Title: Marketing Campaign Performance Analysis

Subtitle: Exploratory Data Analysis (EDA) Findings

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INTRODUCTION

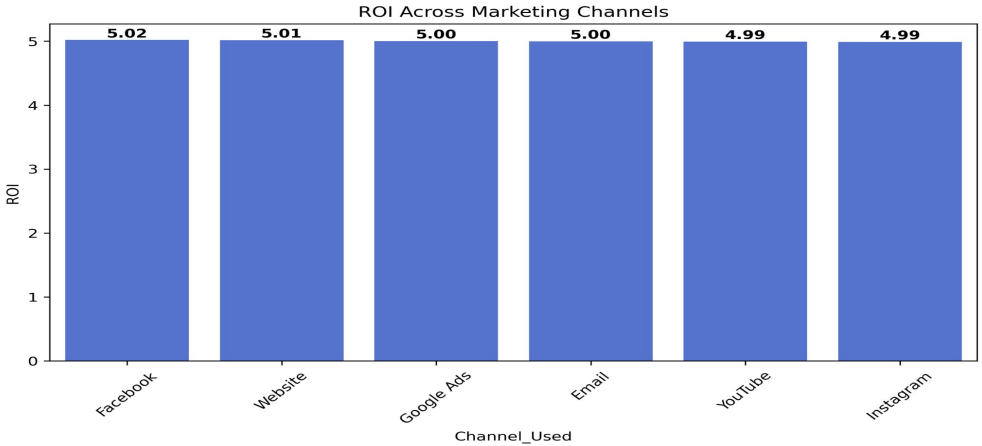
This is an exploratory data analysis of a marketing dataset containing 200,005 records and 14 columns. The dataset consists of a mix of data types, including object (9 columns), integer (4 columns), and float64 (2 columns). The key columns used in the analysis are Impressions, Clicks, Acquisition Cost, Channel Used, ROI, Conversion Rate, Campaign Type, and Location. The Acquisition Cost column was converted to float after removing the dollar symbol and commas for accurate analysis. The Acquisition Cost, Clicks, and Impressions columns were used to calculate important performance metrics like Cost Per Click (CPC) and Click-Through Rate (CTR).

The objective of this analysis is to uncover key insights that can guide strategic decision-making and provide recommendations for optimizing marketing campaigns.

Findings & Insights

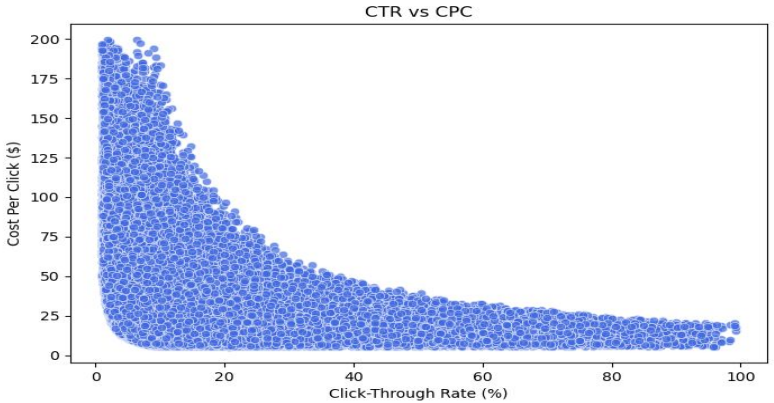
Campaign Performance Across Channels

The bar chart shows that Facebook, Website, and Google Ads have the highest ROI, with Facebook leading at 5.02. Channels like Instagram and YouTube show lower ROI, indicating they may need optimization. Conversion rates are consistent at around 2%.



CTR, CPC & Conversion Rate Analysis

The scatter plot reveals the average CTR is 14.04%, with CPC at $32.01 and a conversion rate of 2.05%. There's significant variation, with some campaigns achieving very high CTRs and low CPCs, while others are less cost-effective.

