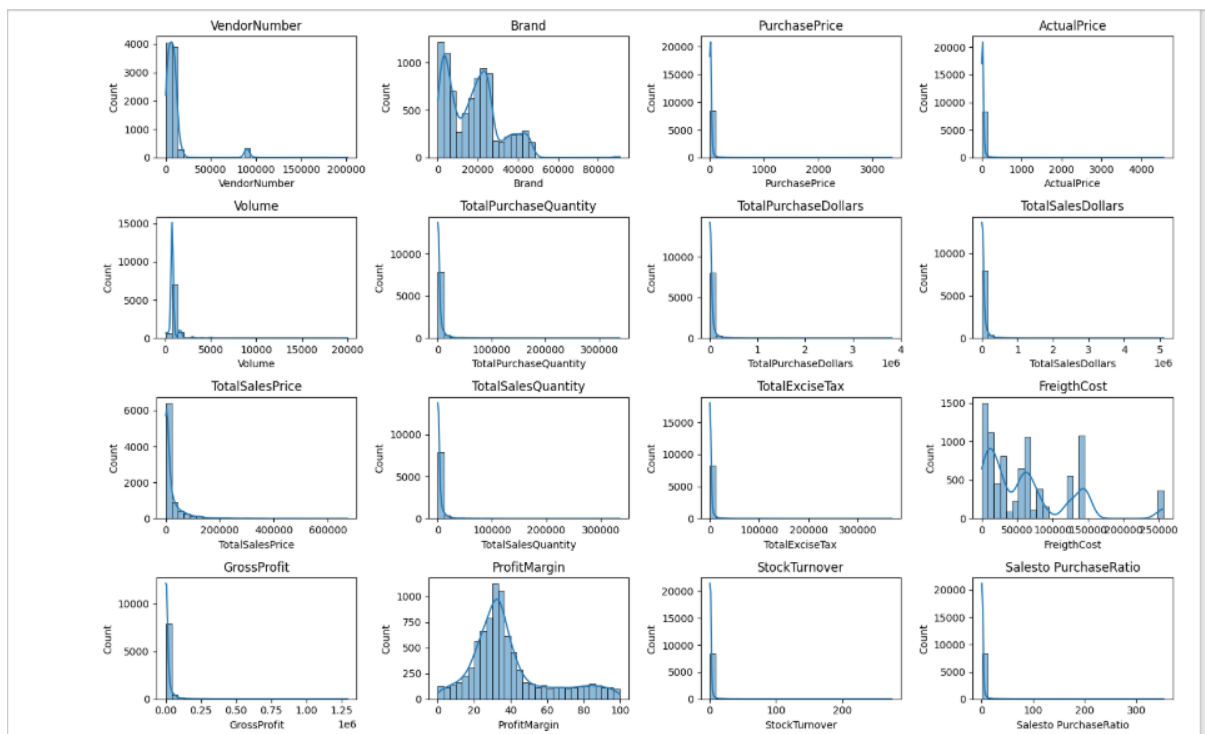


VENDOR SALES PERFORMANCE (Report)

