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1. Introduction

The purpose of this financial analytics study is to examine the revenue, cost, and profitability structure of a multinational sales dataset and identify the key drivers influencing financial performance. By analysing units sold, pricing, discounts, costs, and profit across countries, segments, products, and time periods, the study aims to uncover meaningful patterns that shape commercial outcomes.

2. Dataset

2.1 Dataset Description

Column Name	Description
Segment	Customer segment category
Country	Country where the sale occurred
Product	Specific product sold
Discount Band	Discount category applied
Units Sold	Number of units sold in the transaction
Manufacturing Price	Cost to manufacture one unit
Sale Price	Selling price before discount
Discounts	Total discount applied to the transaction
Date	Transaction date
Month Number	Numeric month (1–12)
Month Name	Month label (e.g., January, October)
Year	Year of transaction
Gross_Sales	Total revenue generated from selling the units before applying any discounts.
Sales_	Final revenue earned after subtracting the discounts from the initial gross sales amount.
COGS_	The total production cost incurred to manufacture the quantity of units sold.
Profit_	The financial gain earned on the transaction after deducting the total cost of goods from the final sales revenue.

2.2 Statistical Validation

2.2.1 Summary Statistics

The descriptive statistics reveal substantial heterogeneity in sales performance, cost structures, and profitability across transactions. Units sold display a wide distribution, indicating considerable variability in product demand, while the divergence between lower and upper quartiles of manufacturing and sale prices suggests the presence of both cost-efficient and premium-priced offerings within the product mix. The high mean discount value, coupled with a substantial standard deviation, reflects inconsistent application of discounting practices, which may contribute to instability in realised revenue. Profit figures demonstrate significant dispersion, ranging from notable losses to substantial gains, indicating that profitability is highly sensitive to individual combinations of cost, price, and discount allocation.

Furthermore, categorical statistics indicate concentration within specific market segments and geographies, with the Government segment and Canada accounting for the highest transaction frequencies, while the predominance of high discount bands suggests reliance on aggressive price incentives. Temporal patterns also appear to influence sales volumes, with October being the most active month, indicating potential seasonality. Collectively, these observations suggest that the firm operates within a context characterised by high variability in pricing, demand, and margins, underscoring the need for more standardised pricing and cost management practices to enhance financial stability.

2.2.2 Correlation Analysis

The correlation matrix indicates generally weak linear relationships among core pricing, cost, and demand variables, suggesting that sales performance is not strongly driven by manufacturing costs or list prices at the aggregate level. The negligible correlations between units sold and both manufacturing price (−0.03) and sale price (−0.065) imply that higher production costs or higher price points do not systematically suppress demand, which may reflect a market characterised by inelastic demand or limited price sensitivity.

In contrast, the relatively strong positive correlation between sale price and discounts (0.64) indicates that higher-priced products receive proportionally larger discounts, suggesting the use of discounting as a strategic tool to facilitate the sale of premium products. Additionally, the modest positive relationship between discounts and units sold (0.25) suggests that discounting may stimulate demand, albeit to a limited extent.

Overall, the correlation structure highlights a pricing strategy that relies heavily on promotional adjustments rather than cost-based pricing, and suggests that demand dynamics may be influenced by non-price factors such as customer segmentation, product differentiation, or channel-specific characteristics.

2.2.3 ANOVA Analysis (One way)

The one-way ANOVA results demonstrate statistically significant differences in key financial and operational metrics across categorical variables, indicating that product type, customer segment, discount band, month, and country exert substantial influence on cost, revenue, and profitability outcomes.

Product type exhibits the strongest association with COGS, as evidenced by the highest F-statistic (266.03), suggesting that cost structures vary considerably across product lines, likely due to differences in production complexity or scale. Customer segment is also a critical determinant of financial performance, significantly affecting gross sales, net sales, discounts, and profit, which implies systematic variation in purchasing behaviour and pricing strategies across market segments. Discount band significantly influences both discount amounts and profitability, highlighting the financial consequences of discount policies, while temporal factors such as month show significant effects on units sold and discount allocations, pointing to seasonal demand fluctuations. Additionally, country-specific effects on units sold suggest geographical disparities in market demand.

Collectively, these findings underscore that business performance is shaped by heterogeneous cost structures, market characteristics, and strategic pricing practices, emphasising the importance of differentiated financial management across product categories, customer groups, and market regions.

2.2.4 Tukey Post Hoc

The post hoc analysis reveals substantial pairwise differences in financial performance across product, segment, discount band, temporal, and geographic categories, demonstrating pronounced heterogeneity within the dataset.

Differences in COGS across product pairs are consistently significant, with very large mean differences, indicating that cost structures are highly product-specific and likely driven by underlying variation in production complexity, material inputs, or supply chain requirements. Across customer segments, significant disparities emerge in gross sales, net sales, discounts, and profit outcomes, suggesting that market segments not only exhibit diverse purchasing behaviours but also generate differentiated revenue and profitability profiles, potentially reflecting divergent pricing and promotional strategies. Discount bands are shown to significantly influence both discount magnitudes and profit levels, where higher discount tiers correspond with markedly higher financial concessions but also exhibit meaningful impacts on profitability, highlighting the trade-off between promotional intensity and margin preservation.

Temporal analysis indicates that specific months, particularly April, experience significantly lower sales volumes relative to peak periods such as October, pointing to pronounced seasonality in demand, while country-level comparisons reveal geographic variation in unit sales, implying distinct market dynamics across regions.

Collectively, these findings underscore that cost efficiency, revenue generation, and profitability are shaped by structural differences across product lines and market segments, as well as by temporal and regional demand fluctuations, thereby reinforcing the need for differentiated pricing, cost control, and market-specific strategies to enhance financial performance.

2.2.5 Chi-square test

The Chi-Square analysis reveals statistically significant associations between discount band and temporal patterns, as well as between discount band and customer segment, indicating that discount strategies are not randomly distributed across time or market categories. The significant relationship between discount band and month of the year ($\chi^2 = 60.14$, $p < 0.01$) suggests that the intensity and type of discounting vary systematically across months, likely reflecting seasonality in demand, promotional calendars, or inventory management practices. Similarly, the significant association between customer segment and discount band ($\chi^2 = 26.82$, $p < 0.01$) implies that different market segments receive differentiated discount levels, pointing to targeted promotional strategies tailored to segment-specific purchasing behaviours or price sensitivities.

These findings collectively indicate that discounting is a strategic lever used selectively across both time periods and customer groups rather than a uniform policy, highlighting the use of differentiated pricing mechanisms to influence demand and manage customer relationships. From a financial perspective, these structured discounting patterns may help firms optimize revenue outcomes, but they also underscore the importance of monitoring discount effects on margin erosion across segments and seasons.

2.2.6 ANOVA Analysis (Two way)

The two-way ANOVA results indicate extensive and statistically significant interaction effects between categorical factors and financial outcomes, demonstrating that performance metrics are not merely

influenced by single market attributes but are jointly shaped by combinations of product, segment, time, geography, and discount strategy. Product consistently interacts with other factors to influence manufacturing price and COGS, indicating that cost variability is driven not only by intrinsic product characteristics but also by contextual factors such as country, month, and discount positioning. Segment interactions with product, country, month, and discount band exert strong effects on sale price, gross sales, net sales, discounts, and profit, suggesting that customer type plays a central role in moderating pricing effectiveness, sales volume, and profitability outcomes. The repeated significance of discount band interactions across sale price, gross sales, net sales, and profit further indicates that the financial consequences of promotional intensity are contingent on market context, rather than uniform across products or customer groups. Temporal effects, evidenced by significant month interactions with product and segment, highlight seasonality in both demand and discount allocation. Finally, interaction effects on units sold demonstrate that demand is jointly determined by product characteristics, customer segment, promotional strategy, and seasonal timing.

Collectively, these findings underscore the complexity of financial performance drivers, revealing that cost efficiency, revenue generation, and profitability are shaped by multi-level, context-dependent interactions across the product–market–time–and pricing landscape, necessitating segmented and adaptive management strategies rather than standardized policies.

3. Exploratory Data Analysis

3.1 Total Units sold by segment

The distribution of total units sold across segments indicates that the Government segment overwhelmingly dominates demand, substantially outpacing all other segments. While Small Business, Channel Partners, Enterprise, and Mid-market display relatively comparable sales volumes, the Government segment generates a disproportionately high level of unit sales, suggesting that it serves as a major revenue driver. This concentration of demand may reflect institutional purchasing patterns, larger order sizes, or long-term procurement contracts typical of the public sector.

From a financial perspective, this creates both opportunity and exposure: although the Government segment likely ensures high-volume sales, the business may be vulnerable to revenue volatility if reliance on a single segment leads to risk concentration. Strategic efforts aimed at diversifying demand across segments may mitigate this vulnerability and improve long-term revenue stability.

3.2 Total Units sold by Country

The country-level distribution shows moderate regional variation in unit sales, with Canada and France emerging as the largest demand sources, followed closely by the United States, while Germany and Mexico represent comparatively smaller markets. This pattern suggests that the firm’s strongest commercial performance is concentrated in North American and select European regions, potentially reflecting differences in customer purchasing power, market maturity, or product-market fit. The relatively narrow gap between most regions suggests a degree of geographic diversification, which may help buffer against region-specific economic downturns.

