

# Introduction

**Research objective:** optimize marketplace sales strategy to increase 1) revenue, 2) margins, and 3) customer retention.

**Period** covered by the analysis: January 1, 2024 - December 31, 2024.

The **tasks** include: 1) identification of key growth metrics, 2) optimization of the product range matrix, 3) analysis of the effectiveness of the pricing policy, 4) examination of customer behavior.

The **structure of this report** consists of the following stages:

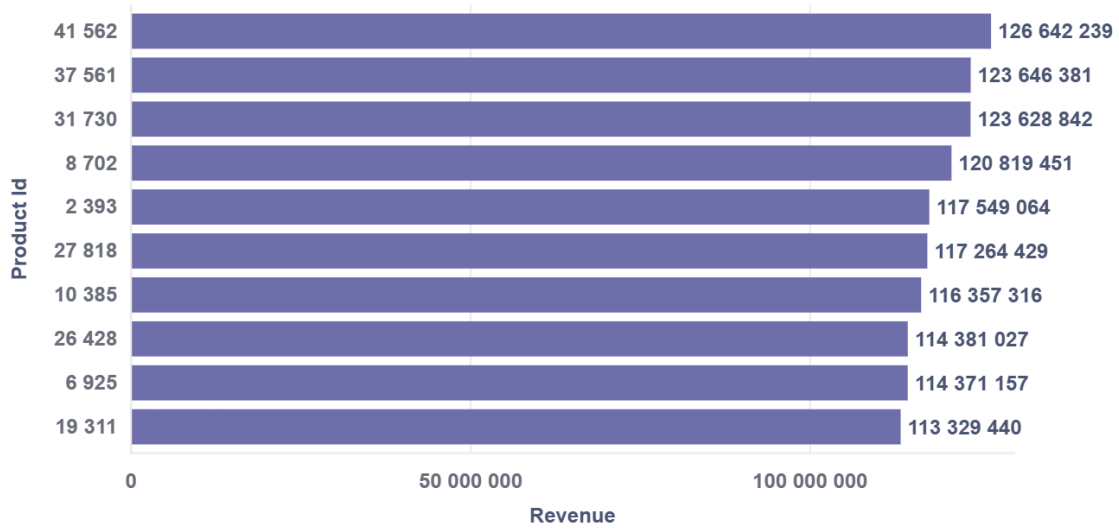
- 1) data preparation;
- 2) sales analysis;
- 3) customer base analysis;
- 4) product assortment matrix analysis (ABC segmentation) and optimization;
- 5) product hypothesis test results;
- 6) conclusions

## (1) Sales Analysis

### Business Insights and Recommendations

1. **The top-10 products** by revenue **contribute a substantial share of revenue**, ranging from 113 to 126 million (*Figure 1*) →
  - 1) develop **a sales strategy focused on the most profitable products**, and enhance marketing efforts and inventory management for these products during periods of high demand;
  - 2) **reallocate marketing budgets** from unprofitable products to the top 10 performers.
2. Products X have high turnover but low average order value (*Figure 1, Figure 2*) → consider **testing bundling strategies**.
3. **Discounts are the primary driver of orders**. Non-discounted items are purchased rarely (*Figure 3*). Update discount system to stimulate purchase volume →
  - 1) volume discounts ("the more items in the basket, the higher the discount");
  - 2) cross-discounts;
  - 3) dynamic pricing (adjust discounts in response to demand)
4. The peak sales months are January, February, and November (*Figure 4*). **Launch new items** before peaks → test demand with limited batches.

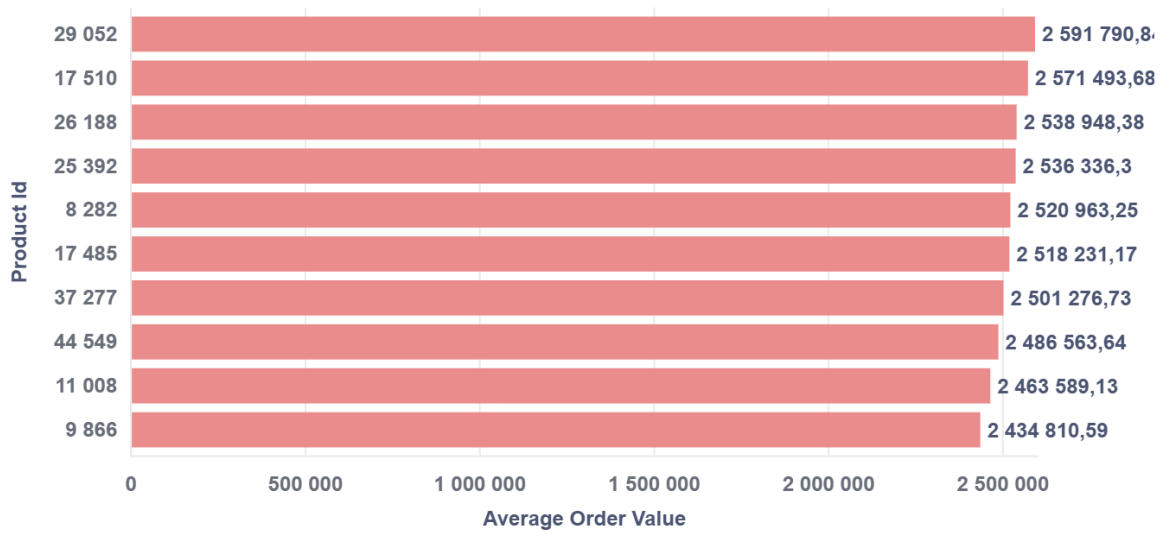
TOP-10 Products by Revenue



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Figure 1: TOP-10 Products by Revenue

