MARKETING CAMPAIGN ANALYSIS

Key Insights and Performance Metrics

HNG-Internship

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Topics

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Introduction

The **marketing campaign dataset** from the HNG Internship Program contains **200,005** rows and **15** columns, offering valuable insights into various marketing campaigns. Key performance metrics such as ROI, CTR, CPC, Conversion Rate, Customer Segment, and Target Audience are included. Python was used for data exploration, cleaning, and analysis to uncover trends that can inform future strategies.

Objective

The analysis focuses on identifying patterns and actionable insights to optimize marketing efforts.

Key metrics:

- **Return on Investment- ROI** (Measure campaign profitability)
- **Conversion Rate** (Tracks users actions)
- **Click-Through Rate - CTR** (Assesses audience engagement)
- **Cost Per Click - CPC** (Evaluates the efficiency of campaign spending)

Data Overview

The dataset was already in good shape, with no missing values, duplicates, or outliers. To enhance the analysis, the **Date** column type was converted to datetime format(YYYY/MM/DD), allowing for better handling of date-related operations. Additionally, two new columns were created to calculate **CTR** (Click-Through Rate) and **CPC** (Cost Per Click), providing more meaningful insights into campaign performance. These adjustments ensured the data was well-structured and optimized for deeper analysis and more accurate comparisons.


Visual Insights on Outliers in Numerical Data
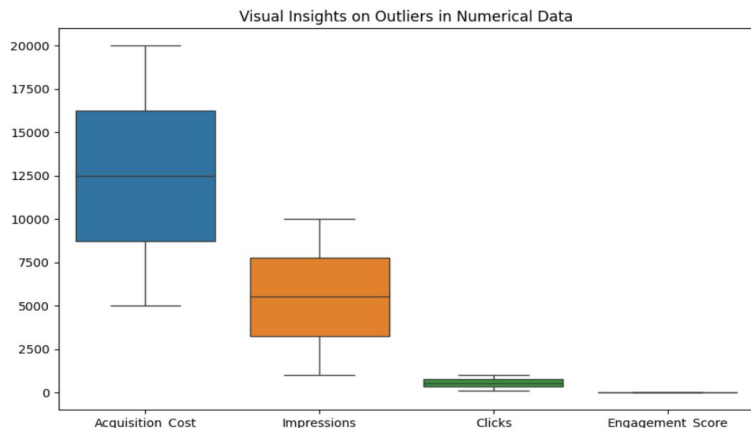
```python
# creating CTR and CPC column for each campaign
data['CTR'] = data['Clicks'] / data['Impressions'] * 100
data['CPC'] = data['Acquisition_Cost'] / data['Clicks']
```

```python
data.head()
```

| _Used	Conversion_Rate	Acquisition_Cost	ROI	Location	Date	Clicks	Impressions	Engagement_Score	Customer_Segment	CTR	CPC
le Ads	4.0	16174	6.29	Chicago	2021-01-01	506	1922	6	Health & Wellness	26.326743	31.964427
le Ads	12.0	11566	5.61	New York	2021-02-01	116	7523	7	Fashionistas	1.541938	99.706897
uTube	7.0	10200	7.18	Los Angeles	2021-03-01	584	7698	1	Outdoor Adventurers	7.586386	17.465753
uTube	11.0	12724	5.55	Miami	2021-04-01	217	1820	7	Health & Wellness	11.923077	58.635945
uTube	5.0	16452	6.50	Los Angeles	2021-05-01	379	4201	3	Health & Wellness	9.021662	43.408971