However, the performance gap between high- and low-demand countries also highlights opportunities for targeted market development strategies in underperforming regions such as Germany and Mexico, where growth in unit volumes could contribute to improved global scale efficiencies.

3.3 Total Units sold by product

The product-level analysis reveals that while most products generate relatively similar levels of demand, Paseo significantly outperforms all others, indicating its market leadership and central role in the firm's sales portfolio. The remaining products—Carretera, Montana, Amarilla, Velo, and VTT—cluster closely in demand, suggesting a balanced but less differentiated product mix. The dominance of Paseo may indicate strong brand preference, superior product attributes, or successful marketing strategies, resulting in economies of scale and higher revenue generation potential.

However, dependence on a single product introduces strategic risk, as demand shifts or competitive pressure could disproportionately affect overall performance. Enhancing differentiation and promotional investment in lower-performing product lines could increase portfolio resilience and reduce concentration risk.

3.4 Total Units sold by discount band

The discount band analysis demonstrates a clear positive relationship between discount level and unit sales, with the highest volumes observed in the High and Medium discount categories, followed by Low, and markedly lower sales in the No-discount category. This suggests that discounting serves as a major demand stimulus, with more aggressive price reductions producing substantial increases in volume. While this may enhance short-term sales performance, it also implies a trade-off between volume and profitability, particularly if the incremental revenue gains do not offset margin erosion.

Strategically, these patterns underscore the importance of balancing promotional intensity with financial outcomes, optimising discount structures to target price-sensitive segments or low-performing products while limiting excessive discounting that could undermine profitability. Further, the minimal sales in the No-discount category indicate limited baseline demand, highlighting potential challenges with organic market pull absent incentives.

3.5 Units sold by Segment within each country

The cross-tabulation of units sold by segment within each country indicates that the Government segment consistently exhibits the highest sales volumes across all regions, followed by Mid-market and Channel Partners, while Small Business and Enterprise display comparatively lower contributions. This pattern suggests that institutional demand, particularly from government entities, constitutes the primary source of market volume internationally, irrespective of geographic context. Interestingly, Canada and France show especially strong Government segment performance relative to other countries, implying strong institutional market penetration or procurement contracts in these regions. Conversely, Mexico and Germany show lower participation from Enterprise and Small Business, potentially reflecting differences in market maturity or firm size distribution.

Overall, the table highlights that demand is both segment-driven and geographically uneven, emphasising the need for region-specific customer engagement strategies and differentiated value propositions.

3.6 Average units sold by segment and product

This demonstrates that demand heterogeneity is strongly contingent on both customer segment and product type, with the Government segment consistently generating the highest unit sales across all products, and particularly for Paseo, which greatly exceeds all other product-segment combinations. Channel Partners and Enterprise exhibit moderate demand across most products, while Small Business and Mid-market represent the lowest values, reflecting lower purchase frequency or smaller order sizes in these segments. The distribution suggests that Paseo's high performance is not isolated but is reinforced across multiple customer types, indicating broad market appeal and potentially a key role in driving revenue scale.

However, reliance on a single high-performing product may expose the firm to product-specific demand shocks. These patterns suggest that performance improvements could stem from targeting product-segment combinations with untapped potential, rather than relying solely on dominant high-volume relationships.

3.7 Total units sold by segment and discount band

The analysis of total units sold by segment and discount band reveals that discount intensity has a substantial effect on sales volume across all segments, with High and Medium discounts consistently generating the greatest unit sales. The Government segment demonstrates a particularly strong response, exhibiting the highest volumes under both aggressive discount schemes, indicating that institutional procurement may be price-sensitive despite large budgets. Conversely, sales under no discount conditions are minimal across segments, confirming that price incentives are essential in stimulating demand. The comparative strength of Medium discounts suggests potential diminishing marginal returns between Medium and High discount levels, particularly if additional discounts fail to deliver proportional increases in volume. These outcomes highlight the strategic need to calibrate discount structures by segment, balancing competitive pressure with long-term margin integrity.

3.8 Total units sold by country and product

The country-product heat map shows that while Paseo dominates sales in every region, demand for it varies significantly, with the highest performance observed in Canada and France, followed by the United States, Mexico, and Germany. Other products—particularly VTT, Velo, and Carretera—exhibit moderate but regionally variable performance, suggesting that product-market fit differs across geographic contexts. For example, Carretera performs relatively poorly in Germany, while Amarilla achieves comparatively higher results in the United States. These patterns indicate that market heterogeneity is shaped by geographical preferences, possibly related to cultural, economic, or competitive differences. The sustained dominance of Paseo across all markets suggests a strong global value proposition, but the firm could benefit from localised product positioning strategies to enhance performance of weaker product lines in underperforming regions.

3.9 Total units sold by country and discount band

The distribution of units sold by country and discount band illustrates that discounts drive demand consistently across all regions, with High discounts producing the greatest sales volumes, followed by Medium and Low tiers, while no-discount purchases account for a small fraction of total sales. Canada, the United States, and France demonstrate the strongest response to discounting, whereas Germany and Mexico exhibit weaker performance overall, even under aggressive discount conditions. These variations suggest that regional differences in price sensitivity and market competitiveness influence the effectiveness of promotional strategies. The significant reliance on high-discount schemes across countries reinforces the role of price incentives as a critical market lever, but also points toward potential vulnerability to margin compression and promotional dependency, particularly in mature markets.

3.10 Units sold by Product and discount band

The product-discount heat map demonstrates clear interaction effects between product type and discount intensity, with Paseo showing exceptionally high sales across all discount levels, particularly under Medium and High bands. Other products, such as Amarilla, Carretera, and VTT, show substantial increases in demand under discount conditions compared to no-discount scenarios, indicating strong price elasticity. The low baseline sales under no-discount conditions suggest that most products lack inherent organic pull and require promotional support to sustain demand. The superior performance of Medium discounts relative to High discounts for some products suggests that moderate price incentives may achieve optimal returns, balancing incremental volume gains with profitability objectives. These findings highlight the need for product-specific pricing strategies, rather than uniform discount policies, to maximise contribution margins.

3.11 Average manufacturing price by segment

The average manufacturing price by segment indicates relatively modest variation across customer groups, with Small Business exhibiting the highest production cost, followed by Channel Partners and Government, while Midmarket demonstrates the lowest average costs. This pattern suggests that products purchased by Small Business customers may involve more complex configurations, smaller production batches, or higher input costs, leading to increased per-unit manufacturing expenditure. Conversely, lower costs associated with the Midmarket segment may reflect economies of scale or standardized offerings tailored to this customer group. The general proximity of values across segments implies that cost structures are not heavily segmented, although the elevated cost burden observed for Small Business may undermine profit margins unless compensated by pricing premiums or reduced discounting. These disparities highlight the importance of aligning pricing and discount strategies with underlying cost structures to prevent erosions in segment-specific profitability.

3.12 Average manufacturing price by discount band

The chart depicting average manufacturing price by discount band shows a notable association between higher manufacturing costs and the use of more aggressive discount strategies, with the highest costs observed in the High discount category, followed by Medium and None, while Low discounts are linked to substantially lower production costs. This alignment suggests that firms are more likely to deploy intensive promotional incentives for higher-cost products, potentially to overcome price resistance or stimulate demand in price-sensitive markets. However, this strategy may exacerbate margin compression if discounts are applied to products with already elevated cost structures. The lower manufacturing cost associated with lower discount bands implies that demand for cost-efficient products may be less dependent on price incentives. Overall, the observed pattern emphasizes a strategic tension between revenue generation via discount-driven demand stimulation and cost control, necessitating careful evaluation of whether promotional efforts yield net financial benefits for high-cost products.

3.13 Average manufacturing Price by product

The product-level analysis reveals substantial heterogeneity in production costs, with Amarilla and VTT incurring exceptionally high manufacturing prices relative to other products, followed by Velo, while Carretera, Montana, and Paseo exhibit significantly lower production costs. This distribution indicates a clear distinction between high-cost and low-cost product categories, potentially reflecting differences in materials, technology requirements, or product complexity. The considerable cost disparity suggests that profitability will depend heavily on pricing power or volume dynamics for high-cost products, as they are likely to face tighter margin constraints. Conversely, low-cost products offer greater flexibility for competitive pricing and discounting, while still supporting positive contribution margins. The asymmetric cost structure underscores the need for differentiated pricing strategies, whereby high-cost products command premium positioning, while lower-cost products may serve as volume drivers.

3.14 Average manufacturing price by country

The country-level summary indicates that manufacturing costs are broadly similar across international markets, with values clustered between approximately 94 and 102 units, though the United States shows slightly higher costs relative to other countries. This modest variation suggests that production processes and supply chain inputs are relatively standardized across regions, reducing the likelihood of country-specific cost inefficiencies. The marginally higher costs in the U.S. may reflect labor, logistics, taxation, or regulatory factors that elevate input prices. Importantly, the absence of extreme cost disparities indicates that geographic differences in profitability are likely driven more by demand-side dynamics, such as pricing power or discount intensity, rather than production inefficiencies. Consequently, international profit

optimization will depend primarily on sales strategy and market development efforts rather than cost restructuring.

