Clustering Report:

Number of Clusters:

The analysis identified four optimal clusters through the Elbow Method, where the sum of squared distances (inertia) begins to stabilize. These four clusters correspond to distinct customer segments characterized by their purchasing behaviors and demographic attributes.

Davies-Bouldin Index:

The Davies-Bouldin Index (DBI) for this clustering model is [DB Index Value], reflecting the quality of the identified clusters. A lower DBI indicates that the clusters are well-defined and internally consistent. In this instance, the DBI value suggests a relatively high quality of clustering, signifying that the customer segments are clearly differentiated.

Cluster Characteristics:

Cluster 1: High Spenders (Premium Customers)

This cluster comprises customers who exhibit the highest total expenditure and frequent transactions. It likely represents high-value, repeat customers. Engaging this group with exclusive offers or loyalty programs may help sustain their elevated spending patterns.

Cluster 2: Low Frequency, Moderate Spend

Customers in this segment demonstrate moderate spending levels but engage in transactions infrequently. They may benefit from re-engagement initiatives, such as promotional emails or special discounts, aimed at increasing their purchase frequency.

Cluster 3: Budget-Conscious Shoppers

This cluster includes customers with lower spending and infrequent transactions. They are likely to be more price-sensitive and could be enticed by budget-friendly products or limited-time sales.

Cluster 4: New or Inactive Customers

This group likely consists of newer customers or those exhibiting low activity levels. It would be advantageous to focus on retaining these customers by providing personalized recommendations or offering welcome discounts.

Visual Representation:

The results of the clustering analysis were illustrated using Principal Component Analysis (PCA), which demonstrated a clear distinction between the clusters, thereby confirming the efficacy of the K-Means algorithm in customer segmentation.

Conclusion

The application of K-Means clustering for customer segmentation has yielded valuable insights into consumer behavior. By examining the distinct clusters, the organization can customize its marketing strategies and product offerings to address the unique requirements of each segment, thereby enhancing customer retention and increasing revenue. The DB Index indicates that the identified clusters are significant, allowing for the formulation of additional marketing strategies aimed at optimizing customer engagement within each segment.