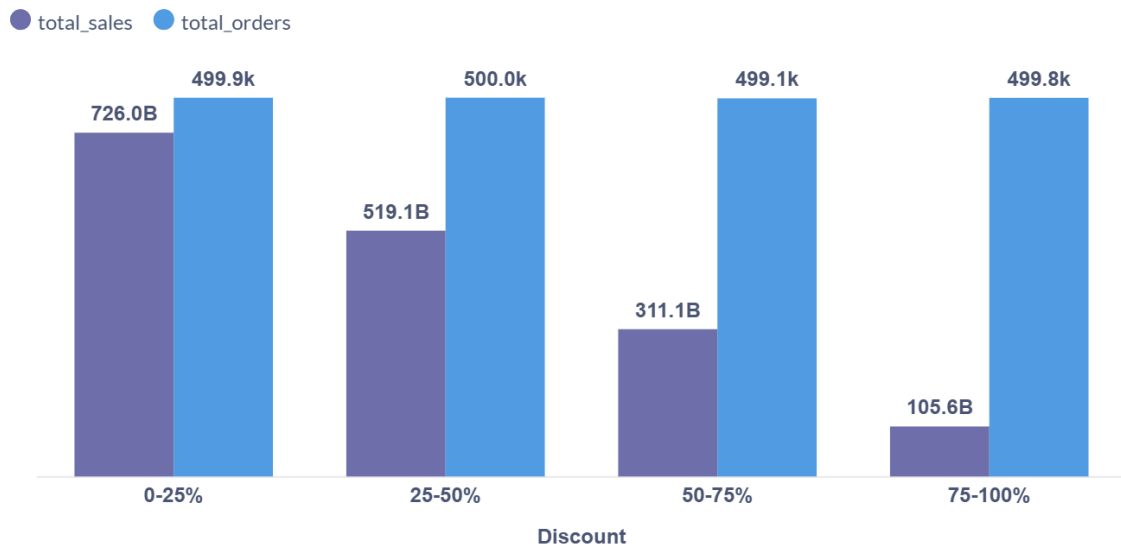
TOP-10 Products by Average Order Value (AOV)



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Figure 2: TOP-10 Products by Average Order Value (AOV)

Revenue and Number of Orders by Discount Size



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Figure 3: Revenue and Number of Orders by Discount Size

Monthly Revenue Trend



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Figure 4: Monthly Revenue Trend

## (2) Customer Base Analysis

### Business Insights and Recommendations

1. Daily Active Users (DAU) = 5 193 (users)
2. Weekly Active Users (WAU) = 37 557 (users)
3. Monthly Active Users (MAU) = 153 350 (users)

4. Analysis of **purchase activity by time of day** (*Figure 5*) indicates that sales volume in the morning hours (before 12:00) is approximately twice as high as in subsequent periods. This effect may be attributed to customer behavioral patterns, occupational schedules, and the timing of marketing incentives. To enhance afternoon sales, the following measures are recommended:

**1) Introduction of time-specific promotions**

- Midday discounts (12:00 - 16:00): implemented to mitigate the decline in customer activity during off-peak hours and to optimize traffic distribution;
- Evening promotions (18:00 - 22:00): structured to enhance purchasing activity in the late hours of the day and extend consumer engagement;
- Flash discounts: time-limited (2 - 3h) campaigns designed to induce urgency, encourage immediate decision-making, and increase conversion rates.

