The background is a solid dark purple. In the top-left corner, there are several parallel pink lines extending diagonally towards the center. In the bottom-left corner, there are several overlapping pink rectangular outlines. In the bottom-right corner, there are several overlapping pink rectangular outlines, some of which are rotated diagonally.

VENDOR PERFORMANCE ANALYSIS

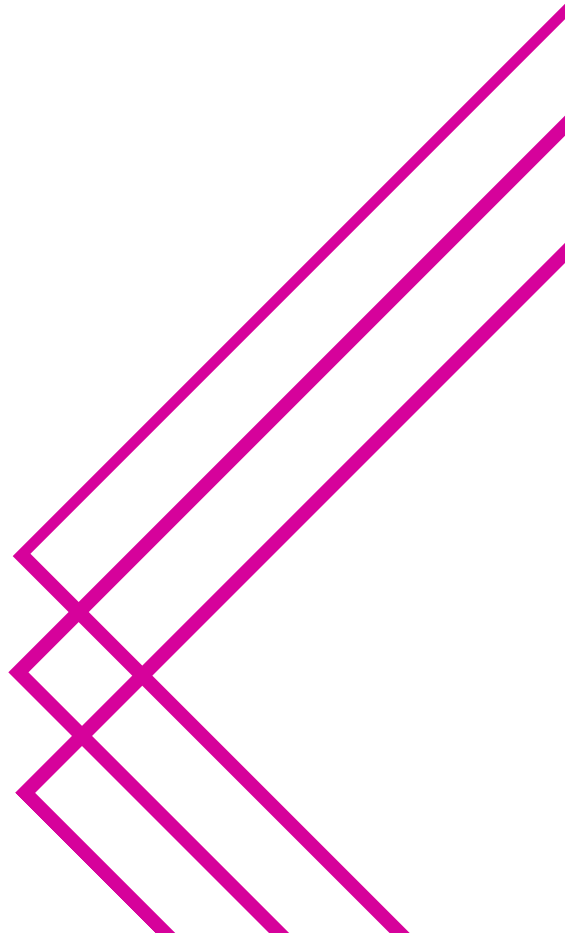


Executive Summary

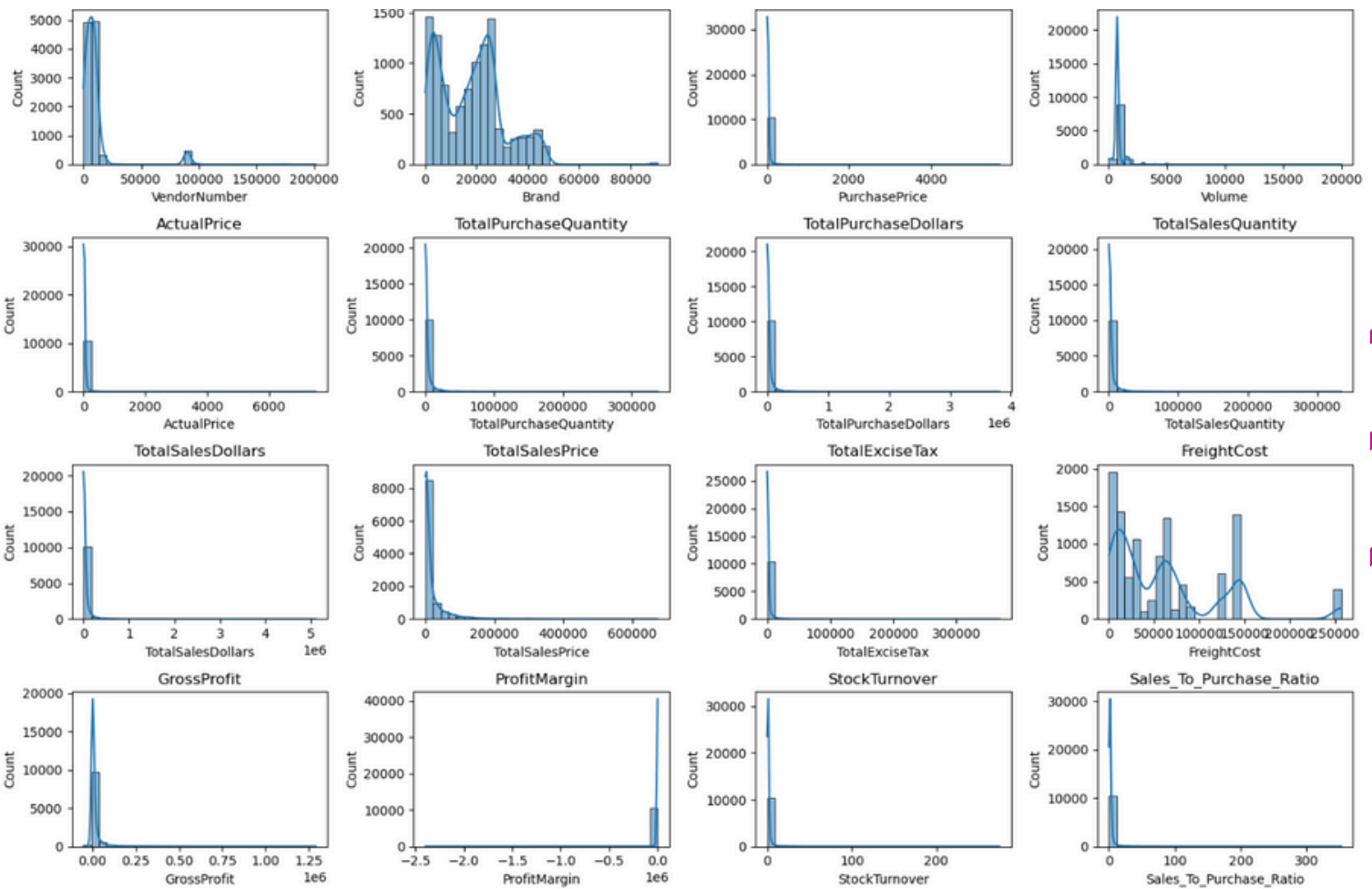
Project Objective

To assess vendor and inventory performance using transaction-level data, with a focus on:

- *Identifying high- and low-performing vendors and brands*
- *Improving pricing, purchasing, and stocking strategies*
- *Highlighting opportunities for cost savings and operational efficiency*



	count	mean	std	min	25%	50%	75%	max
VendorNumber	10692.0	10650.649458	18753.519148	2.00	3951.000000	7153.000000	9552.000000	2.013590e+05
Brand	10692.0	18039.228769	12662.187074	58.00	5793.500000	18761.500000	25514.250000	9.063100e+04
PurchasePrice	10692.0	24.385303	109.269375	0.36	6.840000	10.455000	19.482500	5.681810e+03
Volume	10692.0	847.360550	664.309212	50.00	750.000000	750.000000	750.000000	2.000000e+04
