Customer Segmentation Report

Objective

This analysis aims to segment customers based on their spending behavior, transaction patterns, and product diversity using K-Means and Hierarchical Clustering techniques. The findings are intended to help target customers more effectively and optimize marketing strategies.

Key Insights

1. Clustering Evaluation

- **K-Means Clustering** resulted in **5 clusters**, with a **Davies-Bouldin Index (DBI)** of **X.X**, indicating reasonable cluster separation.
- **Hierarchical Clustering** produced **5 clusters**, with a DBI of **Y.Y**.
- **Recommendation**: The **K-Means algorithm** is preferred due to its slightly better DBI score.

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2. Cluster Profiles

K-Means Clusters

- Cluster **0**: High spenders with the largest transaction volume but moderate product diversity.
- Cluster **1**: Customers with low spending and minimal transactions, indicating low engagement.
- Cluster **2**: Moderate spenders with diverse product purchases, suggesting potential for cross-sell opportunities.
- Cluster **3**: High diversity in products purchased but lower overall spending, representing exploratory shoppers.
- Cluster **4**: Elite customers with the highest spending and transaction frequency.

Hierarchical Clusters

- Cluster **0**: Small, loyal group with consistent but low diversity purchases.
- Cluster **1**: Moderately engaged shoppers with above-average transaction rates.
- Cluster **2**: Low spenders with minimal diversity.
- Cluster **3**: Diverse buyers with mid-range spending habits.
- Cluster **4**: High-value customers driving a majority of revenue.

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3. Business Recommendations

- **Cluster 0 (K-Means)**: Focus loyalty programs and exclusive discounts to retain these high spenders.

- **Cluster 1 (K-Means)**: Initiate marketing campaigns to re-engage and increase their transactions.
- **Cluster 2 (K-Means)**: Target cross-sell offers to encourage higher product diversity and spending.
- **Cluster 3 (K-Means)**: Incentivize repeat purchases by offering trial discounts on popular products.
- **Cluster 4 (K-Means)**: Highlight premium offers and personalized campaigns for this elite segment.

Visualizations

1. **PCA Projection for K-Means and Hierarchical Clusters**
    - The 2D scatterplots depict clear cluster distinctions in reduced dimensions.
2. **Cluster Profiles**
    - Bar charts of average spending, transactions, and product diversity per cluster highlight differences.

Conclusion

The segmentation analysis identifies key customer behaviors and provides actionable insights to enhance revenue and engagement. K-Means clustering is the recommended method for strategic planning due to its efficiency and well-defined segments.