Findings & Insights

ROI by Campaign Type
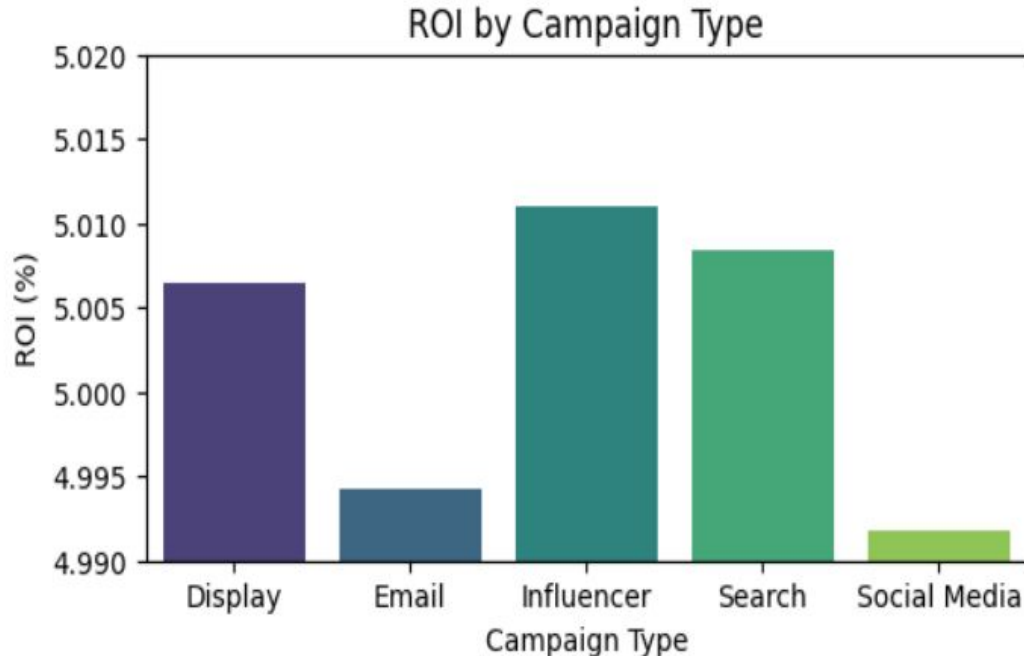
Influencer campaigns have the highest ROI among all campaign types.

Email campaigns have the lowest ROI

Search campaigns maintain a moderate ROI, performing slightly below Influencer campaigns but better than Email and Social Media.
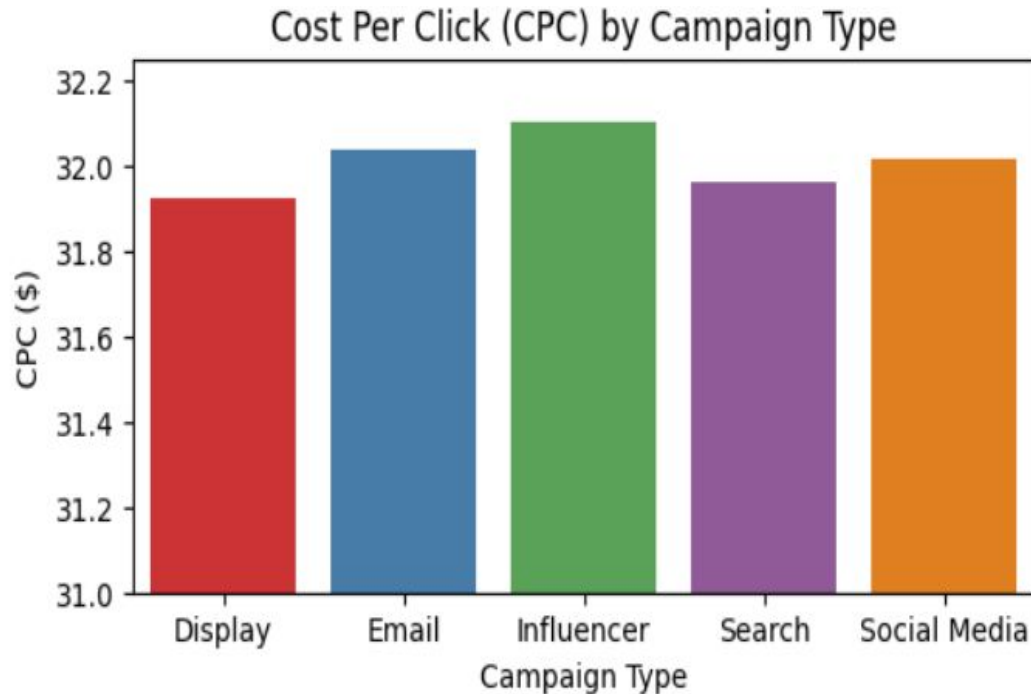
Findings & Insights