**2) Personalized push notifications**

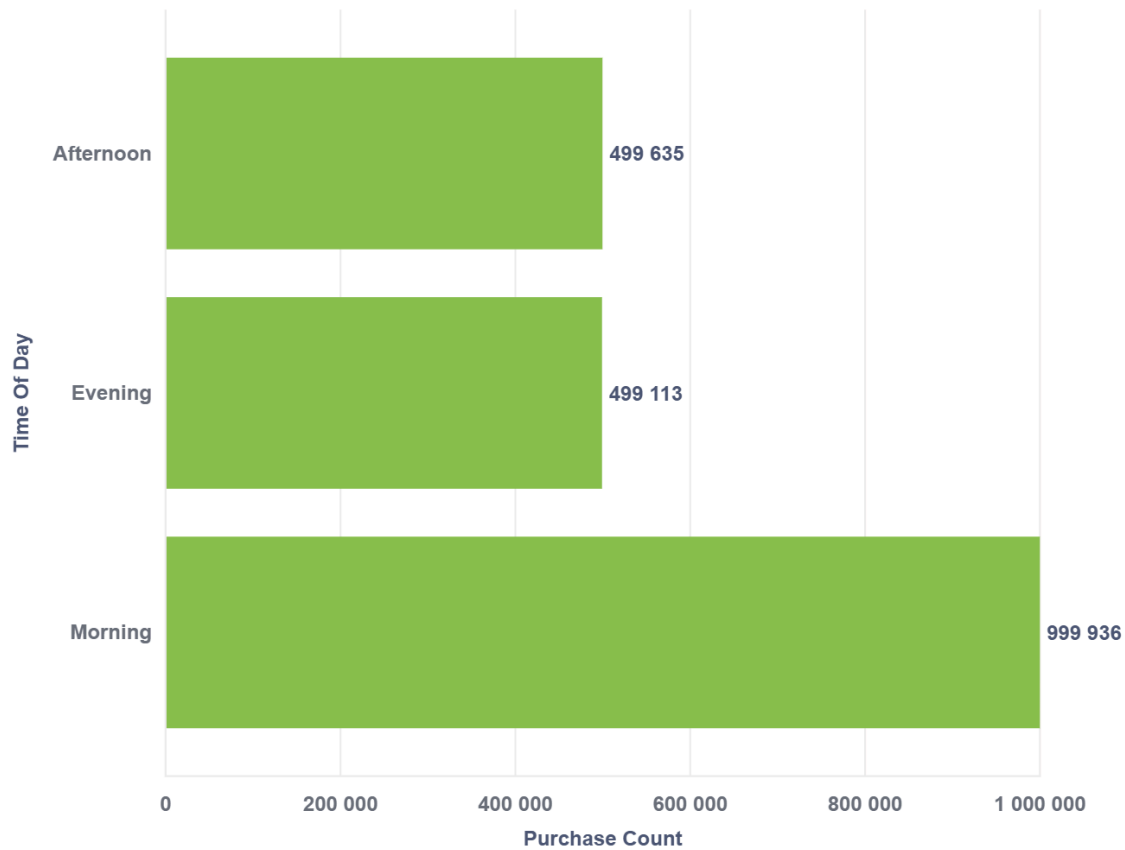
- Cart reminders (afternoon) → reduce drop-offs;
- Predictive suggestions → smarter, tailored offers

**3) Game mechanics and “happy hours”**

- Gamification → cashback for afternoon purchases;
- Loyalty boost → extra bonuses after 12:00 p.m.

5. **Rolling Retention** shows a decline (*Figure 6*) → boost repeat purchases (email & push (30 - 60 days))
6. Elevated retention rates observed in **March, April, and May** (*Figure 6*) suggest **stronger repeat purchase activity** in this period; it is advisable to extend these strategies to other months
7. LTV (Lifetime Value) = 7 327 221 (rubles).  
**Customer segmentation** → **top 10% of customers by LTV** → tailored offers

Distribution of Purchases by Time of Day



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Figure 5: Distribution of Purchases by Time of Day

Rolling Retention

cohort	cohort_size	day_0	day_1	day_3	day_7	day_14	day_30	day_60	day_90
2024-01	163,866	100	85.16	85	84.68	84.04	82.27	79.07	75.29
2024-02	137,504	100	82.33	82.11	81.64	80.86	79.23	75.48	70.96
2024-03	103,467	100	78.92	78.73	78.3	77.47	75.32	70.81	65.6
2024-04	97,466	100	75.28	74.97	74.39	73.36	70.92	65.81	59.56
2024-05	76,390	100	70.16	69.82	69.23	68.08	65.24	59.05	51.73
2024-06	62,711	100	64.82	64.43	63.68	62.22	58.93	51.67	43.45
2024-07	55,102	100	59.08	58.67	57.73	56.11	51.88	43.72	34.89
2024-08	47,380	100	51.25	50.68	49.6	47.74	43.25	34.53	23.05
2024-09	35,769	100	42.88	42.35	41.13	39.11	34.21	22.65	8.86
2024-10	30,078	100	33.33	32.75	31.54	28.94	22.34	8.44	0.05
2024-11	32,567	100	21.53	20.57	18.75	15.6	8.41	0.02	
2024-12	22,272	100	7.36	6.46	4.82	2.49	0.01		

Figure 6: Rolling Retention

### (3) Product Assortment Matrix Analysis and Optimization

- **Group A** consists of core products, which account for 80% of both revenue and units sold. Category A represents the largest share, indicating an **overextended product range**;
- **Group B** represents secondary products (15% of both revenue and units sold);
- **Group C** includes insignificant products (5% of both revenue and units sold) → this category should be **optimized or excluded from the product range**

