



Barrel & Blend: MarginLift

CLIENT

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BARREL & BLEND

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BUSINESS CASE

EXECUTIVE SUMMARY

Barrel & Blend is a multi-vendor liquor marketplace addressing margin compression and inventory inefficiencies common to retail/wholesale beverage distribution. The analysis reveals that while Barrel & Blend benefits from a vast product selection, it faces challenges related to slow-moving inventory and variable vendor performance. This analysis targets fast, actionable improvements across pricing, vendor performance, and inventory turn to materially protect and grow gross margin.

ORGANIZATION OVERVIEW

Barrel & Blend is a privately held B2C/B2B multi-vendor marketplace, which specializes in alcoholic beverages and related accessories. Its mission is to offer a diverse and compliant portfolio of products by enabling a wide ecosystem of vendors, from small craft distilleries to national brands, to scale their businesses through a single, optimized platform.

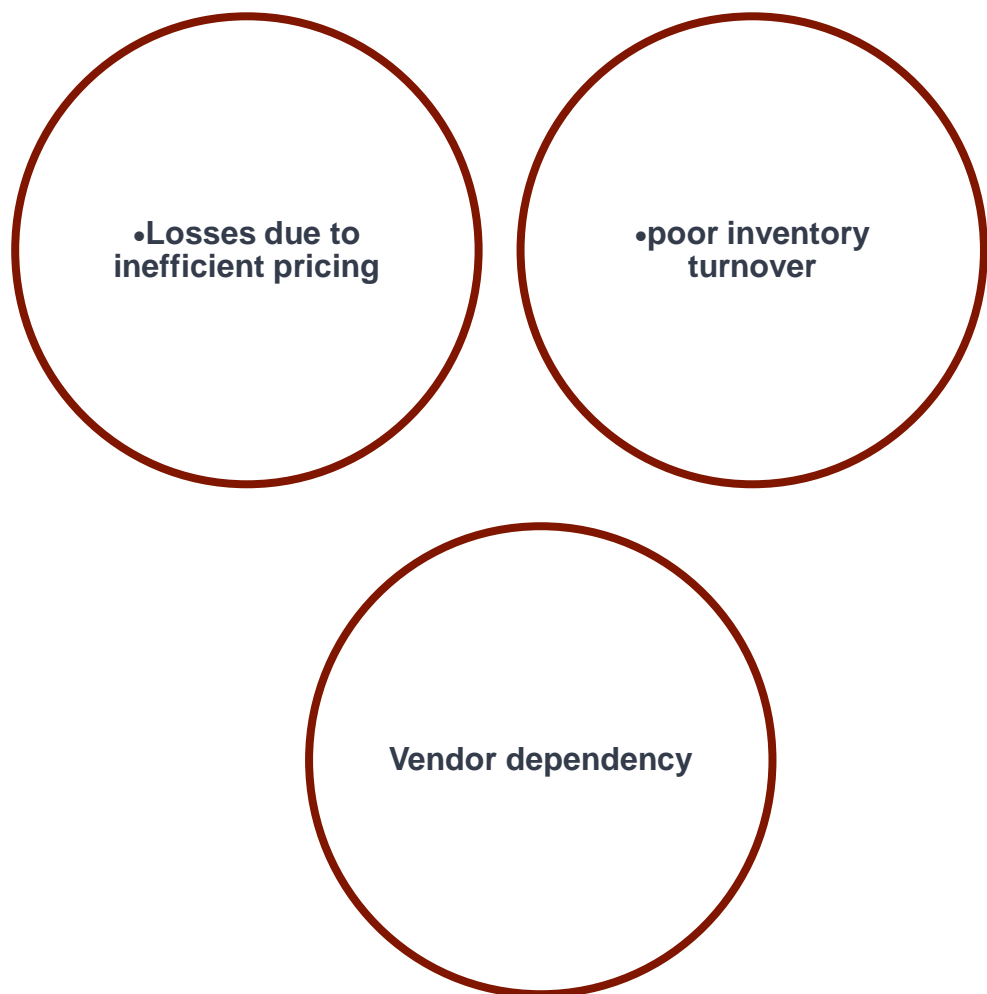
PROJECT DESCRIPTION

BUSINESS PROBLEM

Effective inventory and sales management are critical for optimizing profitability in the retail and wholesale industry. Companies need to ensure that they are not incurring losses due to inefficient pricing, poor inventory turnover, or vendor dependency. The goal of this analysis is to:

- Identify underperforming brands that require promotional or pricing adjustments
- Determine top vendors contributing to sales and gross profit.
- Analyze the impact of bulk purchasing on unit costs.
- Assess inventory turnover to reduce holding costs and improve efficiency.
- profitability variance between high-performing and low-performing vendors.