Click-Through Rate (CTR) by Campaign Type
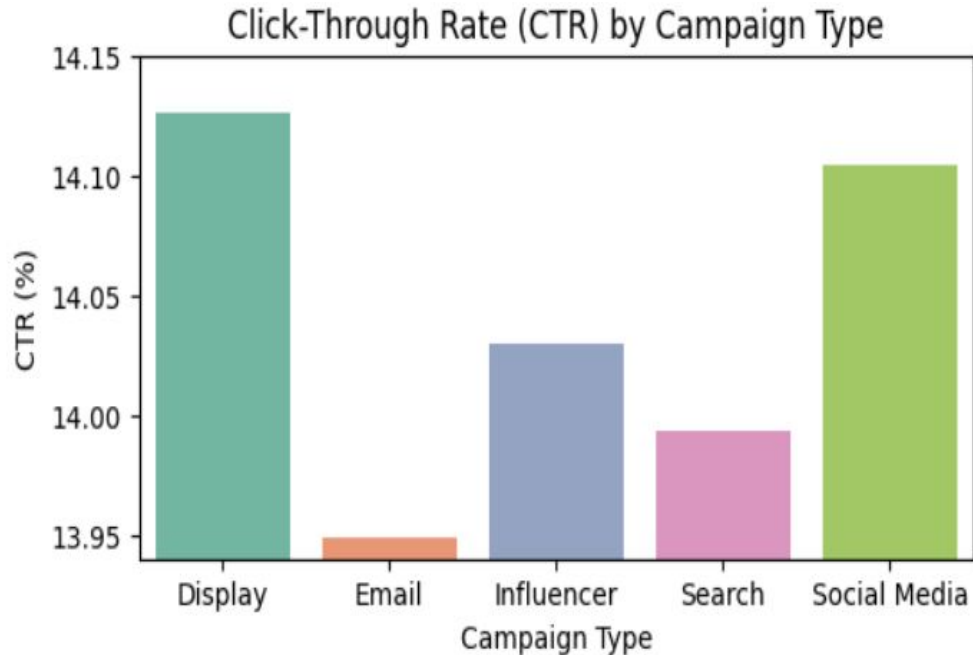
Display and **Social Media campaigns** have the highest CTR, indicating strong engagement from users.

Email campaigns show the lowest ROI, suggesting that email marketing is less effective at driving clicks.

