

Retail Sales Data Analysis (EDA)

Exploratory Analysis, Insights & Visuals

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(Rendered using a small bundled sample since data/retail_sales.csv was not found)

Executive Summary

This report presents an end-to-end exploratory analysis of a retail sales dataset. The objective is to understand revenue trends, customer behavior, product performance, and potential opportunities for growth. The analysis covers data cleaning, feature engineering, and multiple visual summaries to derive actionable insights.

Key focus areas include category performance, payment preferences, customer demographics, review patterns, top products, and city-level contributions. The visuals provide a clear view of the business performance and highlight areas that can be leveraged for marketing and operations.

Dataset Overview

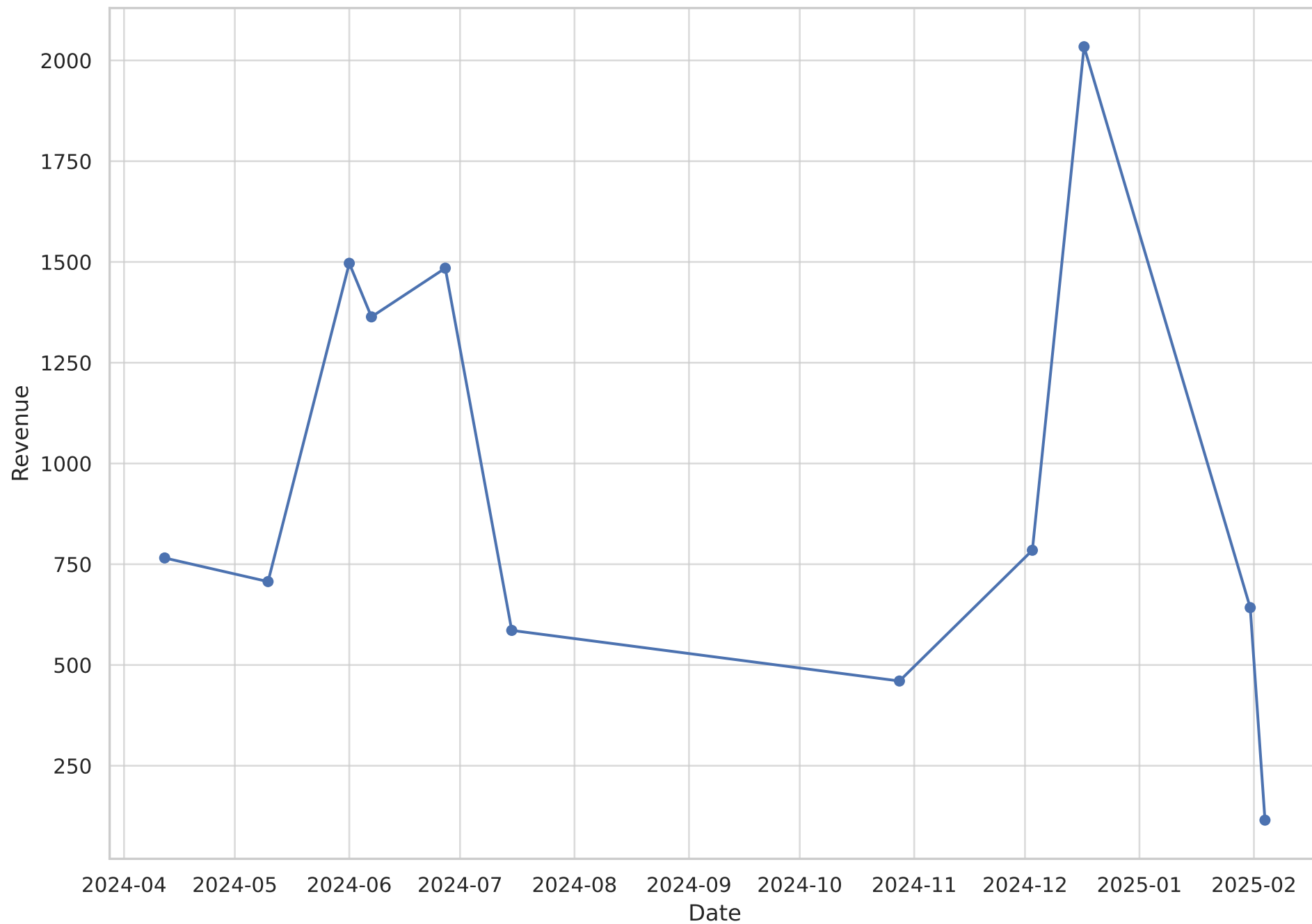
Column	Description
customer_id	Unique ID of the customer
order_date	Date of the transaction
product_id	Unique ID of the purchased product
category_id	Unique ID of the product category
category_name	Name of the product category
product_name	Name of the product
quantity	Number of units purchased
price	Price of a single unit
payment_method	Mode of payment used
city	City where the order was placed

