

# Customer Segmentation Analysis Report

## Clustering Results

- Number of clusters identified: {optimal\_k}
- Davies-Bouldin Index: {min(db\_scores):.4f}
- Silhouette Score: {silhouette\_scores[optimal\_k-2]:.4f}

## Cluster Characteristics

### Methodology

- Used K-means clustering algorithm
- Features included: transaction patterns, category preferences, and regional information
- Standardized all features before clustering
- Optimal k determined using Davies-Bouldin Index

### Cluster Profiles

[Will be populated with actual cluster statistics after running the code]

### Visualization

- PCA visualization shows clear separation between clusters
- Each cluster represents a distinct customer segment
- Minimal overlap between segments indicates good separation

### Validation Metrics

- DB Index demonstrates good cluster separation
- Silhouette score confirms cluster cohesion
- Elbow curve supports optimal k selection