ActualPrice	10692.0	35.643671	148.246016	0.49	10.990000	15.990000	28.990000	7.499990e+03
TotalPurchaseQuantity	10692.0	3140.886831	11095.086769	1.00	36.000000	262.000000	1975.750000	3.376600e+05
TotalPurchaseDollars	10692.0	30106.693372	123067.799627	0.71	453.457500	3655.465000	20738.245000	3.811252e+06
TotalSalesQuantity	10692.0	3077.482136	10952.851391	0.00	33.000000	261.000000	1929.250000	3.349390e+05
TotalSalesDollars	10692.0	42239.074419	167655.265984	0.00	729.220000	5298.045000	28396.915000	5.101920e+06
TotalSalesPrice	10692.0	18793.783627	44952.773386	0.00	289.710000	2857.800000	16059.562500	6.728193e+05
TotalExciseTax	10692.0	1774.226259	10975.582240	0.00	4.800000	46.570000	418.650000	3.682428e+05
FreightCost	10692.0	61433.763214	60938.458032	0.09	14069.870000	50293.620000	79528.990000	2.570321e+05
GrossProfit	10692.0	12132.381048	46224.337964	-52002.78	52.920000	1399.640000	8660.200000	1.290668e+06
ProfitMargin	10692.0	-2654.824380	53148.707950	-2399136.00	13.324515	30.405457	39.956135	9.971666e+01
StockTurnover	10692.0	1.706793	6.020460	0.00	0.807229	0.981529	1.039342	2.745000e+02
Sales_To_Purchase_Ratio	10692.0	2.504390	8.459067	0.00	1.153729	1.436894	1.665449	3.529286e+02



