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LAB EXERCISE 3 - REPORT

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Introduction

The visualizations provide deep insights into TwoWheels' sales dynamics. Pareto charts reveal concentration in product and customer contributions, guiding strategic optimization. Correlation analyses between discounts and sales quantity inform effective marketing strategies, while Sales Forecasting Trend Analysis anticipates growth amid seasonality challenges. In essence, these visualizations diagnose trends and challenges, offering actionable insights to optimize sales performance and overall business strategies for TwoWheels.

Data Discoveries & Analysis

Dashboard

High-Value Products Pareto Analysis

This visualization represents a Pareto chart that analyzes the cumulative contribution of different products to the total discounted sales. The vertical bars show individual product sales, and the ascending curve illustrates the cumulative percentage of total sales, indicating which products generate the most revenue.

Trend: The initial segment of the chart, where the curve rises sharply, indicates that a small number of products account for a large percentage of the sales. This reflects the Pareto principle, where most effects (sales revenue) come from a minority of causes (products). The curve starts to plateau towards the end of the chart, showing that the remaining products contribute less significantly to total sales.

Issue: The steepness of the initial curve suggests that the company's sales are heavily reliant on a limited range of products. This concentration could pose a risk if these products' sales decline due to market changes or shifts in consumer preferences.

Opportunity: There is an opportunity to maximize revenue by focusing marketing efforts and stock availability on the high-performing products that contribute most significantly to sales. Additionally, the company could explore strategies to diversify the product range that significantly contributes to sales, potentially increasing the robustness of the revenue stream. For products contributing less to sales, there might be an opportunity to analyze their market positioning, demand generation, and competitive pricing to enhance their performance.

High-Value Customer Pareto Analysis

This visualization presents a Pareto chart focusing on the high-value customers of a company. The bars represent the total discounted sales attributed to each customer, and the ascending curve illustrates the cumulative percentage of total sales. This chart is instrumental in identifying customers who contribute the most to sales revenue, following the Pareto principle that a small percentage of customers typically account for a large percentage of sales.

Trend: The chart indicates that a small group of customers contributes a significant portion of the sales revenue. A steep initial ascent in the curve shows that high-value customers are responsible for a substantial part of the total sales, which then plateaus, indicating that the remaining customer base contributes marginally.

Issue: The reliance on a limited number of customers for the bulk of sales revenue could be risky for the company, as the loss of any of these key customers could have a significant impact on the overall sales figures.

Opportunity: The company can strengthen relationships with these high-value customers through personalized marketing, loyalty programs, and exclusive offers to maintain and potentially increase their lifetime value. Additionally, the company could analyze the purchasing patterns of these top customers to identify and target potential high-value customers within the larger customer base. For those contributing less to sales, strategies could be developed to increase engagement and spending, such as targeted promotions or cross-selling of additional products.

Correlations between Discount and Sales Quantity Analysis

This visualization presents a scatter plot that examines the relationship between the count of discounts given and the quantity of sales. Each point on the plot represents a product, with the position determined by the number of times a discount was applied (on the x-axis) and the total quantity sold (on the y-axis). A trend line has been added to assess the correlation between these two variables.

Trend: The trend line shows a positive correlation between the number of discounts and the quantity sold, suggesting that as discounts are applied more frequently, the quantity sold increases. This indicates that discounts may be an effective sales driver for the products represented.

Issue: While the overall trend is positive, there is a spread in the data points, indicating variability in how discounts influence sales quantity. Some products with a high count of discounts do not show a corresponding high quantity sold, suggesting that discounts alone may not always result in increased sales volume.

Opportunity: The company could leverage the positive correlation by strategically using discounts to boost sales for products that respond well to such promotions. For products that do not show a significant increase in sales quantity despite frequent discounts, the company might consider other sales strategies or investigate the underlying reasons for the lack of response, such as market saturation, pricing strategy, or customer preferences. Additionally, the data can be used to refine the discounting approach, targeting products and customer segments most responsive to promotions and avoiding discounting products that do not show a sales increase, thereby maximizing profit margins.

Box and Whisker Sales Distribution Analysis

This visualization features a Box and Whisker plot, which provides a detailed view of the distribution of total discounted sales across various quarters from 2016 to 2018. The graph illustrates the central tendency and dispersion of sales data over time, offering insights into the overall sales performance, variability, and outliers in the dataset.

Trend: The sales exhibit an overall increasing median value from Q1 2016 through Q4 2017, followed by a mixed trend in 2018, with Q1 and Q3 showing lower medians compared to the surge in Q2. The final

quarter of 2018 sees a drop in median sales, suggesting a potential decrease in customer spending or sales volume.

Issue: Notable variability is observed in sales figures, as indicated by the length of the boxes and whiskers. The presence of outliers, particularly in Q4 of each year, suggests sporadic sales activity that significantly deviates from typical patterns, which may affect the accuracy of forecasting and inventory planning.

Opportunity: The ascending median sales trend until Q4 of 2017 indicates a growing market which the company could further capitalize on. The variability and outliers present an opportunity to analyze the sales process in-depth to identify potential operational improvements or customer preferences that could influence sales strategies. For the declining trend observed in 2018, especially Q4, the company could investigate market trends and customer behavior to adapt its sales and marketing efforts accordingly. This could involve strategic promotions, product bundling, or customer loyalty programs aimed at maintaining sales momentum throughout the year.

Scorecard

Pareto Sales Bike Analysis

This visualization presents a Pareto chart that analyzes the sales distribution across different bicycle categories. The bars represent the total discounted price of sales for each category, and the line indicates the cumulative percentage of total sales. The Pareto principle often mentioned as the 80/20 rule, suggests that roughly 80% of effects come from 20% of the causes. In sales terms, this often translates to many sales coming from a minority of categories.