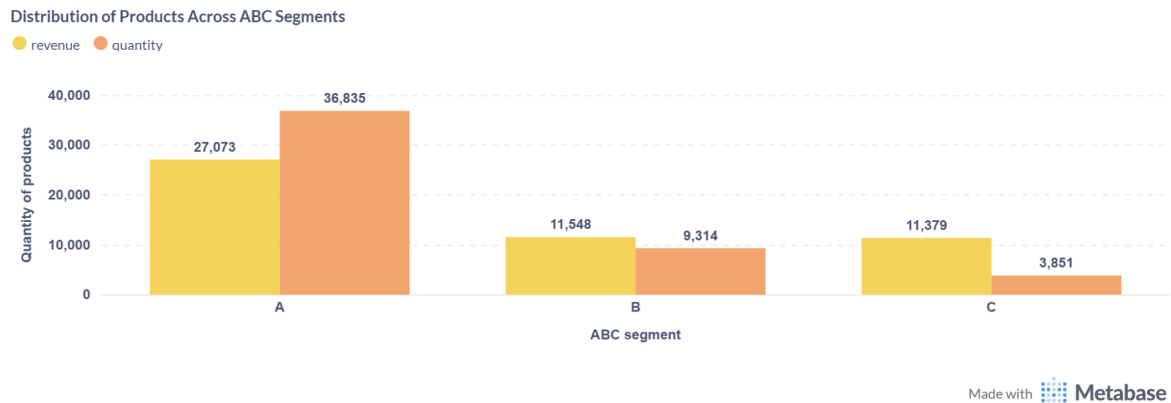


Figure 7: Distribution of Products, ABC Segmentation

#### Group AA (high revenue and high sales volume), 43.16%

- **Maintain current strategies:** continue applying the existing marketing and sales strategies for these products
- **Enhance product assortment:** consider expanding or refining the product range to increase cross-sales. For example, if a product from Group AA is frequently purchased together with another item, place them next to each other on shelves or within the same advertising block
- **Strengthen customer loyalty:** introduce loyalty programs targeting customers who regularly purchase these products to encourage repeat purchases. For instance, offer discounts on subsequent purchases or provide bonus points

#### Group AB (high revenue and average sales volume), 8.57%

- **Promotions and discounts:** implement seasonal or event-based promotions to stimulate sales growth. For example, offer a 20% discount during a specific time of year or as part of a special campaign
- **Marketing activities:** strengthen the promotion of these products through channels such as social media and email newsletters. For instance, launch a viral campaign or engaging social media content to increase product visibility
- **Special offers:** develop bundle deals or package offers to attract new customers. For example, combine several products into a set offered at a reduced price

### Group AC (high revenue, but low sales volume), 2.42%

This product category generates significant revenue but sells in relatively low volumes. These are often premium or niche products with a high price point. To increase sales, consider implementing demand-stimulation strategies:

- **Marketing development:** strengthen promotional efforts by emphasizing the unique features and value of these products
- **Promotions and special offers:** for example, provide purchase-related bonuses or offer discounts on subsequent orders
- **Product range management:** if availability is limited, explore options to expand distribution, improve logistics, or adjust pricing

### Group BA (average revenue, but high sales volume), 15.38%

### Group BB (average revenue and average sales volume), 5.03%

- **Price analysis:** conduct a detailed price analysis and evaluate the potential impact of lowering prices to drive revenue growth
- **Discounts and promotions:** introduce targeted discounts and promotional campaigns to stimulate demand for these products
- **Marketing and promotion:** strengthen product visibility through marketing initiatives, such as social media campaigns or email newsletters

### Group BC (average revenue, but low sales volume), 2.69%

#### Recommendations:

- **Boost visibility** through targeted marketing (ads, product benefits)
- **Stimulate demand** via promotions and special offers
- **Increase awareness** among the target audience, especially for niche products

### Group CA (low revenue, but high sales volume), 15.13%

#### Recommendations:

- **No major changes needed** - these essential, low-cost products have stable demand
- **Increase average order value** through promotions (e.g., *"Buy two, get the third at a discount"*)
- Monitor competitors' prices and **explore pricing optimization** to maintain competitiveness and improve margins

