E-Commerce Customer Behavior Analysis

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Executive Summary

- Analyzed over 10,000 customer records to uncover behavior patterns.
- Found Electronics, Clothing and Toys as top-purchased categories.
- Identified that discounts slightly increase average purchase value.
- Noted that satisfied users are more likely to return.
- Mobile devices dominate usage but Desktop and Tablet follow closely.
- Recommendations focus on payment UX, product focus and loyalty building.

Dataset Overview

The dataset contains customer behavior data collected from an e-commerce platform. It includes information like customer ID, age, location, product categories, purchase amount, time on website and device used. Basic data cleaning and preprocessing were performed.

Exploratory Data Analysis

Below are key findings supported by visualizations:

## Top 3 Product Categories
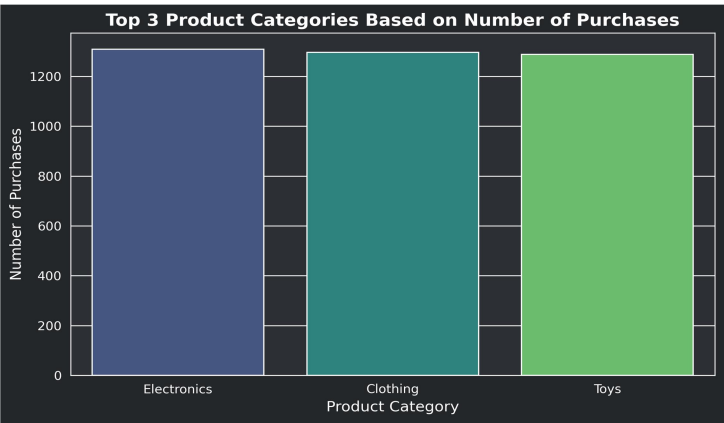
The top 3 product categories with the highest number of purchases are Electronics (1309), Clothing (1297), and Toys (1288). Electronics slightly leads the chart, showing strong demand in tech-related products. Clothing and Toys follow closely, suggesting a balanced interest across multiple lifestyle categories. This insight can help prioritize inventory, promotions, and marketing efforts toward these high-performing segments.

Review Score Distribution (Bar & Pie)

Despite the overall average rating being 3.0, the most frequent review score is 4 — indicating that a large portion of customers were satisfied with their experience. The distribution suggests a tendency toward positive feedback with room for further improvement.
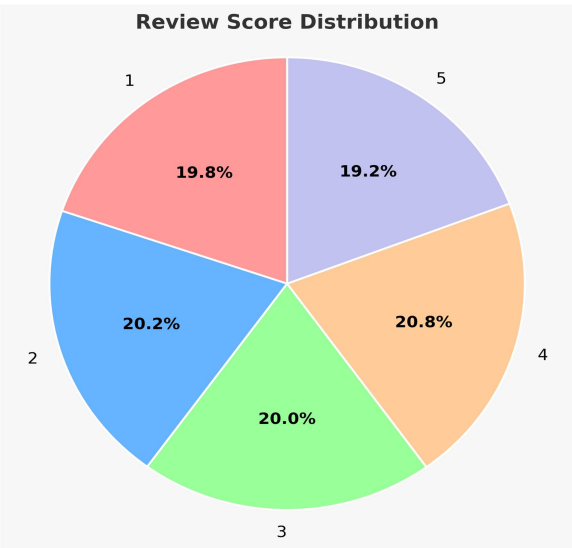

While the average review score stands at 3.0, a deeper look reveals that 4-star ratings dominate the customer feedback. This hints at generally good service, although a notable percentage still rated below average.

**Purchase Amount: Discounted vs Non-discounted**
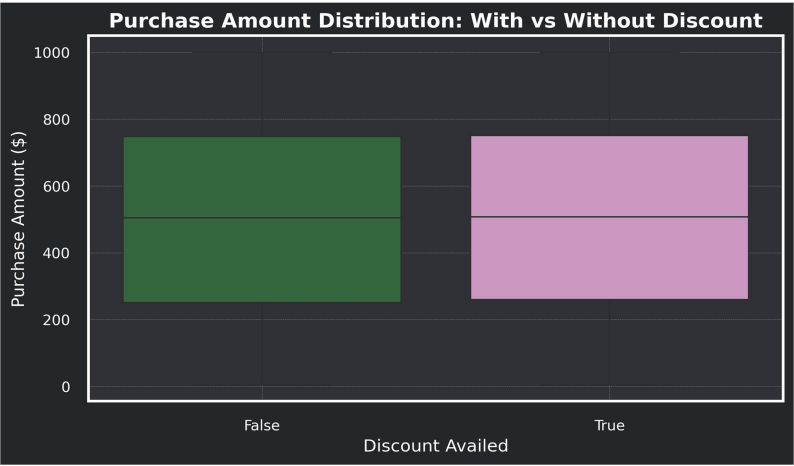
Customers who availed discounts spent slightly more on average (505.26) than those who didn't (502.51). This suggests that offering discounts may encourage customers to spend more per order, possibly increasing cart size. The difference is small but consistent — highlighting how strategic discounting can influence buyer behavior.

