

Vendor Performance Intelligence Report : An In-Depth Business Analysis & Strategic Insights.

Business Problem

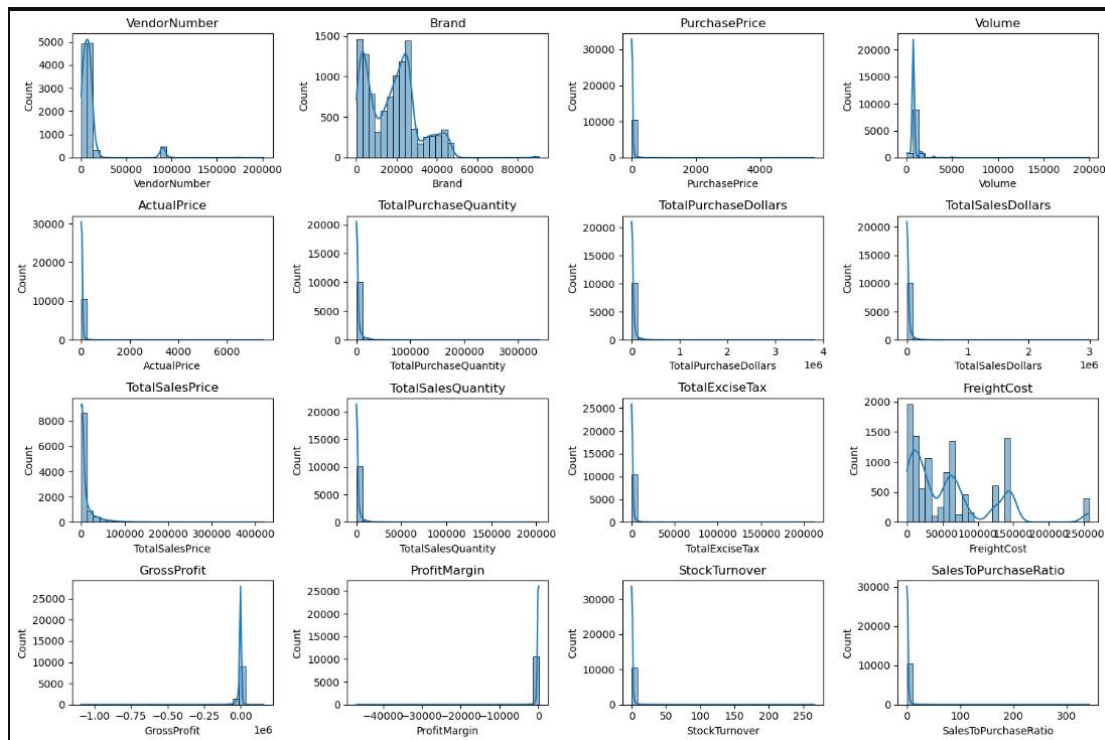
Effective inventory and sales management are critical for optimizing profitability in the retail and wholesale industry. Companies need to ensure that they are not incurring losses due to inefficient pricing, poor inventory turnover, or vendor dependency. The goal of this analysis is to:

- Identify under performing 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.
- Investigate the profitability variance between high-performing and low-performing vendors.

