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1.Customer Regional Distribution: The customer base's regional analysis identifies key markets with high concentrations and untapped regions for potential expansion. For instance, if most customers reside in a specific continent, targeted marketing and resource allocation in those regions will maximize ROI.

2. Product Portfolio and Category Insights: Analyzing product categories reveals best-sellers and underperformers, aiding portfolio optimization. For example, over-representation in one category could point to a saturated market, while gaps in other categories could signal opportunities for diversification or new product launches.

- **Category Performance:** Focus resources on high-performing categories to increase sales.
- **Price Optimization:** Adjust pricing strategies for categories with wide price ranges or significant outliers.
- **Product Development:** Expand underrepresented categories to diversify offerings and attract new customers.

3. Pricing Strategy and Product Value: Studying price distributions highlights pricing variations across categories, exposing outliers and revenue optimization opportunities. For example, categories with wide price ranges could indicate inconsistent pricing or opportunities to introduce premium products for increased profitability.

Key Steps and Insights:

1. Overall Price Distribution:

- **Histogram:** Understand the overall distribution of product prices.
- **Insights:** Spot skewness in pricing (e.g., if most products are budget-friendly or premium).

2. Price Distribution by Category:

- **Box Plot:** Compare price ranges, medians, and outliers across product categories.
- **Insights:**
 - Categories with high variability may include both premium and budget products.
 - Outliers could indicate premium products or potential pricing anomalies.

3. Premium and Budget Products:

- **Threshold Analysis:** Identify the top 10% (premium) and bottom 10% (budget) products.

- **Insights:**
 - Highlight premium products for targeted marketing and exclusive promotions.
 - Budget products can drive high-volume sales in price-sensitive markets.

4. **Potential Trends and Market Behavior:** The data serves as a foundation for identifying customer behaviors and sales patterns over time. For instance, aligning marketing efforts with seasonal spikes or understanding long-term trends could significantly enhance forecasting and strategy.

Key Insights:

1. **Seasonal Trends:**
 - Monthly sales trends reveal periods of high or low demand (e.g., holiday seasons or end-of-year surges).
 - **Business Implication:** Align marketing campaigns, promotional offers, and inventory levels with these trends.
2. **Best-Selling Products:**
 - Identifies top 10 products contributing most to revenue.
 - **Business Implication:** Focus marketing and cross-selling efforts on high-performing products.
3. **Regional Behavior:**
 - Analyzes total sales by region, highlighting profitable and underperforming areas.
 - **Business Implication:** Allocate resources efficiently and design region-specific strategies.

Business Applications:

- **Forecasting Demand:** Use identified trends for demand planning and stock replenishment.
- **Strategic Marketing:** Target key regions and promote best-sellers during peak periods.
- **Product Lifecycle Management:** Identify products at maturity or decline for strategic decisions.

5. Data Quality and Missing Values: Understanding data quality is crucial for reliable analysis. For example, detecting missing customer or transaction details ensures we address potential biases. High missing data in specific fields, like customer addresses, can hinder targeted marketing efforts and need corrective actions.