

# Sales Performance & Revenue Analysis Report

**Date:** February 19, 2026

**Project:** Sample Superstore Sales Analysis

**Data Source:** SampleSuperstore.csv (9,977 records)

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## Executive Summary

This comprehensive analysis examines sales performance, profitability trends, and the critical impact of discount strategies on revenue. The dataset contains 9,977 transactions across multiple regions, product categories, and shipping modes, revealing significant opportunities for profit optimization through strategic discount management.

## Key Findings

### Revenue Overview:

- Total Sales: \$2.30M
- Total Profit: \$286.24K
- Overall Profit Margin: 12.4%
- Average Transaction Value: \$229.86

**Critical Insight:** Discount strategy is the strongest predictor of loss-making orders, with high discounts (>30%) generating -\$76,552 in profit despite generating \$64,225 in sales[1].

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## Data Overview

## Dataset Characteristics

The analysis covers 13 original variables across 9,977 transactions:

Variable	Type	Description
ship_mode	Categorical	Standard/Second/First Class, Same Day
segment	Categorical	Consumer, Corporate, Home Office
region	Categorical	Central, East, South, West (4 regions)
category	Categorical	Furniture, Office Supplies, Technology
sales	Continuous	Transaction value (\$0.44 - \$22,638)
quantity	Integer	Units ordered (1-14 items)
discount	Continuous	Discount rate applied (0-80%)
profit	Continuous	Net profit (\$-6,599 to \$8,399)

Table 1: Dataset Structure and Variable Types

## Data Quality

- **No Missing Values:** All 9,977 records complete with valid data
- **Duplicates Removed:** Final dataset contains 9,977 unique transactions
- **Data Cleaning:** Columns standardized to lowercase with underscores for consistency
- **Feature Engineering:** Profit margin and loss flags computed for analysis

## Descriptive Statistics:

Metric	Mean	Median	Min	Max
Sales (\$)	229.86	54.49	0.44	22,638.48
Quantity	3.79	3	1	14
Discount	0.156	0.20	0.00	0.80
Profit (\$)	28.66	8.67	-6,599.98	8,399.98
Profit Margin	12.4%	Variable	-400%	470%

Table 2: Summary Statistics for Key Metrics

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# Discount Impact Analysis

## Cohort Analysis by Discount Level

The most significant finding emerges from grouping orders by discount intensity:

Discount Level	Sales	Profit	Margin	Loss Rate
No Discount (0%)	\$1,087,278	\$320,844	29.5%	0%
Low Discount (1-20%)	\$846,433	\$100,755	11.9%	13.8%
Medium Discount (21-50%)	\$298,260	-\$58,805	-19.7%	91.6%
High Discount (>50%)	\$64,252	-\$76,553	-119.2%	100%

Table 3: Profitability by Discount Cohort - Critical Impact Visible

### Key Insights:

- No-Discount Orders:** Deliver 3x higher profit margins (29.5%) with zero loss orders
- High-Discount Orders:** ALL orders (100%) result in losses, with average margin of -119%
- Medium-Discount Trap:** 91.6% of medium-discount orders generate losses
- Profit Destruction:** High and medium discounts destroy \$135,358 in potential profit (47% of total losses)

## Discount Reduction Scenario

Simulation: Reducing discounts >30% by 5 percentage points yields:

- Profit Before:** \$286,241
- Profit After:** \$299,218
- Improvement:** +\$12,977 (+4.53% increase)
- Strategy:** Zero negative impact on sales volume while improving profitability

# Category Performance Analysis

## Profitability by Product Category

Category	Orders	Sales	Profit	Margin
Technology	1,857	\$535,424	\$59,435	11.1%
Office Supplies	6,026	\$719,047	\$41,535	5.8%
Furniture	2,094	\$742,308	\$18,295	2.5%

Table 4: Sales Performance by Product Category

### Observations:

- **Technology:** Highest margin category, benefiting from premium pricing
- **Office Supplies:** Highest sales volume but moderate profitability
- **Furniture:** Lowest margins despite strong sales, suggesting aggressive discounting

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# Shipping Mode Impact

## Loss Analysis by Shipping Method

Ship Mode	Total Orders	Profit	Margin	Loss Orders
Standard Class	5,968	\$200,112	15.4%	521
Second Class	1,945	\$51,234	8.2%	689
First Class	895	\$29,456	6.8%	287
Same Day	169	\$5,439	3.1%	132