3.15 Average manufacturing price by segment within each country

The pivot table reveals considerable context-specific variation in manufacturing costs across segment-country combinations, indicating that cost structures are shaped by the interaction of market type and geography rather than by segment alone. For example, Channel Partners exhibit low manufacturing costs in Canada but substantially higher costs in France and Germany, whereas Small Business costs are highest in the United States and Canada. Similarly, Enterprise costs fluctuate widely across markets, ranging from relatively high in Canada to comparatively moderate in France. These patterns suggest that cost heterogeneity is driven by localised product configurations, value propositions, or procurement requirements tailored to specific markets and segments, rather than uniform cost models. Such variability complicates profitability management, as successful pricing policies must account for both segment-specific cost burdens and regional demand conditions. These findings underscore the need for granular cost-to-price alignment rather than standardized pricing frameworks.

3.16 Average manufacturing price by product and discount band

The heatmap indicates that manufacturing price is primarily determined by the product rather than by the discount band applied. Products such as Amarilla and VTT exhibit substantially higher production costs relative to others, regardless of whether the discount band is high, low, medium, or none. In contrast, items such as Carretera, Montana, and Paseo have markedly low cost structures, reflecting either lower material intensity or simpler production processes. The uniformity of prices across discount categories suggests that the company does not use cost-adjusted pricing strategies in relation to discount incentives, but instead maintains consistent manufacturing expenses irrespective of subsequent promotional positioning. This structure implies that cost-based segmentation strategies are driven by product characteristics, not marketing strategy.

3.17 Average manufacturing price by segment and discount band

The pivot table illustrates notable heterogeneity in manufacturing costs across segments and discount bands, implying that pricing structures vary across customer groups. High discount bands are associated with the highest manufacturing prices for most segments, particularly Channel Partners and Enterprise, while low discount categories show comparatively reduced production costs, potentially reflecting lower-value product mixes or strategic allocation of discounts to lower-cost items. Interestingly, the Government and Small Business segments exhibit higher mean manufacturing costs under medium and no discount scenarios, indicating potential misalignment between discount incentives and cost structures. Overall, these findings suggest that the company may be absorbing higher production costs in segments where discounts are prevalent, raising questions about margin erosion and pricing optimization.

3.18 Average manufacturing price by country and product

The product–country pivot table shows near-perfect homogeneity in manufacturing cost by product across all countries, with Amarilla, VTT, and Velo remaining consistently high-cost items, while Carretera, Montana, and Paseo remain cost-efficient alternatives. This outcome implies that manufacturing processes are globally standardized and unaffected by geographic location. The uniformity further indicates centralized supply chain management, efficient international cost control, and possible reliance on global manufacturing hubs rather than regionally differentiated production systems. As a result, the company benefits from predictable cost structures, but lacks cost differentiation opportunities that could support region-specific competitive strategies.

3.19 Average manufacturing price by country and discount band

The relationship between discount category and manufacturing price varies considerably across countries, suggesting distinct price–cost dynamics shaped by geographic market conditions. In France and the United States, the “None” discount band exhibits relatively high manufacturing costs, possibly reflecting the sale of more premium products without discount support. Conversely, markets such as Canada and Mexico show higher costs associated with high and medium discount bands, implying that costly products are more aggressively discounted in these regions. The existence of these cross-market discrepancies implies that the company’s pricing and promotion decisions are not uniformly aligned with production cost structures, potentially exposing the firm to inconsistent gross margins across countries.

3.20 Sales efficiency by country

The sales efficiency index reveals meaningful cross-country disparities in performance relative to manufacturing cost. Canada and France demonstrate the highest sales efficiency, suggesting that these markets generate higher unit sales per dollar of production cost, likely due to favourable demand conditions or effective sales and marketing strategies. Conversely, Germany exhibits the lowest efficiency, indicating reduced volume uptake relative to cost, which may reflect weaker product–market fit, pricing misalignment, or competitive pressures. The United States, although an important market, performs only moderately, pointing to potential inefficiencies in cost recovery relative to sales volume. These results highlight opportunities for targeted efficiency improvements in lower-performing markets and potential replication of strategies from highly efficient regions.

3.21 Average manufacturing price per product per segment

The heatmap illustrates that manufacturing prices differ dramatically by product, while remaining constant across segments. Products such as Amarilla and VTT exhibit particularly high manufacturing costs, averaging around 260 and 250 respectively, whereas lower-cost items like Carretera, Montana, and Paseo have marginal production costs of 3, 5, and 10. The uniformity of values across segments indicates that customer segment does not influence production cost, suggesting standardised production processes and supplier pricing. Strategically, this implies that product-level cost optimization is more critical than segment-based pricing adjustments, and that high-cost products may require premium pricing or targeted efficiency improvements to sustain profitability.

3.22 Units sold by segment and manufacturing price

The box plot reveals considerable variation in units sold across manufacturing price tiers within each segment. Across all segments, high manufacturing-price tiers tend to be associated with higher sales volumes, particularly in the Enterprise and Government segments, which exhibit a wider interquartile range and higher maximum values. Conversely, segments such as Midmarket and Channel Partners display more modest distributions, reflecting lower demand levels. The presence of multiple outliers suggests sporadic spikes in large-volume orders, possibly due to contract-based procurement. This pattern indicates that segments with greater purchasing power are less sensitive to high production costs and may prioritise product performance or strategic value, supporting differentiated pricing strategies and tailored go-to-market models.

3.23 Product-level heat map : Units sold, Manufacturing price, sale price

This heatmap demonstrates a clear contrast between manufacturing costs and demand across products. Products with extremely low production costs, such as Carretera (3) and Montana (5), register comparatively high volumes sold, suggesting price-elastic market behaviour where affordability drives adoption. Meanwhile, premium products such as VTT (250) and Amarilla (260) maintain competitive sales volumes despite their high cost structure, implying strong perceived value or brand equity. Sale prices scale

proportionally with production costs, reflecting a consistent cost-plus pricing strategy. Collectively, these findings indicate a bimodal product portfolio, balancing high-margin premium products with high-volume, low-cost offerings, which may enhance overall revenue stability.

3.24 Average manufacturing price and units sold by discount band

The pivot table comparing manufacturing price and units sold by discount band reveals that the high discount band exhibits the highest average manufacturing cost (102.5) yet maintains high unit sales (1,625), suggesting discounting is used strategically to drive demand for premium products. The low discount band has substantially lower production costs (82.9) but sustains similar sales volumes (1,637), indicating sensitivity to price incentives among mid-range products. The medium tier shows reduced sales despite moderate cost, signalling a potential inefficiency in discount allocation. These outcomes suggest that discount strategies are more effective when aligned with high-value products, whereas mid-range products might benefit from revised discount structures or repositioning strategies.

3.25 Top selling products

The ranking of products based on average units sold positions Paseo, Montana, and Amarilla as the top three performers, with mean sales of 1,674, 1,658, and 1,652 units, respectively. Notably, Paseo combines high sales with extremely low manufacturing cost (10), highlighting its efficiency in generating high sales volumes at minimal cost. In contrast, Amarilla and VTT incur substantially higher manufacturing costs (260 and 250), yet still achieve competitive demand levels, reinforcing their premium positioning. The lowest performer, Velo, shows both moderate cost and moderate demand, indicating limited market differentiation. From a portfolio management perspective, these insights highlight opportunities to leverage low-cost, high-volume products to drive profitability, while maintaining premium offerings that may bolster brand positioning and margin contribution.

3.26 Sale Price by product

The heatmap of sale price metrics by product reveals substantial variation in pricing structures across the product range, with mean sale prices clustering between approximately 110 and 140 units for most products, except for VTT which sits at a higher average of around 140. Minimum prices are uniform across all products, suggesting a consistent baseline or reference price regardless of product category. Maximum sale prices, however, are unusually high and identical across all products, likely capturing extreme outliers or fixed high-value deals, rather than nominal prices. The standard deviation highlights moderate variability across offerings, indicating pricing flexibility that could reflect strategic discounts, customer segmentation, or negotiated pricing. Overall, the results imply that while the product portfolio shares a consistent pricing strategy on the lower bound, variability emerges in negotiated deals and premium sales.

3.27 Mean sale price by segment

The comparison of sale prices across customer segments demonstrates sharp heterogeneity in pricing strategies, with Small Business customers exhibiting exceptionally high mean sale prices relative to all other segments. Enterprise and Government segments show comparable mid-range prices, while Channel Partners and Midmarket segments are priced substantially lower. This price dispersion suggests deliberate segmentation-based pricing, where willingness-to-pay or negotiated contract structures differ materially between customer types. The elevated pricing among Small Businesses may reflect smaller volume purchases, lower bargaining power, or premium targeting, whereas lower prices among Channel Partners may indicate wholesale or bulk-purchase incentives. These disparities highlight the firm's strategic monetization of different markets based on customer price sensitivity and purchase behavior.

3.28 Sale price variation by segment

The analysis of sale price variability indicates that most segments—including Channel Partners, Enterprise, Midmarket, and Small Business—show zero variance, implying fixed or standardized pricing structures within those segments. Conversely, the Government segment exhibits substantial variability, reflecting a wide dispersion of sale prices. This suggests that government contracts may involve greater negotiation flexibility, price adjustments, or differentiated procurement policies. The presence of variability exclusively in the Government segment highlights its distinct procurement dynamics, possibly involving varied tenders, project-specific deals, or cost-plus pricing arrangements. For pricing managers, this pattern signals that most segments operate under rigid pricing frameworks, whereas the Government requires a customizable, contract-driven pricing strategy.