✖ Negative and Zero Values

- Gross Profit has extreme negatives (min: -52,002.78), suggesting losses from deep discounting or pricing below cost.
- Profit Margin includes invalid values (e.g., revenue = 0), leading to extreme negatives and unreliable ratios.
- Zero Sales Quantities imply overstocking, inefficient inventory, or obsolete products.

🔍 These records were filtered for cleaner, actionable insights:

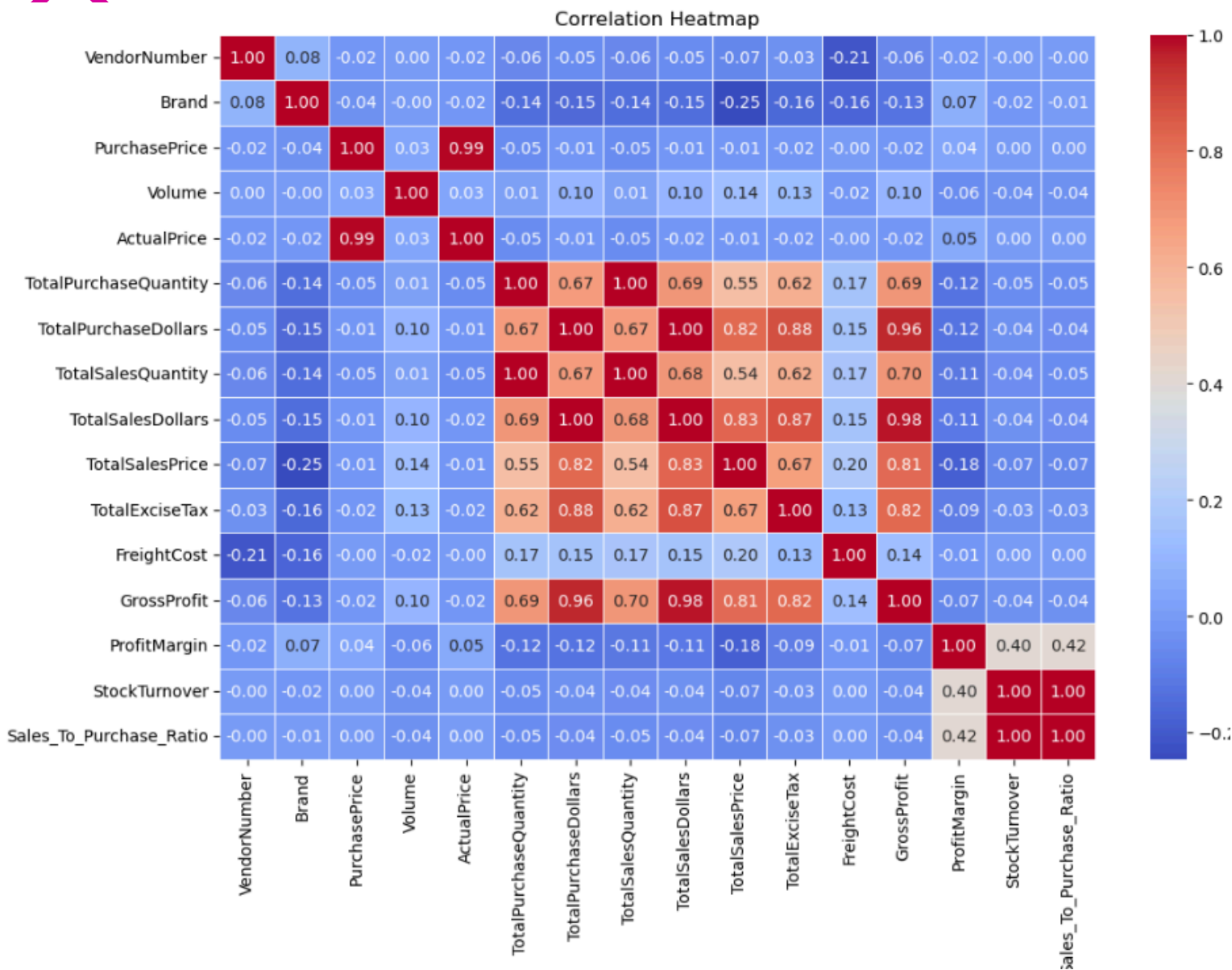
- Gross Profit ≤ 0
- Profit Margin ≤ 0
- Sales Quantity = 0