Delivery Time by Subscription Type
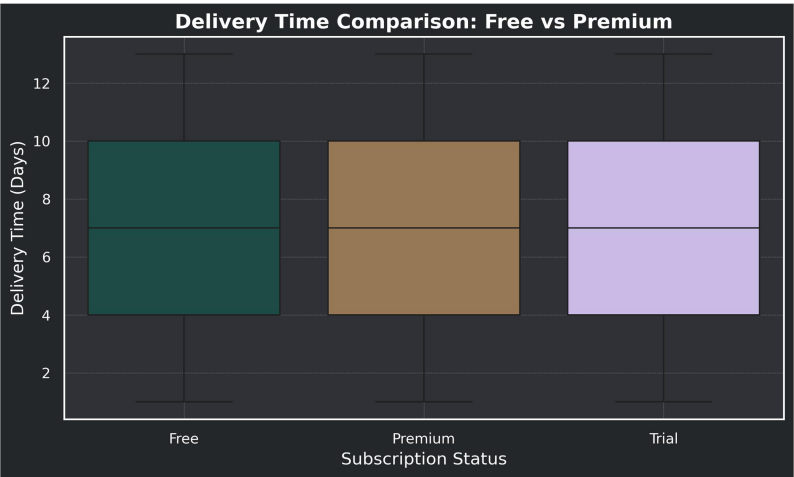
Premium users experience slightly longer average delivery time (7.07 days) compared to Free users (6.96 days) and Trial users (7.00 days). The difference is minimal, suggesting that subscription status doesn't significantly impact delivery speed.

Subscription Type Distribution

Customer Count by Subscription Type
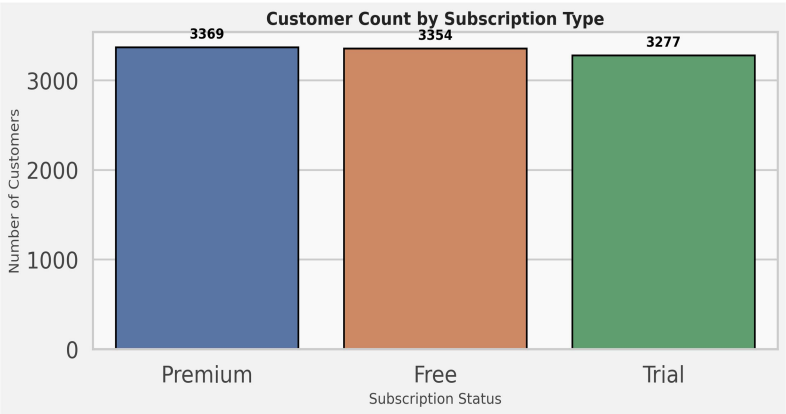
The customer base is almost evenly split across all three subscription types — Premium (3369), Free (3354), and Trial (3277). Premium users slightly lead in count, indicating a healthy paid-user base. The high number of Trial and Free users shows strong onboarding but also presents an opportunity to increase conversion through targeted campaigns.