Exploratory Data Analysis Insights

Summary Statistics

	count	mean	std	min	25%	50%	75%	max
VendorNumber	10692.0	10650.649458	18753.519148	2.000000e+00	3951.000000	7153.000000	9552.000000	2.013590e+05
Brand	10692.0	18039.228769	12662.187074	5.800000e+01	5793.500000	18761.500000	25514.250000	9.063100e+04
PurchasePrice	10692.0	24.385303	109.269375	3.600000e-01	6.840000	10.455000	19.482500	5.681810e+03
Volume	10692.0	847.360550	664.309212	5.000000e+01	750.000000	750.000000	750.000000	2.000000e+04
ActualPrice	10692.0	35.643671	148.246016	4.900000e-01	10.990000	15.990000	28.990000	7.499990e+03
TotalPurchaseQuantity	10692.0	3140.886831	11095.086769	1.000000e+00	36.000000	262.000000	1975.750000	3.376600e+05
TotalPurchaseDollars	10692.0	30106.693372	123067.799627	7.100000e-01	453.457500	3655.465000	20738.245000	3.811252e+06
TotalSalesDollars	10692.0	24237.829173	97775.640982	0.000000e+00	229.557500	2550.400000	15695.860000	2.993479e+06
TotalSalesPrice	10692.0	10988.627669	27288.563567	0.000000e+00	69.950000	1319.735000	8788.602500	4.190547e+05
TotalSalesQuantity	10692.0	1774.992144	6499.741162	0.000000e+00	12.000000	121.000000	1031.250000	2.027850e+05
TotalExciseTax	10692.0	1043.519385	6528.040167	0.000000e+00	1.580000	21.780000	223.382500	2.117014e+05
FreightCost	10692.0	61433.763214	60938.458032	9.000000e-02	14069.870000	50293.620000	79528.990000	2.570321e+05
GrossProfit	10692.0	-5868.864198	29560.889106	-1.090594e+06	-3956.242500	-377.065000	122.377500	1.565361e+05
ProfitMargin	10692.0	-158.663043	1297.419696	-4.686081e+04	-36.872718	-6.009133	10.756428	9.970760e+01
StockTurnover	10692.0	1.184289	5.130594	0.000000e+00	0.292657	0.553409	0.723474	2.660000e+02
SalesToPurchaseRatio	10692.0	1.733403	7.135500	0.000000e+00	0.419843	0.819994	1.120529	3.420000e+02



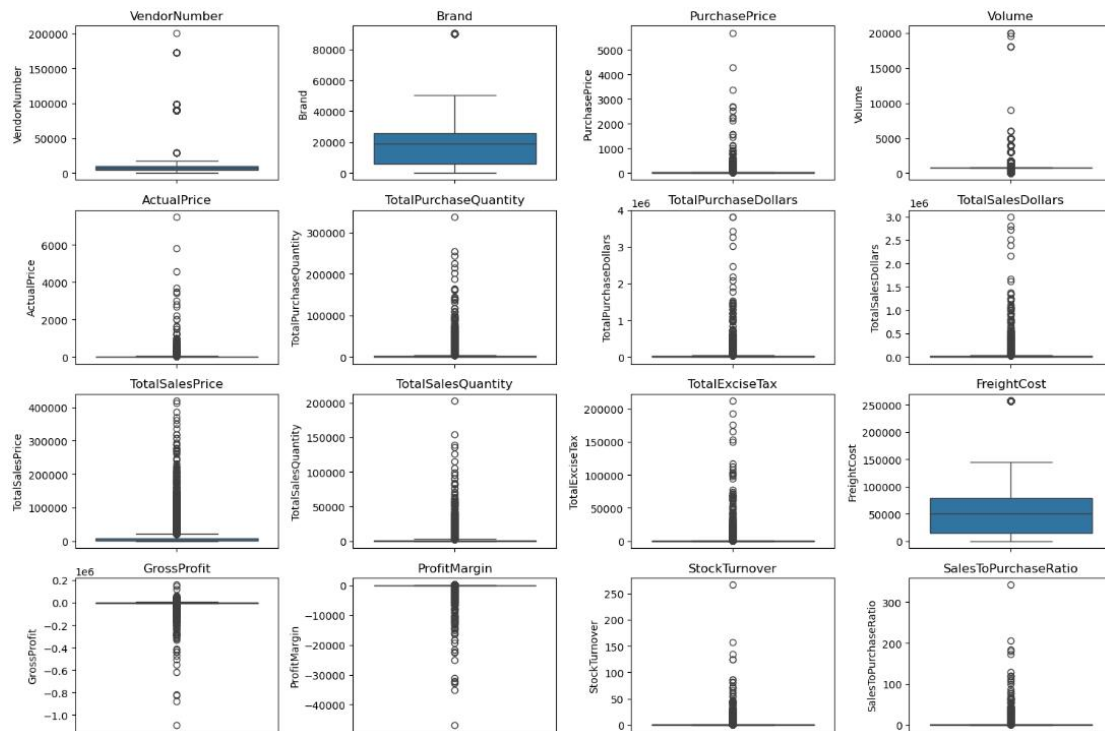
Negative & Zero Values :