Influencer and **Search campaigns** have moderate CTR

Findings & Insights
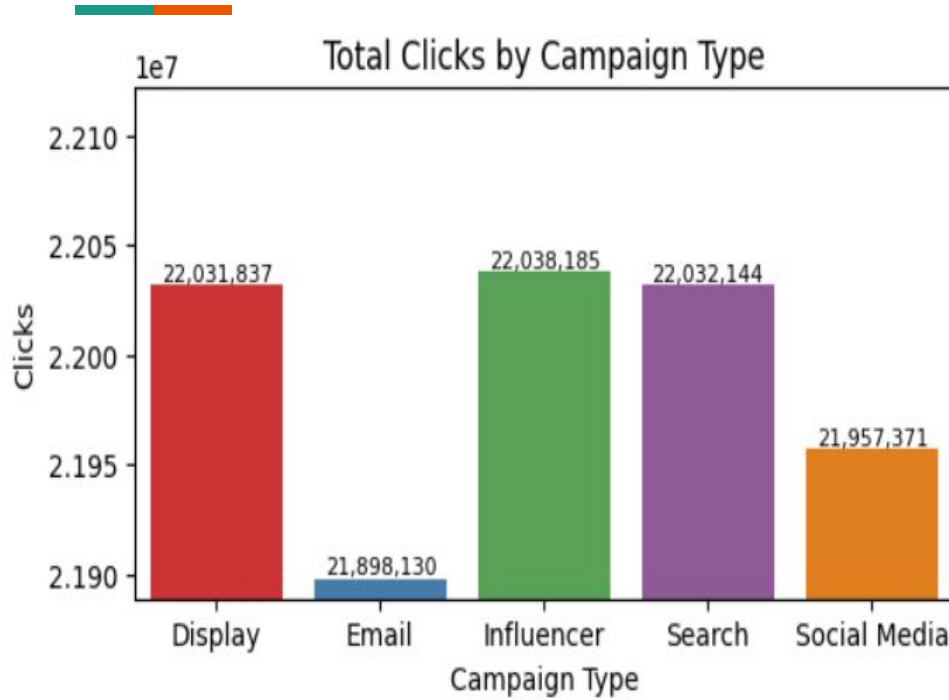

Cost Per Click (CPC) by Campaign Type

Influencer campaigns have the highest CPC, meaning advertisers **pay more per click** compared to other channels.

Display campaigns have the lowest CPC, making them the most **cost-effective** in terms of per-click pricing.

Findings & Insights

Total Clicks by Campaign Type

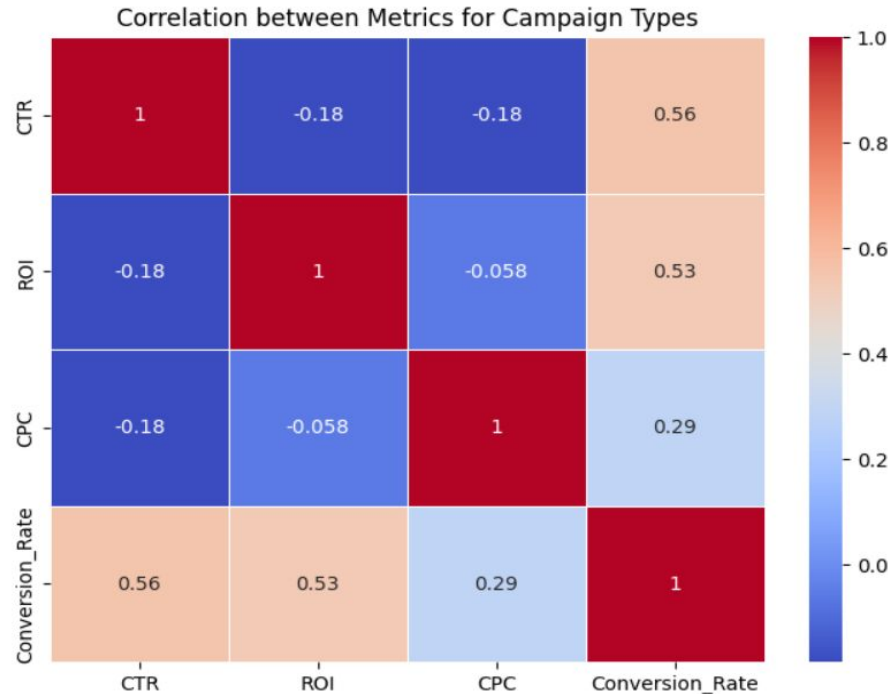**Influencer campaigns** drive the most engagement.

Search and Display campaigns are nearly as effective.

Social Media and Email campaigns receive fewer clicks, suggesting lower engagement levels.