Exploratory Data Analysis Insights

Summary Statistics

| | count | mean | std | min | 25% | 50% | 75% | max |
|-----------------------|---------|--------------|---------------|-----------|--------------|--------------|--------------|--------------|
| VendorNumber | 10692.0 | 1.065065e+04 | 18753.519148 | 2.00 | 3951.000000 | 7153.000000 | 9552.000000 | 2.013590e+05 |
| Brand | 10692.0 | 1.803923e+04 | 12662.187074 | 58.00 | 5793.500000 | 18761.500000 | 25514.250000 | 9.063100e+04 |
| PurchasePrice | 10692.0 | 2.438530e+01 | 109.269375 | 0.36 | 6.840000 | 10.455000 | 19.482500 | 5.681810e+03 |
| ActualPrice | 10692.0 | 3.564367e+01 | 148.246016 | 0.49 | 10.990000 | 15.990000 | 28.990000 | 7.499990e+03 |
| Volume | 10692.0 | 8.473605e+02 | 664.309212 | 50.00 | 750.000000 | 750.000000 | 750.000000 | 2.000000e+04 |
| TotalPurchaseQuantity | 10692.0 | 3.140887e+03 | 11095.086769 | 1.00 | 36.000000 | 262.000000 | 1975.750000 | 3.376600e+05 |
| TotalPurchaseDollars | 10692.0 | 3.010669e+04 | 123067.799627 | 0.71 | 453.457500 | 3655.465000 | 20738.245000 | 3.811252e+06 |
| TotalSalesDollars | 10692.0 | 4.223907e+04 | 167655.265984 | 0.00 | 729.220000 | 5298.045000 | 28396.915000 | 5.101920e+06 |
| TotalSalesPrice | 10692.0 | 1.879378e+04 | 44952.773386 | 0.00 | 289.710000 | 2857.800000 | 16059.562500 | 6.728193e+05 |
| TotalSalesQuantity | 10692.0 | 3.077482e+03 | 10952.851391 | 0.00 | 33.000000 | 261.000000 | 1929.250000 | 3.349390e+05 |
| TotalExciseTax | 10692.0 | 1.774226e+03 | 10975.582240 | 0.00 | 4.800000 | 46.570000 | 418.650000 | 3.682428e+05 |
| FreighCost | 10692.0 | 6.143376e+04 | 60938.458032 | 0.09 | 14069.870000 | 50293.620000 | 79528.990000 | 2.570321e+05 |
| GrossProfit | 10692.0 | 1.213238e+04 | 46224.337964 | -52002.78 | 52.920000 | 1399.640000 | 8660.200000 | 1.290668e+06 |
| ProfitMargin | 10692.0 | -inf | NaN | -inf | 13.324515 | 30.405457 | 39.956135 | 9.971666e+01 |
| StockTurnover | 10692.0 | 1.706793e+00 | 6.020460 | 0.00 | 0.807229 | 0.981529 | 1.039342 | 2.745000e+02 |
| Salesto PurchaseRatio | 10692.0 | 2.504390e+00 | 8.459067 | 0.00 | 1.153729 | 1.436894 | 1.665449 | 3.529286e+02 |



Summary statistics insights

NEGATIVE & ZERO VALUES:

Gross Profit: min value is -52002.78, indicating losses .Some products or transactions may be selling at a loss due to high costs or selling at discounts lower than the purchase price.

Profit margin: Has a min of - infinity, which suggests cases where revenue is zero or even lower than costs.

Total Sales Quantity & Sales Dollars: Min value are 0, meaning some products were purchased but never sold. These could be slow-moving or obsolete stock.

OUTLIERS INDICATED BY HIGH STANDARD DEVIATIONS:

Purchase and Actual Prices: The max value are significantly higher than the mean, indicating potential premium products.

Freight Costs: Huge variation from 0.09 to 257032.07 suggests logistics inefficiencies or bulk shipments.

Stock Turnover: Ranges from 0 to 274.5, implying some products sell extremely fast while others remain in stock indefinitely. Value more than 1 indicates that sold quantity for that product is higher than purchased quantity due to either sales are being fulfilled from older stock.

