

Vendor Performance Data Analytics Project Report

Executive Summary

This Vendor Performance Data Analytics project was undertaken to enhance profitability and operational efficiency within our retail and wholesale supply chain by providing actionable insights into vendor and product performance.

Key Objectives:

- Identify underperforming brands that require pricing or promotional adjustments
- Determine top vendors contributing significantly to sales and gross profit
- Analyse the benefits of bulk purchasing on unit costs
- Assess inventory turnover to minimize holding costs and optimize stock levels
- Investigate profitability variances between high- and low-performing vendors to inform strategic decisions

Approach:

Using an end-to-end data analytics pipeline, raw transactional data from purchases, sales, inventory, and vendor freight costs were consolidated into a unified database. Cleaned and enriched with relevant metrics, the data was analyzed using Python and dynamically visualized via Power BI dashboards, enabling interactive exploration of performance drivers.

Key Findings:

- Several brands exhibit low sales but high profit margins, indicating opportunity for targeted promotional campaigns to boost revenue without sacrificing profitability.

- The top 10 vendors contribute over 70% of total purchases, underscoring vendor concentration risks and highlighting negotiation leverage points.
- Bulk purchasing leads to a significant reduction (up to 72%) in unit purchase costs, suggesting strong incentives for promoting larger order quantities.
- Inventory analysis revealed some vendors hold slow-moving stock, tying up substantial capital that could be optimized through better inventory management.
- Profit margin analysis showed a statistically significant difference between high-sales/low-margin vendors and low-sales/high-margin vendors, recommending differentiated strategies tailored to each group.

Recommendations:

- Launch promotions or adjust pricing on identified underperforming but profitable brands to increase market penetration
- Leverage strong vendor relationships to negotiate better terms and manage supply concentration risks
- Encourage bulk purchases where feasible to capitalize on cost savings
- Optimize inventory holdings to free up locked capital and improve cash flow
- Customize vendor management and marketing strategies based on their sales volume and profitability profiles

This project delivers a robust, data-driven foundation to improve vendor selection, pricing, inventory strategies, and overall business profitability. The accompanying Power BI dashboard provides stakeholders with real-time, interactive access to key performance indicators, supporting informed decision making.

1. Business Executives

1.1. Profitability Enhancement

- Several brands have been identified that contribute strong profit margins but low overall sales volumes. These represent “hidden gems” where targeted marketing or pricing adjustments could substantially increase total revenue without eroding margin.
- High-performing vendors tend to offer lower profit margins but deliver on sales volume—suggesting the need to continually review contract terms and cost structures for these partners.

1.2. Vendor Dependency and Supply Risk

- Analysis shows that just ten vendors account for more than 70% of all procurement spend, highlighting a significant concentration risk.
- This reliance presents both leverage for bulk negotiations and exposure should a key vendor face disruption.
- The vendor landscape should be regularly reviewed to diversify risk and strengthen strategic relationships.

