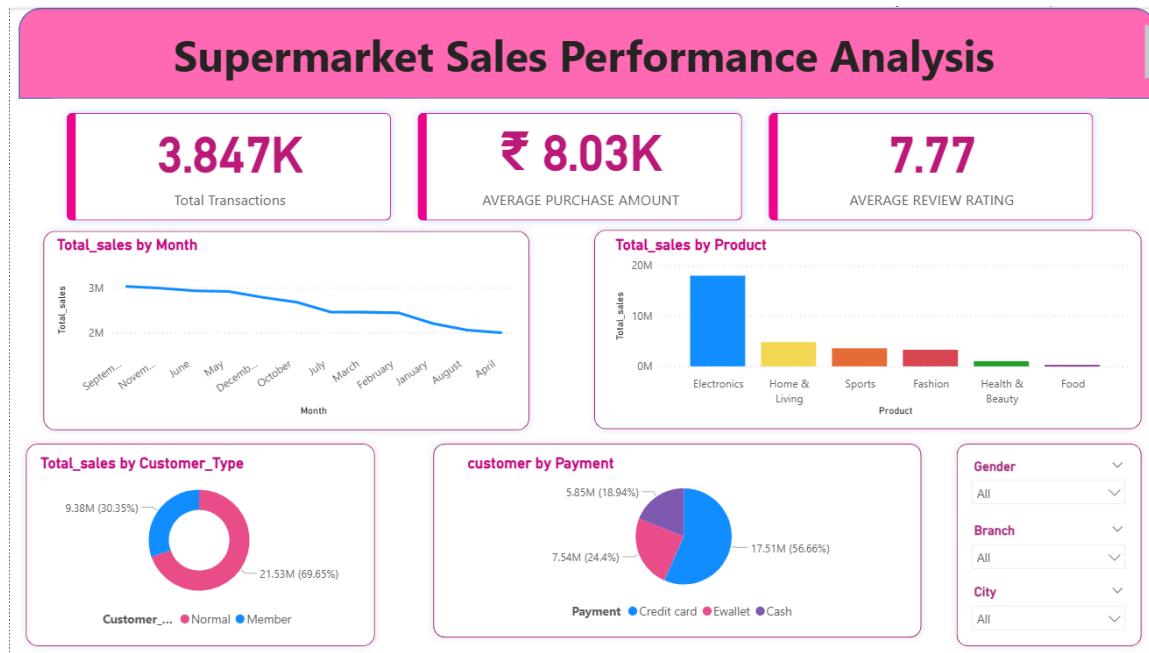


- Payment Insights



Visuals: KPIs, bar charts, heatmaps, treemaps.

Final view of report



6. Key Insights

- Members spend more than non-members
- Electronics & Health & Beauty have highest margins
- Credit card users generate the highest average revenue
- Ratings average around 7/10
- Branch and city differences affect sales patterns

7. Business Recommendations

- Promote high-margin categories
- Strengthen membership programs
- Improve low-rated product lines
- Encourage card-based payments
- Focus on high-revenue branches
- Use personalization for recommendations