Insights from Clustering (Customer Segmentation)

1. **Customer Groups with High Spending**:

   One cluster represents customers with high spending and frequent purchases. These customers are likely the most valuable to the business and should be targeted with loyalty programs or exclusive offers to retain them.

2. **Budget-Conscious Customers**:

   Another cluster consists of customers who make infrequent, low-value purchases. Strategies like discounts or bundle offers can help convert these customers into higher-value customers.

3. **Moderate Spenders**:

   A middle-tier cluster reflects customers with average spending and transaction frequency. These customers can be upsold with personalized product recommendations to increase their purchase value.

4. **Regional Preferences**:

   Cluster analysis reveals differences in purchasing behavior across regions. For example, some clusters have a strong preference for specific product categories, which can guide region-specific marketing campaigns.

5. **Optimal Number of Customer Segments**:

   Based on the elbow method and Davies-Bouldin Index, clustering with 4 segments provided the best results. This segmentation strikes a balance between meaningful insights and manageable customer groups for targeted strategies.