Gross Profit: Minimum of -1,090,594.06, indicating potential heavy losses due to steep discounts, overstock liquidations. This could be due to selling products at significantly lower prices than their purchase costs.

Profit Margin: Has a minimum of -46,808.18 and mean of -158.66, which suggests instances where costs significantly exceed revenue, leading to extreme negative profit margins and overall poor profitability performance.

Total Sales Quantity & Sales Dollars: Some products show zero sales, indicating they were purchased but never sold. These may be slow-moving, expired, or obsolete stock, leading to inventory inefficiencies and capital tied up in unsold products.

Stock Turnover: Shows zero values in some cases, indicating products that were purchased but never sold, representing poor inventory management and potential write-offs.



Outlier Detection by High Standard Deviations:

Purchase Price & Actual Price: Max values of 5,681.81 (Purchase) and 7,499.99 (Actual) vs. means of 24.39 and 35.64, suggesting presence of high-value premium products or pricing anomalies that significantly skew the overall pricing distribution.

Freight Cost: Ranges from 0.09 to 257,032.07 with standard deviation of 60,938.46, likely due to logistics inefficiencies, bulk shipments.

Stock Turnover: Maximum of 274.5 vs. mean of 1.18, implying some products are selling very quickly (high velocity) or sales are being fulfilled from past stock, causing unusually high turnover rates that may indicate supply chain issues.

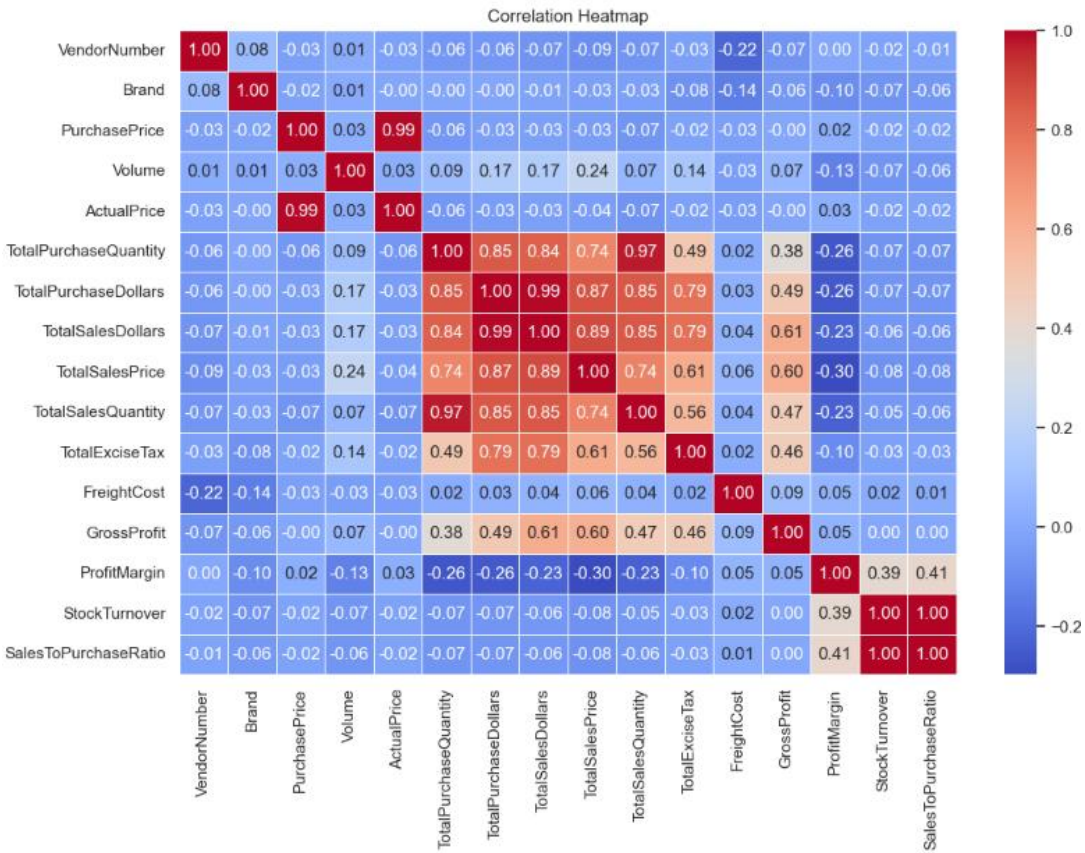
Sales to Purchase Ratio: Maximum of 342.0 vs. mean of 1.73, with values over 100x signaling extremely high sales relative to purchase quantities, which may reflect back-orders being fulfilled, or one-time large orders distorting normal ratios.