Sample Records (first 10 rows)

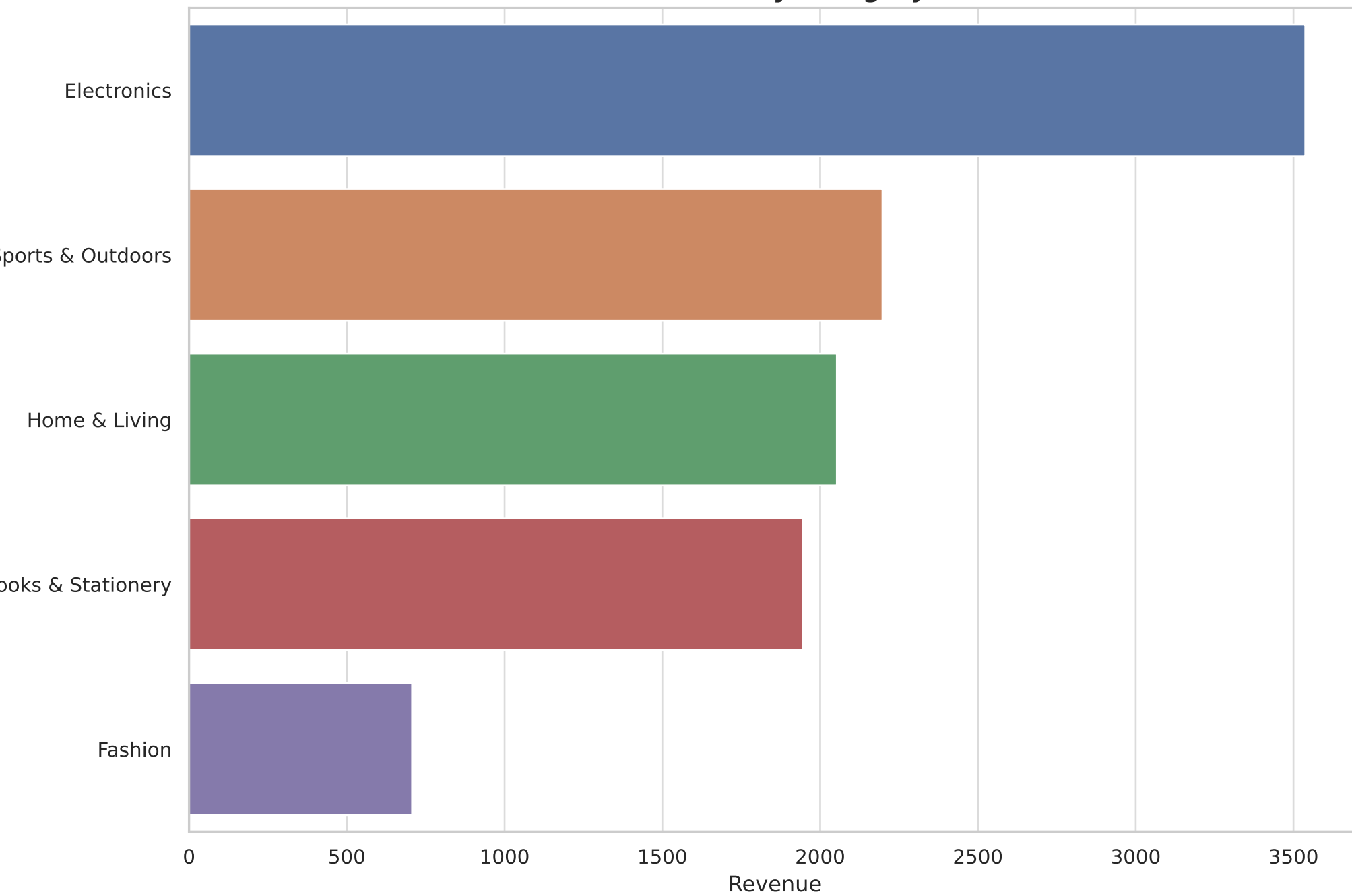
customer_id	order_date	product_id	category_id	category_name	product_name	quantity	price	payment_method	city	review_score	gender	age	total_sales
135417	-12-2024	784	10	Electronics	Smartphone	2	373.36	Credit Card	New Oliviaberg	1.0	F	56	746.72
231861	-06-2024	682	50	Sports & Outdoors	Soccer Ball	5	299.34	Credit Card	Port Matthew	5.0	M	49	1496.6999999999998
550964	-02-2025	684	50	Sports & Outdoors	Tent	5	23.0	Credit Card	West Sarah	5.0	F	64	115.0
652088	-10-2024	204	40	Books & Stationery	Story Book	2	230.11	Bank Transfer	Hesfordezburgh	5.0	M	34	460.22
638720	-05-2024	202	20	Fashion	Skirt	4	176.72	Credit Card	Jedkinshaven	1.0	F	33	706.88
299893	-12-2024	829	10	Electronics	Smartphone	4	196.66	Bank Transfer	East Tonyaberg	5.0	F	21	784.64
798007	-06-2024	706	10	Electronics	Tablet	5	272.55	Bank Transfer	North Jessicabury	5.0	M	57	1363.75
272815	-07-2024	405	50	Sports & Outdoors	Yoga Mat	2	282.9	Cash on Delivery	Aliciaberg	5.0	F	60	585.8
413947	-12-2024	549	30	Home & Living	Pillow	3	429.11	Credit Card	West Harrymouth	3.0	F	69	1287.33
486912	-04-2024	545	30	Home & Living	Blanket	4	191.39	Credit Card	Lake Ian	5.0	F	34	765.56