3.29 Mean sale price by country

The mean sale price across countries is uniform, with identical average values observed for Canada, France, Germany, Mexico, and the United States. This convergence suggests that international pricing strategies are standardized, with minimal geographic differentiation. Such uniformity may reflect either centralized price governance or a homogeneous global customer base with similar purchasing behavior. While this supports operational simplicity and global brand consistency, it may also indicate missed opportunities for regional price optimization based on competitiveness, purchasing power, or market maturity. In highly competitive or price-sensitive regions, uniform pricing could limit penetration, whereas in wealthier markets, it may under-monetize demand.

3.30 Sale price variability across countries

The standard deviation in sale prices is identical for all countries, highlighting a consistent degree of price variability irrespective of geography. This further reinforces the observation that the firm adopts globally uniform pricing strategies rather than country-specific pricing policies. However, the presence of variability—despite uniform averages—suggests the existence of tiered pricing structures, discounts, or volume-based negotiations within each market. The uniformity of variation implies similar pricing flexibility policies deployed worldwide. This consistency may facilitate internal policy alignment, but could reduce responsiveness to local market dynamics, exchange rate fluctuations, or competitor behavior in specific countries.

3.31 Average Sale Price for Each Discount Band

The bar chart illustrates systematic variation in average sale prices across discount bands, revealing that the Low discount band achieves the highest average sale price, followed by Medium and High, while products with no discount exhibit the lowest price levels. This inverse relationship between discounting and sale price deviates from conventional pricing logic, where higher discounts typically lower price points. This anomaly may suggest that products receiving “Low” discounts are inherently premium items with higher base prices, using minimal discounting to drive affordability while maintaining value. Conversely, products falling under the “None” category may be priced as entry-level or promotional inventory, achieving the lowest monetized value. Overall, these results highlight that the discount strategy is being deployed not to uniformly reduce prices, but to segment market tiers by product type and perceived value.

3.32 Price Distribution by Demand Level

The box plot demonstrates that Low, Mid-Low, and Mid-High demand levels have overlapping price distributions with similarly high upper bounds, indicating substantial variability and the presence of premium-priced items across these categories. In contrast, the High-demand category shows a markedly lower median price, as well as a compressed interquartile range, implying that high-demand products tend to be consistently lower-priced. A few extreme outliers in the higher-demand tiers suggest occasional premium purchases, but these are statistically rare. Collectively, this pattern suggests an inverse association between

demand and price, consistent with price-sensitive markets in which demand is driven by affordability, rather than premium positioning. Firms seeking to increase demand may need to focus on competitive pricing, whereas premium strategies may remain viable only for niche, low-volume products.

3.33 Margin Per Unit Distribution

The distribution of margin per unit reveals a bimodal structure, with clusters of negative margins and high positive margins, alongside a large concentration near zero. Negative margins indicate that certain products are consistently sold below their manufacturing cost, suggesting either aggressive penetration pricing, stock liquidation, or data anomalies. The mass near zero indicates a large share of break-even transactions, while the tail of high positive values signifies premium items with substantial profitability per unit sold. The dispersion suggests a mixed portfolio strategy, with simultaneous pursuit of market share gains (via low-margin products) and profit maximization (via high-margin products). Firms should evaluate whether loss-making products are strategically justified or whether repricing could improve profit efficiency without materially reducing volume.

3.34 Average Sale Price across Segment & Country

The heatmap demonstrates homogeneity in average sale price across countries for each segment, indicating that international pricing strategies are standardized, with minimal geographic variation. At the segment level, Small Business consistently exhibits the highest average price (~300), whereas Channel Partners and Midmarket maintain lowest price levels (12–15). These findings imply that price differentiation is primarily driven by segment characteristics rather than geographic market differences, suggesting a consistent value proposition across international markets. The premium pricing in the Small Business segment may reflect customized solutions, small-batch ordering, or higher service intensity, while mass-market channels operate under cost-sensitive pricing models. Standardized cross-country pricing minimizes arbitrage risk but may overlook local purchasing power opportunities.

3.35 Avg Sale Price: Product × Segment

This heatmap shows strong segmentation effects on product pricing. Across all product categories, the Small Business segment records uniformly high sale prices (~300), highlighting that products are consistently up-priced for this customer base. Enterprise and Government segments display moderate variability, with some products (e.g., VTT, Amarilla) commanding noticeably higher prices, suggesting premiumization for institutional buyers. Channel Partners and Midmarket exhibit uniformly low price levels, consistent with bulk purchasing, distribution-oriented pricing, or reduced willingness to pay. This cross-interaction highlights that pricing decisions are segment-driven rather than product-driven, implying that value perception is tied to customer profile, not item characteristics.

3.36 Average Sale Price by Product and Country

The cross-tabulation of product and country indicates moderate price variability across markets, particularly for premium items such as Amarilla and VTT. The United States and Canada show relatively higher price points for select products, possibly reflecting stronger purchasing power or differentiated market positioning. Lower price values for certain products in Mexico and Germany suggest localized discounting or economic constraints. The variation indicates that country-level market dynamics influence pricing, contrasting with earlier findings showing geographic uniformity at the segment level. Thus, country-specific value extraction varies more within products than within segments, implying product-level competitive positioning is tailored to national markets.

3.37 Average Sale Price by Product vs Discount Band

The matrix shows that price adjustments within each product category vary substantially across discount

bands. Certain products, such as Amarilla and VTT, show higher average prices under Low discounts, implying selective premium discounting strategies. Conversely, some categories (e.g., Carretera, Montana) exhibit limited sensitivity to discount level, suggesting inelastic customer response or standardized pricing. Lower prices under the “None” category indicate a deliberate strategy to position no-discount products as budget alternatives, rather than using discounting to reduce price. Overall, this table highlights a non-linear pricing response, wherein discount bands alter price more for premium items, signaling strategic segmentation rather than uniform discounting behavior.

3.38 Comparison of Manufacturing vs Sale Price Across Products

The dual-bar plot reveals that products such as VTT and Amarilla have markedly higher manufacturing costs, which translates into correspondingly higher sale prices. However, the gap between cost and price is not uniform across products, indicating varying margin structures. Lower-cost products (Carretera, Paseo, Velo) exhibit moderate pricing levels, suggesting narrower unit margins, while higher-cost items maintain substantial price premiums to preserve profitability. This demonstrates a clear cost-plus pricing model for premium products but a market-competitive model for lower-tier items. The disparity in cost-price spread implies that product-level margin optimization remains a critical strategic lever.

3.39 Sale Price, Manufacturing Price, and Units Sold by Segment

The table shows that Small Business commands the highest sale price, but exhibits relatively lower unit sales, indicating a high-price, low-volume sales model. In contrast, Midmarket and Enterprise segments show lower price points but higher unit volumes, reflecting a volume-driven revenue strategy. Manufacturing price remains relatively uniform across segments, with only minor cost variation, suggesting that price differences are driven by market positioning rather than production cost differences. The government exhibits mid-range pricing and moderate volume, implying a balanced revenue structure. These findings highlight distinct market strategies, with price and volume tailored to customer type.

3.40 Price Elasticity by Product Category

The correlation coefficients indicate weak negative price elasticity for most products, with slight negative values suggesting that increases in sale price do not substantially reduce units sold. Velo is an exception, exhibiting positive correlation, meaning higher prices are associated with higher sales, potentially reflecting premium signalling effects or misclassification. The weak elasticities overall imply that demand is inelastic, allowing firms to raise prices without major reductions in quantity sold. This provides strategic justification for premium pricing, particularly in low-elasticity categories, to maximize revenue per unit.

3.41 Average Discount by Segment

The bar chart illustrates substantial heterogeneity in discounting strategies across market segments. Small Business customers receive markedly higher average discount amounts compared to all other groups, indicating stronger price sensitivity or lower purchasing power within this segment. Enterprise and Government follow with moderate average discounts, possibly reflecting negotiated procurement practices or bulk purchasing agreements. Conversely, Channel Partners and Midmarket segments receive minimal discounts, suggesting either standardized pricing models or lower bargaining leverage. Overall, the distribution indicates that pricing strategies are differentiated by segment, likely based on their purchasing behaviors and strategic importance rather than uniform discount policy.

3.42 High Discount Transaction Ratio by Segment

The high discount transaction ratio further reinforces segment-level disparities observed previously. Small Business accounts for the highest proportion of high-discount transactions, indicating frequent reliance on discounting to stimulate sales or maintain competitiveness in this segment. Enterprise also exhibits a notable

ratio, which may reflect systematic discount negotiations tied to contract or enterprise-level procurement processes. In contrast, Channel Partners and Midmarket exhibit no high-discount transactions, implying fixed pricing models or low discount sensitivity. This pattern suggests that discounting is selectively applied in segments where firms face higher price elasticity or competitive pressures.

3.43 Profit Margin by Country

The profit margin analysis reveals negative average margins across all countries, implying that the cost of manufacturing consistently exceeds the sale price relative to revenue. Germany and France demonstrate the lowest margins, suggesting particularly unfavorable pricing or cost structures in these markets. Although Canada and Mexico show slightly improved values, margins remain substantially negative, indicating systemic unprofitability rather than isolated inefficiencies. These findings highlight the need to reassess pricing strategy, cost management, or product portfolio alignment across regions. Without intervention, the current model may be financially unsustainable.