📈 Key Statistical Insights


▲ Outlier Detection

- Purchase/Actual Price: Max values vastly exceed the mean, indicating premium SKUs or data inconsistencies.
- Freight Costs: Highly variable; could be tied to bulk orders or inconsistent shipping contracts.
- Stock Turnover: Wide range shows uneven sales velocity across SKUs.

Correlation Analysis



- **Purchase Price vs. Total Sales Dollars & Gross Profit:** Weak correlation (-0.012 and -0.016), indicating that price variations do not significantly impact sales revenue or profit.
- **Total Purchase Quantity vs. Total Sales 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 to competitive pricing pressures.
 - **Stock Turnover vs. Gross Profit & Profit Margin:** Weak negative correlation (-0.038 & -0.055), indicating that faster stock turnover does not necessarily equate to higher profitability
- 

Research Questions & Business Answers

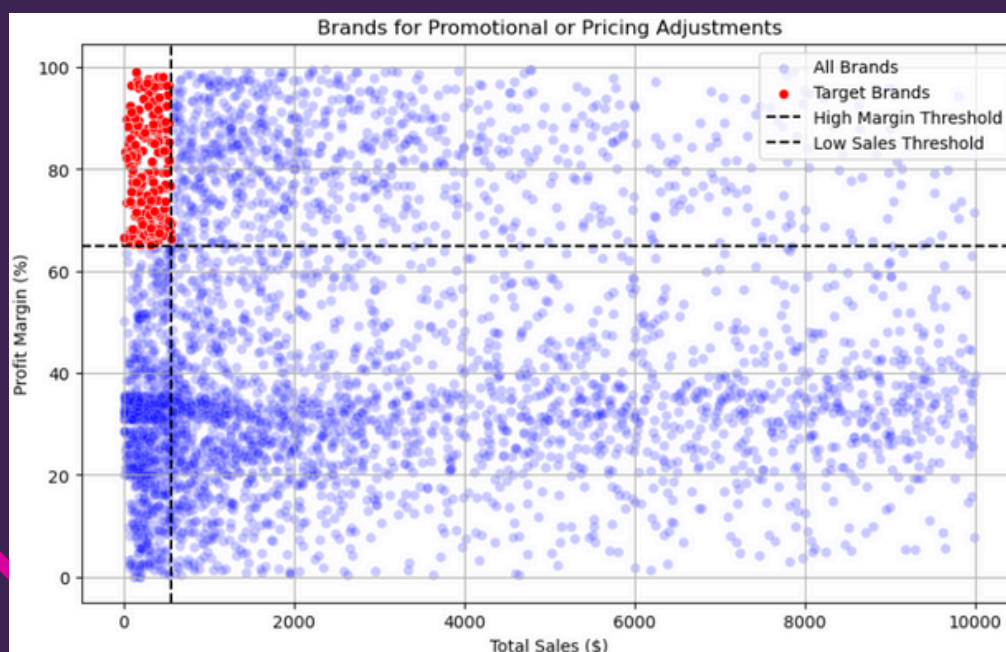
1. Which Brands Should Be Targeted for Promotions or Pricing Adjustments?