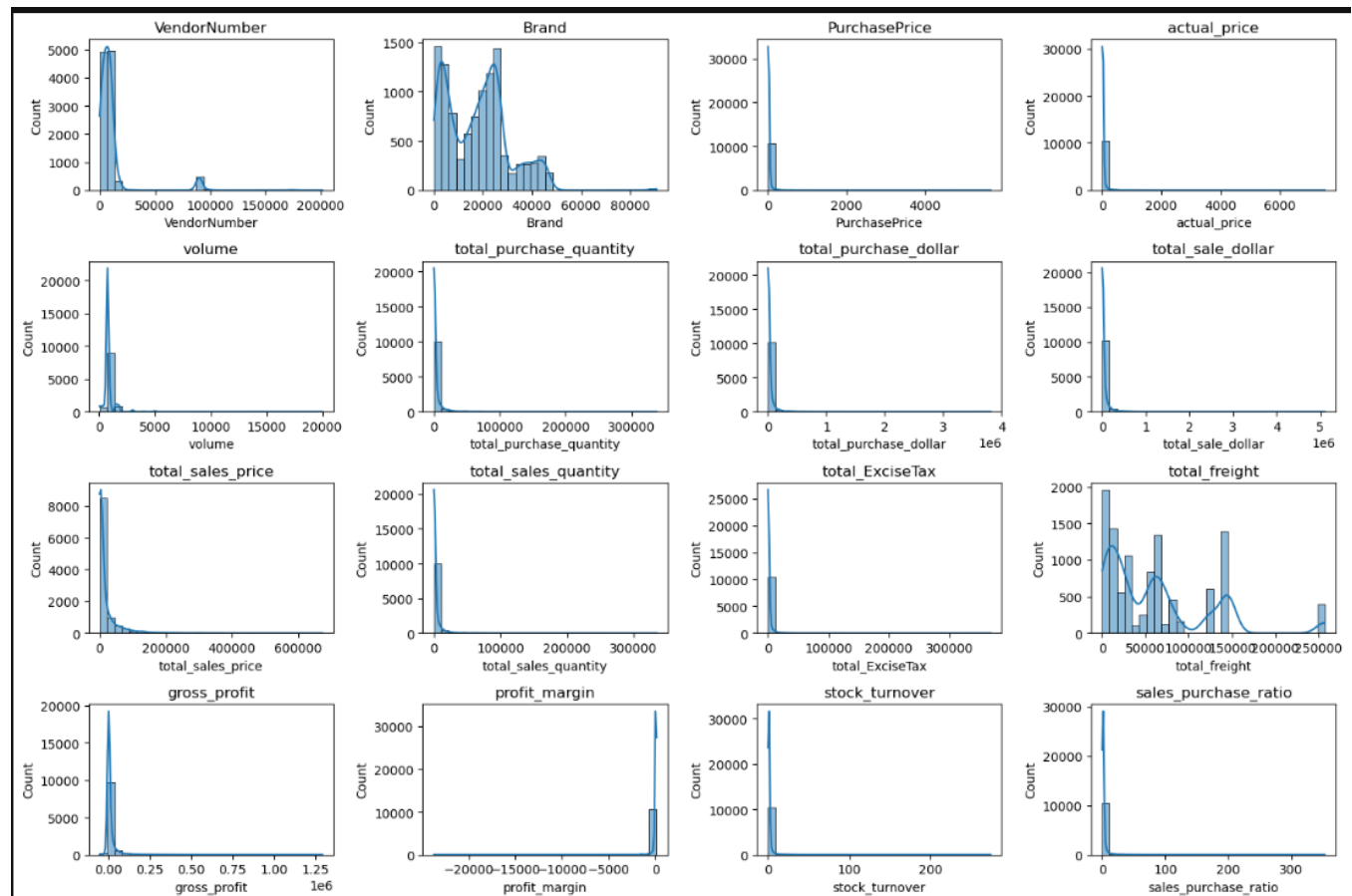
GOALS & OBJECTIVES



EXPLORATORY DATA ANALYSIS

SUMMARY STATISTICS

| | count | mean | std | min | 25% | 50% | 75% | max |
|-------------------------|---------|--------------|---------------|---------------|--------------|--------------|--------------|--------------|
| VendorNumber | 10692.0 | 10650.649458 | 18753.519148 | 2.000000 | 3951.000000 | 7153.000000 | 9552.000000 | 2.013590e+05 |
| Brand | 10692.0 | 18039.228769 | 12662.187074 | 58.000000 | 5793.500000 | 18761.500000 | 25514.250000 | 9.063100e+04 |
| PurchasePrice | 10692.0 | 24.385303 | 109.269375 | 0.360000 | 6.840000 | 10.455000 | 19.482500 | 5.681810e+03 |
| actual_price | 10692.0 | 35.643671 | 148.246016 | 0.490000 | 10.990000 | 15.990000 | 28.990000 | 7.499990e+03 |
| volume | 10692.0 | 847.360643 | 664.309116 | 50.000000 | 750.000000 | 750.000000 | 750.000000 | 2.000000e+04 |
| total_purchase_quantity | 10692.0 | 3140.886831 | 11095.086769 | 1.000000 | 36.000000 | 262.000000 | 1975.750000 | 3.376600e+05 |
| total_purchase_dollar | 10692.0 | 30106.693372 | 123067.799627 | 0.710000 | 453.457500 | 3655.465000 | 20738.245000 | 3.811252e+06 |
| total_sale_dollar | 10692.0 | 42239.074419 | 167655.265984 | 0.000000 | 729.220000 | 5298.045000 | 28396.915000 | 5.101920e+06 |
| total_sales_price | 10692.0 | 18793.783627 | 44952.773386 | 0.000000 | 289.710000 | 2857.800000 | 16059.562500 | 6.728193e+05 |
| total_sales_quantity | 10692.0 | 3077.482136 | 10952.851391 | 0.000000 | 33.000000 | 261.000000 | 1929.250000 | 3.349390e+05 |
| total_ExciseTax | 10692.0 | 1774.226259 | 10975.582240 | 0.000000 | 4.800000 | 46.570000 | 418.650000 | 3.682428e+05 |
| total_freight | 10692.0 | 61433.763214 | 60938.458032 | 0.090000 | 14069.870000 | 50293.620000 | 79528.990000 | 2.570321e+05 |