### Group CB (low revenue, but average sales volume), 5.03%

#### Recommendations:

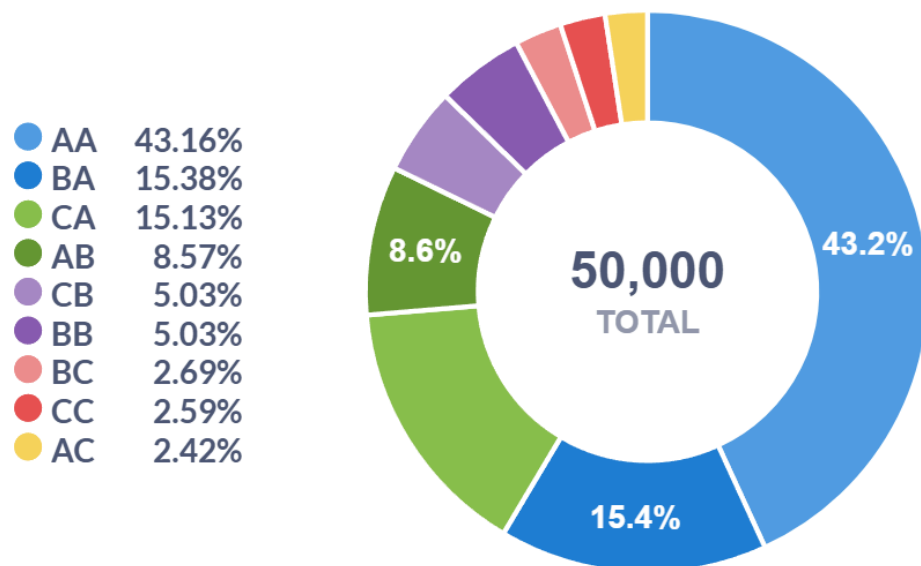
- Focus on **revenue growth opportunities**
- **Review pricing policy** for potential adjustments
- Strengthen marketing efforts **to raise visibility**
- **Introduce special offers** to stimulate demand

## Group CC (low revenue and low sales volume), 2.59%

### Recommendations:

- **Cause analysis:** investigate reasons for low sales and revenue through customer feedback. If demand is weak, consider improving the product (e.g., features, design)
- **Cost reduction:** explore opportunities to reduce production and logistics costs. Process optimization can increase profitability, especially for products requiring significant investment
- **Product range adjustment:** if a product shows no revenue potential, evaluate whether improvements are feasible. If not, consider removing it from the range to free resources for more profitable items.

### Combined ABC Segment



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Figure 8: Combined ABC Segment

## (4) Product Hypothesis Test Results

**Research objective:** to minimize the risk of errors in product development.

### Methodology:

1. Users were divided into two groups (1 and 2).
2. Key performance indicators were calculated.
3. Statistical significance of differences was assessed using p-values.



# Tested Hypotheses

- 1) **Hypothesis 1:** on average, women spend more than men when shopping.

Women historically spend more → needs statistical confirmation.

Approach: split into groups (M/F), analyze distributions (KS test, Q-Q plot), then select appropriate method for hypothesis testing.

KS test & Q-Q plot → **distributions not normal (M/F)**

→ Use **Mann-Whitney U test (nonparametric)**.

