AI-POWERED EXPENDITURE PREDICTION PLATFORM BASED ON PERSONALIZED CONSUMER BEHAVIOR USING M-PESA TRANSACTIONS.

OUTLINE

- Project Overview
- Business Problem
- Objectives & Research Questions
- Data
- Visualizations & Model Incorporated
- Recommendations
- Next Steps

PROJECT OVERVIEW

The primary goal of this project is to use **M-PESA transaction data** to analyze consumer expenditure patterns and predict future spending behavior. Leveraging on predictive models, such as ARIMA and deliver personalized insights that can inform business strategies. The goal is to help Safaricom understand **how** and **why** consumers spend, to improve services and marketing.

The analysis extracts insights regarding consumer behavior from M-PESA transactions. These insights include **monthly spending trends**, **top spending categories**, and **predictions** of future behavior, allowing Safaricom to tailor services, improve marketing efforts, and offer personalized financial planning tools for consumers.

BUSINESS PROBLEM

➢ Safaricom has access to a large volumes of **M-PESA transaction data** and might not be fully utilizing this data to personalize services and enhance customer engagement.

➢ Without using **predictive** analytics, Safaricom risks offering generic marketing, missing customer spending trends, and losing opportunities for targeted advertising, customer retention, and revenue growth through cross-selling and upselling.
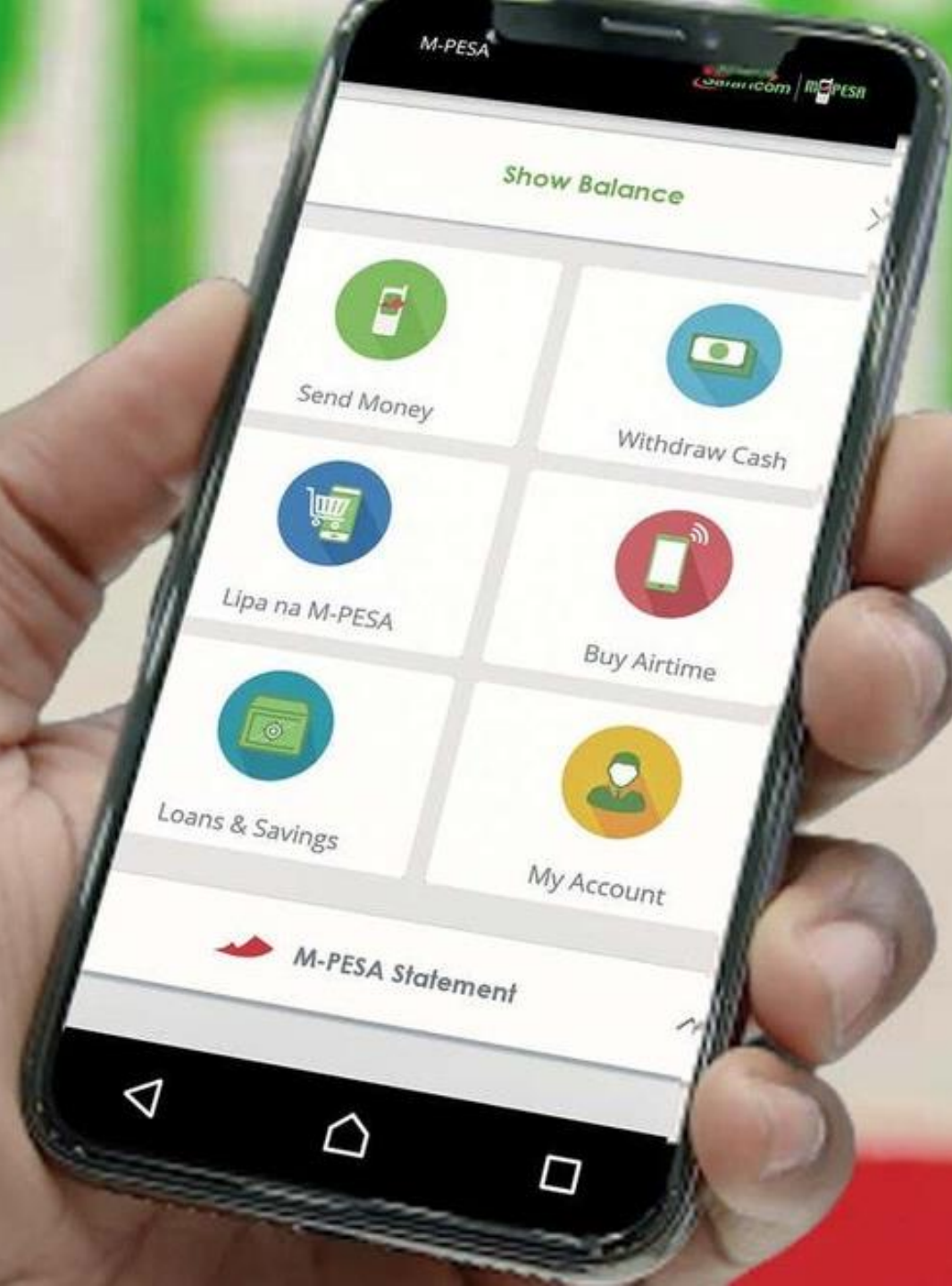
Specific Objectives

