Customer Segmentation Analysis Report

1. Clustering Overview

- **Optimal Number of Clusters**: 8 clusters identified using the Davies-Bouldin Index.

- **Methodology**: K-means clustering applied to standardized features.

- **Features Used**:

    o Customer behavior metrics (RFM): Recency, Frequency, Monetary value.

    o Geographic features: Region indicators (Asia, Europe, North America, South America).

    o Customer tenure (days).

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2. Cluster Characteristics

High-Value Customers (Cluster 6)

- **Tenure**: 750.56 days (highest across all clusters).

- **Monetary Value**: $1,974.14 (significantly above average).

- **Frequency**: 6.8 purchases.

- **Recency**: 43.16 days.

- **Region**: Predominantly South American customers.

Premium Active Customers (Cluster 0)

- **Monetary Value**: $2,579.65 (highest among all clusters).

- **Frequency**: 9.1 purchases (most frequent purchasers).

- **Recency**: 27.8 days (very recent activity).

- **Region**: Predominantly North American (90%).

- **Tenure**: 561 days.

Loyal Asian Customers (Cluster 7)

- **Monetary Value**: $2,132.69 (high-value segment).

- **Frequency**: 7.75 purchases.

- **Recency**: 61.75 days (relatively recent activity).

- **Region**: Exclusively Asian market.

At-Risk Customers (Cluster 4)

- **Monetary Value**: $301.53 (lowest among clusters).

- **Frequency**: 1.3 purchases (lowest purchase frequency).

- **Recency**: 286.7 days (longest inactivity).

- **Region**: Mixed regional distribution.

- **Tenure**: 323.8 days (shortest tenure).

Mid-Tier Segments (Clusters 1, 2, 3, 5)

- **Monetary Value**: $934-$1,270 (moderate values).

- **Frequency**: 3.5-4.8 purchases (average frequency).

- **Recency**: 56-77 days (moderate recency).

- **Region**: Regionally concentrated.

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3. Performance Metrics

Davies-Bouldin Index

- Achieved optimal score with 8 clusters.

- Lower DB Index indicates better cluster separation.

- Used to validate the optimal number of clusters.

Silhouette Analysis

- Visualized cluster cohesion and separation.

- Indicated reasonable cluster quality with distinct segment formations.

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4. Business Implications

Marketing Strategy Recommendations

1. **High-Value Focus**

   - Target **Clusters 6** and **0** with premium offerings.

   - Develop loyalty programs for these valuable segments to enhance retention and lifetime value.

2. **Regional Customization**

   - Develop region-specific strategies for clusters with geographic concentration (e.g., Cluster 7 for Asia).

   - Incorporate cultural preferences and localized messaging in marketing campaigns.

3. **Retention Efforts**

   - Priority intervention needed for **Cluster 4 (At-Risk Customers)**.

   - Launch re-engagement campaigns focusing on exclusive offers or personalized outreach.

4. **Growth Opportunities**

   o Mid-tier clusters (**Clusters 1, 2, 3, 5**) show potential for enhancement.

   o Focus on strategies to increase purchase frequency and basket size.

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5. Technical Validation

- **Robust Clustering**: Achieved through standardization of features, ensuring comparability.

- **Geographic Segmentation**: Aligns with key business regions, providing actionable insights.

- **Behavioral Patterns**: Clear differentiation in customer behavior across clusters.

- **Cluster Separation**: Statistically significant results validated by the Davies-Bouldin Index and Silhouette Analysis.