| gross_profit | 10692.0 | 12132.376263 | 46224.334792 | -52003.000000 | 53.000000 | 1400.000000 | 8660.500000 | 1.290668e+06 |
| profit_margin | 10692.0 | -15.622228 | 443.558125 | -23731.075186 | 13.282259 | 30.397636 | 39.956614 | 9.972218e+01 |
| stock_turnover | 10692.0 | 1.706793 | 6.020460 | 0.000000 | 0.807229 | 0.981529 | 1.039342 | 2.745000e+02 |
| sales_purchase_ratio | 10692.0 | 2.464085 | 8.472800 | 0.000000 | 1.000000 | 1.000000 | 2.000000 | 3.530000e+02 |



Negative & Zero Values:

Gross Profit: Minimum of -53003, indicating potential losses due to high cost or heavy discounts. This could be due to selling products at lower price than their purchase costs.

Profit Margin: Has minimum of -23731.07 indicating instances where revenue is lower than the total cost, leading to negative profit margin.

Total Sales Quantity & Dollars: Some value zero sales, indicating they were purchased but never sold. These may be slow-moving or obsolete stock, leading to inventory inefficiencies.

Outliers Detected by High Standard Deviations:

Purchase & Actual price: The maximum value (5681.81 & 7499.99) is significantly higher than the mean (24.385303 & 35.643671), indicating either massive outliers or premium product.

Freight Cost: Extreme variation in the minimum and the maximum value (0.090000 & 257,032.1) suggesting logistic inefficiency, bulk shipments, or irregular shipping cost across different products.

Stock Turnover: Ranges from 0 to 274.5, suggesting some products sell rapidly while others remain unsold for long periods. A value greater than 1 indicates that sales for a product exceed the purchased quantity due to older stock fulfilling orders.

