

## **Business Insights**

### **Customer**

**Graph1-** The distribution of customers across different regions appears uneven. Peaks in specific regions indicate higher customer concentration, suggesting these areas are primary markets. The presence of a skew or outliers may reflect untapped potential or challenges in less-represented regions. Identifying the factors driving customer density in high-performing regions can help replicate success elsewhere. Conversely, low-customer regions warrant further analysis to understand barriers, such as lack of awareness, distribution inefficiencies, or competition. This data-driven insight can guide targeted marketing strategies, resource allocation, and regional expansion plans, aligning efforts to maximize customer engagement and revenue growth.

### **Product**

**Graph 1-** The distribution of product prices, revealing key pricing trends. Peaks in specific price ranges indicate popular or frequently offered price points, potentially aligning with customer affordability or demand. A right-skewed distribution suggests most products are priced lower, catering to cost-sensitive customers, while fewer high-priced items target premium segments. If the data shows multimodality, it may indicate distinct product categories or pricing strategies. Identifying gaps in the price distribution can uncover opportunities to introduce new products or reprice existing ones. These insights can guide pricing strategies to balance affordability, profitability, and market positioning effectively.

**Graph 2-** The price distribution across product categories, highlighting variations in pricing strategies. Distinct peaks for each category suggest different pricing ranges tailored to specific customer segments. Overlapping price ranges may indicate competition between categories or product bundling opportunities. Categories with narrow distributions likely target niche markets, while broader distributions suggest diverse pricing to appeal to a wider audience. If certain categories dominate higher price ranges, it indicates a focus on premium offerings, while others in lower ranges suggest cost-focused strategies. These insights can inform category-specific pricing adjustments, promotional strategies, and product development to optimize profitability and market appeal.

**Graph 3-** The price distribution of the top 10 most common products compared to all other products grouped as "Other." Distinct price trends within the top products reveal their pricing strategies and customer demand levels. Products with concentrated price ranges indicate consistent pricing, while those with wider distributions suggest varied

offerings or customization options. The "Other" category's spread may point to diverse or less-defined pricing for niche or lower-demand products. Identifying the pricing sweet spots for top products can drive sales, while analyzing "Other" products may uncover potential for consolidation, targeted marketing, or portfolio refinement to improve profitability.

## **Transaction**

**Graph 1-** The distribution of transaction total values, shedding light on customer spending behavior. Peaks in specific ranges suggest popular transaction amounts, which could indicate standard pricing tiers or frequent purchase patterns. A right-skewed distribution, if present, highlights that most transactions occur at lower values, with fewer high-value outliers. These outliers may represent bulk purchases or high-end products. Understanding the factors driving high-value transactions can help tailor upselling or premium offerings. Conversely, low-value transactions might indicate an opportunity to bundle products or increase average order value. These insights support optimizing pricing, promotions, and product strategies to boost revenue.

**Graph 2-** The distribution of transactions over time, segmented by quantity purchased. Peaks in specific time periods indicate heightened transaction activity, which could align with seasonal trends, promotional campaigns, or product launches. Transactions with higher quantities during these periods may point to bulk buying or high-demand products. Consistent transaction levels across time suggest stable demand, while dips could indicate off-season periods or market challenges. Analyzing patterns in high-quantity purchases can help identify products or customer segments driving growth. This insight enables businesses to optimize inventory, plan timely promotions, and tailor strategies to sustain or capitalize on demand fluctuations.

**Graph 3-** The bar plot highlights the top 20 customers by total transaction value, providing valuable insights into customer spending patterns. A few customers contribute significantly to the overall revenue, suggesting that a strong customer loyalty or high-volume purchases drive sales. The distribution of total value across customers reveals whether the business relies heavily on a small group of top spenders or has a more balanced customer base. Focusing on retaining and rewarding these high-value customers can help drive sustained revenue, while exploring ways to increase engagement from lower-spending customers may help diversify and expand the customer base.