Device Usage among Customers

Device Usage Distribution for Purchases
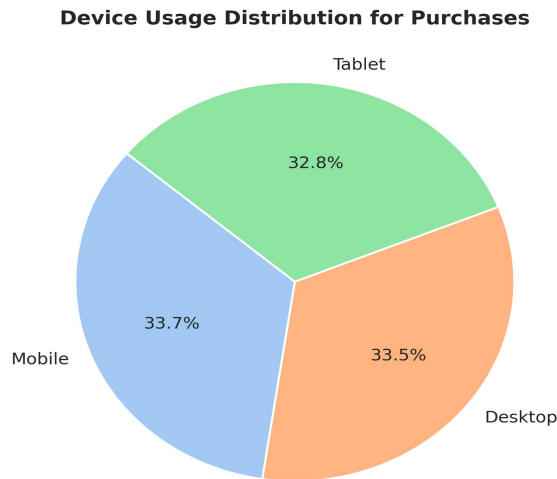
Device usage among customers is almost evenly distributed: Mobile (33.7%), Desktop (33.5%), and Tablet (32.8%). The slight lead by mobile users indicates a marginal preference for mobile shopping, but all platforms are well-utilized. This balanced usage highlights the importance of maintaining consistent user experience across all device types.
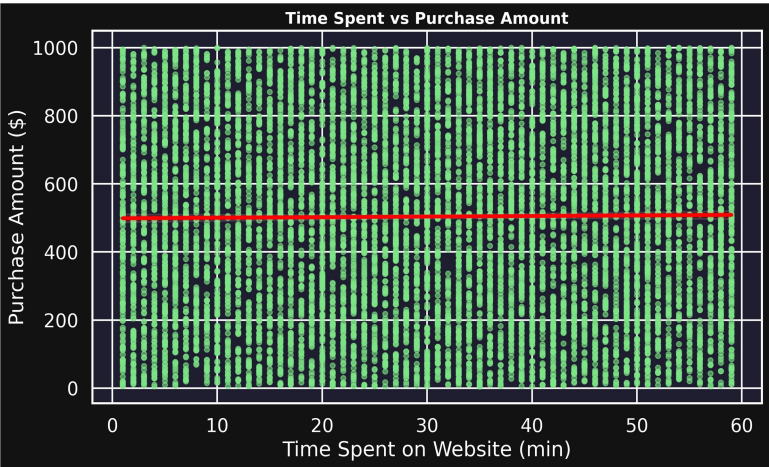
Avg Purchase by Location (highlight 2nd highest)
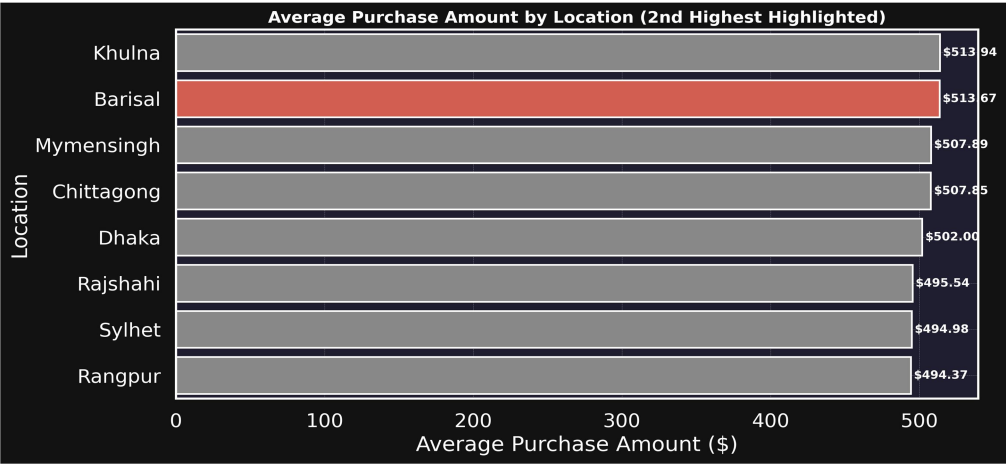
Barisal stands out as the second-highest location in terms of average purchase amount, with customers spending an impressive $513.67 on average. This indicates a strong purchasing power in the region.

Correlation & Patterns

Time Spent on Website vs Purchase Amount

The correlation between time spent on the website and the purchase amount is almost negligible (r = 0.01). This suggests that customers who spend more time on the website don't necessarily spend more money — indicating that browsing duration doesn't directly impact purchase value.

Review Score vs Items Purchased

The correlation between the number of items purchased and customer satisfaction is very weak (0.0097) — essentially no meaningful relationship. This suggests that customers who buy more items are not necessarily more or less satisfied than those who buy fewer.