Brands with Low Sales but High Profit Margins:

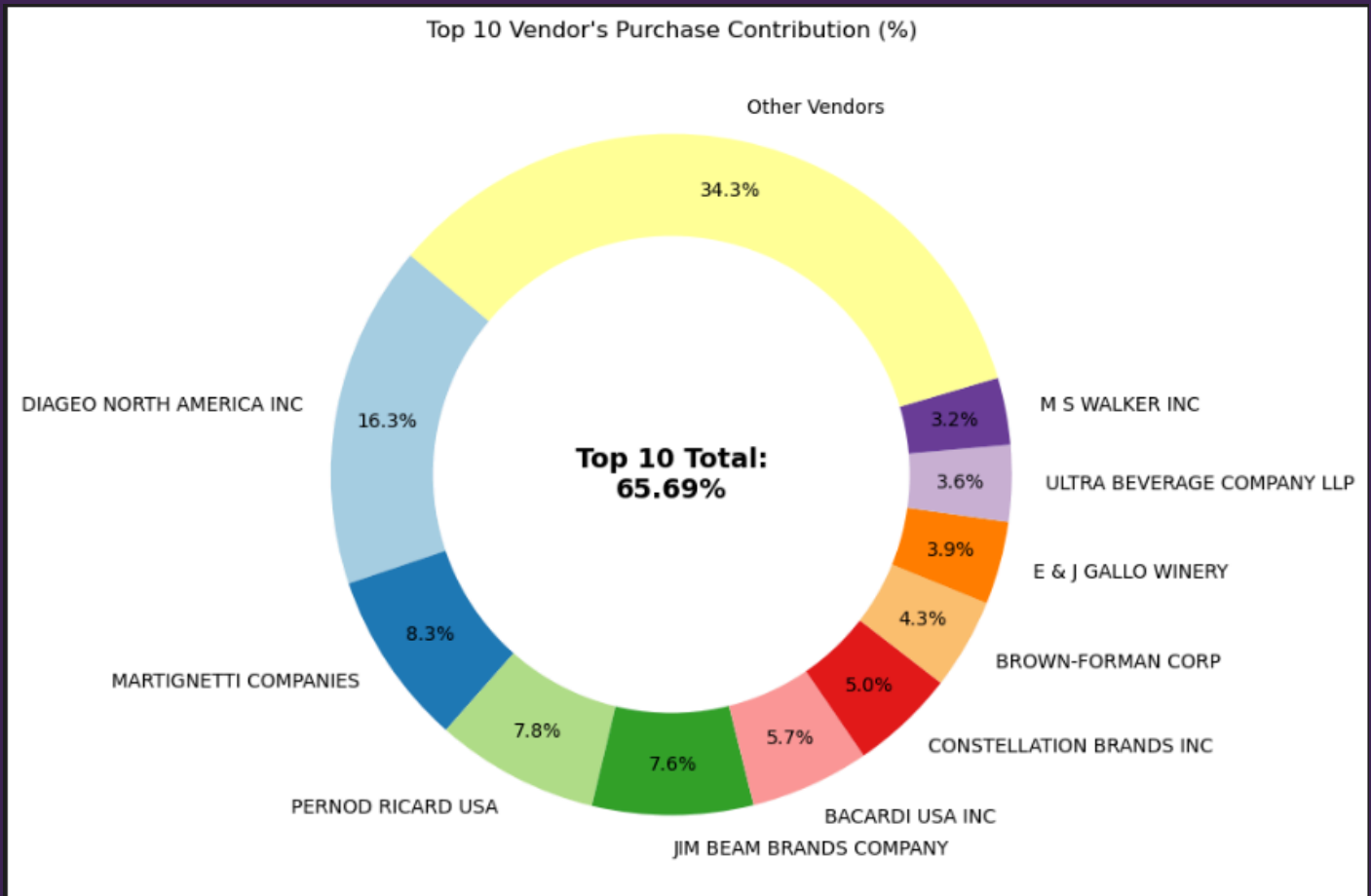
	Description	TotalSalesDollars	ProfitMargin
6199	Santa Rita Organic Svgn Bl	9.99	66.466466
2369	Debauchery Pnt Nr	11.58	65.975820
2070	Concannon Glen Ellen Wh Zin	15.95	83.448276
2188	Crown Royal Apple	27.86	89.806174
6237	Sauza Sprklg Wild Berry Marg	27.96	82.153076
...
5074	Nanbu Bijin Southern Beauty	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