3.44 Average Sale Price by Segment and Discount Band

The pivot table indicates strong segmentation in pricing strategies, yet reveals surprising uniformity of price across different discount bands within each segment. For instance, the sale price remains constant across all discount categories for Channel Partners, Enterprise, and Small Business, suggesting that discounting does not meaningfully alter transaction-level pricing for these groups. The government, however, shows greater price variation, implying more flexible or negotiated pricing structures. These results suggest that, for most segments, list price is a dominant determinant of sales price, and discounting may be applied in ways that do not change final selling price—potentially through back-end incentives, volume rebates, or non-price promotional mechanisms.

3.45 Mean and Sum of Sale Price and Units Sold by Segment

This output highlights clear distinctions between segments in terms of revenue potential and sales volume. The government generates the highest total sales revenue despite only moderate average units sold, suggesting high-value transactions or large bulk orders. Enterprise similarly performs strongly in both average and total units sold, supporting its strategic importance for revenue generation. Channel Partners and Midmarket, although exhibiting similar average units sold, have significantly lower total sales, implying smaller market sizes or limited transaction frequency. Surprisingly, Small Business, despite having the highest average sale price, displays relatively low total units sold, indicating a niche but high-margin customer base. These patterns underscore the need for segment-specific strategies to balance volume and margin.

3.46 Average Sale Price and Manufacturing Price by Segment

This pivot reveals systematic pricing variance among segments, with Small Business commanding the highest average sale price, substantially above its manufacturing cost. Enterprise and Government exhibit mid-range sale prices closely aligned with moderate manufacturing costs, likely reflecting structured procurement norms. Notably, Channel Partners exhibit a substantial gap between manufacturing price and sale price, resulting in low margin potential, while Midmarket shows lower pricing overall. These results suggest that while pricing is broadly aligned with cost structures, Channel Partners and Midmarket may present critical margin challenges, whereas Small Business represents a high-value opportunity.

3.47 Average Sale Price by Country and Discount Band

The cross-tabulation reveals substantial variability in sale prices across countries and discount levels, indicating differential market dynamics and pricing sensitivities. Canada and the United States generally exhibit higher sale prices, particularly under high discount conditions, which may reflect stronger baseline

pricing or differing discount structures. Mexico and Germany show large fluctuations across discount categories, implying greater price sensitivity or less standardized pricing frameworks. Overall, price dispersion across geographies suggests that market conditions, purchasing power, and competitive environment significantly influence pricing strategies.

3.48 Average Sale Price and Units Sold by Discount Band

This table reveals that low discount transactions generate the highest average sale prices, yet correspond to relatively high volumes of units sold, contradicting conventional expectations of price sensitivity. In contrast, high and medium discount categories produce comparable sale prices but lower average volumes, implying that heavier discounting does not necessarily improve sales performance. Transactions without discounts exhibit relatively high volume but the lowest prices, potentially reflecting commodity-like products or standardized contracts. These findings highlight the need to evaluate whether discount policies effectively drive volume or erode margins without tangible sales benefits.

3.49 Average Sale Price and Manufacturing Price by Discount Band

Comparison of sale and manufacturing prices across discount bands demonstrates that high discount categories still maintain a price premium over manufacturing cost, while low discount categories show the highest price-cost differential. Conversely, transactions with no discount display near parity between sale and manufacturing price, implying minimal profitability. These results suggest that discounting is not always associated with reduced pricing power; however, non-discounted transactions may reflect cost-based pricing practices that restrict margin growth. Strategic optimization of discount allocation could improve profitability.

3.50 Percentage of Transactions with No Discount by Country

This analysis shows that the vast majority of transactions across all countries include discounts, with the United States and Mexico having the highest proportions of transactions with applied discounts. Germany exhibits the lowest discount rate, indicating a greater prevalence of full-price purchasing or stricter pricing policies. High discount prevalence may indicate price-competitive markets or buyer expectations of concessions. However, excessive discount reliance can erode long-term profitability. Variability across countries suggests that discount strategies are influenced by local market norms, necessitating differentiated pricing approaches.

3.51 Average Discount Amount by Product

The bar chart indicates substantial variation in average discount amounts across products, with Velo receiving the highest discounts, followed by Amarilla, VTT, Paseo, and Montana, while Carretera receives the lowest. The upward pattern suggests that higher-priced or higher-margin products may be subject to more aggressive discounting to stimulate demand. The systematic escalation from Carretera to Velo indicates that discounting is not random but strategically targeted towards specific product categories, potentially reflecting differences in competitive intensity, product lifecycle stage, or customer price sensitivity. This pattern implies that discount strategies may disproportionately focus on premium offerings, with management likely leveraging discounting as a tactical tool to drive volume and mitigate revenue risk associated with high-value inventory.

3.52 Discount Amount by Discount Band

The distribution of discount amounts by discount band reveals significant heterogeneity across discount levels. "None" shows negligible discount values with low dispersion, whereas "Low" demonstrates modest median discounts but with several large outliers, suggesting occasional targeted price reductions. "Medium" exhibits a broader distribution with larger variability, while "High" displays both the highest median

discounts and most extreme outliers, indicating major discount events. The progressively expanding spread from Low to High bands suggests that discount magnitude is not only categorically higher but also more volatile at upper levels. This pattern may imply segmentation by price sensitivity, with high discounts deployed selectively to clear inventory or win price-competitive deals, whereas lower discount segments rely on narrower, more controlled pricing approaches.

3.53 Average Discount Amount by Segment & Country

The heatmap shows material differences in discount allocation across segments and countries. Small Business consistently records the highest discount amounts in all countries, particularly in the United States, where discount magnitude is more than double that of other segments. Enterprise and Government segments also exhibit elevated discount levels relative to Channel Partners and Midmarket, suggesting that institutional buyers receive substantial price reductions. Country-level variation is relatively modest except for the United States, where discount magnitudes are systematically higher across segments. These results suggest that discounting strategies are strongly influenced by buyer type and national market dynamics, with small business and large institutional buyers in certain geographies driving discount expenditure.

3.54 Average Discount Amount by Segment & Product

This heatmap illustrates that discount allocation is highly uneven across both segments and products. Small Business receives consistently high discounts on almost all products, with especially elevated values for Velo and Amarilla, indicating a targeting of premium products in lower-volume customer groups. Enterprise segment discounting is concentrated on Carretera, while Government shows balanced but generally high reductions across most products. Channel Partners and Midmarket receive minimal discounts regardless of product category. These patterns suggest that discounts serve as a pricing lever to drive conversion in markets with potentially lower willingness-to-pay or greater price elasticity, while more stable channels remain less dependent on price incentives.

3.55 Average Discount Amount by Segment and Discount Band

The heatmap stratified by segment and discount band shows stark contrasts in discount strategy application. Small Business receives exceptionally high discounts in the High and Medium bands, while Enterprise and Government also receive significant allocations in these categories. In contrast, Midmarket and Channel Partners receive modest discounts, even at higher discount tiers. Notably, no segment appears to receive tangible discounts under the "None" category, signifying clear segmentation of pricing policy. This suggests discount structures are intentionally tiered to match segment-level profitability objectives, with heavier discounting deployed to incentivize volume or support highly price-sensitive buyers, while low-elasticity segments receive limited intervention.

3.56 Discounts vs. Units Sold by Segment

The scatter plot reveals a weak but positive association between discount magnitude and units sold, with Small Business and Enterprise segments displaying higher discount values and moderate-to-high unit sales. Government exhibits dispersed points indicating high discounts but variable unit sales, suggesting inconsistent responsiveness to price reductions. Channel Partners and Midmarket cluster near lower discount values with moderate sales, implying that sales performance in these segments is less dependent on discounts. Collectively, the distribution implies that aggressive discounting may stimulate sales in some segments but not uniformly. Segment-specific price elasticity likely moderates the effectiveness of discount-based strategies.

3.57 Discounts vs. Manufacturing Price by Segment

The plot highlights that discounts are not linearly associated with manufacturing price. High-cost items do

not consistently receive the largest discounts; rather, discount magnitude varies significantly even within similar cost tiers. Small Business and Enterprise segments show exceptionally high discounts on both low-cost and high-cost items, reinforcing a strategic use of discounting to stimulate adoption independent of production cost structure. Conversely, Channel Partners and Midmarket exhibit much lower discount dispersion, suggesting less reliance on price manipulation. This indicates pricing strategy is more demand-driven than cost-driven, likely reflecting willingness-to-pay, competitive pressures, or strategic account priorities.

3.58 Discounts vs. Units Sold by Product

The scatter plot indicates heterogeneous relationships between discounts and units sold across products. Products like VTT and Velo show observations with high discounts coupled with moderate unit sales, implying that aggressive discounting may stimulate demand for premium offerings. In contrast, lower-priced items, such as Carretera and Montana, exhibit lower discount values but higher dispersion in unit volumes, indicating that demand for these products is less reliant on discounts. The wide dispersion suggests product-specific elasticity, with premium products benefiting more predictably from discount incentives compared to lower-tier offerings.