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

Correlation Insights



Purchase Price vs. Total Sales Dollars & Gross Profit: Weak correlation (-0.02 and 0.00), indicating that price variations do not significantly impact sales revenue or profit performance.

Total Purchase Quantity vs. Total Sales Quantity: Strong correlation (0.97), confirming efficient inventory turnover and suggesting good demand forecasting and procurement planning.

Purchase Price vs. Actual Price: Very strong correlation (0.99), indicating consistent pricing strategy with minimal markup variations between purchase and selling prices.

Total Sales Dollar correlations: High positive correlations with Total Purchase Dollars (0.99), Total Sales Price (0.89), and Total Sales Quantity (0.85), confirming strong relationships between sales volume, pricing, and revenue generation.

Stock Turnover vs. Sales to Purchase Ratio: Perfect correlation (1.00), indicating these metrics measure similar inventory efficiency aspects and move in tandem.

Freight Cost correlations: Generally weak correlations across most variables, suggesting freight costs operate independently of other business metrics and may need separate.

Research Questions & Key Findings

1. Brands for Promotional or Pricing Adjustments

Brands with Low Sales but High Profit Margins:

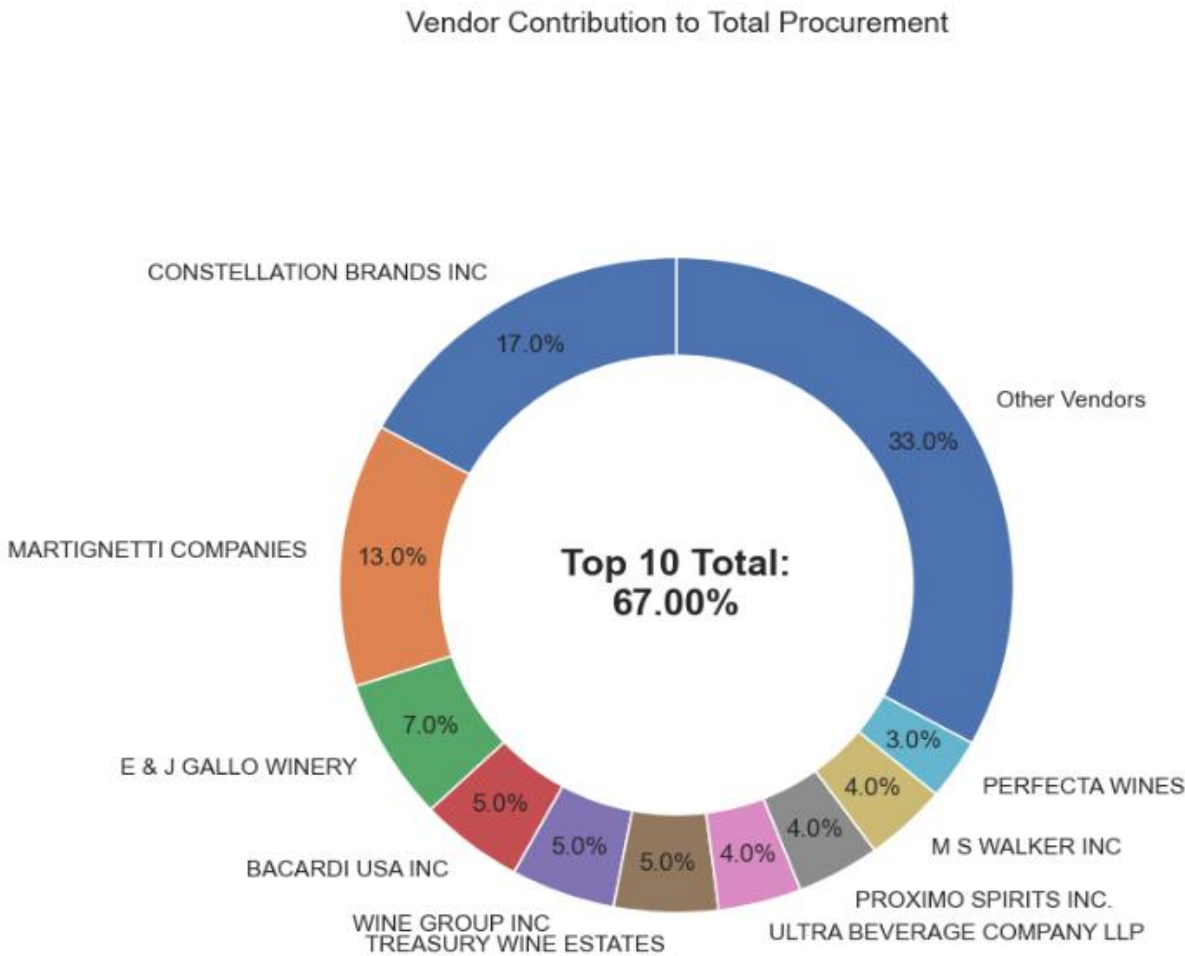
	Description	TotalSalesDollars	ProfitMargin
998	Concannon Glen Ellen Wh Zin	15.95	83.448276
1044	Crown Royal Apple	23.88	88.107203
2624	Sauza Sprklg Wild Berry Marg	27.96	82.153076
3016	Tracia Syrah	44.94	88.495772
262	Basilica Amaretto	47.45	85.079031
904	Cherry On Top Sweet White	51.96	86.258661
1189	Dr McGillicuddy's Apple Pie	62.72	96.269133
2406	Promesses de France CdRhone	71.91	92.337644
2932	The Club Strawbry Margarita	83.58	98.241206
2931	The Club Mudslide	83.58	91.325676
2970	Three Olives Grape Vodka	85.14	99.166079

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



2. Top Vendors by Sales & Purchase Contribution

The top 10 vendors contribute 67% of total purchases , while the remaining vendors contribute only 33%. This over-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 Savings

Vendors buying in large quantities receive a 82% lower unit cost (\$9.5 per unit vs higher unit costs in small orders)