Trend: Mountain Bikes dominate the sales, contributing the most significant portion to the total sales revenue, followed by Road Bikes. Categories such as Cruisers, Electric, and Cyclocross Bicycles contribute less individually but collectively make up a substantial portion of sales. Comfort and Children Bicycles represent the smallest share in this dataset.

Issue: The lower end of the Pareto chart, including Comfort and Children Bicycles, indicates categories with less contribution to sales which could be underperforming or may have untapped market potential.

Opportunity: Focusing on the high-performing categories like Mountain and Road Bikes could further increase the total sales revenue by capitalizing on their market popularity. For the underperforming categories, there might be an opportunity to investigate the causes behind the lower sales and develop strategies to improve their performance, such as targeted marketing campaigns, pricing adjustments, or product enhancements to better meet customer needs and preferences. The chart suggests that a targeted approach to each category could optimize the product mix and increase overall sales effectiveness.

Sales Forecasting Trend Analysis

This visualization displays the sales forecasting for a company, with data points representing the total sales (discounted) over time. The line graph, complemented by a forecast region, shows the historical sales trend, and predicts future sales. The solid line indicates actual past sales, while the dashed lines represent the forecasted sales trend and its confidence interval.

Trend: The company's sales have experienced fluctuations over time, with an overall upward trend from November 2015 to the latter part of 2018. The forecast suggests a continuation of this growth trend into 2019.

Issue: There are noticeable peaks and troughs indicating seasonality or potential sales cycle patterns in the historical data. The variance within the confidence interval suggests that while the trend is upward, there is uncertainty about the magnitude of future sales, which could pose a risk to inventory management and supply chain planning.

Opportunity: The anticipated growth in sales presents an opportunity to invest in marketing and sales initiatives to capitalize on the positive trend. The company could also refine its sales forecasting model to better account for the observed seasonality, potentially leading to more accurate predictions. By understanding the causes of the sales fluctuations, the company can take targeted actions during expected low and high periods to smooth out the variance and better meet customer demand.

Differential Total Sales Analysis

This visualization displays the differential total sales for various bicycle categories over several quarters from 2016 to 2018. The table uses color-coding and symbols to indicate the percentage difference in sales compared to the same quarter in the previous year, providing insights into the sales trends and performance of each category.

Trend: There is a noticeable seasonal pattern with certain quarters consistently performing better or worse than others. For example, Q4 of 2018 shows a significant drop across almost all categories, with Road Bikes and Mountain Bikes experiencing the least decline. On the other hand, some categories like Cruisers Bicycles and Cyclocross Bicycles see a substantial increase in Q4 of 2017, indicating potential seasonal demand.

Issue: The most significant issue is the sharp decline in sales for several categories in Q4 of 2018, suggesting a possible overarching market or economic factor affecting consumer spending. Comfort Bicycles show a consistent decrease, potentially signaling a shift in consumer preference or increased competition.

Opportunity: Given the observed trends, there is an opportunity to engage in targeted marketing during quarters with historically lower sales to boost performance. For instance, promotions and advertising campaigns could be timed to precede the quarters where dips are expected. There's also a chance to explore new market segments or refresh the product line for categories like Comfort Bicycles to reinvigorate sales. Additionally, optimizing inventory levels based on these trends could help manage costs more effectively.

Most Acceptance Price Rate Analysis

This visualization illustrates a scatter plot that depicts the Most Acceptance Price rate of bicycles from TwoWheels, plotting the list price of bicycles against the count of orders. Each dot represents a price point with the number of orders at that price, providing insights into the most accepted price ranges by customers for different bicycle types.

Trend: The bulk of orders cluster in the lower price range, indicating a higher volume of sales at more affordable price points. As the list price increases, the count of orders decreases, suggesting that fewer customers are willing to purchase bicycles at higher price points.

Issue: There is a notable drop in the number of orders as the list price exceeds approximately $1,000. This could indicate a price sensitivity threshold beyond which customer purchase likelihood significantly diminishes.

Opportunity: TwoWheels has an opportunity to focus on bicycles priced at what appears to be the 'sweet spot' for most of their customers. Additionally, the company could explore strategies to increase the perceived value of higher-priced bicycles, such as offering financing options, enhancing product features, or bundling with attractive accessories. This could potentially expand the customer base willing to purchase at higher price points. Moreover, product development efforts could be directed towards the most popular price categories to maximize turnover.

Conclusion

The data-driven insights garnered from the visualizations provide a comprehensive understanding of various aspects of the company's sales dynamics. The Pareto analyses shed light on the concentration of both product and customer contributions, offering opportunities for strategic optimization. The correlation between discounts and sales quantity indicates a positive trend, allowing for targeted marketing strategies. Box and Whisker Sales Distribution Analysis uncovers trends and outliers for nuanced operational improvements.

The Pareto Sales Bike Analysis highlights dominant categories, suggesting focused marketing for high-performing products and strategic interventions for underperforming ones. Sales Forecasting Trend Analysis predicts growth but emphasizes the need for refined forecasting due to observed seasonality. The Differential Total Sales Analysis reveals seasonal patterns, guiding targeted marketing and inventory optimization. Most Acceptance Price Rate Analysis underscores the importance of pricing strategy, encouraging a focus on the most accepted price ranges while exploring opportunities for higher-priced products. In conclusion, these data-driven visualizations not only diagnose current trends and challenges but also illuminate opportunities for targeted actions to optimize sales performance and enhance overall business strategies.