

# Cluster Segmentation Analysis Report

## A Introduction

Customer Personality Analysis is a detailed analysis of a company's ideal customers. It helps a business to better understand its customers and makes it easier for them to modify products according to the specific needs, behaviors and concerns of different types of customers. Customer personality analysis helps a business to modify its product based on its target customers from different types of customer segments.

## B Objective

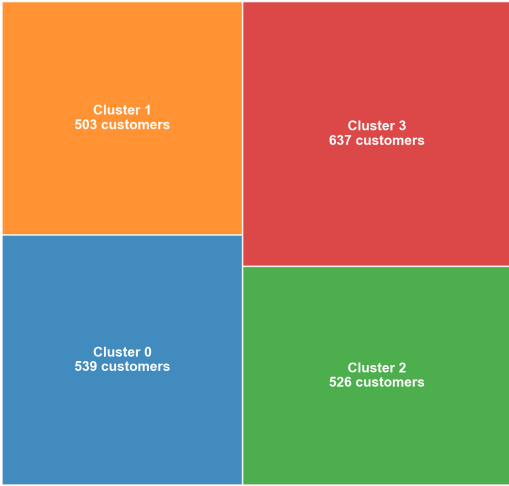
Our main goal is to perform clustering to summarize customer segments

## C Methodology

- To perform effective customer segmentation, the dataset was first cleaned to remove inconsistencies and missing values. Dimensionality reduction was then applied using Principal Component Analysis (PCA), reducing the features to three principal components for better visualization and clustering performance.
- For clustering, K-Means Clustering was selected due to its superior silhouette score compared to other methods. The optimal number of clusters (k = 4) was determined using the elbow method, which identified the point of diminishing returns in the within-cluster sum of squares.
- Finally, Exploratory Data Analysis (EDA) was conducted on the resulting clusters to extract actionable insights into the characteristics, behaviors, and spending patterns of each customer segment.

## Results

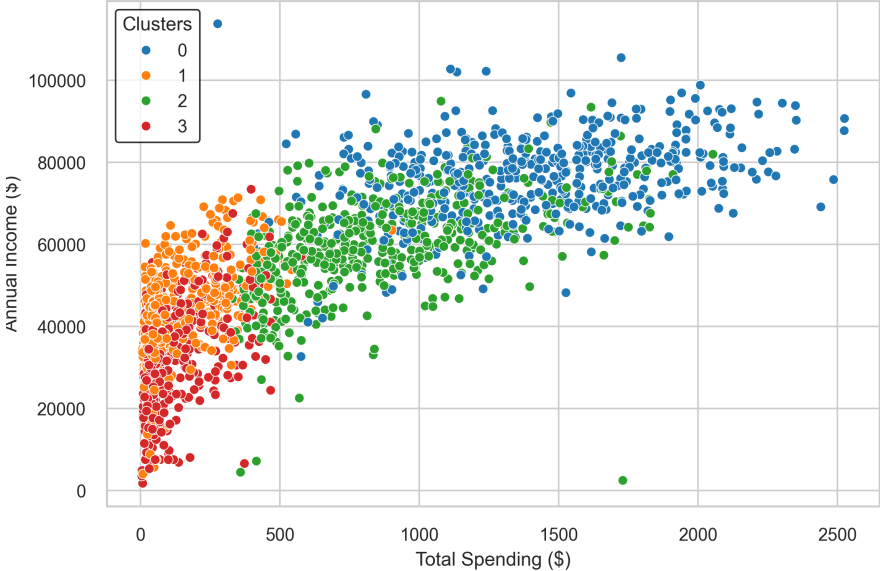
Customer Distribution by Cluster



The dataset also showed that the higher the income of an individual the more likely the individual is to spend across all clusters

The analysis revealed four main customer groups. Luxury Spenders (Cluster 0) are high-income professionals who spend the most across all categories. Budget Families (Cluster 1) are larger households with lower incomes and very cautious spending habits. Loyal Shoppers( Cluster 2) earn a moderate income and are highly engaged, shopping often both online and in-store. Lastly, Low Spending Youth (Cluster 3) are younger, lower-income individuals who show the least shopping activity overall.

Cluster Based Insights Into Customer Spending Patterns



## Cluster Summary

### 0 Cluster 0 High Income, High Spending Professionals

- Mostly university graduates
- Marital Status:** Mixed, with the highest proportion of singles (41%).
- Parental Status:** Mostly non-parents.
- Smallest households across all clusters.
- Median number of children is 0, typically child-free.
- Highest median income at \$76,467.
- Highest overall spenders across all product categories: Wine, fruits, meat, fish, sweets, and gold.
- Moderate users of online and catalog shopping channels.
- Very active in in-store shopping.
- Not influenced by deals or discounts.

### 2 Cluster 2 Loyal, Middle-Income, High-Engagement Shoppers

- Mostly graduates
- Marital Status:** Majority in relationships
- Parental Status:** Mostly parents
- Medium-sized households
- Average children size of 1
- Median Income is \$60,569.5
- Most loyal customers
- Second highest spenders, especially on wine, meat, gold
- Most active online and catalog shoppers
- Strong deal engagement
- Very active in in-store shopping

### 1 Cluster 1 Budget-Conscious Family-Oriented Customers

- Mostly university graduates
- Marital Status:** Highest proportion in relationships (73%)
- Parental Status:** Almost all are parents
- Largest households across all clusters
- Most numbers of children
- Median income at \$44,124.
- Low spenders across all categories (wine, meat, sweets, etc.)
- Low online and in-store shopping
- Moderate deal usage
- Low catalog activity

### 3 Cluster 3 Young, Low-Income, Low-Spending Individuals

- Diverse Educational background including many undergraduates
- Marital Status:** Mixed, with single customers exhibiting slightly higher spending behavior.
- Parental Status:** Varied, with a higher proportion of parents.
- Small households
- Average children size of 1
- Lowest Median Income \$30,467
- Low to Moderate Loyalty
- Lowest spenders in all product categories
- Very low catalog, online, and in-store shopping
- Not deal-focused

## Recommendation

### 0 Cluster 0

Premium products, loyalty programs, and luxury marketing. Focus on quality, not discounts.

### 2 Cluster 2

Upsell with value-based offers, subscriptions, and loyalty benefits. Highlight convenience and consistency.

### 1 Cluster 1

Promote discounts, bundles, and family-focused campaigns. Emphasize affordability.

### 3 Cluster 3

Target with entry level products, student discounts, and re engagement campaigns.