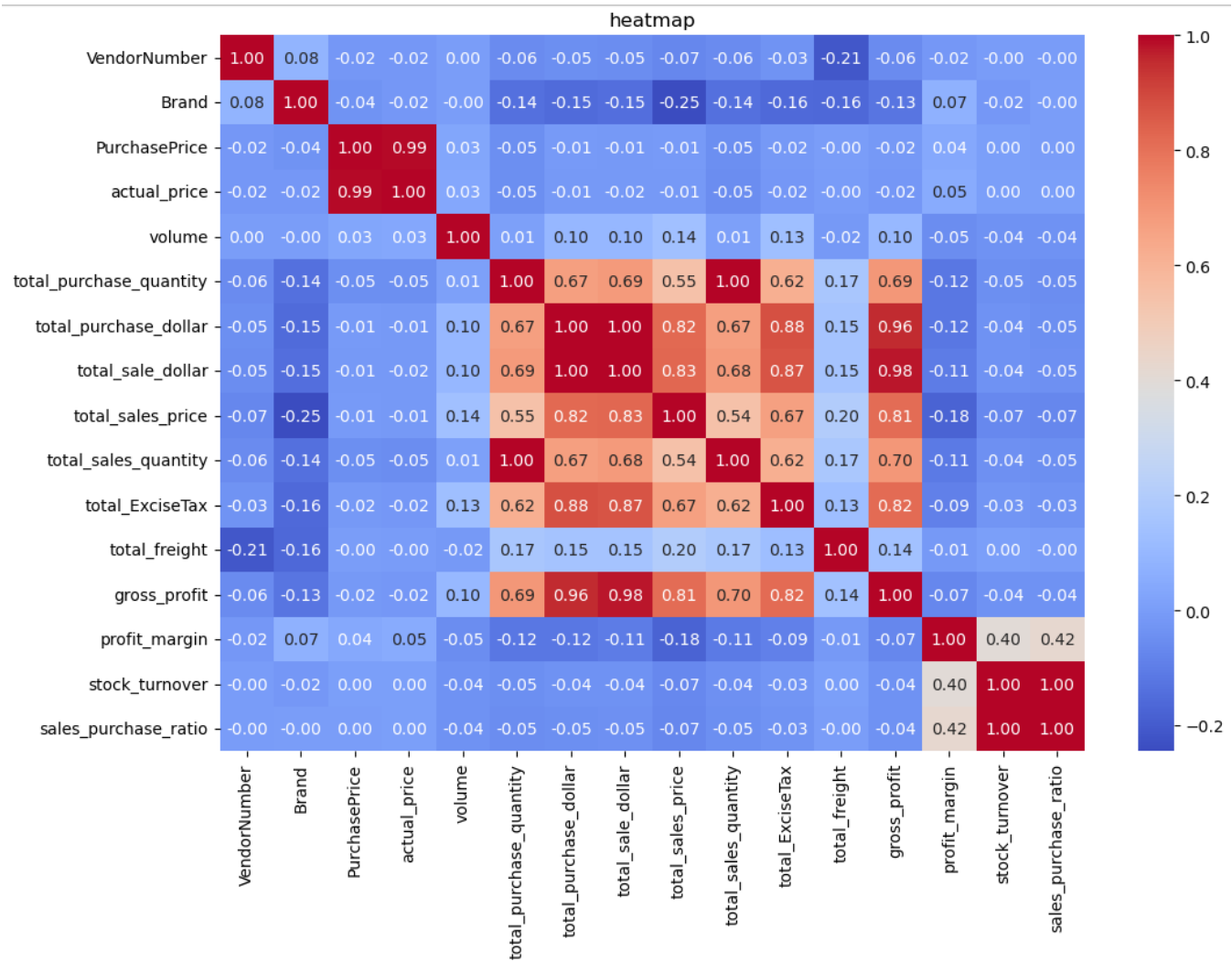
Data Filtering

From the information gathered from the statistical insights, we gather that products with 0 sale quantity and negative gross profit and profit margin are inconsistent and need to be filtered out.

To enhance the reliability of the insights, we removed inconsistent data points where:

- Gross profit ≤ 0 (to exclude transactions leading to losses)
- Profit margin ≤ 0 (to ensure analysis focuses on profitable transaction)
- Total sales quantity = 0 (to eliminate inventory that was never sold)

Correlation insights



Purchase prices vs Total sale & Gross profit: Purchase price has weak correlation with total sale dollar and gross profit (-0.01, -0.016) suggesting that price variation does not significantly impact sales revenue or profit.

