# Customer Lifetime Value (CLV) Analysis Report

## Objective

The objective of this analysis is to estimate Customer Lifetime Value (CLV) to segment customers and identify high-value targets. This enables marketing teams to focus resources on the most valuable customers and improve overall profitability.

## Dataset Description

The dataset consists of two main components:

1. Customer Demographics: Includes Customer ID, Gender, Age, City, and Signup Date.

2. Transaction History: Includes Transaction ID, Customer ID, Transaction Date, and Amount spent.

## Data Preparation

- Merged transaction history with customer demographics.

- Cleaned and formatted the dataset.

- Computed the snapshot date as one day after the latest transaction date.

## RFM Analysis

RFM (Recency, Frequency, Monetary) metrics were calculated as follows:

- Recency: Number of days since the last purchase.

- Frequency: Total number of transactions.

- Monetary: Total amount spent by the customer.

## SQL Queries Used

### Total Spend Per Customer

SELECT CustomerID, SUM(Amount) AS TotalSpend FROM Transactions GROUP BY CustomerID;

### Purchase Frequency

SELECT CustomerID, COUNT(\*) AS Frequency FROM Transactions GROUP BY CustomerID;

### Recency Calculation

SELECT CustomerID, MAX(TransactionDate) AS LastPurchaseDate, DATEDIFF(DAY, MAX(TransactionDate), '2025-01-01') AS Recency FROM Transactions GROUP BY CustomerID;

### Customer Demographics

SELECT \* FROM Customers;

## Python Analysis Steps

- Imported necessary libraries including pandas, numpy, sklearn, matplotlib, seaborn.

- Generated synthetic data for customer and transaction history.

- Performed RFM metrics calculation.

- Scaled the RFM data using StandardScaler.

- Applied KMeans clustering to segment customers.

- Visualized customer segments using scatter and bar plots.

## Visualization Summary

- Scatter plot showing customer segments by Recency and Monetary value.

- Bar chart displaying customer distribution across different clusters.

## Conclusion

This CLV analysis enables targeted marketing by identifying high-value customer segments. The clustering approach helps understand customer behavior and allocate resources effectively.