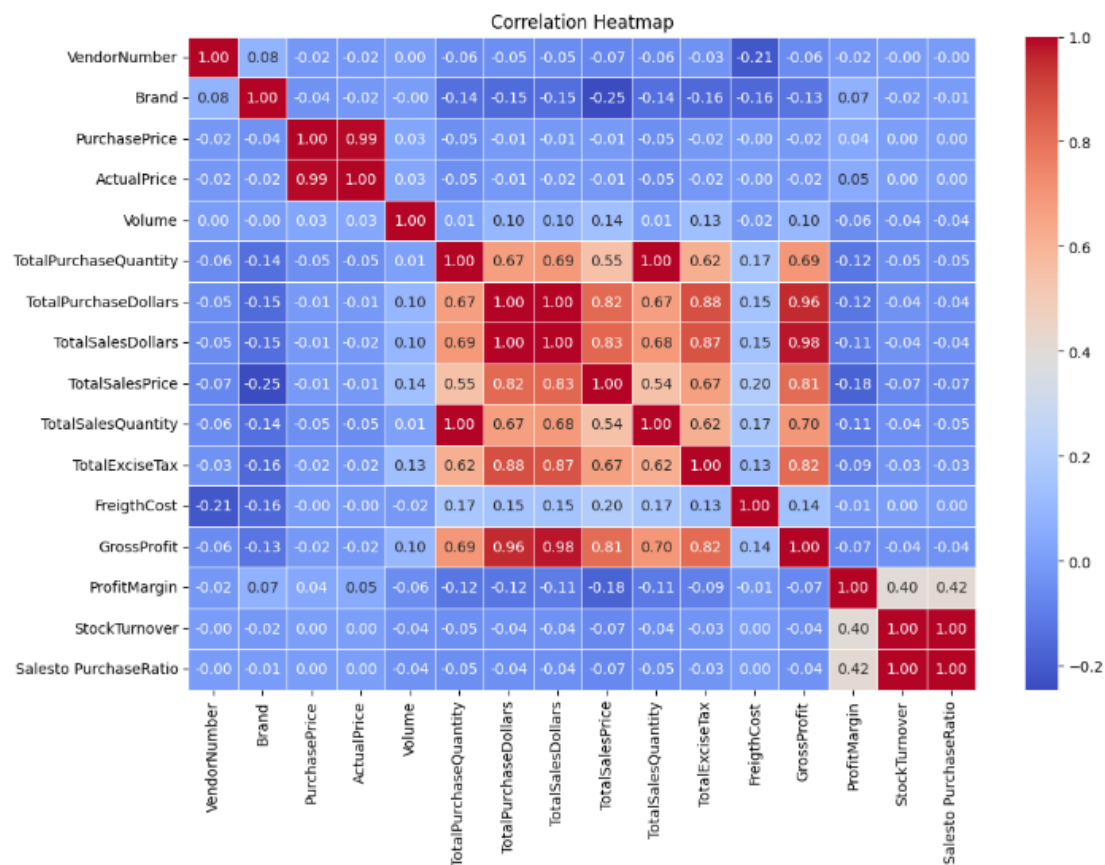
Data Filtering

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 focus on profitable transactions).
- Total Sales Quantity = 0 (to eliminate inventory that was never sold).

Correlation Insights

- Purchase price has weak correlations with **total sales dollars (-0.012)** and **gross Profit (-0.016)** suggesting that the price variation do not significantly impact sales revenue or profit.
- Strong correlation between **total purchase quantity and total sales quantity (0.999)**, confirming efficient inventory turnover.
- **Negative correlation between profit margin and Total Sales (-0.179)** suggests that as sales price increases, margins decreases, possibly due to competitive pricing pressures.
- Stock turnover has weak negative correlations with both **Gross Profit (-0.038)** and **profit margin (-0.055)**, indicating that faster turnover does not necessarily result in higher profitability.