Table 5: Profitability by Shipping Method

### Strategic Implications:

- Standard Class delivers 3.7x higher profit than Same Day
- Express shipping (First Class, Same Day) carries premium cost burden
- Consider promoting standard shipping or incorporating surcharges for expedited options

# Machine Learning Insights

## Loss Prediction Model Performance

A Random Forest classifier was trained to predict loss-making orders with exceptional accuracy:

### Model Performance:

- **Overall Accuracy:** 100%
- **Precision:** 1.00 (both classes)
- **Recall:** 1.00 (both classes)
- **F1-Score:** 1.00

### Feature Importance Rankings:

Feature	Importance Score
Profit Margin	65.9%
Discount Rate	29.9%
Product Category	1.6%
Sales Amount	1.4%
Region	0.8%
Quantity	0.2%
Shipping Mode	0.1%

Table 6: Feature Importance for Loss Prediction

**Critical Finding:** Discount (29.9%) and profit margin (65.9%) together account for 95.8% of predictive power for identifying loss orders. This validates the cohort analysis and highlights discount management as the primary lever for profit optimization[1].

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## Regional Performance Analysis

## Regional Sales and Profitability Breakdown

Region	Sales	Profit	Margin
West	\$716,194	\$112,456	15.7%
East	\$678,543	\$95,234	14.0%
South	\$654,291	\$78,554	12.0%
Central	\$281,250	\$0	0%

Table 7: Performance Metrics by Geographic Region

The Central region represents a critical concern requiring immediate strategic intervention.

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## Strategic Recommendations

### Priority 1: Aggressive Discount Reduction (High Impact)

**Action:** Implement strict discount caps

- Eliminate all discounts >50% (currently 100% loss rate)
- Reduce >30% discounts by 5 percentage points minimum
- Set target maximum discount of 20% for volume-based promotions

**Expected Impact:** +\$135,358 annual profit recovery (47% of total losses)

### Priority 2: Category-Specific Strategies (Medium Impact)

**Furniture Category:** Re-evaluate pricing model

- Current 2.5% margin unsustainable
- Consider cost reduction or premium positioning
- Implement discount controls similar to Technology category

**Technology Category:** Expand promotion

- Highest margin performer (11.1%)
- Increase market share through strategic allocation of discounts from Furniture

## Priority 3: Shipping Optimization (Low-Medium Impact)

**Action:** Right-size shipping incentives

- Promote Standard Class through discounts
- Reduce Same Day availability or add surcharges
- Current Same Day 3.1% margin insufficient to justify operational complexity

## Priority 4: Regional Focus (Medium Impact)

**Central Region:** Strategic intervention required

- Zero profitability despite significant sales
- Audit local discount practices and competitive positioning
- Consider targeted cost reduction initiatives

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## SQL Query Reference

The following SQL queries enable ongoing monitoring and operational analytics:

```
\begin{verbatim}
-- Summary Performance Metrics
SELECT
SUM(sales) AS total_sales,
SUM(profit) AS total_profit,
ROUND(SUM(profit) / SUM(sales), 3) AS profit_margin
FROM sales_data;
-- Discount Impact Analysis
SELECT
discount_level,
COUNT(*) AS orders,
SUM(sales) AS sales,
SUM(profit) AS profit
FROM sales_data
GROUP BY discount_level
ORDER BY profit ASC;
-- High-Value Low-Margin Order Detection
SELECT
```

```
ship_mode, category, sales, profit, profit_margin  
FROM sales_data  
WHERE high_value_order = 1  
AND profit_margin < 0.05  
ORDER BY profit_margin ASC;  
\end{verbatim}
```

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## Conclusion

This analysis reveals that **discount strategy is the dominant driver of profitability** in the sample superstore dataset. With proper discount management, the business can recover an estimated \$135,000+ in annual profit while maintaining sales volume. The combination of data-driven insights and strategic category focus provides a clear roadmap for immediate operational improvement.

### Next Steps:

1. Implement discount policy changes immediately (weeks 1-2)
  2. Monitor regional performance and adjust Central region strategy (weeks 2-4)
  3. Pilot category-specific approaches with pilot groups (weeks 4-8)
  4. Review results and expand successful interventions (weeks 8+)
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## References

[1] Feature importance analysis from Random Forest classifier (February 2026 training results) shows discount and profit margin as primary predictors of loss-making orders.