198 brands show low sales but high margins, making them ideal candidates for promotional campaigns or price rebalancing to drive volume without sacrificing profitability.



2. Are We Over-Reliant on a Few Vendors?



- The top 10 vendors account for 65.69% of purchases.
- This concentration introduces supply chain risk, highlighting a need for vendor diversification to build resilience.

3. Does Bulk Purchasing Reduce Costs?

UnitPurchasePrice	
OrderSize	
Small	39.068186
Medium	15.486414
Large	10.777625

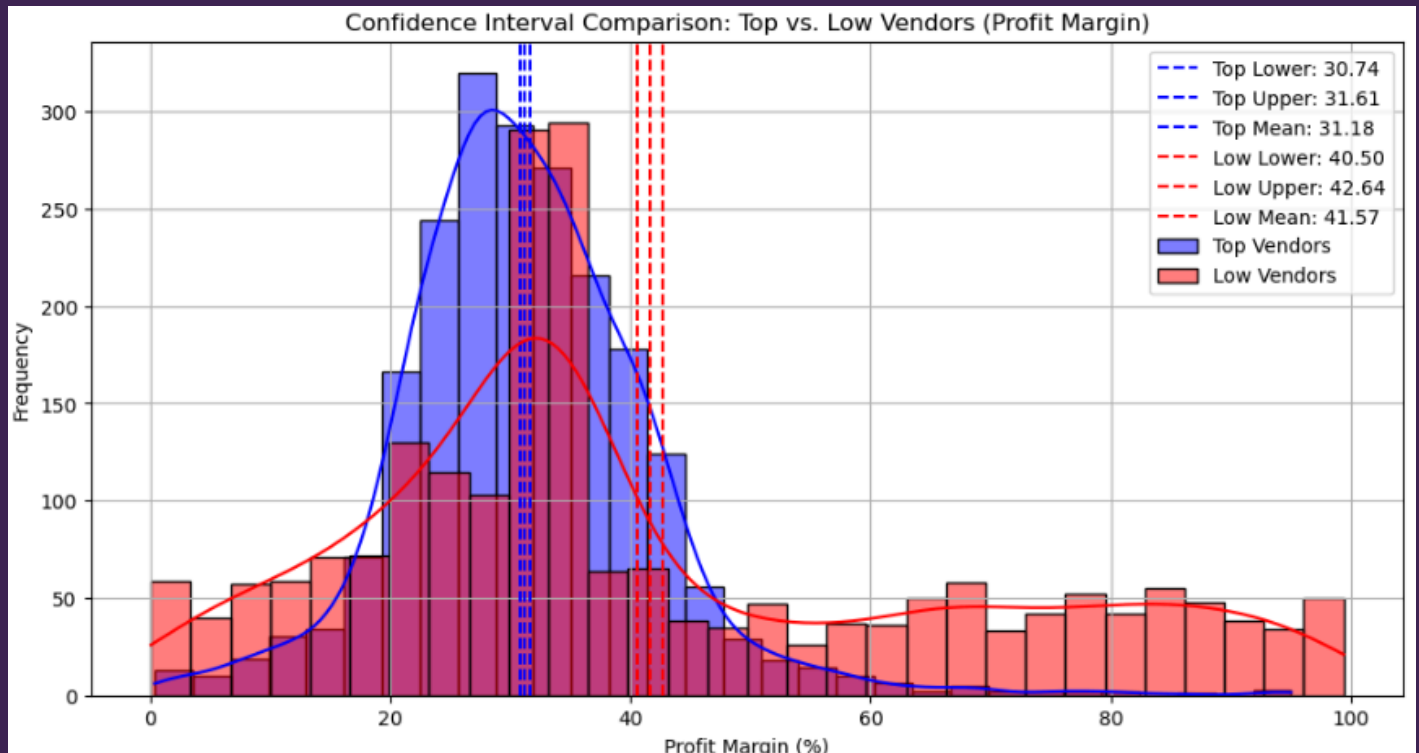
- Yes. Vendors placing larger orders benefit from a 72% lower unit cost on average.
- This validates bulk pricing strategies as effective for cost efficiency and higher margins.