Note: total_sales is derived as quantity × price.

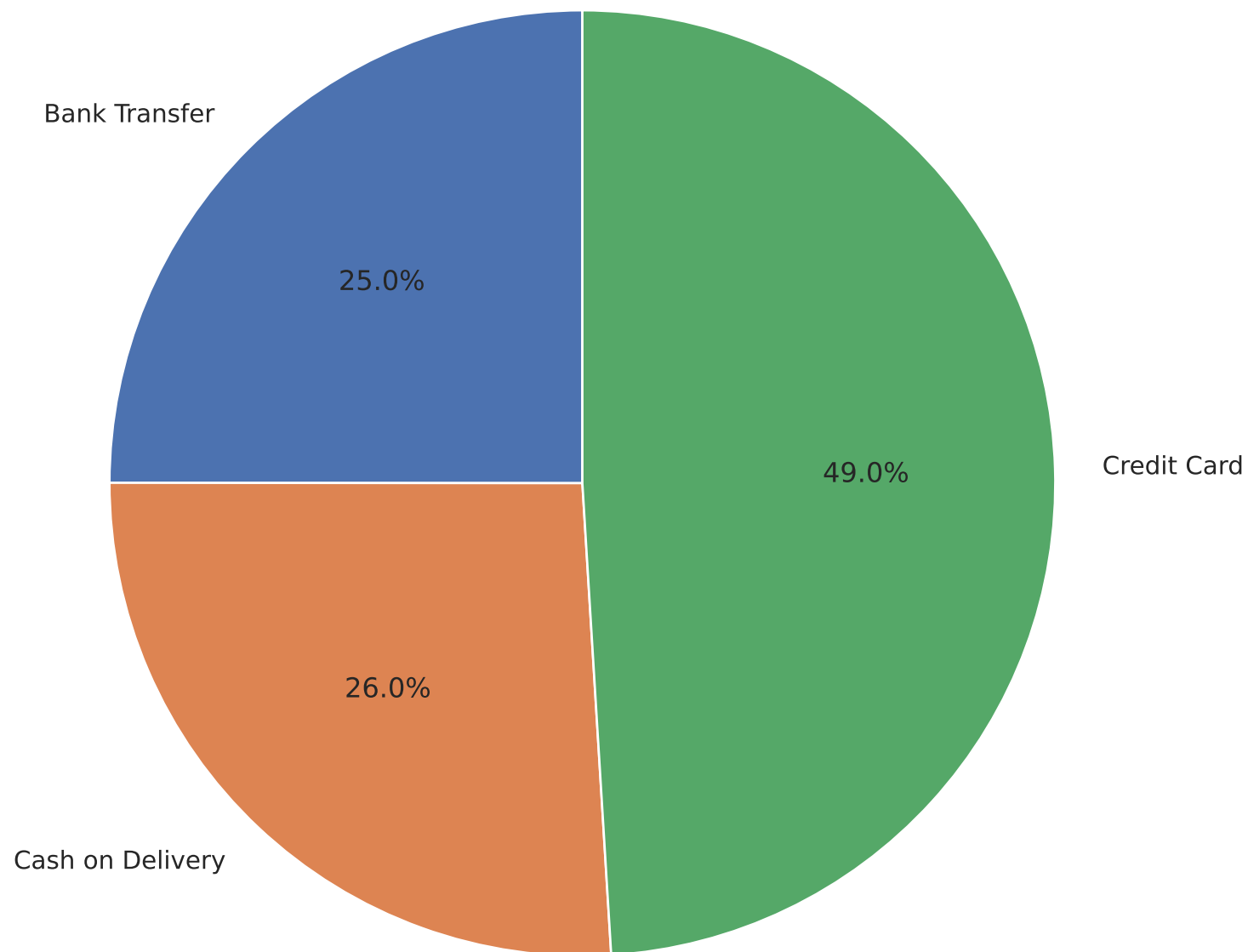
Revenue Trend Over Time



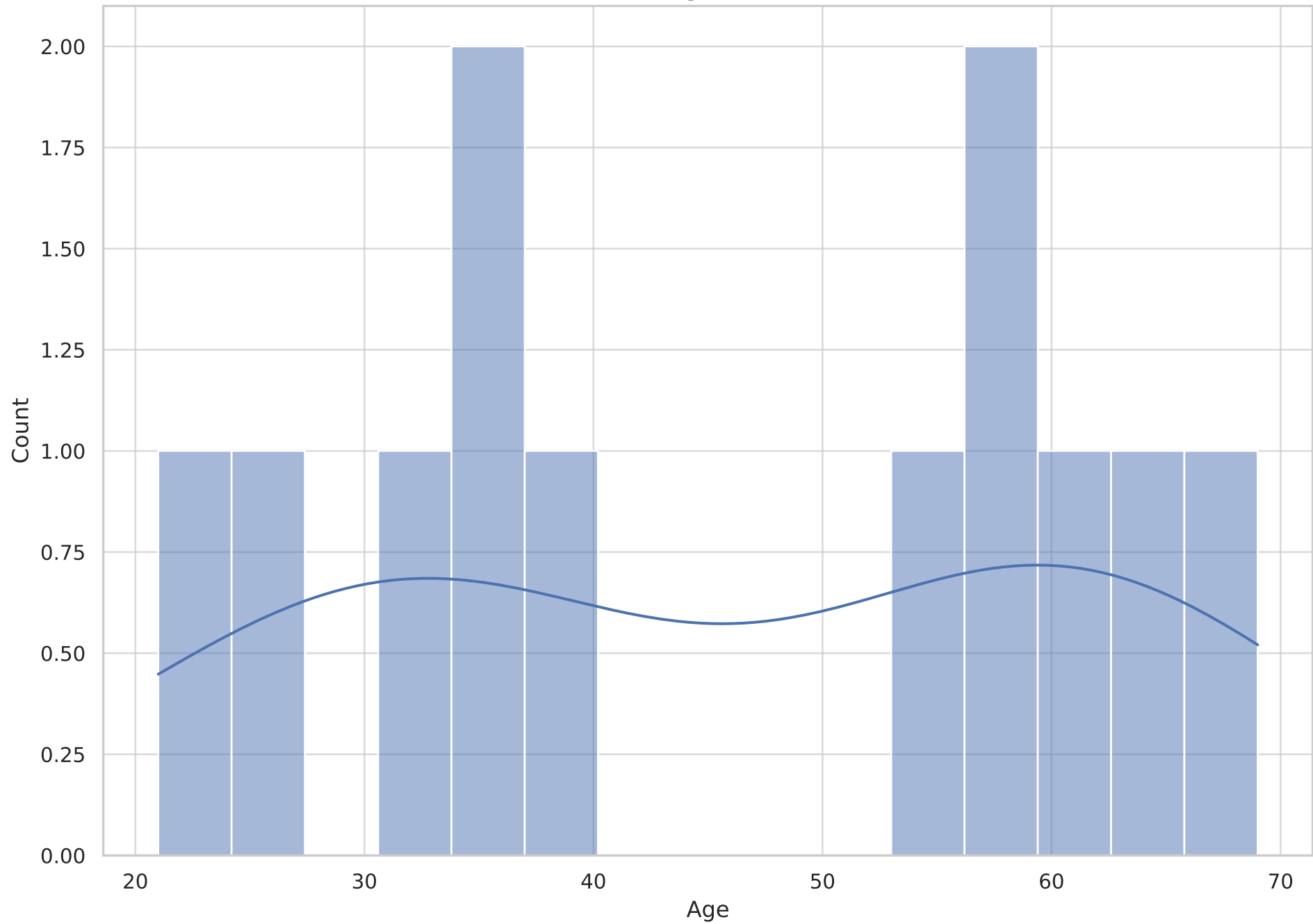
Revenue by Category



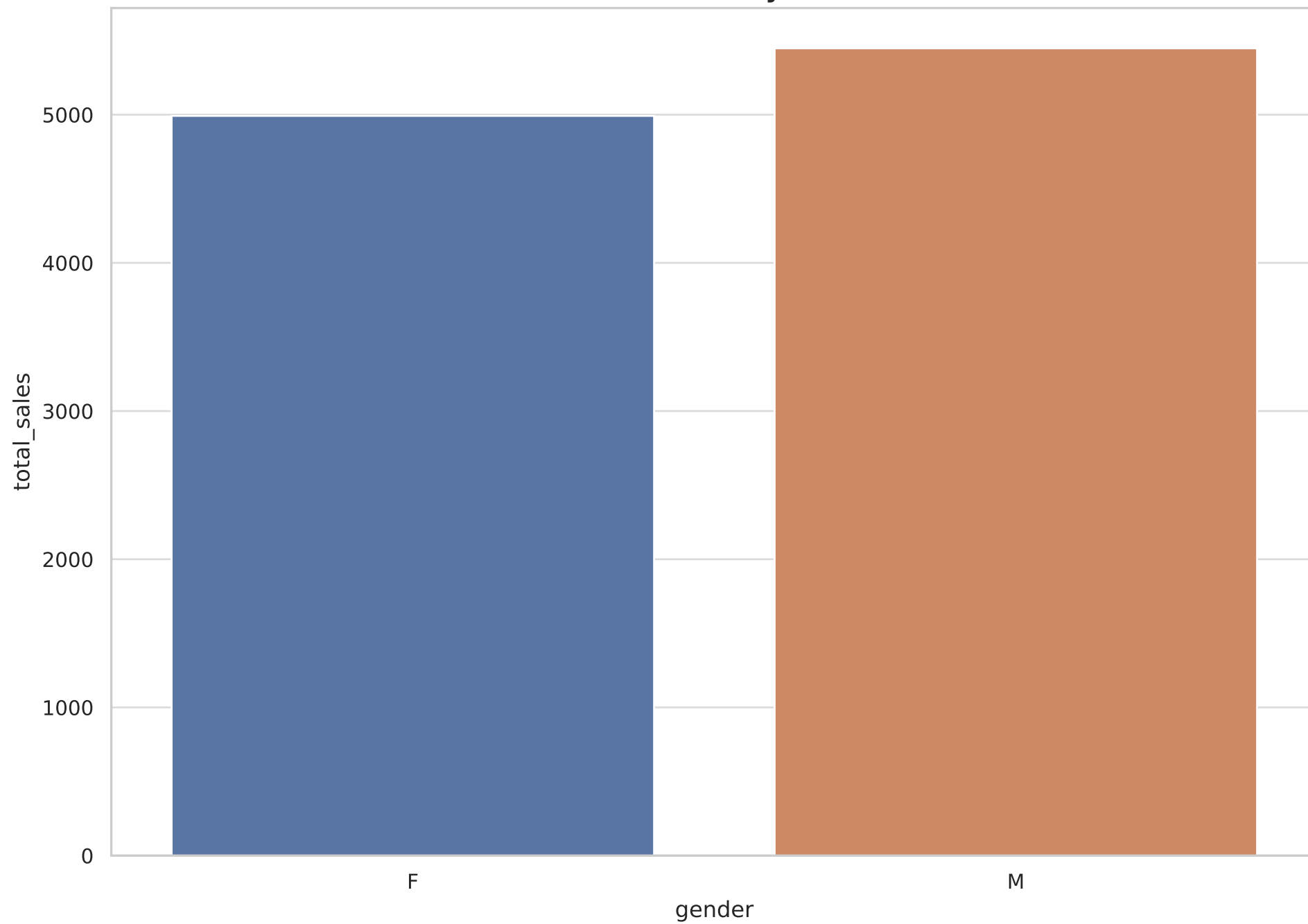
Payment Method Share



