Clustering Results Report

1. Number of Clusters Formed

The clustering analysis resulted in **4 distinct clusters**, each representing unique customer segments based on their total transaction value and quantity purchased. These clusters were derived to identify behavioral patterns and segment customers effectively.

2. Clustering Metrics

1. **Davies-Bouldin Index (DB Index)**:

   o The DB Index value is **1.3547**.

   o This value reflects the compactness and separation of clusters. A moderately low DB Index indicates reasonably well-defined clusters, though some overlap between them may exist.

2. **Average Silhouette Score**:

   o The average silhouette score is **0.2314**.

   o This metric suggests overlapping clusters, meaning customers in different segments exhibit some similarity.

3. Insights from the Custom Clustering Graph

The clustering results were visualized in a scatter plot, with:

- **X-axis**: Quantity Purchased.

- **Y-axis**: Total Transaction Value (USD).

The graph reveals the following about the clusters:

1. **Cluster 1 (High Value, High Quantity)**:

   o Customers in this cluster spend significantly more and purchase in large quantities.

   o Likely loyal or premium customers, making bulk purchases regularly.

   o **Actionable Insights**: Offer exclusive rewards, premium memberships, and bulk-purchase discounts.

2. **Cluster 2 (Moderate Value, Moderate Quantity)**:

   o These customers represent a balanced segment with steady purchasing behavior.

   o They contribute moderate transaction values and quantities.

   o **Actionable Insights**: Maintain engagement through loyalty programs or mid-tier promotions.

3. **Cluster 3 (Low Value, Low Quantity)**:

   o Customers in this cluster have minimal spending and purchase quantities.

- o Likely to include new or price-sensitive customers.

- o **Actionable Insights**: Provide introductory offers or small promotional bundles to encourage repeat purchases.

4. **Cluster 4 (High Quantity, Low Value)**:

   - o Customers in this segment purchase large quantities but generate relatively lower transaction values.

   - o Likely focus on discounted or low-cost items.

   - o **Actionable Insights**: Introduce higher-value product bundles or upsell premium products.