Customer Segmentation Insights

Objective:

The goal of customer segmentation is to group customers based on their purchasing behaviors and spending patterns. By identifying distinct clusters, businesses can implement targeted marketing strategies, improve personalization, and enhance overall customer experience.

Process and Methodology:

1. **Data Preparation:**
    - The transactional dataset was aggregated for each customer, focusing on key features such as:
        - **TotalValue**: The total spending of the customer.
        - **Quantity**: The total number of products purchased.
        - **Average Price (Price_x)**: The average price of products bought by the customer.
    - These metrics form the basis for clustering.
2. **Feature Standardization:**
    - Using StandardScaler, the features were normalized to ensure equal importance during clustering. This prevents larger values (e.g., total spending) from dominating the clustering algorithm.
3. **Clustering Technique:**
    - **K-Means Clustering** was applied with a predefined number of clusters, **n_clusters=5**. The optimal number can be fine-tuned using the Elbow Method or Silhouette Analysis in future iterations.
    - The algorithm grouped customers into **5 distinct clusters**, each representing similar spending behaviors and purchasing habits.
4. **Evaluation Metrics:**
    - The **Davies-Bouldin Index (DBI)** was calculated to evaluate the clustering performance. A lower DBI indicates better-defined clusters. For this model, the DBI score was **{db_index}** (computed dynamically).
    - Visual inspection of clusters using scatterplots helped validate the separation between groups.
5. **Cluster Visualization:**
    - The clusters were plotted on a 2D scatter plot, with customers distributed based on their feature values. Each cluster was assigned a unique color, making patterns easy to interpret.

Key Insights:

1. **Distinct Customer Groups:**
    - The segmentation process identified 5 key customer groups. Each group exhibits unique spending patterns, making them ideal for tailored marketing strategies.
    - For example:
        - **Cluster 1**: High spenders with low purchase quantities, indicating a preference for premium products.
        - **Cluster 2**: Moderate spenders with high purchase quantities, likely buying in bulk.
2. **Customer Behavior Patterns:**
    - Customers in the same cluster share similar purchasing habits, such as average price preference or total spending, which can be leveraged to design personalized campaigns.
3. **Targeted Marketing:**
    - Cluster-wise segmentation allows for crafting specific promotions:
        - Loyalty rewards for high-value customers.
        - Discounts or upsell opportunities for mid-range spenders.
        - Bulk purchase deals for quantity-focused buyers.
4. **Cross-Selling Opportunities:**
    - Similar customers within a cluster might be encouraged to explore complementary products, increasing the overall basket size.

Conclusion:

The customer segmentation model effectively groups customers into actionable clusters, enabling businesses to improve engagement and drive revenue. By tailoring strategies to the unique needs of each segment, businesses can achieve greater efficiency, higher customer satisfaction, and improved ROI