Research Question's and Key Findings

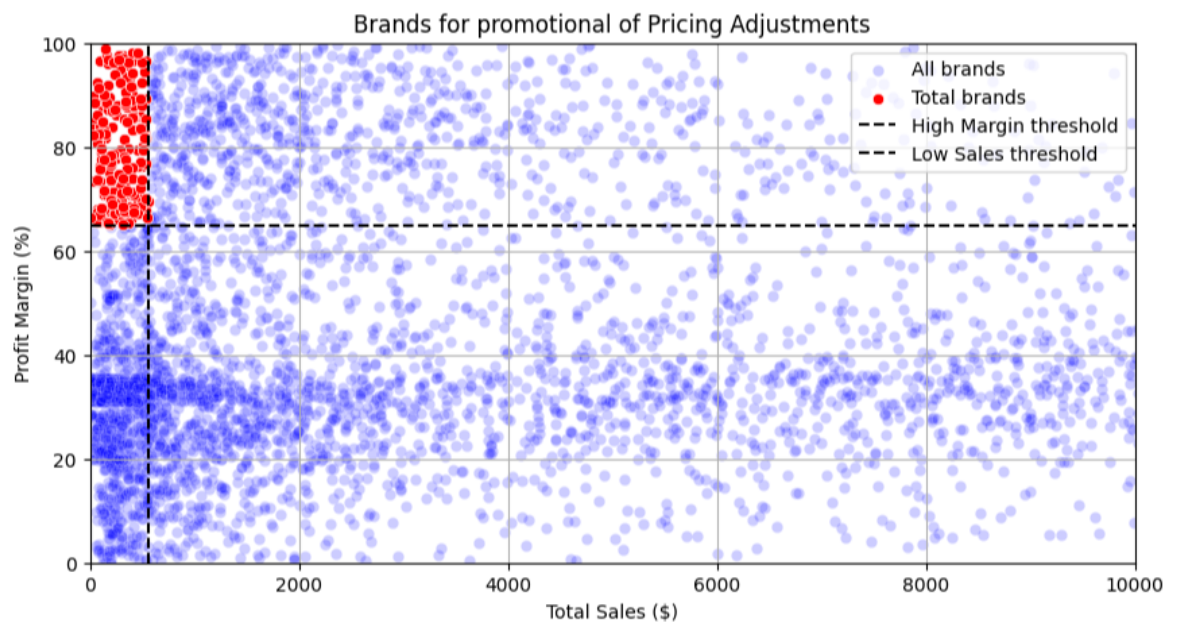
1. Brands for Promotional or Pricing Adjustments

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

Brands with low Sales and High Profit margin:

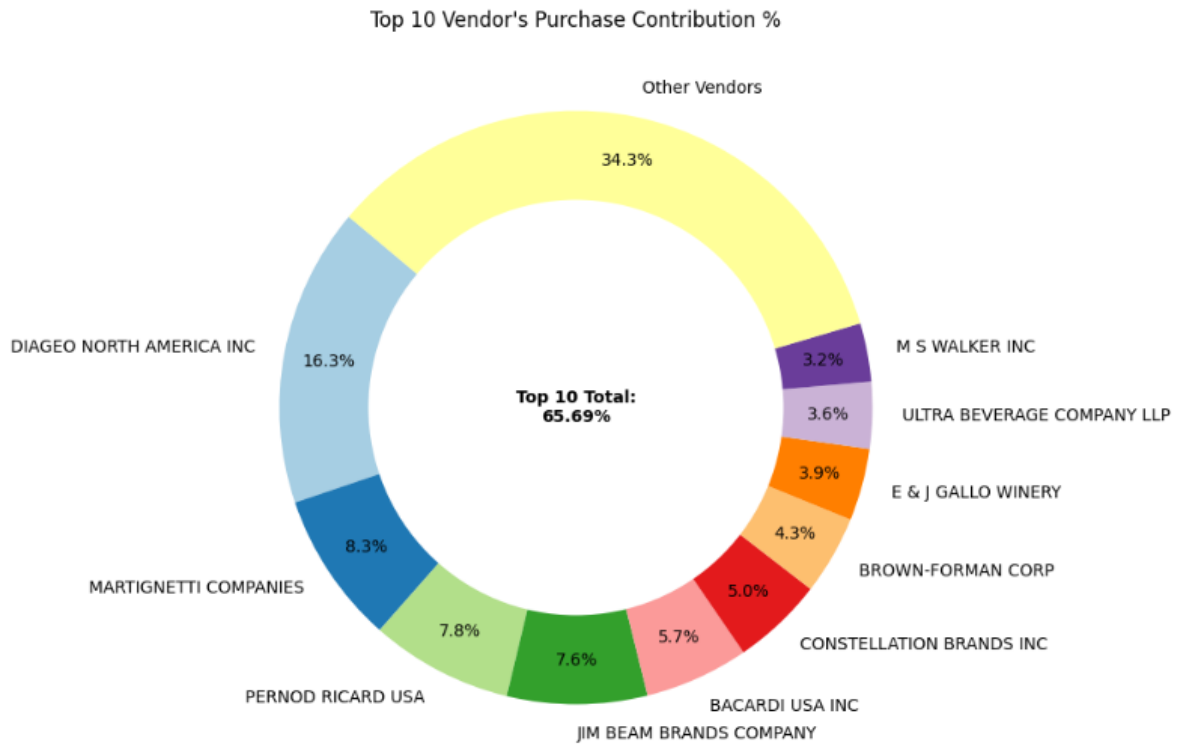
| | Description | TotalSalesDollars | ProfitMargin |
|------|------------------------------|-------------------|--------------|
| 6199 | Santa Rita Organic Svgn Bl | 9.99 | 66.466466 |
| 2369 | Debauchery Pnt Nr | 11.58 | 65.975820 |
| 2070 | Concannon Glen Ellen Wh Zin | 15.95 | 83.448276 |
| 2188 | Crown Royal Apple | 27.86 | 89.806174 |
| 6237 | Sauza Sprklg Wild Berry Marg | 27.96 | 82.153076 |
| ... | ... | ... | ... |
| 5074 | Nanbu Bijin Southern Beauty | 535.68 | 76.747312 |
| 2271 | Dad's Hat Rye Whiskey | 538.89 | 81.851584 |
| 57 | A Bichot Clos Marechaudes | 539.94 | 67.740860 |
| 6245 | Sbragia Home Ranch Merlot | 549.75 | 66.444748 |
| 3326 | Goulee Cos d'Estournel 10 | 558.87 | 69.434752 |

