**Results**

**1. Number of Clusters:**

* The analysis was performed with **5 clusters**.
* Each cluster represents customers with distinct transactional and profile patterns.

**2. Davies-Bouldin Index:**

* **DB Index:** 0.7451

**3. Other Metrics:**

* **Silhouette Score:** 0.4807

**4. Key Metrics per Cluster:**

The clustering process grouped customers based on the following aggregated metrics:

* **Total spending (total\_spent):** Sum of all transactions made by a customer.
* **Average transaction value (avg\_transaction\_value):** Mean purchase value per transaction.
* **Total number of transactions (total\_transactions):** Count of transactions made by a customer.

**Methodology**

**1. Data Preparation:**

* **Datasets Used:** Customers.csv and Transactions.csv.
* The customer dataset includes profile attributes such as **Region** and **Signup Date**.
* The transaction dataset provides details about purchase behavior.
* Aggregated transaction data into key metrics:
  + **Total number of transactions.**
  + **Total spending.**
  + **Average transaction value.**
* Merged customer and transaction data to prepare features for clustering.

**2. Feature Selection and Scaling:**

* **Selected Features:**
  + **Region:** Encoded as numeric using LabelEncoder.
  + **total\_transactions:** Total number of purchases.
  + **total\_spent:** Total value of all purchases.
  + **avg\_transaction\_value:** Average value per transaction.
* **Scaling:** Applied StandardScaler to standardize numerical features, ensuring equal contribution to clustering.

**3. Clustering Algorithm:**

* Applied **K-Means clustering** for customer segmentation.

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