Research Questions

Analyze Spending Patterns: Identify & understand key trends in monthly spending and expenditure categories from M-PESA transaction data.

What are the **top categories** of consumer expenditure based on M-PESA transaction data?

Predict Future Expenditures: Forecast future spending behavior using time series models (such as ARIMA) for personalized financial planning.

How do monthly income and expenditure trends fluctuate for different consumers, and what factors influence these trends?

Enhance Targeted Marketing: Leverage consumer behavior insights to deliver personalized and relevant marketing content, improving customer engagement and retention.

Can predictive models accurately forecast future consumer spending, and how can these predictions be used to enhance Safaricom's **targeted advertising**?

DATA

Data Source

- **Platform:** Mpesa Statements.
- **Timeframe of Data Collection:** 6 months.

Data Volume

- **Data Analyzed:** 6 months worth of transactions.

Data Features

- **Columns Featured:** Receipt Number, Completion Time, Details, Paid In, Paid Out (Withdrawn) & Balance.

MONTHLY INCOME & EXPENDITURE TRENDS
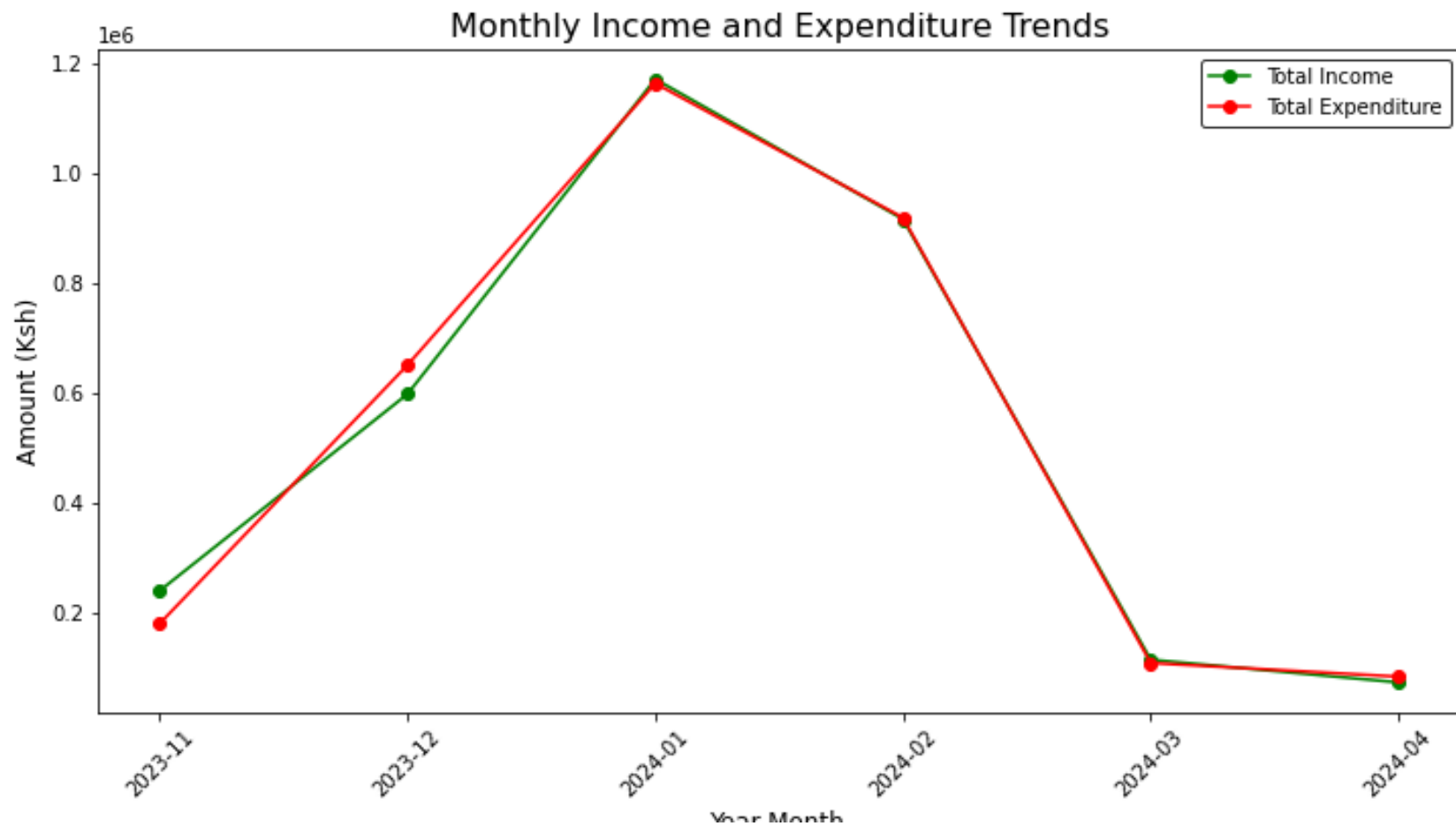
Top Spending Categories
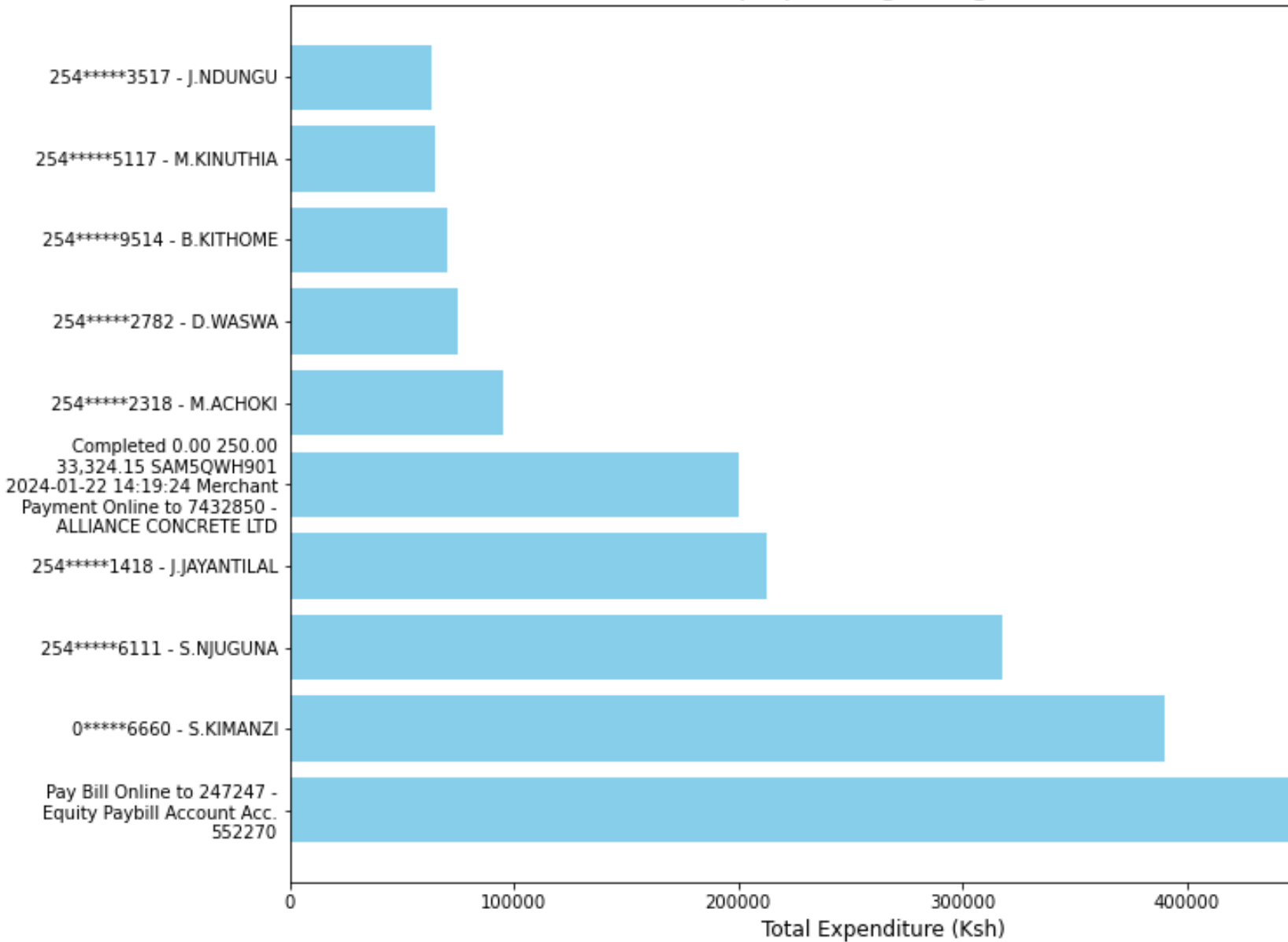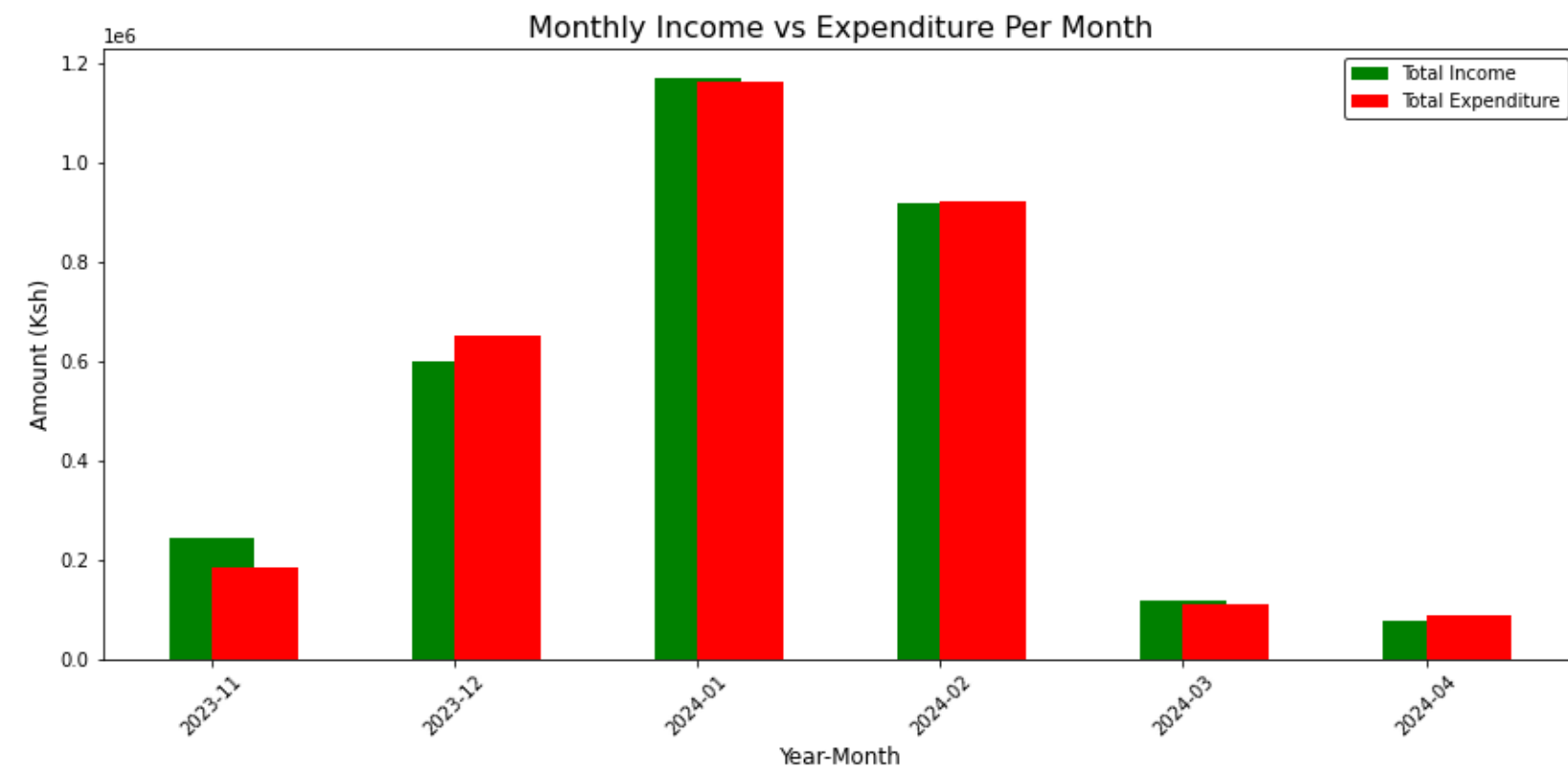
TOP SPENDING CATEGORIES