3.59 Discounts and Units Sold Summary by Country

This descriptive table highlights notable variability in discount and sales metrics across countries. The United States and Canada exhibit the highest mean discount amounts, indicating a more aggressive pricing strategy relative to France, Germany, and Mexico. However, unit sales are fairly consistent across countries, suggesting that deeper discounts do not necessarily produce proportionally higher sales volumes. Large standard deviations in both discounts and sales across all countries highlight substantial variability, indicating that performance outcomes are highly dependent on individual transactions rather than uniform market behavior. This reinforces the need for targeted, rather than broad-based, discount policies.

3.60 Average Discount by Country and Product

This pivot table shows substantial variability in discount behavior across country-product combinations, with Canada displaying the highest discounts for most products, followed by the United States and France. Germany reports comparatively lower discounts for multiple products, suggesting lower strategic reliance on price incentives in that market. Certain products, such as Amarilla and Velo, receive consistently high discounts across countries, whereas others, like Paseo, exhibit more country-specific discounting patterns. These differences suggest that discount strategy is not only product-driven but also shaped by country-level market conditions, such as competition, demand elasticity, and currency effects.

3.61 Discounts vs Units Sold (Colored by Manufacturing Price)

This scatter plot reveals a positive but weak relationship between discounts and units sold: higher discounts often correspond to higher sales volumes, particularly in the mid-range discount values (5k–50k). However, the spread of points suggests that discounts alone do not reliably drive demand, as there are many low-discount transactions with high demand and high-discount transactions with moderate demand. The color coding shows that products with higher manufacturing price (yellow markers) tend to receive larger discounts, but their units sold vary widely, implying that discounting high-cost products is strategic rather than reactive. Overall, the firm seems to employ discounting to push expensive products, but demand elasticity appears product-specific rather than uniform.

3.62 Monthly Seasonality by Segment (2013 vs 2014)

The monthly seasonality charts show fluctuating sales across months, but no consistent seasonal peak across segments, indicating that demand is not predominantly driven by cyclical or seasonal effects. In both years,

Small Business, Enterprise, and Government exhibit higher variability, suggesting demand is influenced by business cycles or procurement schedules rather than seasonality. Midmarket and Channel Partners show lower but more stable demand, hinting at transactional regularity. The spike in sales around November for multiple segments in both years may suggest a year-end purchasing push, budget utilization, or promotional cycles. Segment behavior changed notably in 2014, becoming more volatile, indicating market conditions or strategic shifts impacting purchasing behavior.

3.63 Monthly Seasonality by Country (2013 vs 2014)

Seasonality across countries shows no uniform sales cycles, but France and the USA experienced higher sales peaks in certain months, particularly April and November, hinting at market-specific triggers rather than global seasonality. Canada and Mexico show less volatility, implying more consistent demand. Germany has lower averages and spike volatility, suggesting a price-sensitive or slow-moving market. Comparing years, 2014 shows stronger fluctuations, especially in the USA, likely driven by promotions, policy changes, or competitive pressure. Markets show idiosyncratic behavior, meaning regional strategy tailoring—rather than global campaigns—would be most effective.

3.64 Monthly Seasonality by Product (2013 vs 2014)

Product seasonality indicates that no single product dominates demand throughout the year, but Paseo, Carretera, and VTT show periodic spikes, particularly during Q2 and Q4, suggesting project-based or promotional demand cycles. Montana and Velo exhibit more consistent demand, implying broader market adoption. A comparison between years reveals 2014 is more volatile, pointing to greater sensitivity to pricing events, campaigns, or supply conditions. Products have distinct demand cycles, implying that inventory, pricing, and promotions must be product-level optimized rather than category-level.

3.65 Manufacturing Price Trend by Segment (2013 vs 2014)

Manufacturing price trends differ greatly by segment, with Channel Partners and Small Business showing large fluctuations, likely due to changing product mixes rather than cost adjustments. Enterprise shows a declining cost trend, suggesting optimization, volume discounts, or standardization benefits. Government and Midmarket maintain moderate, stable cost levels, reflecting consistent ordering behavior. In 2014, volatility increased significantly across all segments, indicating portfolio restructuring, supplier changes, or macro shocks. Higher volatility suggests cost management risk, especially for segments heavily reliant on expensive SKUs.

3.66 Manufacturing Price Trend by Country (2013 vs 2014)

Manufacturing costs varied modestly by country in 2013, with the USA showing the highest volatility and cost levels, hinting at premium product mixes or market-specific customization. In 2014, volatility increased sharply in the USA, with frequent peaks and drops, suggesting dynamic supply chain conditions or aggressive product switching. Other countries remain relatively stable, though France exhibits spikes likely from product launches or demand surges. Overall, the USA market appears largest, most volatile, and most cost-intensive, requiring tight cost controls.

3.67 Manufacturing Price Trend by Product (2013 vs 2014)

Manufacturing prices by product are stable over time, with Amarilla and VTT carrying the highest costs consistently, while Carretera, Montana, and Paseo remain low-cost items. The minimal month-to-month variance indicates that manufacturing pricing is stable and rarely adjusted, meaning cost differences are structural rather than tactical. Velo sees slight changes, suggesting production scaling or optimization. High-cost items underpin pricing strategies but also pose risks in demand downturns.

3.68 Sale Price Trend by Segment (2013 vs 2014)
Sale price trends show complete stability within each segment, with fixed pricing regardless of month or year. Small Business products consistently have the highest sale price, while Channel Partners and Midmarket have the lowest prices, reflecting segmentation strategy and possibly contract terms. Enterprise and Government maintain similar price levels, likely due to negotiated standardized pricing. Stability suggests value-based or contract-based pricing, rather than dynamic pricing, but it limits the firm's ability to respond to market shocks or demand fluctuations.

3.69 Discounts & Manufacturing Price by Country (Pivot Table Summary)
The pivot table shows that the USA has the highest average discount and highest average manufacturing price, indicating an expensive product mix with aggressive discounting. Canada and Mexico also display relatively high discounts, implying competitive price pressure. Germany has the lowest discounts and moderate manufacturing price, consistent with its more conservative procurement behavior. The correlation of high discounts with high manufacturing prices suggests discounting is used to manage high-cost SKUs rather than stimulate demand across the board.

3.70 Discounts & Manufacturing Price by Product (Pivot Table Summary)
This table reveals meaningful insights: Amarilla and VTT have the highest manufacturing costs and above-average discounts, showing that discounts are likely used to compensate for premium pricing or high production costs. Carretera, Montana, and Paseo are low-cost products, yet still receive substantial discounts, indicating that discounting is broadly used across the portfolio, not only for premium lines. Velo shows the highest discount level relative to cost, suggesting an aggressive push to scale adoption or clear excess stock. Overall, discounting appears cost-driven but also strategically used for market penetration.

3.71 Sale Price Trend by Country (2013 & 2014)
Across both 2013 and 2014, sale prices appear uniform across countries and stable over time, with all countries exhibiting values near 118.5 units, and no visible deviations or seasonal fluctuations. This uniformity suggests the presence of a standardized global pricing strategy that does not vary based on geographical markets, time periods, or economic conditions. The absence of dispersion across any time point indicates that pricing is centrally managed rather than influenced by local market dynamics, which may reflect a strong emphasis on brand consistency and market positioning rather than localized optimization. From a profitability standpoint, this could constrain margins in high-value regions but enhance cross-market transparency and predictability.

3.72 Sale Price Trend by Product (2013 and 2014)
In 2013, sale prices exhibited a high degree of variance across products, with substantial fluctuations observed throughout the period. Products such as Montana, VTT, and Velo display particularly large price movements, while others like Carretera and Amarilla remain comparatively stable. The magnitude of fluctuation suggests potential promotional cycles, dynamic market positioning, or changes in cost structures related to specific products. This temporal volatility may reflect tactical pricing strategies intended to drive demand or align with lifecycle events (e.g., introduction, clearance). Such variation indicates that pricing decisions are product-centric rather than market- or segment-centric, which may encourage differentiated revenue outcomes depending on product elasticity.

In 2014, sale price variation across products remained substantial, with no convergence toward uniformity seen in 2013. Pricing volatility appears greater, suggesting a potential shift toward more aggressive, dynamic pricing practices. Products like Montana, VTT, and Velo continue to exhibit extreme variation, possibly indicating sensitivity to consumer demand or production costs. The irregular price spikes, rather than

cyclical patterns, imply reactive rather than seasonal pricing, potentially tied to inventory optimization or competitive pressure. Consistent volatility across multiple products suggests that price elasticity may differ significantly by category, necessitating segmented pricing strategies informed by demand forecasting and cost management.

3.73 Discount Trend by Segment (2013 and 2014)
In 2013, discount levels vary substantially across segments, with Small Business exhibiting the most pronounced volatility and the highest magnitudes. A notable spike in Q4 indicates a potentially targeted promotional campaign or an inventory clearance effort aimed at smaller customers. Government and Enterprise segments show moderate fluctuations, while Channel Partners and Midmarket remain relatively low. The concentration of discounting effort toward Small Business implies a strategic focus on customer acquisition and market penetration rather than retention. However, volatility introduces potential margin risk, suggesting a need for stronger alignment between discounting policies and profitability objectives.

In 2014, discount trends continue to show high variability across segments, with Small Business again receiving the highest and most volatile discount levels. Unlike 2013, spikes appear more frequent, suggesting a more systematic, recurring use of discounting as a demand-generation strategy. Enterprise and Government discounts show moderate increases but lack consistent patterns, indicating reactive rather than strategic deployment. Channel Partners remain comparatively stable, potentially reflecting long-term contracts or built-in incentive structures. The data suggests that discount intensity is more strongly linked to segment value potential than seasonal factors, and highlights the need for more formalized pricing governance.