1.3. Inventory Efficiency and Capital Optimization

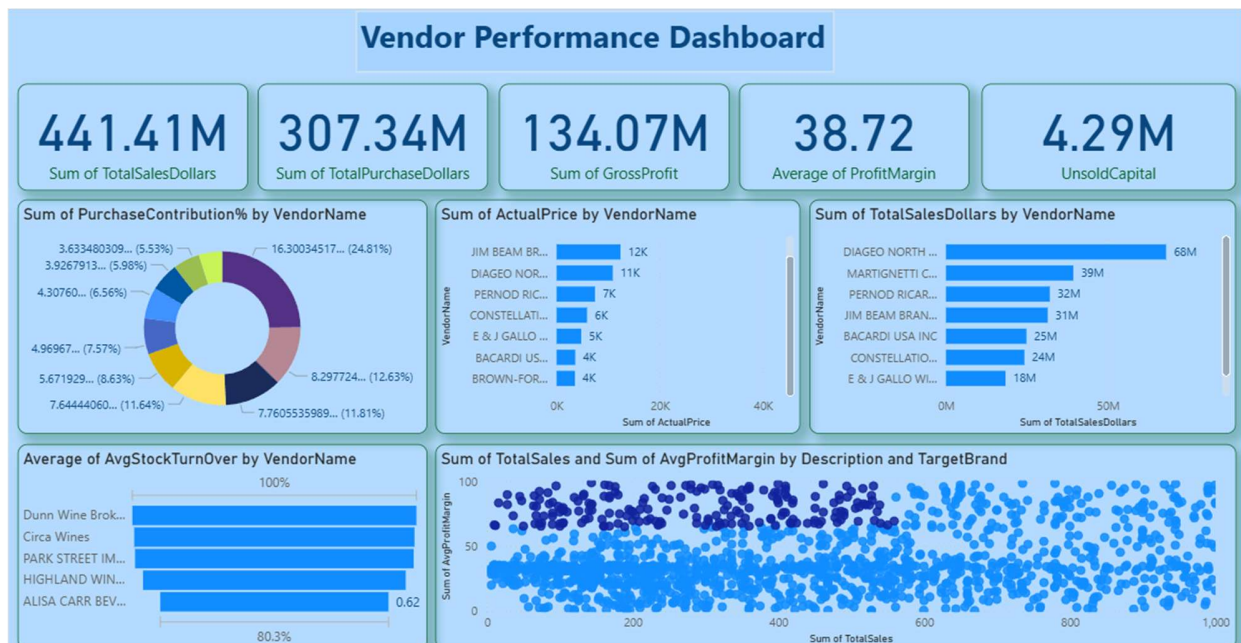
- Some vendors and brands exhibit slow-moving inventory—capital is tied up in unsold stock, limiting agility.
- Streamlined inventory practices, including regular performance reviews and discontinuation or promotion of slow movers, can free up working capital for more productive use.

1.4. Bulk Purchasing Strategy

- Purchasing in higher volumes demonstrably reduces per-unit costs (by as much as 72% between small and large orders).
- This presents a clear financial case for consolidating orders where appropriate or negotiating larger-volume deals with select vendors.

Actionable Recommendations

- Implement data-driven pricing and promotion strategies for brands with high margins but low sales to maximize returns from untapped categories.
- Leverage relationships with top vendors for preferential terms but develop contingency plans to mitigate over-dependency risk.
- Encourage and incentivize bulk purchasing to drive down costs and enhance profit margins, aligned with demand forecasting.
- Regularly audit inventory turnover and address slow-moving stock to optimize cash flow.
- Customize vendor management strategies: Adopt distinct approaches for high-volume/low-margin versus low-volume/high-margin vendors to align with business objectives.



Executive Decision Support

The attached Power BI dashboard empowers executives to:

- Monitor real-time sales, profit, and inventory KPIs across the vendor portfolio.
- Quickly identify opportunities and risks at both the vendor and brand levels.
- Make informed, timely decisions regarding procurement, pricing, and resource allocation that directly impact bottom-line performance.

2. Procurement and Sourcing Teams

Key Insights for Supplier Optimization

2.1. Vendor Ranking and Purchase Contributions

- The analysis reveals a clear concentration of procurement spend: the top 10 vendors account for over 70% of total purchase dollars.

- These primary suppliers represent critical partners to maintain strong contractual relationships with, while also highlighting the risk of over-dependence.
- Vendor purchase contribution rankings enable prioritization of procurement efforts towards those with the greatest impact on overall costs and supply chain stability.