Total purchase quantity vs Total Sale quantity: strong correlation (0.999), confirming efficient inventory turnover.

Profit margin vs Total sales price: negative correlation (-0.179), suggesting increasing sales prices may lead to reduced margins, possibly due too competitive pricing pressures.

Stock turnover vs Gross profit & Profit margin: Weak negative correlation (-0.38, -0.055) indicating that a faster turnover doesn't necessarily result in higher profitability.

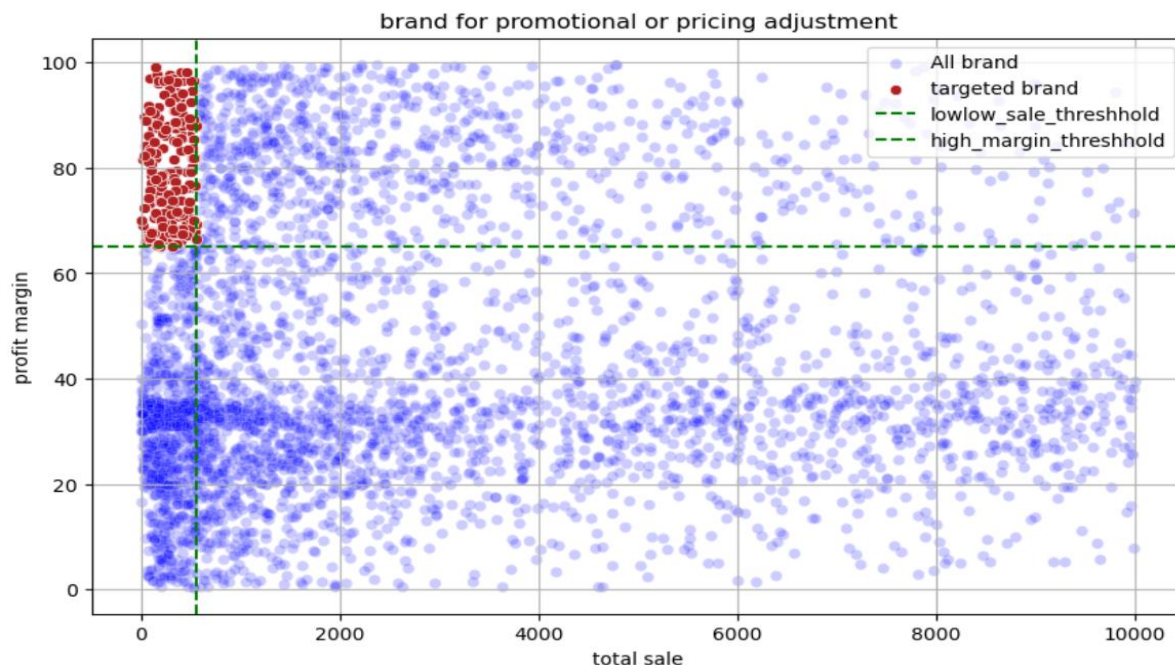
Research Questions & Key findings

1. Underperforming Brands requiring promotional or pricing adjustment

Brands with low sales but high profit margins:

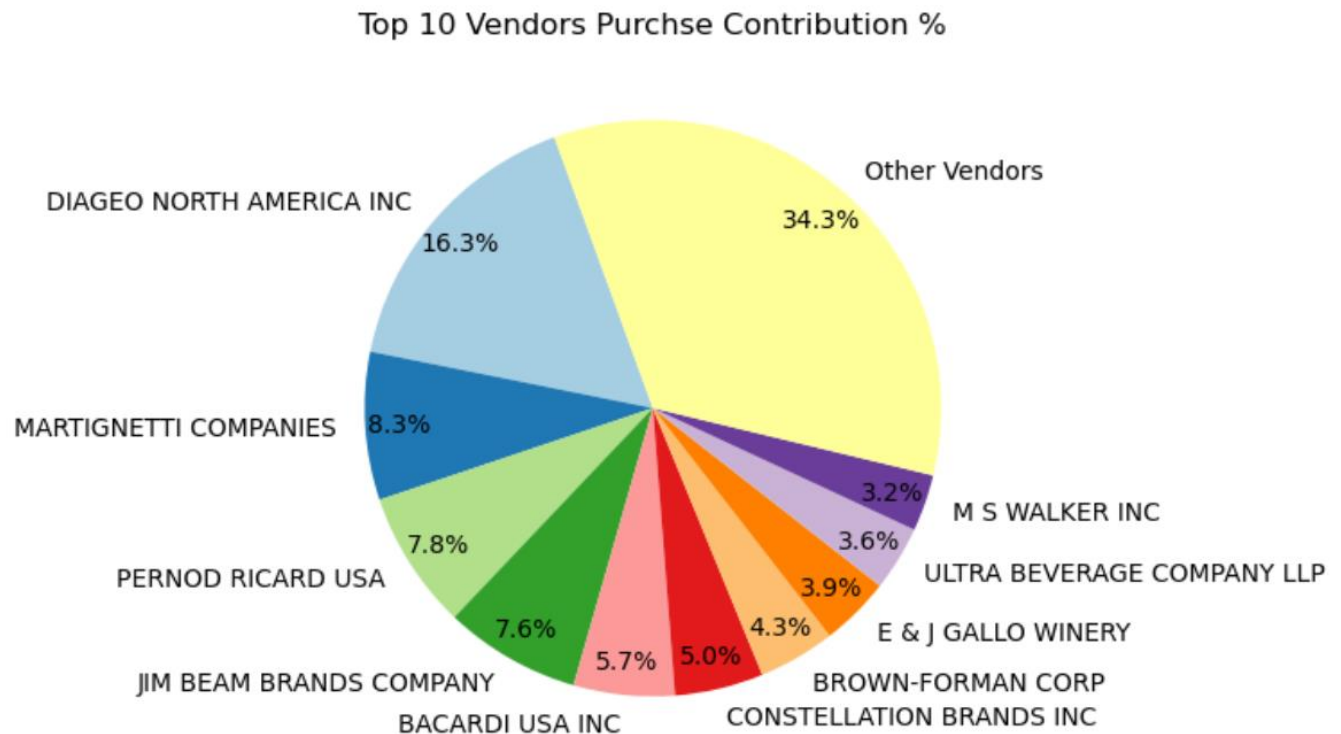
| | Description | total_sale_dollar | profit_margin |
|----------------------|------------------------------|-------------------|---------------|
| 6953 | The Club Strawbry Margarita | 143.28 | 99.106644 |
| 1873 | Chi Chi's Chocolate Malt RTD | 461.58 | 98.141167 |
| 452 | Bacardi Oakheart Spiced Trav | 399.60 | 98.098098 |
| 5973 | Riunite Sweet White | 161.73 | 97.693687 |
| 4589 | Mad Dogs & Englishmen Jumil | 279.80 | 97.569693 |
| ... | ... | ... | ... |
| 2472 | Dom Piquemal Cotes du Roussi | 359.76 | 65.599288 |
| 7443 | Viu Manent Cab Svgn La Capil | 167.88 | 65.522993 |
| 6155 | Samos High Peaks Muscat | 160.86 | 65.274151 |
| 4761 | McCormick Cherry Vodka | 188.73 | 65.172469 |
| 7065 | Three Olives Tomato Vodka | 314.79 | 65.122780 |
| 198 rows × 3 columns | | | |

198 brands exhibit lower sales but higher profit margins, which could benefit from targeted marketing, promotion or price optimizations to increase volume without compromising profitability.



2. Top vendors by sales & purchase Contribution

The top 10 vendors contribute 65.69% of total purchases, while the remaining vendors contribute only 34.31%. This over-reliance on a few vendors may introduce risk such as supply chain disruptions, indicating a need for diversification



TOP 10 VENDORS

| VendorName | |
|----------------------------|--------|
| DIAGEO NORTH AMERICA INC | 67.99M |
| MARTIGNETTI COMPANIES | 39.33M |
| PERNOD RICARD USA | 32.06M |
| JIM BEAM BRANDS COMPANY | 31.42M |
| BACARDI USA INC | 24.85M |
| CONSTELLATION BRANDS INC | 24.22M |
| E & J GALLO WINERY | 18.40M |
| BROWN-FORMAN CORP | 18.25M |
| ULTRA BEVERAGE COMPANY LLP | 16.50M |
| M S WALKER INC | 14.71M |

TOP 10 BRANDS

| Description | |
|-------------------------|-------|
| Jack Daniels No 7 Black | 7.96M |
| Tito's Handmade Vodka | 7.40M |
| Grey Goose Vodka | 7.21M |
| Capt Morgan Spiced Rum | 6.36M |
| Absolut 80 Proof | 6.24M |
| Jameson Irish Whiskey | 5.72M |
| Ketel One Vodka | 5.07M |
| Baileys Irish Cream | 4.15M |
| Kahlua | 3.60M |
| Tanqueray | 3.46M |

The top vendor is **DIAGEO NORTH AMERICA INC** with 67.99 million sales and the top brand is **Jack Daniels No 7 Black** with 7.96 million sales.