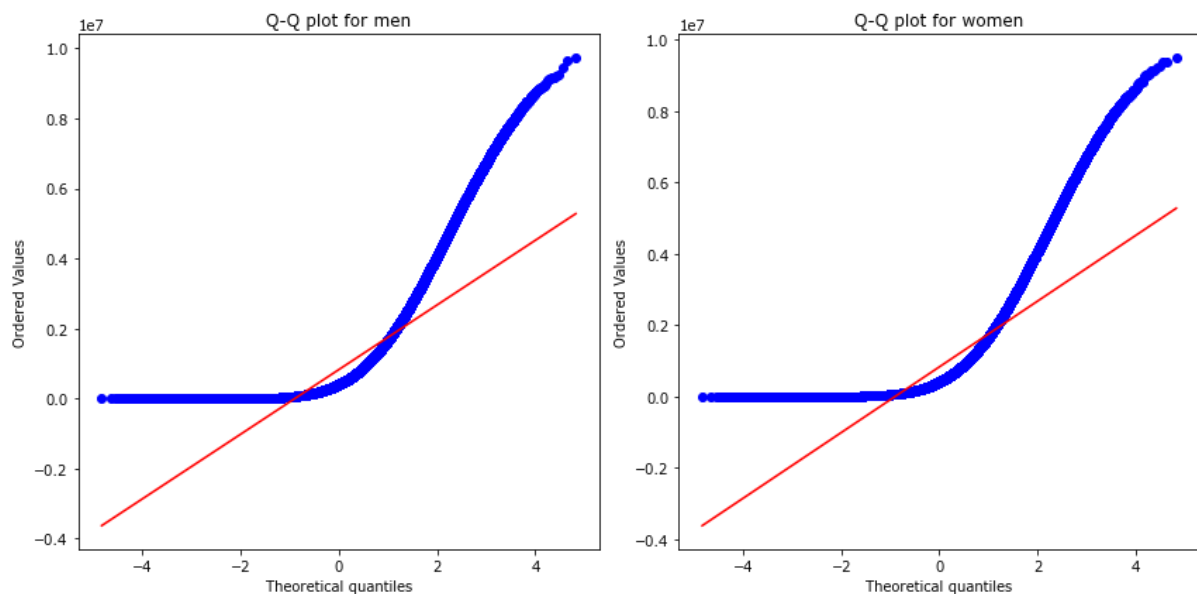


Figure 9: Q-Q Plot for men / women

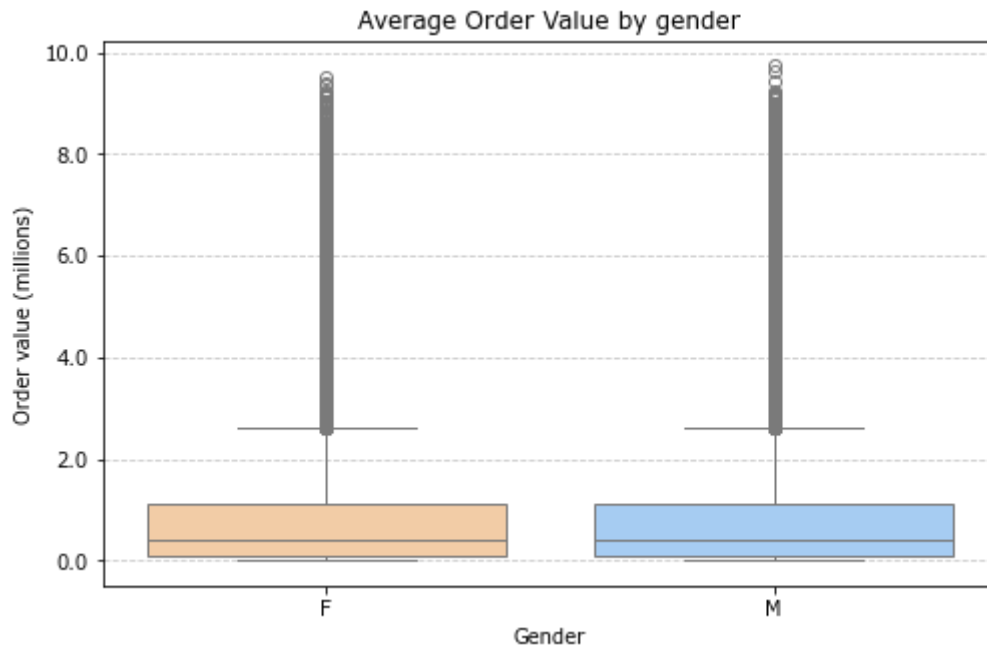


Figure 10: Average Order Value by Gender

$U = 499.13B$ ,  $P = 0.6 \rightarrow$  No significant difference in average order value (women vs. men).

**Customer gender does not influence average order value; men and women spend roughly the same.**

2) **Hypothesis 2:** the average order size depends on the availability of a discount.

KS test & Q-Q plot  $\rightarrow$  **distributions not normal (No discount group / Discount group)**

$\rightarrow$  Use **Mann-Whitney U test (nonparametric)**.