MONTHLY INCOME VS EXPENDITURE PER MONTH

Total Income   50.1%   49.9%   Total Expenditure
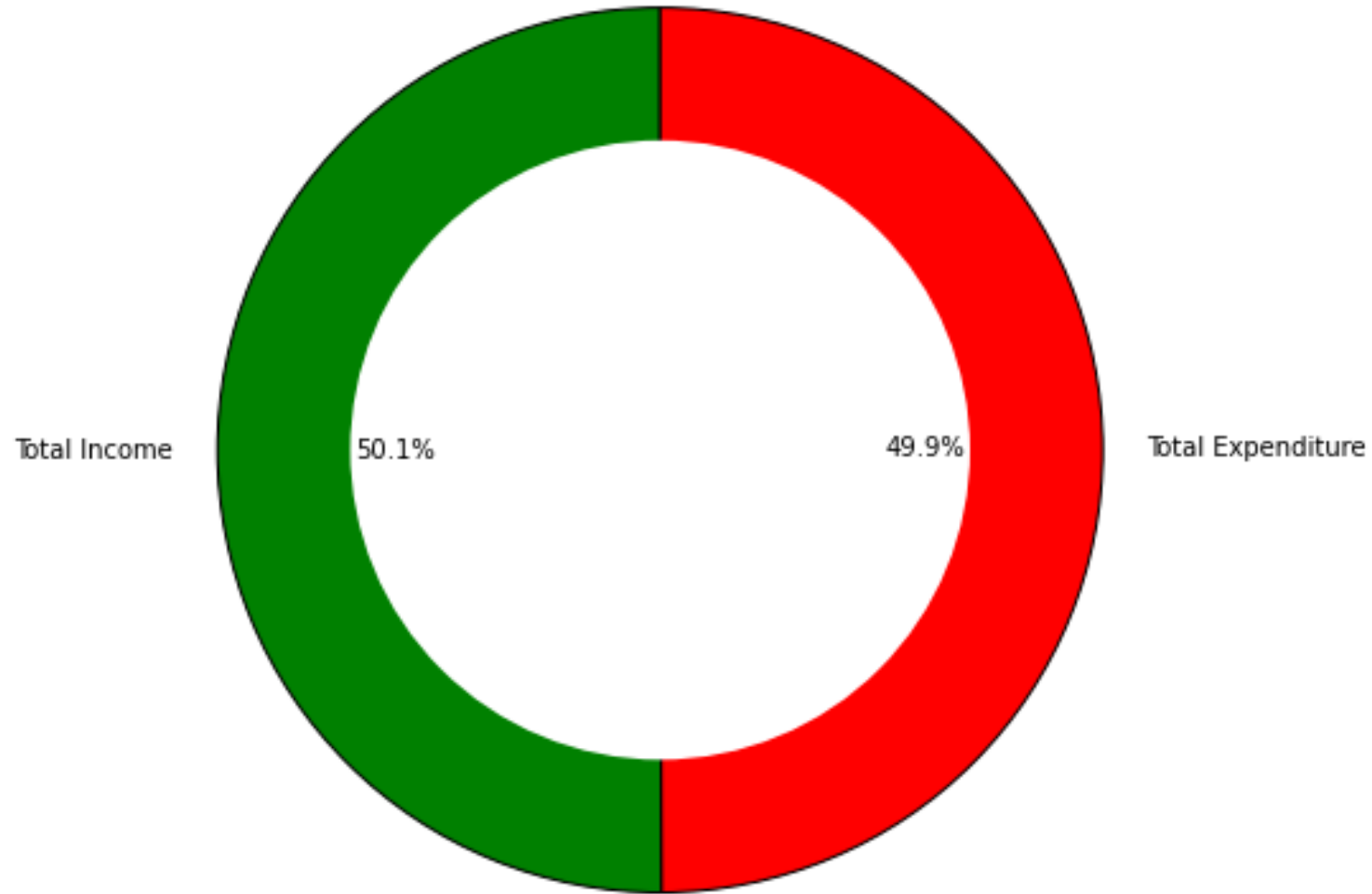
DONUT CHART FOR INCOME VS EXPENDITURE (%)