3.74 Discount Trend by Country (2013 and 2014)
In 2013, discount activity varied noticeably across countries, with the United States, Mexico, and Germany exhibiting the highest peaks, particularly in Q4. The convergence of peaks suggests a synchronized end-of-year discount strategy, possibly influenced by seasonal demand cycles or international inventory policies. Canada and France show more moderate and consistent discount levels, indicating potential differences in market maturity or demand responsiveness. The variation across countries highlights the need for localized discount management, as uniform policy may inadequately capture regional revenue opportunities.

Discount trends in 2014 display greater volatility across all countries, with more frequent peaks and less synchronized timing compared to 2013. France and the United States exhibit the highest discount magnitudes, possibly indicating more competitive or price-sensitive market environments in those regions. Germany and Mexico show intermittent peaks, while Canada displays consistent mid-range discounting. The irregularity and frequency of spikes suggest that discount policies may have become more opportunistic and reactive, potentially leading to revenue instability if not linked to demand forecasting and profitability analytics.

3.75 Discount Trend by Product (2013 and 2014)
Discount activity across products in 2013 is highly variable, with Velo, VTT, and Paseo experiencing significant spikes, particularly in late periods. These spikes may reflect inventory liquidation, market entry pricing, or response to competitor activity. Carretera and Amarilla remain relatively stable, suggesting mature demand profiles with lower elasticity. The magnitude of discount variation raises potential margin concerns but may also reflect strategic price differentiation tied to product lifecycle or market positioning. Product-level discounts in 2014 exhibit significantly higher volatility than in 2013, with multiple large peaks across most products. The dispersion suggests that discount strategies became more aggressive and less

predictable, perhaps in response to competitive pressures or inventory constraints. Products such as Montana, Paseo, and VTT show frequent high-magnitude spikes, while Amarilla and Carretera display moderate oscillation. This indicates that discount intensity is not uniformly correlated with product tier or cost structure, highlighting the need for data-driven discount rule management.

3.76 Profit Trend by Segment (2013 and 2014)
In 2013, profitability varied widely across segments, with the Government and Small Business segments generating the highest profit levels, while Enterprise exhibits negative or low profitability. The decline in Small Business mid-year followed by recovery suggests margin sensitivity to discounting practices. Channel Partners and Midmarket show moderate, stable performance, implying limited growth potential. Segment-level disparities highlight structural differences in unit economics, pricing, and customer acquisition cost, suggesting an opportunity for strategic portfolio balancing.

In 2014, profitability improved across most segments, with Small Business and Government exhibiting significant peaks throughout the year, indicating successful pricing or volume optimization. Enterprise remains volatile and frequently unprofitable, potentially due to high acquisition costs or aggressive discounting. Midmarket shows moderate profit stability, whereas Channel Partners exhibit minimal growth. The improved profitability overall suggests a shift toward higher-margin customer targeting, but ongoing volatility indicates potential operational inefficiencies.

3.77 Profit Trend by Country (2013 and 2014)
In 2013, profit performance varied considerably across countries, with Germany and Canada showing the strongest upward trajectories, while Mexico remains relatively flat. France shows mid-year strength followed by decline, and the United States exhibits a downward trend. This pattern indicates that country-level performance is shaped by market demand dynamics and competitive structures, rather than a uniform global strategy.

In 2014, profitability across countries became more volatile, with frequent peaks and troughs across all regions. France and the United States show the most substantial upward spikes, while Germany exhibits periodic performance surges. Canada oscillates between moderate and high profit periods, whereas Mexico remains comparatively weak. This volatility suggests the presence of market-driven profit cycles, potentially influenced by discounting and sales volume fluctuations.

3.78 Profit Trend by Product (2013 and 2014)
Profitability in 2013 varies significantly across products, with Montana, VTT, and Paseo exhibiting strong performance peaks, while Carretera and Amarilla show consistently lower returns. Velo demonstrates substantial early-period profitability followed by decline. The divergence highlights product-specific differences in margin structure, demand elasticity, and lifecycle positioning, suggesting targeted resource allocation would be beneficial.

In 2014, product profitability was highly volatile across all items, with multiple products exhibiting sharp peaks, particularly Amarilla, Montana, and VTT. Carretera remains less profitable throughout the year, while Velo shows modest fluctuations. The increased volatility relative to 2013 indicates a shift toward more dynamic market conditions, potentially increasing financial risk if not matched with cost control and demand forecasting.

3.79 COGS Trend by Segment (2013 and 2014)
In 2013, cost of goods sold demonstrates notable variability across segments, with Channel Partners and

Midmarket exhibiting large cost spikes, particularly mid-year. Small Business and Government show moderate and increasing costs over time, while Enterprise remains relatively stable. This pattern implies differentiated cost structures and production strategies across customer segments, potentially reflecting customized product offerings or service requirements.

In 2014, COGS volatility intensified, with repeated spikes across multiple segments, particularly Small Business, Enterprise, and Government. This suggests increased production cost sensitivity, possibly arising from supply chain constraints or volume variability. The irregular pattern indicates the absence of predictable seasonality and highlights the need for stronger cost planning and operational efficiency initiatives.

3.80 COGS Trend by Country (2013 and 2014)
In 2013, COGS varied significantly across countries, with Canada and Mexico showing rising cost trajectories toward Q4, while France exhibits declining costs over time. Germany shows moderate fluctuations, whereas the United States experiences rising costs mid-year followed by stabilization. The disparity suggests that geographic market cost structures are heterogeneous, potentially driven by logistics, regulatory, or currency conditions.

In 2014, country-level COGS became more erratic, with substantial periodic spikes across the United States, France, and Canada. Germany and Mexico show moderate variability. The irregularity reflects elevated operational uncertainty, which may result from supply chain disruptions, exchange rate fluctuations, or demand volatility. Such unpredictability underscores the need for regional cost forecasting and risk management strategies.

3.81 COGS Over Time by Product (2013 and 2014)
The 2013 COGS trends indicate substantial cost heterogeneity across products, with Amarilla and VTT consistently incurring the highest manufacturing expenses, while Montana, Paseo, and Carretera remain low-cost categories. Amarilla displays relative stability, whereas VTT shows a pronounced spike in mid-period, suggesting either production scaling or cost inflation. Velo exhibits cyclical behaviour, peaking around November before declining sharply, which may reflect inventory adjustments or seasonal demand shifts. The presence of stable low-cost products combined with volatile high-cost categories suggests differentiated manufacturing complexity and strategic portfolio positioning.

In 2014, Amarilla continues to be the highest-cost product, exhibiting significant volatility, particularly large cost spikes in April and July, indicative of either supply chain disruptions or scale-related inefficiencies. Carretera and Montana remain low-cost with minimal variability, highlighting potential operational stability in those product lines. Velo again demonstrates periodic variability but with lower peaks relative to 2013, possibly signalling improved cost control. The strong volatility in 2014 relative to 2013 across most products suggests heightened production uncertainty, lower process standardisation, or dynamic market responses.

3.82 Gross Sales Trend by Segment (2013 and 2014)
Gross sales in 2013 demonstrate clear dominance of the Government and Small Business segments, both showing significant peaks mid-period before declining in December, suggesting seasonal demand strength. Enterprise exhibits moderate growth and relative stability, while Channel Partners and Midmarket generate low but consistent sales. The steep rise and subsequent decline in Government and Small Business may indicate cyclical procurement behaviour or promotional influence. The pronounced disparity in segment performance suggests unequal market penetration and varying price elasticity across segments.

The 2014 data reflect increased volatility across all segments, with Government and Small Business again leading sales but exhibiting exaggerated peaks, particularly in September. Enterprise shows periodic surges driven by large single-period transactions, indicating contract-based purchasing behaviour. Channel Partners remain marginal contributors with low amplitude variation. The increased dispersion and peak magnitude in 2014 may imply aggressive discounting strategies, macroeconomic drivers, or higher demand uncertainty relative to 2013.

3.83 Gross Sales Trend by Country (2013 and 2014)
Gross sales by country display substantial disparities, with Germany dominating during peak periods but experiencing a rapid decline toward the end of the year. The United States and Canada demonstrate moderate but stable performance, whereas Mexico and France show lower initial volumes followed by temporary surges in November. The temporal convergence of all countries in December at lower values suggests global seasonality effects or supply constraints. The highly asymmetric growth patterns highlight differing market maturity and competitive dynamics.

The 2014 trends exhibit significantly higher volatility, with multiple abrupt peaks across all countries, particularly in Canada, France, and Germany. This behaviour suggests episodic procurement cycles or unstable demand conditions. The magnitude of fluctuations indicates greater exposure to macroeconomic uncertainty or promotional campaigns. The United States remains comparatively stable, albeit at variable levels. The heterogeneity of temporal patterns underscores the need for tailored forecasting models by geography.

3.84 Gross Sales Trend by Product (2013 and 2014)
In 2013, product-level gross sales showed considerable volatility, with Paseo and Velo generating exceptional peaks during mid-period, indicating high-margin but irregular sales. Amarilla demonstrates more stable growth with moderate demand concentration in Q4. Carretera remains consistently low, suggesting weak market traction. The divergence in product trajectories implies strong product differentiation and varying adoption cycles, potentially driven by customer preferences, price structures, or channel targeting.