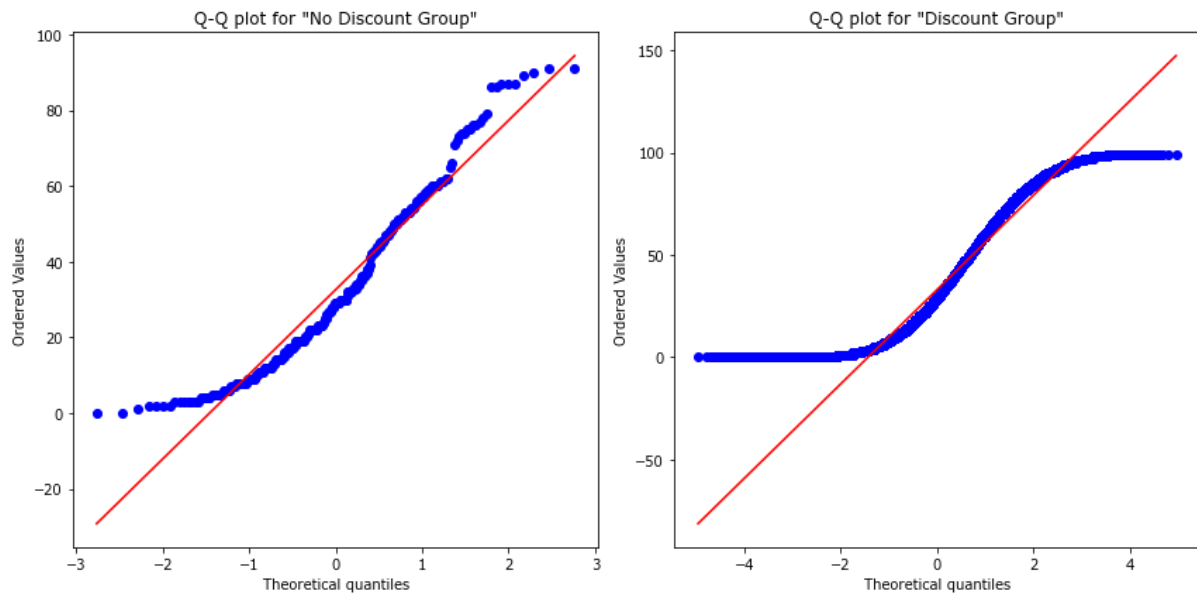


Figure 11: Q-Q Plot for No Discount Group / Discount Group

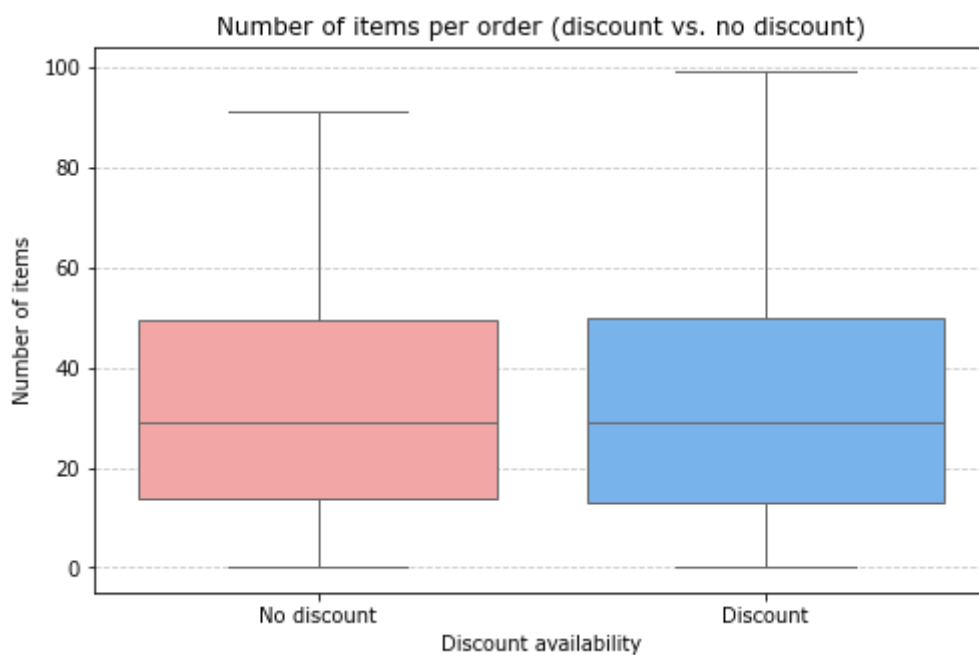


Figure 12: Number of Items per Order (discount vs. no discount)

$U = 242.33M$ ,  $P = 0.958 \rightarrow$  No significant difference in average items per order (no discount vs. discount).

**Discounts do not appear to impact how many items customers order on average (discount  $\rightarrow$  no increase in average items per order).** Order sizes remain nearly the same whether a discount is offered or not.

- 3) **Hypothesis 3:** the probability of placing an order is higher for discounted items compared to non-discounted items.

The two-proportion z-test confirms a statistically significant difference between discounted and non-discounted purchases ( $z = 11479.29$ ,  $p < 0.001$ ). Nearly all sales were made with a discount (99.99%), while only 0.01% of sales occurred without a discount. Thus, **the null hypothesis is rejected**, and it is concluded that **customers are overwhelmingly more likely to purchase discounted items (discounted items → purchased many times more than non-discounted)**.

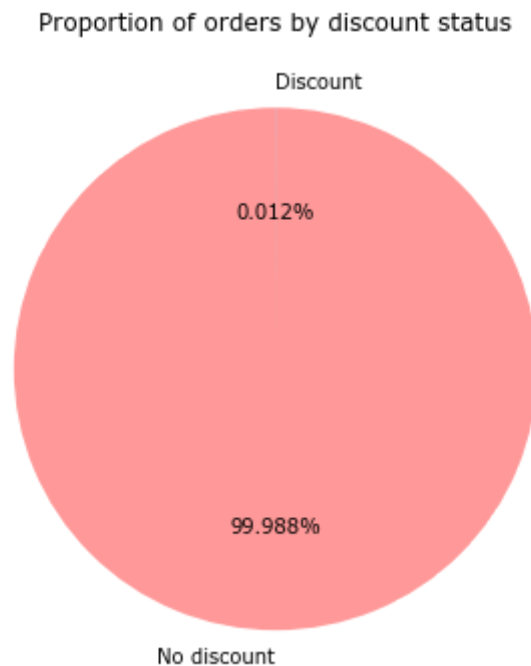


Figure 13: Proportion of Orders by Discount Status

- 4) **Hypothesis 4:** the average quantity of units sold decreases as product price increases.

KS test & Q-Q plot → **distributions not normal (Low-priced products group / High-priced products group)**  
→ Use **Mann-Whitney U test (nonparametric)**.