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

UnitPurchasePrice	
OrderSize	
Small	52.241597
Medium	20.032525
Large	9.437672

4. Identifying Vendors with Low Inventory Turnover

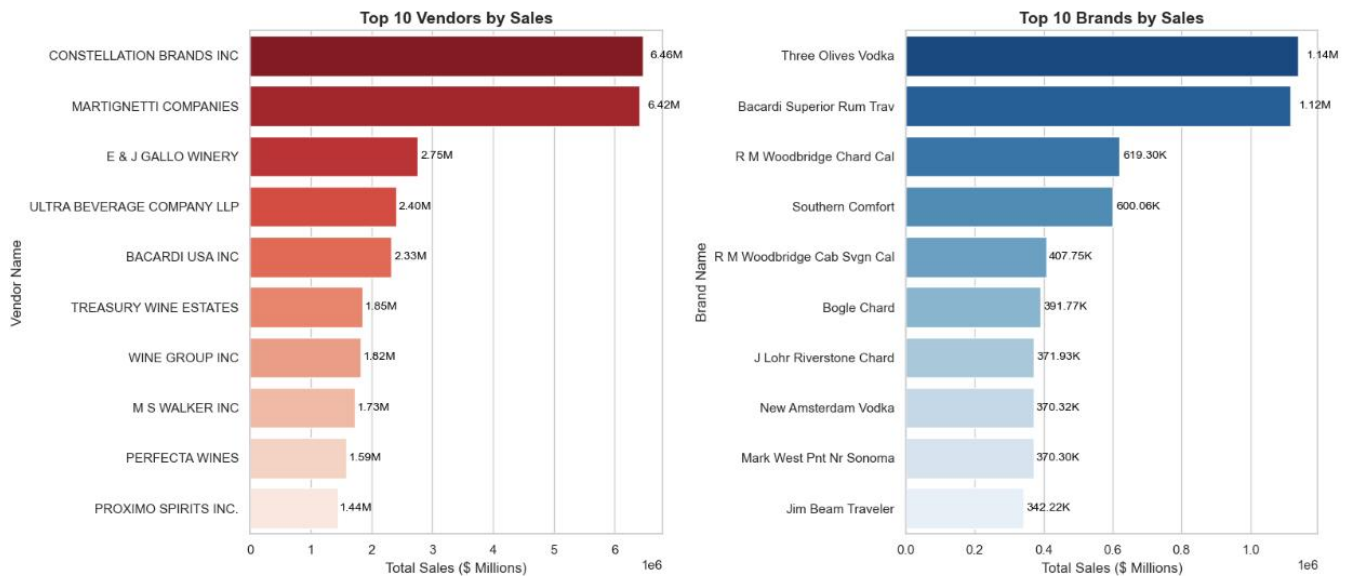
Total Unsold Inventory Capital : \$6.81M

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.

StockTurnover			
VendorName		VendorName	UnsoldInventoryValue
JEWELL TOWNE VINEYARDS	0.583942	14	CONSTELLATION BRANDS INC 2.17M
THE IMPORTED GRAPE LLC	0.589597	23	E & J GALLO WINERY 760.51K
ALISA CARR BEVERAGES	0.625000	46	MARTIGNETTI COMPANIES 719.58K
WINE GROUP INC	0.628567	95	WINE GROUP INC 661.78K
LATITUDE BEVERAGE COMPANY	0.642906	83	TREASURY WINE ESTATES 522.18K
SURVILLE ENTERPRISES CORP	0.650165	61	PROXIMO SPIRITS INC. 292.23K
PARK STREET IMPORTS LLC	0.666667	3	BANFI PRODUCTS CORP 232.62K
CONSTELLATION BRANDS INC	0.669554	73	SOUTHERN WINE & SPIRITS NE 219.47K
TREASURY WINE ESTATES	0.673282	59	PINE STATE TRADING CO 206.40K
BANFI PRODUCTS CORP	0.680352	84	TRINCHERO FAMILY ESTATES 187.49K

5. Vendors & Brands with High Sales Performance



Vendors : Top 2 vendors (Constellation & Martignetti) generate nearly equal sales (~6.4M each), creating high supplier concentration risk with a steep drop-off to remaining vendors.

Brands : Three Olives Vodka and Bacardi dominate (~1.1M each), but there's a sharp 45% decline to third place, showing heavy dependence on premium spirits with weak mid-tier performance.