198 rows × 3 columns



2. Top Vendor's by Sale & Purchase Contribution

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



3. Impact of Bulk Purchasing on Cost Saving's

- Vendors buying in bulk (Large order size) get the lowest unit price (\$10.78 per unit).
- The price difference between Small and Large orders is substantial (~72% reduction in unit price).
- This suggests that bulk pricing strategies encourage vendors to purchase in larger volumes, leading to higher overall sales despite lower per unit revenue.

| UnitPurchasePrice | |
|-------------------|-----------|
| OrderSize | |
| Small | 39.068186 |
| Medium | 15.486414 |
| Large | 10.777625 |

4. Identifying Vendor's with Low Inventory Turnover

Total Unsold Inventory Capital: \$2.71M

Slow moving Inventory increases storage costs, reduce cash flow efficiency, and affects overall profitability.

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

| | | StockTurnover |
|------------|-----------------------------|---------------|
| VendorName | | |
| | ALISA CARR BEVERAGES | 0.615385 |
| | HIGHLAND WINE MERCHANTS LLC | 0.708333 |
| | PARK STREET IMPORTS LLC | 0.751306 |
| | Circa Wines | 0.755676 |
| | Dunn Wine Brokers | 0.766022 |
| | CENTEUR IMPORTS LLC | 0.773953 |
| | SMOKY QUARTZ DISTILLERY LLC | 0.783835 |
| | TAMWORTH DISTILLING | 0.797078 |
| | THE IMPORTED GRAPE LLC | 0.807569 |
| | WALPOLE MTN VIEW WINERY | 0.820548 |

| | | VendorName | UnsoldInventoryValue |
|-----|--------------------------|------------|----------------------|
| 25 | DIAGEO NORTH AMERICA INC | | 722.21K |
| 46 | JIM BEAM BRANDS COMPANY | | 554.67K |
| 68 | PERNOD RICARD USA | | 470.63K |
| 116 | WILLIAM GRANT & SONS INC | | 401.96K |
| 30 | E & J GALLO WINERY | | 228.28K |
| 79 | SAZERAC CO INC | | 198.44K |
| 11 | BROWN-FORMAN CORP | | 177.73K |
| 20 | CONSTELLATION BRANDS INC | | 133.62K |
| 61 | MOET HENNESSY USA INC | | 126.48K |
| 77 | REMY COINTREAU USA INC | | 118.60K |