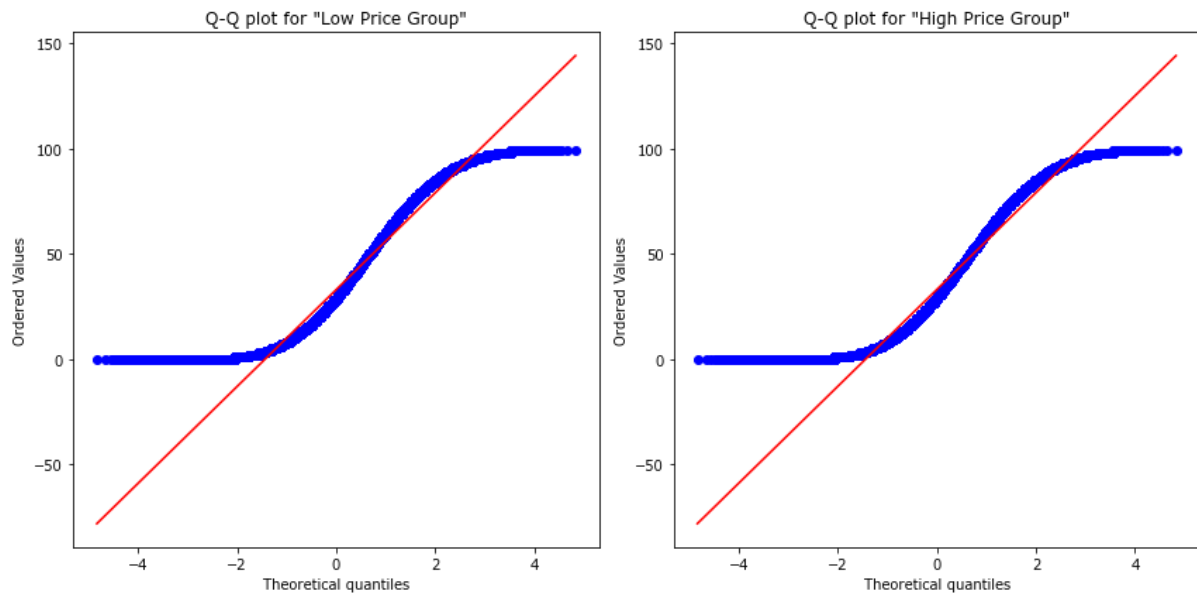


Figure 14: Q-Q Plot for Low Price Group / High Price Group

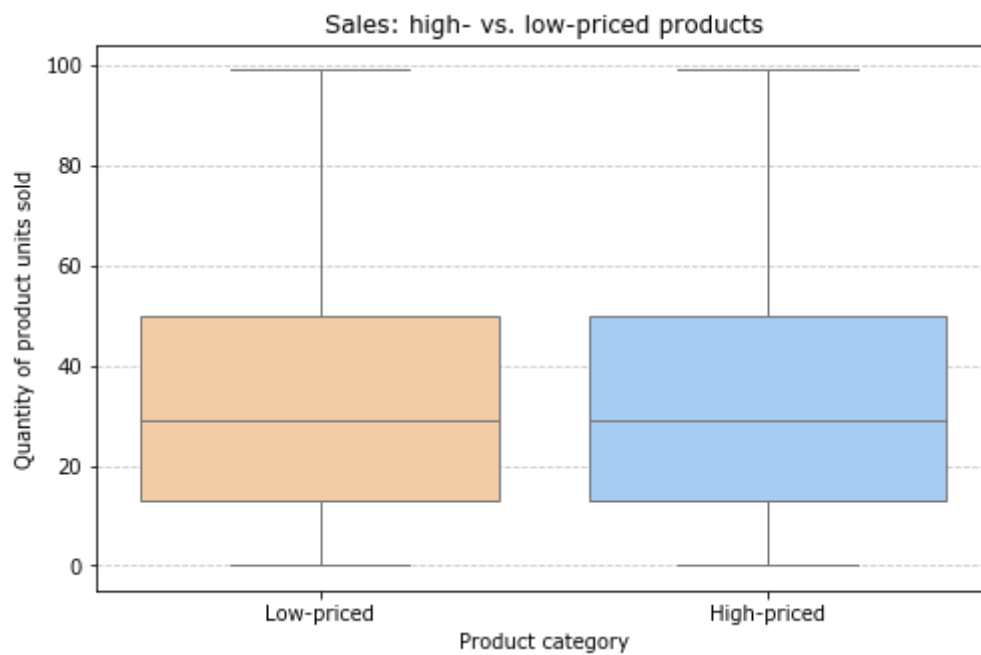


Figure 15: Distribution of Sales: high- vs. low-priced products

$U = 499.29B$ ,  $P = 0.897 \rightarrow$  No significant difference in average items per order (low vs. high-priced products).

Product price does not appear to affect the average sales quantity in this dataset  
**(high product price does not decrease the average sales volume).**

## (5) Conclusions

- Discounts are the primary driver of sales. **Price & discount optimization:**

Within the ABC segmentation framework, it is recommended to

- (1) limit discounts for Group B (mid-range) products to a maximum of 50% in order to preserve profitability;
- (2) implement discount promotions for Group C products before their phase-out

Implementation of these customer base strategies will help achieve:

- (1) higher product margins;
- (2) lower losses from over-discounting;
- (3) balanced pricing structure

- **Customer base strategy:**

- (1) personalized email offers → 30/60/90 days post-purchase;
- (2) referral program;
- (3) loyalty system with cumulative discounts

Implementation of these customer base strategies will help achieve:

- (1) increased retention;
- (2) more repeat purchases & higher LTV;
- (3) DAU/WAU/MAU growth → stable order flow