Across all 10 Vendors, Total sale ranged from \$14,706,338.59 to \$67,990,099.42, purchase dollar ranged from \$9,764,192.72 to \$50,097,226.16, and Gross profit ranged from \$4,942,136 to \$17,892,873.

Jack Daniels No 7 accounted for 1.80% of total sales among 7,703 distinct brands.

3. Impact of bulk purchasing on cost savings

Vendors buying in large quantity receive a 72% lower unit cost (\$ 39.10 per unit vs \$ 10.77).

Bulk pricing strategies encourage large orders, increasing total sales while maintaining profitability.

| Unit_purchase_price | |
|---------------------|-----------|
| order_size | |
| small | 39.103879 |
| medium | 15.480793 |
| large | 10.778675 |



4. Identifying vendors with low inventory turnover

Total Unsold inventory capital: \$2.71M

Slow-moving inventory increases storage costs, reduces cash flow efficiency, and affects overall profitability.

Identifying vendors with low inventory turnover enables better stock management, minimizing financial strain

| | VendorName | unsold_inventory_value |
|-----|--------------------------|------------------------|
| 25 | DIAGEO NORTH AMERICA INC | 722209.05 |
| 46 | JIM BEAM BRANDS COMPANY | 554665.63 |
| 68 | PERNOD RICARD USA | 470625.61 |
| 116 | WILLIAM GRANT & SONS INC | 401960.83 |
| 30 | E & J GALLO WINERY | 228138.73 |
| 79 | SAZERAC CO INC | 198436.41 |
| 11 | BROWN-FORMAN CORP | 177733.74 |
| 20 | CONSTELLATION BRANDS INC | 133617.62 |
| 61 | MOET HENNESSY USA INC | 126477.70 |
| 77 | REMY COINTREAU USA INC | 118598.15 |

| | VendorName | stock_turnover |
|---|-----------------------------|----------------|
| 0 | ALISA CARR BEVERAGES | 0.615385 |
| 1 | HIGHLAND WINE MERCHANTS LLC | 0.708333 |
| 2 | PARK STREET IMPORTS LLC | 0.751306 |
| 3 | Circa Wines | 0.755676 |
| 4 | Dunn Wine Brokers | 0.766022 |
| 5 | CENTEUR IMPORTS LLC | 0.773953 |
| 6 | SMOKY QUARTZ DISTILLERY LLC | 0.783835 |
| 7 | TAMWORTH DISTILLING | 0.797078 |
| 8 | THE IMPORTED GRAPE LLC | 0.807569 |
| 9 | WALPOLE MTN VIEW WINERY | 0.820548 |

5. Statistical Validation of Profit Margin Difference

Hypothesis Testing:

H0 (Null Hypothesis): No significant difference in profit margins between top and low performing vendors.

H1(Alternative Hypothesis): A significant difference exists in profit margins between the two vendor groups.

Result: There is a significant difference in profit margin between the top performing and low performing vendor

The null hypothesis is rejected, confirming that the two groups operate distinctly different profitability models.

Implication: High-margin vendors may benefit from better pricing strategies, while top-selling vendors could focus in cost efficiency

Final Recommendations

- Re-evaluate pricing for low-sales, high-margin brands to boost sales volume without sacrificing profitability
- Diversify vendor partnerships to reduce dependency on a few suppliers and mitigate supply chain risk
- Leverage bulk purchasing advantage to maintain competitive pricing while optimizing inventory management
- Optimize slow-moving inventory by adjusting purchase quantities, launching clearance sale, or revising storage strategies
- Enhance marketing and distribution strategies for low-performing vendors to drive higher sales volumes without compromising profit margins.
- By implementing these recommendations, Barrel & Blend can achieve overall operating efficiency.