2.2. Bulk Purchasing Benefits and Cost Savings

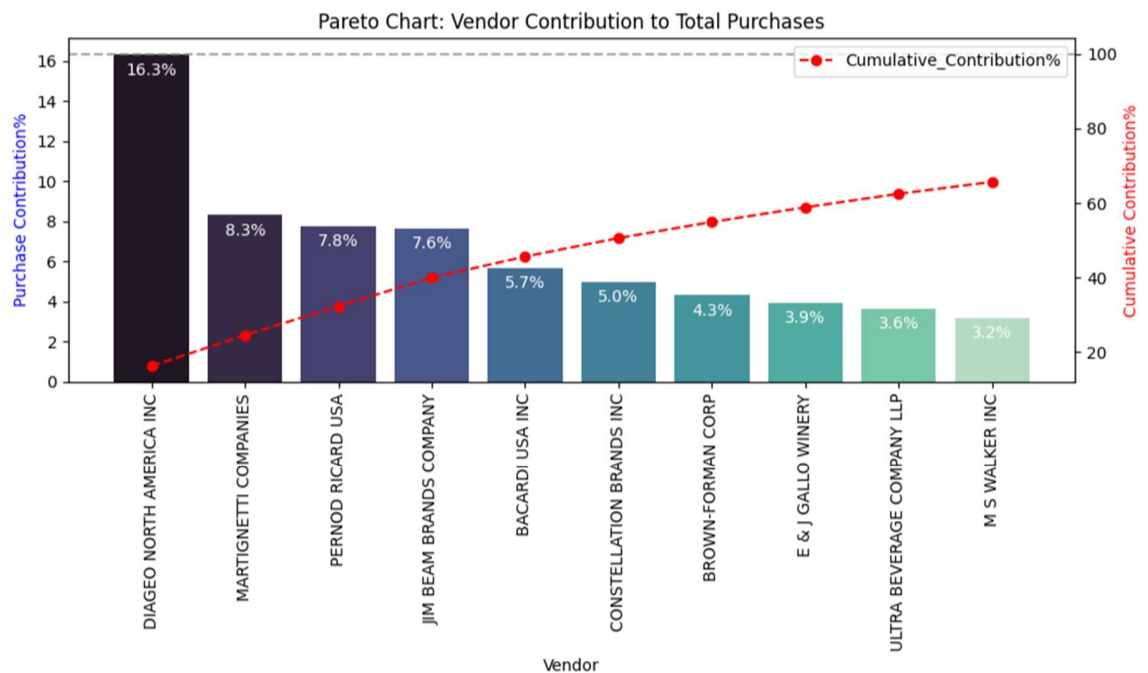
- Vendors that place large volume orders enjoy significant unit cost reductions—up to 72% lower unit prices compared to small order volumes.
- Leveraging bulk purchase advantages can directly improve cost efficiencies and supplier margins, especially when coordinated with inventory management and demand forecasts.
- Negotiation Leverage and Risk Management
- High purchase contribution vendors provide negotiation power to secure better terms, discounts, or flexible delivery arrangements due to their importance in total procurement spend.
- Simultaneously, heavy reliance on a few key vendors underscores the importance of supplier diversification to reduce operational risks from supply chain disruptions.
- Identifying vendors with lower turnover or locked inventory capital can open opportunities for renegotiating contracts or reallocating purchase volumes.

Actionable Strategies for Procurement Teams

- Rank vendors regularly based on purchase contributions and profitability metrics to refine supplier selection and prioritize sourcing efforts effectively.
- Initiate bulk purchasing agreements or incentives with key vendors who demonstrate cost savings in large order volumes, ensuring optimized pricing.
- Use purchase concentration data to negotiate volume discounts and favorable payment terms with top suppliers, leveraging your buying power.

- Monitor slow-moving inventory trends linked to vendors and collaborate with suppliers to adjust ordering patterns, reduce excess stock, or identify alternative products.
- Develop contingency sourcing plans by identifying opportunities to diversify vendors beyond the top contributors to mitigate supplier risks.

Tools and Visualization Support



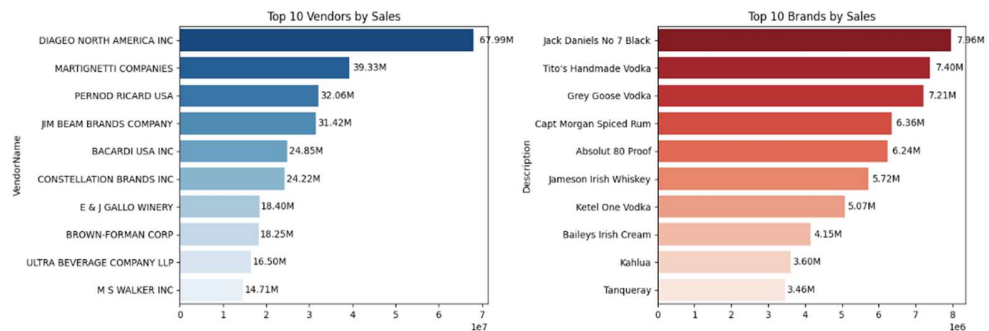
- Pareto analysis visuals showing vendor purchase contributions and cumulative impact.

