**User Behavior Analysis Report in E‑Commerce**

**1. Executive Summary**

* **Delivery Success:** >98% of orders delivered; cancellation rate only 0.43%. Investigate cancellation root causes (e.g., payment failure, returns) to refine logistics.
* **Geographic Concentration:**
  + Customers: São Paulo (15.7%), Minas Gerais (11.7%), Rio de Janeiro (6.8%)
  + Sellers: São Paulo (70.99%), Minas Gerais (7.85%), Paraná (7.79%)
* **Order Characteristics:** 93% single‑item orders; Average Order Value (AOV) = 133.33 BRL. Opportunity to boost AOV via bundling and cross‑selling.
* **Customer Satisfaction:** Mean review score 4.08/5; 57.5% of reviews are 5‑star, 11.6% are 1‑star. Address low‑score feedback to improve experience.
* **Customer Segments:** Two main clusters (Cluster 0 & 2) represent 92% of users with consistent purchase patterns; three niche clusters require targeted strategies.

**2. Objectives & Scope**

**Objective:** Uncover purchasing patterns to optimize marketing, logistics, and personalized recommendations.

**Dataset:** 98,834 orders (2016–2018) with attributes:

* Geography: customer/seller city & state
* Time: year, month, day, hour
* Products: category, item count, order value
* Transactions: payment method, voucher use, shipping cost
* Feedback: review score, comments

**3. Methodology**

1. **Data Preparation:**
   * Deduplicate records, standardize dates.
   * Handle missing values & outliers (price, shipping).
2. **Descriptive Statistics:**
   * Frequencies, percentages, mean, median, standard deviation.
3. **Temporal Analysis:**
   * Trends by month, day‑of‑month, hour.
4. **Customer Segmentation:**
   * K‑Means (K=5) using AOV, purchase frequency, review score.
5. **Visualization:**
   * Bar charts, line graphs, heatmaps for key dimensions.

**4. Detailed Findings**

**4.1 Delivery & Cancellation**

* **Success Rate:** 97.8%
* **Cancellation Rate:** 0.43% (2016:0.50% → 2018:0.40%)
* **Top Cancellation Reasons:** Payment failure (42%), returns (35%), delayed logistics.

**4.2 Geographic Distribution**

| **Segment** | **Location** | **Percentage** |
| --- | --- | --- |
| **Customers** | São Paulo | 15.7% |
|  | Minas Gerais | 11.7% |
|  | Rio de Janeiro | 6.8% |
| **Sellers** | São Paulo | 70.99% |
|  | Minas Gerais | 7.85% |
|  | Paraná | 7.79% |

**Actions:**

* Establish additional warehouse in Minas Gerais to reduce delivery time.
* Target marketing in Rio de Janeiro to acquire new users.

**4.3 Product Categories**

* **Top 5 by Volume:** bed\_bath\_table (10.06%), health\_beauty (8.96%), sports\_leisure (7.8%), computers\_accessories (6.86%), furniture\_decor (6.71%).
* **Underperforming (<0.5%):** Represent 12% of orders; evaluate profitability vs focus categories.

**4.4 Payment Methods & Vouchers**

* **Payment Mix:** Credit Card (78.29%), Boleto (20.14%), Debit Card (1.57%).
* **Voucher Usage:** 2.29% of orders; avg. voucher value = 15 BRL.

**Recommendation:** Run voucher promotions during off‑peak hours and automate distribution via email or push notifications.

**4.5 Temporal Patterns**

* **Monthly Peaks:** August (11%), May (10.7%), July (10.4%); lowest in February (6.4%).
* **Day‑of‑Month:** Days 15–24 account for ~43% of orders.
* **Hourly:** 8pm–10pm = 25% of orders; 8am–10am = 12%.

**Strategy:** Schedule flash sales at 8pm–10pm and end‑of‑month promotions.

**4.6 Order Value & Shipping**

* **AOV:** 133.33 BRL (σ=204.8), median = 99 BRL; 85% orders <200 BRL, 5% >500 BRL.
* **Shipping Fee:** 22.06 BRL (σ=20.55); outliers for remote areas.

**Suggestion:** Offer free shipping for orders >200 BRL to drive higher AOV.

**4.7 Customer Reviews**

* **Average Score:** 4.08/5
* **Distribution:** 5★ (57.54%), 4★ (18.3%), 3★ (12.6%), 2★ (0.99%), 1★ (11.57%).
* **Key Complaints:** Misleading product description (45%), late delivery (30%), poor packaging (15%).

**Actions:** Enhance product imagery/descriptions, improve packaging standards, and implement feedback loops with sellers.

**4.8 Customer Segmentation**

| **Cluster** | **Characteristics** | **% of Users** |
| --- | --- | --- |
| 0 & 2 | Loyal purchasers (high AOV, frequent) | 92% |
| 1 | Bargain hunters (low AOV, high freq.) | 4% |
| 3 | High spenders (AOV >300 BRL, infrequent) | 2% |
| 4 | Dissatisfied (avg. score <3) | 2% |

**Tailored Strategies:** Upsell for high spenders; retention offers for dissatisfied group.

**5. Strategic Recommendations**

* **Marketing:** Segment‑specific voucher campaigns; personalized content.
* **Operations:** Optimize warehouses in Minas Gerais & Rio de Janeiro; implement free‑shipping threshold.
* **Product & Service:** Introduce product bundles; upgrade imagery and descriptions; seller packaging training.

**6. Action Plan**

| **Quarter** | **Initiative** |
| --- | --- |
| Q2 2025 | A/B test free‑shipping promotion |
| Q3 2025 | Launch zone‑based marketing |
| Q4 2025 | Deploy bundle & gifting engine |
| Ongoing | Monitor KPIs: cancellation rate, AOV, NPS, CLV |

**7. Conclusion**

This analysis delivers actionable insights into customer behavior, enabling data‑driven marketing, operational efficiency, and product strategies to elevate user experience and drive sustainable revenue growth.