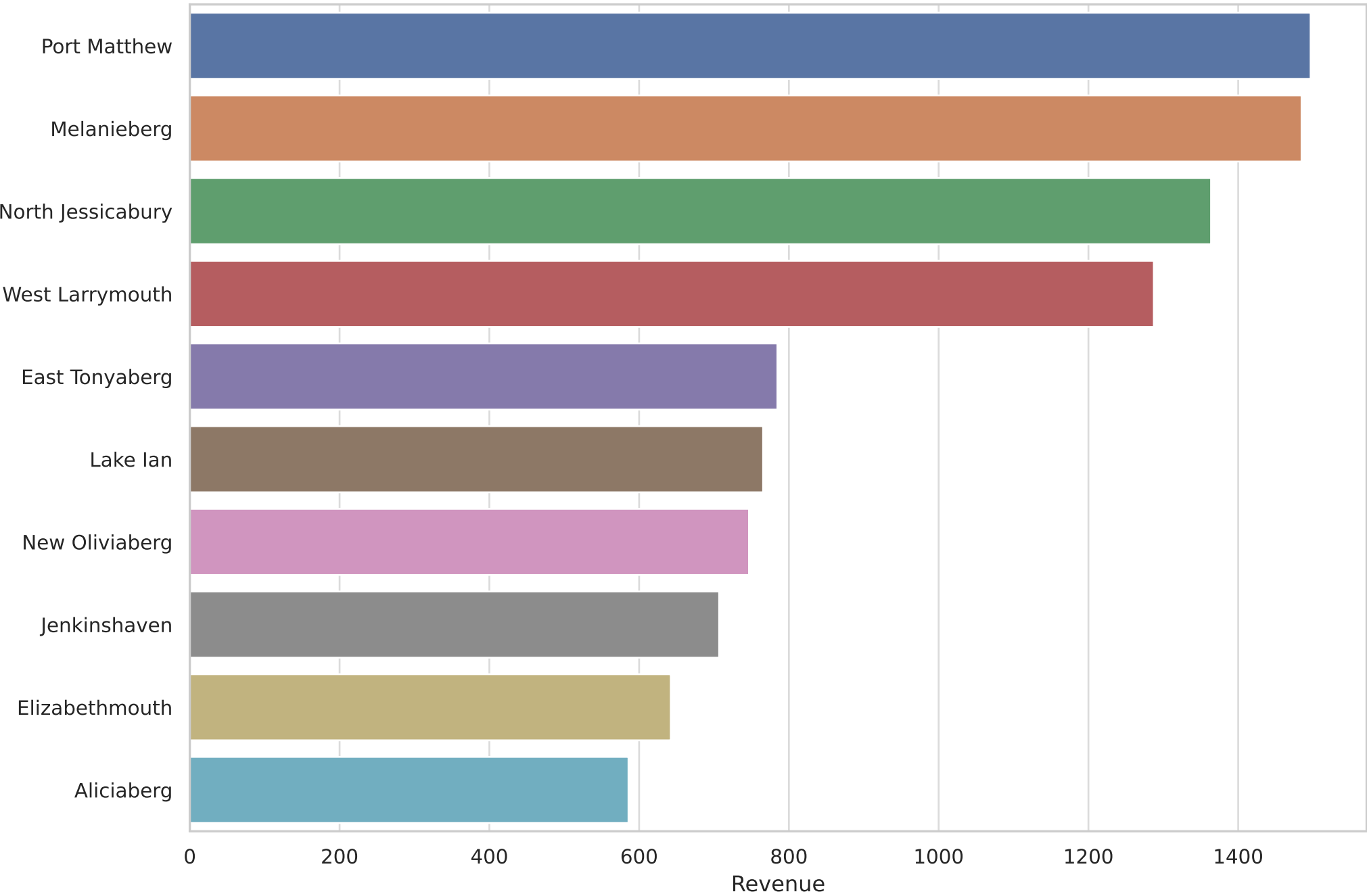
Customer Age Distribution



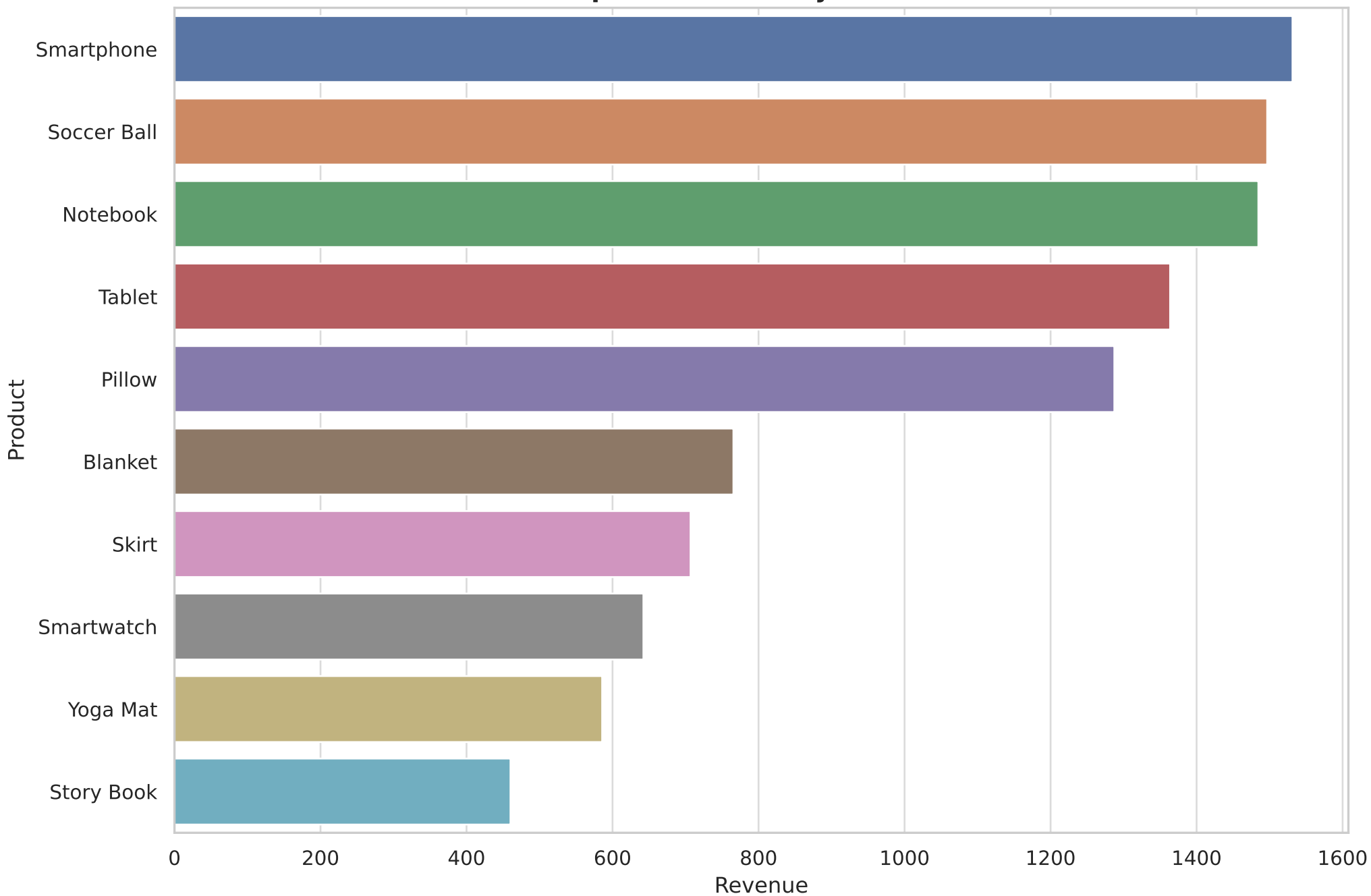
Total Revenue by Gender



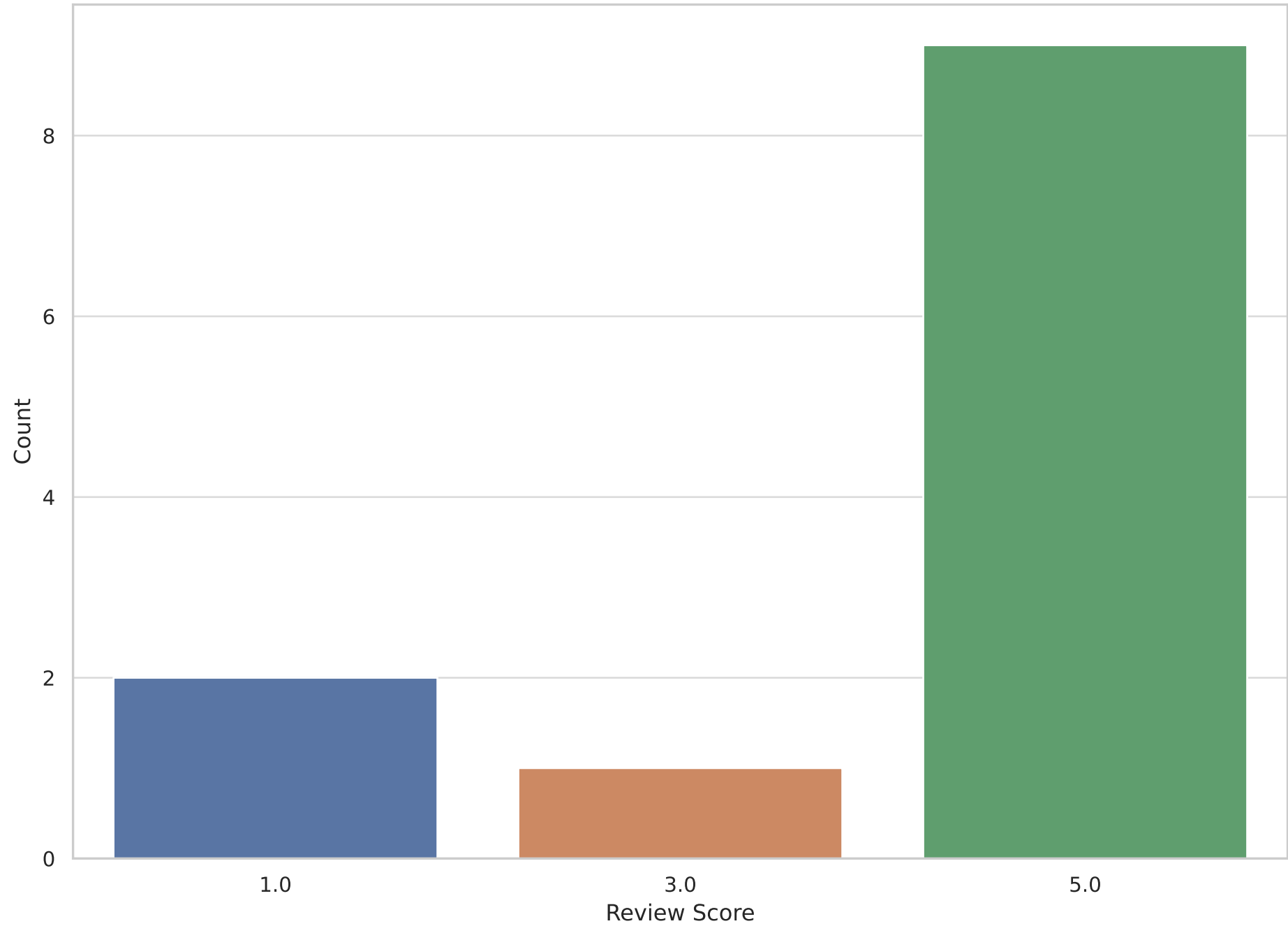
Top 10 Cities by Revenue



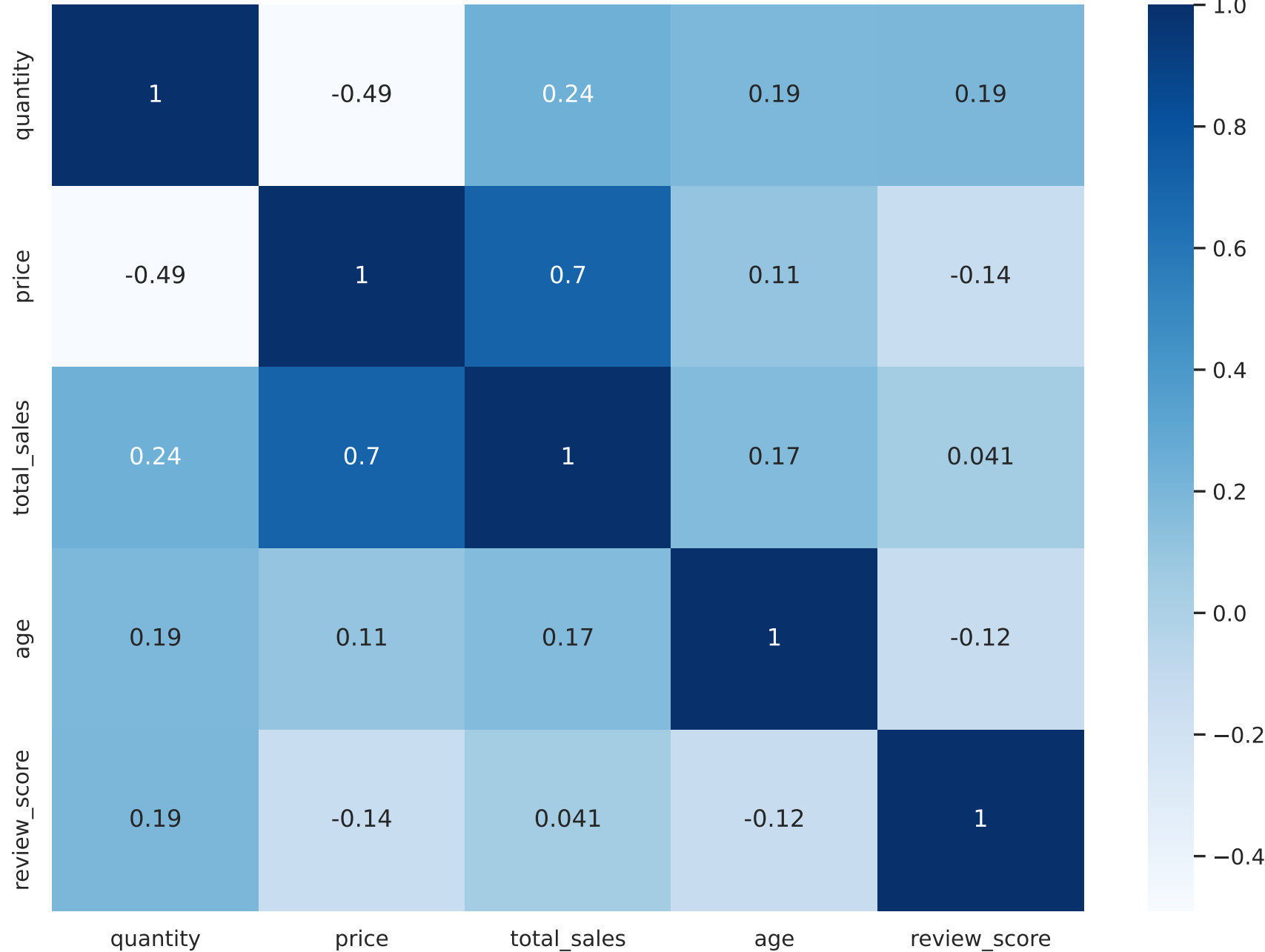
Top 10 Products by Revenue



Review Score Distribution



Correlation Heatmap (Numerical Features)



Business Insights & Recommendations

Focus on top-performing categories to maintain momentum; explore cross-sell bundles with complementary items.

Leverage payment method preferences (e.g., Credit Card) with targeted cashback or loyalty incentives.

Target marketing to the strongest customer age segments and cities revealed in the analysis.

Investigate low review scores by product or category to identify quality or service gaps.

Use seasonal peaks (visible in the revenue trend) to plan promotions and inventory proactively.

Conclusion

This exploratory analysis converts raw retail transactions into business-ready insights. The findings support decisions in merchandising, marketing, and customer retention. The approach and code can be easily extended with predictive modeling (e.g., forecasting) or A/B testing insights.

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