The 2014 product trends exhibit extreme heterogeneity, with multiple sharp spikes for Paseo, Carretera, and VTT, pointing to episodic promotional or contract-driven demand. Amarilla shows erratic performance with periodic surges, further supporting the view of unstable ordering cycles. Montana shows highly volatile mid-year peaks, likely driven by seasonal or batch-based procurement. The data reflect a systemic pattern of volatility, consistent with a market characterised by low predictability and high tactical responsiveness.

3.85 Sales Trend by Segment (2013 and 2014)
Segment-level sales trends in 2013 reflect a hierarchical market structure, dominated by Small Business and Government, both showing clear peaks in November before declining sharply. Enterprise demonstrates moderate performance with temporary surges, whereas Channel Partners remain marginal contributors. Midmarket displays consistently low activity with minimal seasonality. The observed asymmetry indicates concentrated demand in high-value segments and limited scalability in smaller channels.

In 2014, segment-level sales variance increased markedly, with pronounced peaks across Small Business and Enterprise, while Channel Partners remained low. The government exhibits fluctuating demand patterns, suggesting episodic procurement. The increased amplitude and frequency of peaks relative to 2013 may indicate intensified competitive dynamics or supply chain variability. The segmentation profile suggests that

growth opportunities reside primarily within high-volume enterprise markets, accompanied by elevated operational risk.

3.86 Sales Trend by Country (2013 and 2014)
Country-level sales trends reveal a clear lead for Germany and Mexico during peak months, with Canada showing stable but moderate growth. France exhibits a tapered decline toward December, while the United States experiences late-period contraction. The clustering of peaks during October–November indicates a period of concentrated purchasing activity. These patterns likely reflect country-specific demand cycles, fiscal calendars, or seasonal procurement policies.

In 2014, sales patterns show broad volatility, with frequent peaks in Canada, France, and the United States. Germany demonstrates unpredictable oscillation, possibly reflecting unstable distribution channels. The increased number of peaks and troughs relative to 2013 suggests a higher degree of market fluctuation. The wide temporal dispersion emphasises the necessity for agile demand planning and granular regional forecasting.

3.87 Sales Trend by Product (2013 and 2014)
Product-level sales in 2013 highlight Amarilla and Velo as key contributors, with substantial peaks mid-period. Montana and Paseo display notable variability but lower magnitude. Carretera demonstrates weak performance with narrow fluctuation bands. The strong divergence between high- and low-performing products suggests differentiated value perception, potentially informed by price, branding, or market suitability.

The 2014 product sales landscape reveals heightened volatility, with Amarilla, Carretera, and Paseo showing sharp periodic spikes. Montana and VTT present unstable but significant mid-year demand, while Velo demonstrates strong peaks in early and late periods. The fragmentation of temporal patterns suggests an increasingly demand-responsive market, where sales performance is contingent on short-term tactical interventions rather than stable consumption behaviour.

4. Business Recommendations

4.1 Rebalance Product Portfolio to Reduce Risk Concentration and Improve Margins
The dataset shows heavy dependence on a small number of high-volume products (especially Paseo), and simultaneous reliance on costly premium products (Amarilla, VTT) which exhibit volatile profitability and high manufacturing costs. This concentration increases vulnerability to product-specific demand shocks and cost volatility. The firm should pursue a portfolio-balancing strategy aimed at growing mid-cost, mid-margin products (Carretera, Montana, Velo) whose demand is less reliant on aggressive discounting. Product-level repositioning—including promotional support, product enhancement, or bundling strategies—could diversify revenue sources, stabilize cash flows, and reduce sensitivity to cost inflation in premium categories.

4.2 Segment-Specific Pricing Optimization to Improve Contribution Margins
The analysis indicates substantial price differentiation across segments, with Small Business and Government commanding high prices, while Channel Partners and Midmarket operate with low price levels and thin margins. However, discounting does not always change final sale price in several segments, indicating potential misalignment between list price and discount incentives. The firm should implement a segment-level pricing model that aligns expected margins with production cost and demand elasticity. For Small Business, high sale price and high discounts suggest willingness to pay but also price sensitivity;

deploying targeted, smaller but more frequent promotions could protect margin while maintaining conversion. For Channel Partners and Midmarket, where margin compression is persistent, renegotiating baseline prices or reducing discount dependency could enhance profitability without volume loss.

4.3 Geographic Market Strategy to Address Profitability Disparities

Across countries, profit margins are negative, with Germany and France performing particularly poorly despite substantial unit sales. Meanwhile, Canada and the US demonstrate stronger "sales efficiency" but not profitability. This suggests that profitability is driven more by discount policy and pricing than by demand. The business should implement country-specific pricing policies reflecting market purchasing power, competitive dynamics, and cost structures. High-volume but low-margin markets should be targeted for price increases or reduced discount frequency, while low-volume markets with negative margins (France, Germany) may benefit from product substitution strategies, focusing on lower-cost SKUs or premium-pricing opportunities.

4.4 Optimize Discount Strategy to Prevent Margin Leakage and Improve Demand Efficiency

The EDA indicates that high discounts significantly increase unit sales but do not consistently improve financial performance, and medium discounts often fail to produce volume gains. Discount frequency and magnitude vary widely across time, country, product, and segment, suggesting weak control or reactive policy. A data-driven discounting framework should be implemented with rules tied to SKU cost, stock levels, segment elasticity, and profitability targets. Low discounts appear to produce the highest sale prices with high unit sales, suggesting that moderate incentives often outperform aggressive discounts. Redesigning discount structures around low-to-moderate bands, particularly for premium products, could enhance contribution margins without compromising demand.

4.5 Expand Profitability Through Strategic Account-Based Management

Government and Enterprise segments exhibit high volume but volatile profitability linked to discount intensity and procurement cycles. Meanwhile, Small Business shows high price points but low volume. This indicates that each segment operates under different value drivers. The firm should adopt an account-based sales strategy for large institutional buyers, focusing on long-term contracts, predictable pricing, and lower discount volatility. For Small Business, targeted acquisition campaigns with tiered incentives could increase unit volumes and LTV, especially if bundled with value-added services. Channel Partners, given their low-margin profile, may require renegotiation of margin expectations or operational restructuring.

4.6 Strengthen Cost Management Practices for High-Volatility SKUs and Markets

The volatility observed in manufacturing cost trends—especially in premium products and certain regions—suggests supply chain uncertainty, product complexity, or scale inefficiencies. Since manufacturing costs are structurally higher for certain SKUs, but discounts are also heavily applied to the same items, the firm should review product-level cost-to-price alignment. Cost optimization initiatives—such as supplier consolidation, lean production, standardization of configurations, or SKU rationalization—could significantly improve profitability. Additionally, inventory management strategies could reduce reliance on reactive discounting to move high-cost SKUs.

4.7 Implement Predictive Analytics for Pricing, Discounting, and Procurement Cycles

Temporal analysis reveals highly volatile sales, discounting, and cost patterns across segments, products, and countries, with frequent spikes rather than stable seasonality. This unpredictability increases operational risk and complicates financial planning. Implementing predictive models to forecast demand, optimize discount timing, and anticipate cost spikes could support proactive decision-making. Machine learning approaches could identify optimal price bands, optimal discount timing, and profitability thresholds,

reducing volatility and supporting revenue growth.

4.8 Focus on Margin Recovery by Transitioning from Volume-Driven to Value-Driven Strategy
The dominance of discounting, combined with negative profit margins across markets, suggests that volume-based strategies are eroding profitability. Strategic pivoting toward value-based pricing, differentiated premium offerings, and controlled discount mechanisms could reshape customer expectations and improve financial resilience. Messaging should communicate product value, customization, and service benefits rather than purely price-based incentives.

5. Conclusion

The financial performance analysis reveals a business operating with strong sales volumes but structurally weak profitability, driven by heavy dependence on discounting, high-cost product mixes, and heterogeneous pricing strategies across segments and countries. Demand is robust, particularly within the Government and Enterprise segments and for high-volume products like Paseo, but this strength is undermined by cost volatility and aggressive discount strategies that erode margins.

A key challenge identified throughout the analysis is the misalignment between cost structure, price structure, and discount allocation. While discounting is employed extensively to stimulate demand, it does not consistently deliver proportional volume gains or profitability, particularly in mid-range discount bands and low-margin segments. Geographic uniformity in pricing also suggests missed opportunities to capture market-specific value, especially in premium or high-growth regions.

Despite these weaknesses, the firm benefits from a diversified customer base, globally standardized manufacturing processes, and a portfolio containing both high-margin premium products and low-cost volume drivers. These are strategic assets that can be leveraged to transition toward a more profitable, sustainable business model.

In order to improve future financial performance, the firm must adopt a more deliberate, data-driven approach to pricing, discounting, and portfolio management. By shifting from reactive, volume-driven tactics toward predictive analytics, value-based pricing, and segment-specific margin optimization, the firm can reduce revenue volatility, improve cost recovery, and enhance long-term profitability.

Overall, the findings suggest that the business has significant growth potential, but realizing it will require targeted intervention to harmonize pricing, cost structures, and demand generation strategies across products, segments, and international markets.