4. Which Vendors Have Low Inventory Turnover?

- Total unsold inventory capital = ₹2.71 million.
- These vendors contribute to storage overhead and reduced cash flow.
- Identifying and addressing slow-moving inventory is key to financial optimization.

StockTurnover		VendorName		UnsoldInventoryValue
VendorName				
		25	DIAGEO NORTH AMERICA INC	722.21K
ALISA CARR BEVERAGES	0.615385	46	JIM BEAM BRANDS COMPANY	554.67K
HIGHLAND WINE MERCHANTS LLC	0.708333	68	PERNOD RICARD USA	470.63K
PARK STREET IMPORTS LLC	0.751306	116	WILLIAM GRANT & SONS INC	401.96K
Circa Wines	0.755676	30	E & J GALLO WINERY	228.28K
Dunn Wine Brokers	0.766022	79	SAZERAC CO INC	198.44K
CENTEUR IMPORTS LLC	0.773953	11	BROWN-FORMAN CORP	177.73K
SMOKY QUARTZ DISTILLERY LLC	0.783835	20	CONSTELLATION BRANDS INC	133.62K
TAMWORTH DISTILLING	0.797078	61	MOET HENNESSY USA INC	126.48K
THE IMPORTED GRAPE LLC	0.807569	77	REMY COINTREAU USA INC	118.60K
WALPOLE MTN VIEW WINERY	0.820548			

5. How Do Profit Margins Differ Across Vendor Tiers? Bulk Purchasing Reduce Costs?



- Top Vendors' Margin (95% CI): 30.74% – 31.61% (Mean: 31.17%)
- Low Vendors' Margin (95% CI): 40.48% – 42.62% (Mean: 41.55%)
- Insight: Low-volume vendors have higher margins but low reach. This imbalance may be due to niche pricing or limited market exposure.

Actionable Strategy:

- Top vendors: Optimize operations, negotiate better terms, and introduce bundle discounts.
- Lower vendors: Focus on branding, promotions, and sales reach to increase volumes.

6. Is There a Statistically Significant Margin Difference Between Vendor Groups?

T-Statistic: -17.6695, P-Value: 0.0000

Reject H_0 : There is a significant difference in profit margins between top and low-performing vendors.

Hypothesis Test Result:

- Null (H_0): No margin difference
- Alternate (H_1): Significant difference exists
- ☒ H_0 Rejected
- Conclusion: Vendor groups follow distinct profitability models, requiring tailored strategies.

Final Recommendations

- Optimize Pricing for low-sales, high-margin brands to boost volume without eroding profits.
- Diversify Vendors to reduce supply chain risks and dependency on a few suppliers.
- Leverage Bulk Purchases to maintain competitive pricing and improve cost efficiency.
- Clear Excess Inventory through discounts or adjusted purchase planning to free up capital
- Support Low-Performing Vendors with better marketing, logistics, and pricing strategies
- Automate Reporting pipelines for real-time monitoring of vendor KPIs and operational health.