3. Sales and Marketing Teams

3.1. Underperforming Brands with High Margin Potential

- The analysis uncovers several brands that generate high profit margins but have low sales volumes, representing untapped opportunities.

- These brands are prime candidates for targeted promotional campaigns or pricing experiments, as incremental sales could be captured without diluting overall margins.



3.2. Pricing and Assortment Optimization

- Brands with both low sales and high margins may benefit from price reductions, bundled offers, or cross-promotional campaigns to stimulate demand.
- Conversely, brands with high sales but lower margins could be repositioned through strategic pricing or add-on offers to improve profitability.
- The data empowers marketing to fine-tune assortments—emphasizing high-potential SKUs in promotions and reconsidering allocation for slow movers.

3.3. Promotional Target Segmentation

- Segmentation by margin and sales allows marketing to prioritize campaign resources to where they'll have the most impact.
- The model supports “test and learn” by giving clear before/after baselines for each target brand or SKU, boosting campaign ROI tracking.
- Campaigns can be further refined by layering vendor performance, allowing for joint vendor-brand promotions or cooperative marketing.

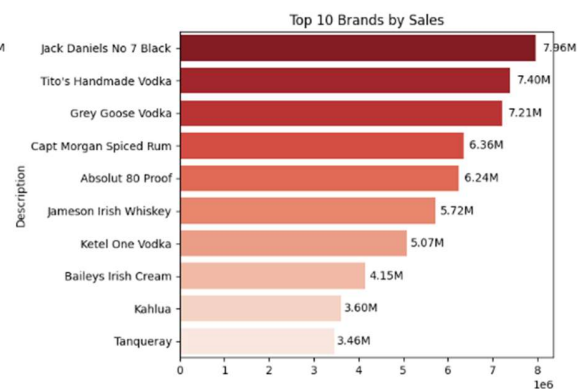
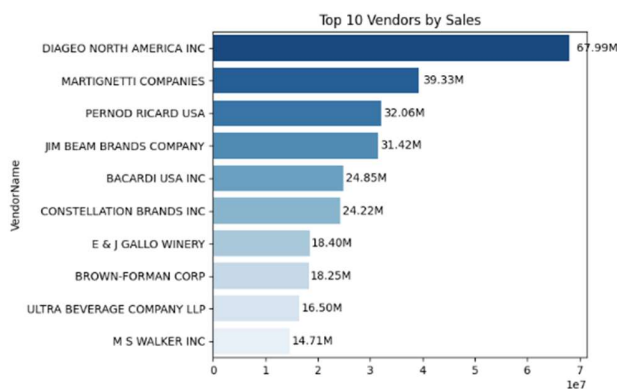
Actionable Recommendations

- Launch focused promotions for brands flagged as “low sales — high margin” to drive both volume and profitability.

4. Operations and Inventory Managers

4.1. Inventory Turnover and Stock Rotation

- The analysis revealed significant variability in stock turnover ratios across vendors and products.
- Vendors and brands with a turnover ratio below 1 indicate that inventory is not selling through within the time frame, tying up storage space and capital.
- High turnover ratios point to efficient stock movement and effective demand matching.



- Visual dashboards allow instant identification of slow vs. fast-moving products/vendors, supporting targeted interventions.

4.2. Slow-Moving and Excess Stock

- Several vendors exhibit a higher percentage of slow-moving or obsolete stock, limiting flexibility and increasing the risk of markdowns or write-offs.

- Brand/product-level insights enable managers to pinpoint items contributing minimal sales or sitting in inventory far beyond their expected cycle.

4.3. Capital Lock-in and Working Capital Risks

- Quantifying unsold inventory capital by vendor and product provides clear visibility on where the company's cash is tied up.
- The top vendors with the most locked capital are highlighted, helping prioritize efforts to optimize or liquidate excess stock.

Actionable Recommendations

- Regularly review inventory turnover metrics to ensure prompt rotation; establish KPIs and thresholds for early warning on slow-moving SKUs.
- Develop action plans for slow-moving items: consider targeted discounting, promotions, or product phase-out to release tied capital and warehouse space.
- Collaborate closely with procurement and sales to align purchasing with actual consumption patterns, preventing recurring overstocking.