5. Profit Margin Comparison: High vs. Low-Performing Vendors

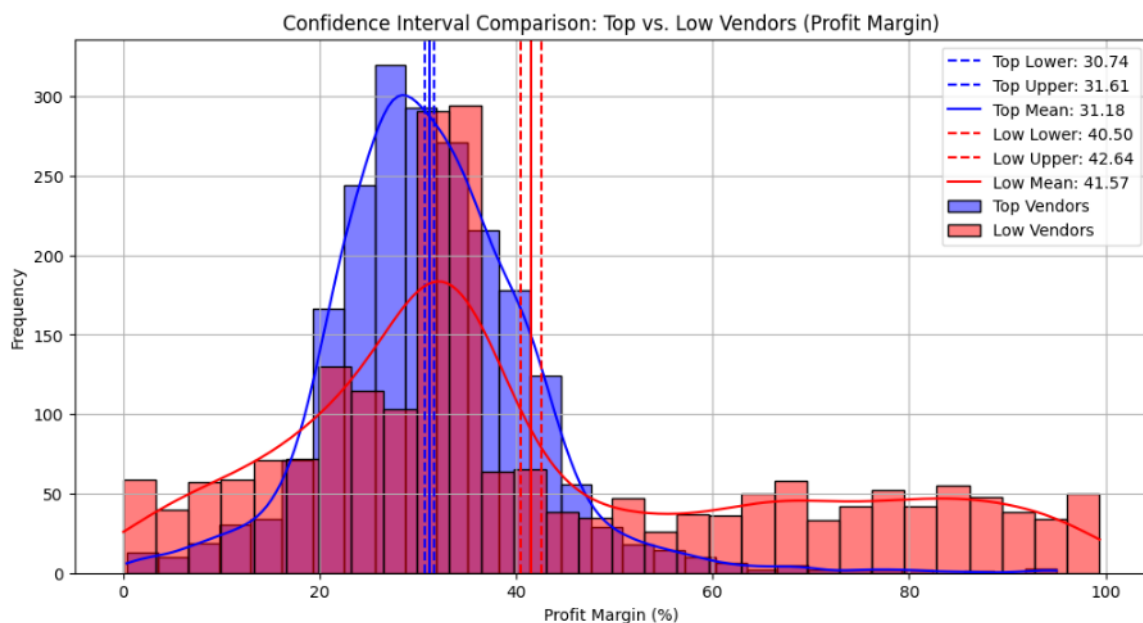
Top Vendors Profit Margin 95% CI: (30.74%, 31.61%), Mean: 31.18%

Low Vendors Profit Margins 95% CI: (40.50%, 42.64%), Mean: 41.57%

This suggests that vendors with lower sales tend to maintain higher profit margins, potentially due to premium pricing or lower operational costs.

For High-Performing Vendors: If they aim to improve profitability, they could explore selective price adjustments, cost optimization, or bundling strategies.

For Low-Performing Vendors: Despite higher margins, their low sales volume might indicate a need for better marketing, competitive pricing, or improved distribution strategies.



6. Statistical Validation of Profit Margin Differences

HYPOTHESIS Testing:

H_0 (Null Hypothesis): There is no significant difference in the mean profit margins of top-performing and low-performing vendors.

H_1 (Alternative Hypothesis): The mean profit margins of top-performing and low-performing vendors are significantly different

Result:

The Null Hypothesis is rejected, confirming that the two groups operate under distinctly different profitability models.

Implication:

High margin vendors may benefit from better pricing strategies, while top selling vendors could focus on cost efficiency.

Final Recommendations

- Re-evaluate pricing for low-sales, high margin brands to boost sales volume without sacrificing profitability.
- Diversify vendor partnership to reduce dependency on a few suppliers and mitigate supply chain risks.
- Leverage bulk purchasing advantages to maintain competitive pricing while optimizing inventory management.
- Optimize slow-moving inventory by adjusting purchase quantities, launching clearance sales, 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, the company can achieve sustainable profitability, mitigate risks, and enhance overall operational efficiency.