Expenditure Forecast for the Next Month
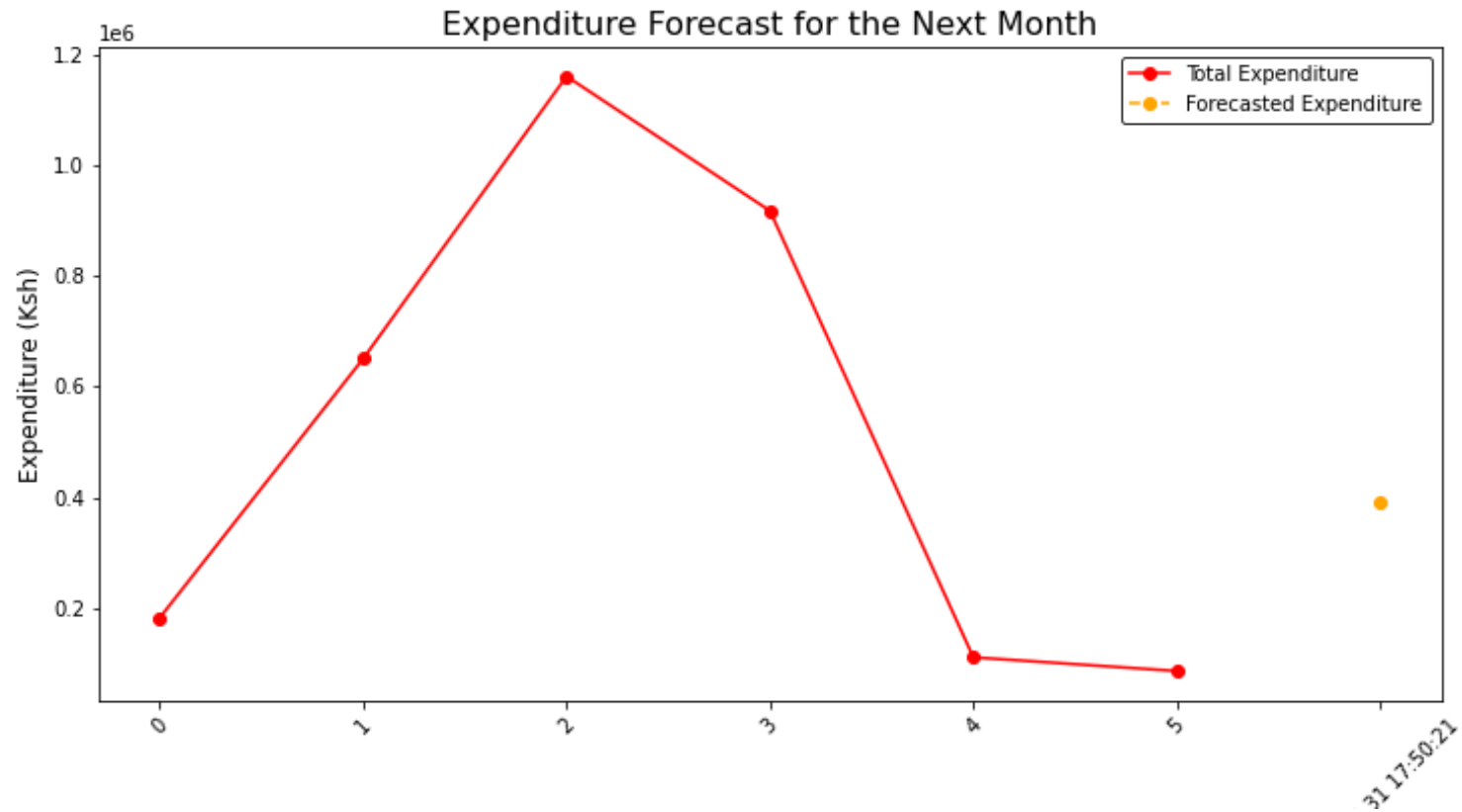
ARIMA PREDICTION MODEL

RECOMMENDATIONS

Safaricom should segment consumers into Thinkers (25%), Drivers (30%), Expressives (20%), and Feelers (25%) based on transaction data. Thinkers get logic-based content, Drivers get convenience-focused offers, Expressives get lifestyle content, and Feelers get emotional appeals. This targeted approach increases engagement and conversion rates.

Use ARIMA/SARIMA models to predict spending with **80% accuracy**. This can be used while **incorporating & training A.I** to increase customer engagement by **10%** through personalized offers. Offering financial services like micro-loans during spending spikes could raise revenue by **5%.** Forecast-driven marketing boosts retention and revenue growth.

Focus on high-spending categories like utilities and retail to drive personalized cross-selling and upselling, which could increase revenue by 10-30%. Offering targeted discounts and loyalty programs could boost customer engagement by 15-25%. Partnerships with merchants in top categories could raise transaction volumes by 20-35%, encouraging more spending.

NEXT STEPS
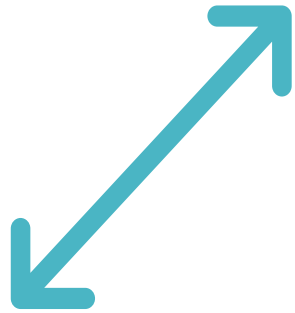
Expand Training Data

Expanding the training data from 6 months to a full year could improve expenditure prediction accuracy by 10-20%. Currently, the model predicts one month with high accuracy, and with more data, it could reliably forecast 3, 6, or 12 months. This would greatly enhance long-term financial insights.

Integrate Feedback Mechanism

Continuously collect new transaction data to refine and improve the predictive model's accuracy over time. This will ensure that the model adapts to changing consumer behaviors and market conditions, increasing prediction reliability.

THANK YOU

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