

Insights from Elbow Method and Customer Clusters

Elbow Method Analysis

The Elbow Method helps determine the optimal number of clusters for segmentation by plotting inertia (sum of squared distances to cluster centers) against the number of clusters.

Inertia Decrease: Inertia reduces as the number of clusters increases, but the rate of reduction diminishes after a certain point.

Elbow Point: The most prominent bend is at 3 or 4 clusters, indicating an optimal segmentation point.

Diminishing Returns: Beyond 4 clusters, the reduction in inertia is minimal, suggesting additional complexity may not add value.

Cluster Analysis (Scatter Plot Insights)

The scatter plot of Total Spend vs. Average Spend per Product reveals four distinct customer segments with unique characteristics:

Cluster 0 (Low Spenders):

Low total spend and average spend per product.

Likely infrequent buyers of less expensive items.

Action: Encourage spending through promotions or discounts.

Cluster 1 (Moderate Spenders):

Moderate total and average spend.

Represents a consistent customer base.

Action: Maintain loyalty through personalized offers.

Cluster 2 (High Spenders with Moderate Average Spend):

High total spend but moderate average spend per product.

Likely frequent buyers of mid-priced items.

Action: Encourage higher-priced purchases with exclusive deals.

Cluster 3 (High Spenders with High Average Spend):

High total and average spend per product.

Most valuable customers who purchase expensive items.

Action: Provide VIP treatment and exclusive access.

Business Implications

Targeted Marketing:

Develop tailored campaigns for each cluster to maximize engagement and ROI.

Product Development:

Offer products at different price points, create bundles, and promote higher-value items.

Resource Allocation:

Focus resources on valuable segments (Clusters 2 & 3) for higher profitability.

Customer Retention:

Use a CRM system to personalize communication and offers.