Return Rate & Satisfaction by Payment Method
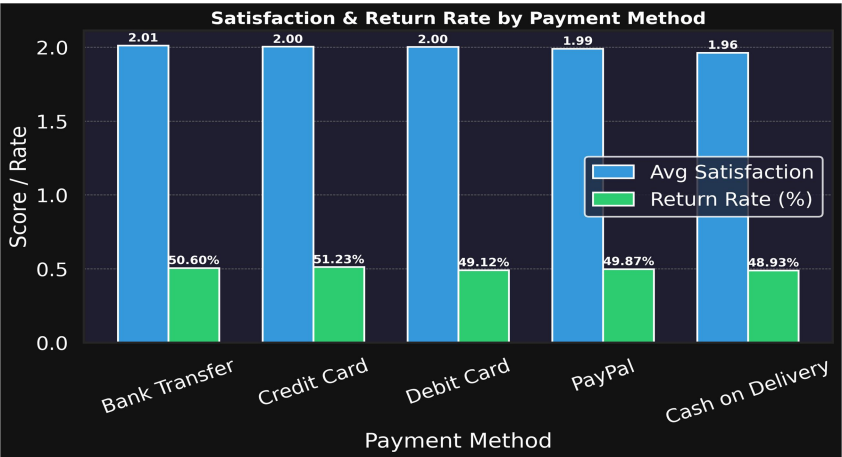


Among all payment methods, Bank Transfer and Credit Card users report the highest average satisfaction scores (≈2.01), with slightly above-average return rates. In contrast, Cash on Delivery users show the lowest satisfaction (1.96) and the lowest return likelihood (48.9%), indicating a possible friction in traditional payment experiences.

Return Customer Factors
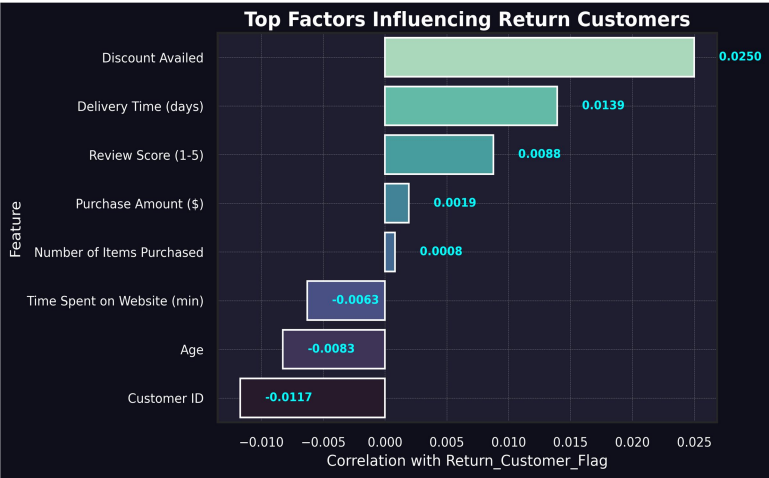
The analysis reveals that being a return customer is only weakly correlated with other factors such as discounts, delivery time, and review scores. With the highest correlation just 0.025 for discount usage, it suggests that loyalty is likely influenced by other unmeasured factors — possibly product experience, brand trust or service satisfaction.

Location vs Purchase & Delivery Time
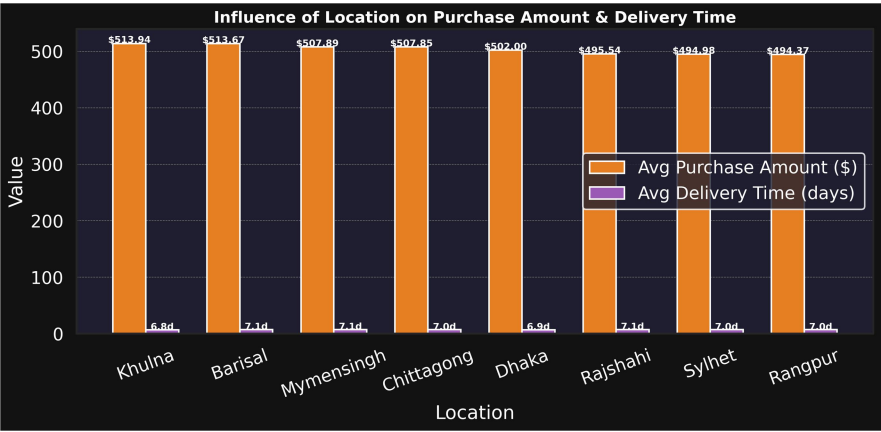
Location plays a significant role in customer behavior and logistics. While some regions like Khulna and Barisal show higher purchase amounts, others like Rajshahi experience longer delivery times — indicating possible logistical challenges or demand clusters.

Business Recommendations

- Focus on middle-aged users (avg age ~44)
- Improve mobile experience and payment UX
- Promote discounts to drive spending
- Invest in faster delivery for regions like Rajshahi
- Convert Free/Trial users to Premium through targeted campaigns
- Boost loyalty programs to retain satisfied users