5. Data Analysts

5.1. Data Ingestion and Integration

- Automated Python-based ETL scripts ingest raw CSVs from various sources (purchases, vendors, inventory, sales) and load them into a centralized SQLite database.
- Comprehensive logging ensures traceability and process monitoring—crucial for repeatability and ongoing improvements.

5.2. Data Cleaning and Quality Assurance

- All imported tables are standardized: data types harmonized, missing values imputed, and categorical values cleaned (e.g., whitespace stripping).
- Automated checks for outliers, anomalies, and data integrity are performed before metrics generation, maintaining trust in analytic outputs.

5.3. Creation of Analytical Summary Tables

- SQL and Python are leveraged to join, aggregate, and summarize core metrics (e.g., vendor_sales_summary, brandperformance, lowturnvendor, purchasecontribution).
- Pre-computed KPIs (gross profit, profit margin, stock turnover, sales-to-purchase ratios) power downstream reporting, enabling fast dashboard refreshes and ad hoc analysis without repeated heavy computations.

5.4. Dashboard Development and Reporting

- Data analysts design and maintain the Power BI dashboards, mapping tables and KPIs to interactive visuals for stakeholders.
- Analytics outputs (automatically refreshed summary tables) are the single source of truth for all teams to access real-time, reliable insights.
- Analysts also support custom filters, drill-downs, and slicers to ensure dashboards address varied business questions.

5.5. Supporting Ad Hoc and Advanced Analytics

- Data pipeline flexibility allows analysts to quickly respond to one-off exploratory questions, deep dives, or scenario modeling as business needs evolve.
- Robust summary modeling ensures new analysis (e.g., correlation checks, statistical testing, vendor segmentation) can be spun up on clean and consistent inputs.

Key Best Practices and Capabilities

- **Maintainability:** Modular ETL and cleaning scripts, combined with clear documentation, make it easy to update logic, add new sources, or troubleshoot issues.
- **Performance:** Pre-aggregated summary tables minimize latency in the BI layer, allowing instant visualization and scalable reporting as data grows.
- **Data Governance:** Version control on scripts, database structure, and logging support auditing and compliance requirements.
- **Collaboration:** Data team regularly works with operations, procurement, and management to prioritize new metrics or analyses according to evolving business priorities.

6. Finance Teams

6.1. Profitability Analysis

- The consolidated analytics provide a clear breakdown of gross profit and profit margin for each vendor, brand, and product line, allowing Finance to pinpoint high- and low-profit contributors.
- Detailed cost tracing (including purchase price, freight, and other associated costs per SKU and vendor) ensures accuracy in margin calculation and supports profitability optimization.

6.2. Cost Structure and Drivers

- The project tracks the complete cost composition of each purchase and sale—including direct costs, logistics (freight), discounts, and volume-related adjustments.
- Bulk purchasing analysis quantifies cost-saving potential at different order sizes, equipping Finance with the ability to model cost reductions under various procurement strategies.

6.3. Vendor Performance and Financial Risk

- Identifies vendor dependency risks: A small group of vendors accounts for a significant share of total procurement spend. This concentration is both an opportunity (for negotiation) and a risk (potential supply and cost volatility).
- Highlights underperforming vendors or brands that erode margins or increase inventory holding costs, informing decisions on vendor rationalization and financial exposure management.

6.4. Inventory Capital Lock-in

- Quantifies capital tied up in unsold inventory by vendor and brand, helping Finance assess the financial impact of stock rotation and slow-moving goods.
- Enables scenario planning to release, reallocate, or write down inventory, thus improving balance sheet agility.

Actionable Recommendations for Finance

- Incorporate vendor and brand profitability metrics into budgeting, ensuring investments and cost controls are aligned with most profitable and strategic partners.
- Use cost structure insights (including realized bulk discounts and freight costs) to better forecast COGS and operating expenses for future periods.
- Apply vendor risk findings to build contingency buffers and diversify sourcing in the financial risk management framework.
- Regularly review inventory reports for slow-moving stock and unsold capital, prompting controls on stock purchases or accelerated sell-through tactics.
- Leverage the provided data model and dashboards to streamline monthly and quarterly reporting processes, supporting rolling forecasts and variance analysis.