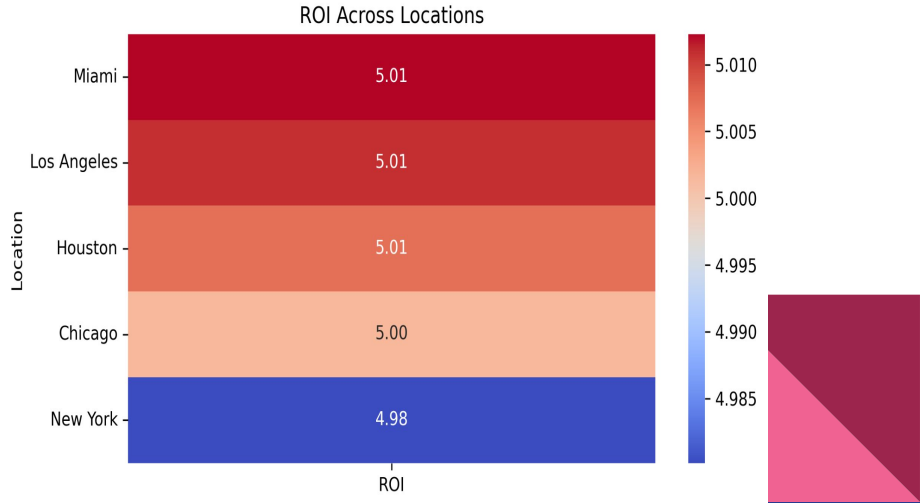


High-Performing and Underperforming Campaigns

The line chart shows that Influencer and Search campaigns have the highest ROI at 5.01, while Social Media campaigns have the lowest at 4.99, suggesting a need for improvement in social media strategies.

Location-Based Trends

The heatmap reveals that Miami and Los Angeles have the highest ROI at 5.01, while New York has the lowest at 4.98, indicating regional differences in campaign effectiveness.



CODE & METHODOLOGY

Key Calculation code

```
mkg['CTR'] = (mkg['Clicks'] / mkg['Impressions']) * 100
mkg['CPC'] = mkg['Acquisition_Cost'] / mkg['Clicks']

plt.figure(figsize=(8, 5))
sns.scatterplot(x=mkg['CTR'], y=mkg['CPC'], alpha=0.7, color='royalblue')
plt.xlabel('Click-Through Rate (%)')
plt.ylabel('Cost Per Click ($)')
plt.title('CTR vs CPC')
plt.savefig('CTR vs CPC.png')
plt.show()

print("CTR, CPC & Conversion Rate Data:\n")
print(mkg[['CTR', 'CPC', 'Conversion_Rate']].head())
```

Missing & Unique values code

```
print("Unique Target Audiences:\n", mkg['Target_Audience'].value_counts())
print("\nUnique Marketing Channels:\n", mkg['Channel_Used'].value_counts())

missing_values = mkg.isnull().sum()

categorical_cols = ['Company', 'Campaign_Type', 'Target_Audience', 'Channel_Used', 'Location', 'Customer_Segment']
unique_values = {col: mkg[col].unique() for col in categorical_cols}

print("Missing Values:\n", missing_values)
print("\nUnique Values in Categorical Columns:\n", unique_values)
```

Data Cleaning code

```
mkg.info()
```

```
mkg.describe()
```

```
mkg['Date'] = pd.to_datetime(mkg['Date'], dayfirst=True)
mkg['Date'] = mkg['Date'].dt.strftime('%d/%m/%Y')

print(mkg['Date'])
```

```
mkg['Acquisition_Cost'] = mkg['Acquisition_Cost'].replace('[\$,]', '', regex=True).astype(float)
```

Outliers Detection code

```
outlier_cols = ['Impressions', 'Clicks', 'Acquisition_Cost']

plt.figure(figsize=(12, 6))
for i, col in enumerate(outlier_cols, 1):
    plt.subplot(1, 3, i)
    sns.boxplot(y=mkg[col])
    plt.title(f'Boxplot of {col}')
plt.tight_layout()
plt.show()
```

RECOMMENDATION & CONCLUSION

Recommendations

- Focus on high-ROI channels like Facebook, Google Ads, and Websites.
- Improve Social Media campaign strategies.
- Adjust budgets based on location ROI trends.
- Use A/B testing for better audience targeting.

Conclusion & Next Steps

Marketing effectiveness varies across channels and locations, with ROI, CTR, and CPC insights guiding strategy refinement. The next steps involve allocating budgets based on data, analyzing customer engagement trends, and continuously tracking performance for ongoing optimization.