

Exploratory Data Analysis and Business Insights

Insight 1: Customer Distribution Concentrated in Key Regions

The analysis of customer distribution by region reveals that a significant proportion of customers are located in certain key regions. The bar chart of customer counts shows that regions like **North America** and **Europe** have the highest number of customers. This suggests that these regions are our primary markets. Focusing marketing efforts and resources on these areas could enhance customer engagement and increase sales. Additionally, exploring growth opportunities in regions with fewer customers may help expand our market presence globally.

Insight 2: Average Product Price Varies Across Categories

Examining the average price of products by category uncovers significant variations. Categories such as **Electronics** and **Jewellery** have higher average prices, indicating premium product offerings in these segments. In contrast, categories like **Books** and **Home Goods** have lower average prices, catering to budget-conscious customers. This diversity in pricing across categories allows the company to target a broad customer base with different spending capacities. Strategic pricing and targeted promotions can optimize sales in both high-end and affordable product categories.

Insight 3: Seasonal Trends Evident in Transaction Volume

The time series analysis of transaction volumes over time reveals distinct seasonal patterns. There are noticeable peaks in transactions during months like **November** and **December**, likely due to holiday shopping seasons and promotional events like Black Friday or Cyber Monday. These spikes indicate increased customer purchasing activity during these periods. By aligning marketing campaigns, inventory management, and staffing with these seasonal trends, the company can capitalize on high-demand periods to maximize revenue and enhance customer satisfaction.

Insight 4: Top-Selling Products Drive Revenue

An analysis of the top-selling products shows that a select few items contribute significantly to sales volume. The bar chart of the top 10 best-selling products highlights that certain products are highly popular among customers. Focusing on these high-demand products by ensuring adequate stock levels, negotiating better supplier terms, and featuring them in marketing materials can drive further sales growth. Additionally, analysing the characteristics of these products can provide insights for product development and expansion of successful product lines.

Insight 5: Minimal Missing Data Ensures Reliable Analysis

The check for missing values across the Customers, Products, and Transactions datasets indicates that there are minimal to no missing entries in key variables. This high level of data completeness enhances the reliability of the analysis and the validity of the insights derived. Reliable data ensures that business decisions made based on this analysis are well-founded. Maintaining data integrity through regular data quality checks is essential for ongoing analytics efforts and informed decision-making processes.