6. Profit Margin Comparison : High vs Low Performing Vendors

Top Vendor's Profit Margin (95% CI): (22.96%,26.31%),Mean: 24.61%

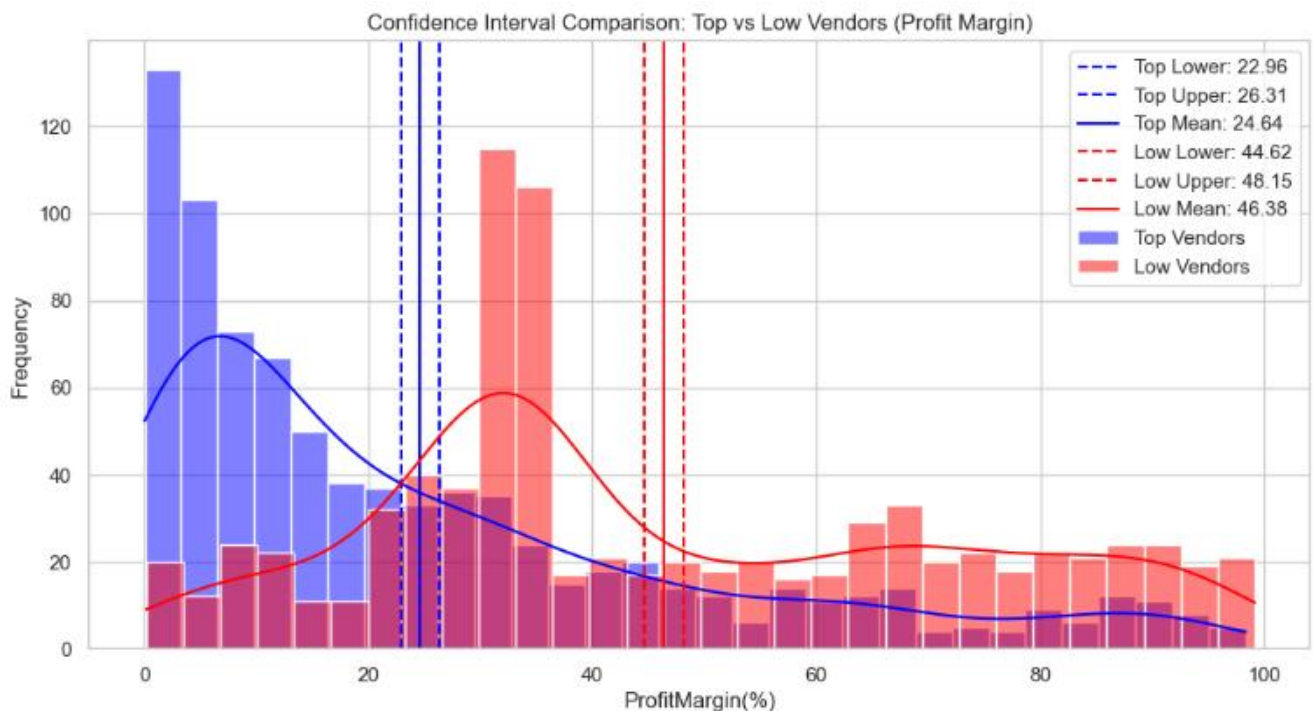
Low Vendor's Profit Margin (95% CI): (44.62%,48.15%),Mean: 46.38%

Low-performing vendors maintain higher margins but struggle with sales volumes, indicating potential pricing inefficiencies or market research issues.

Actionable Insights:

Top-performing vendors: Optimize profitability by adjusting pricing, reducing operational costs or offering bundles promotions.

Low - Performing vendors : Improve marketing efforts, optimize pricing strategies and enhance distribution networks.



7. Statistical Validation of Profit Margins

Hypothesis Testing:

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

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

Result : The null hypothesis is rejected, confirming that 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 partnerships 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.