Findings & Insights

Correlation between Metrics for Campaign Types

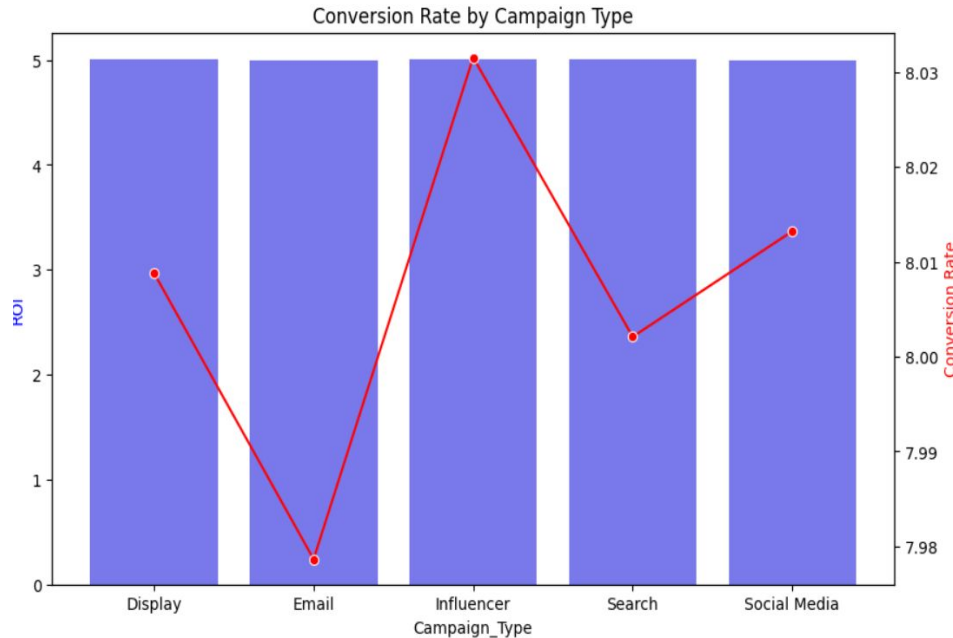**CTR** and **Conversion Rate** have a strong positive correlation(0.56)

ROI and **Conversion Rate** also show a strong positive correlation(0.53)

CPC has a weak positive correlation with Conversion Rate(0.29)

CTR and **CPC** have a weak negative correlation(-0.18)

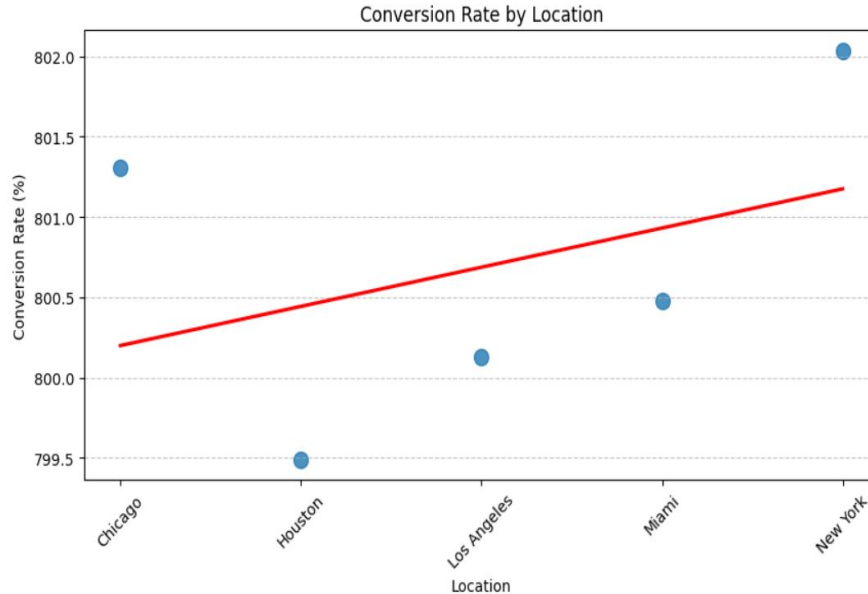# Findings & Insights

Conversion Rate by Campaign Type

The red line drops significantly for **Email campaigns**, meaning they convert fewer users compared to other campaigns.

The red line peaks at **Influencer campaigns**, showing they are the most effective at converting users.

Display, **Search,** and **Social Media campaigns** maintain a balanced performance

Findings & Insights

Conversion Rate by Location

NewYork has the highest conversion rate

Hoston has the lowest conversion rate

Los Angeles and **Miami** have moderate Conversion Rate

The Ovarall trend shows an increasing conversion rate

Findings & Insights

Return on Investment (ROI) by Company

Company	ROI
Alpha Innovations	5.01
DataTech Solutions	5.01
Innovate Industries	5.00
NexGen Systems	4.99
TechCorp	5.01
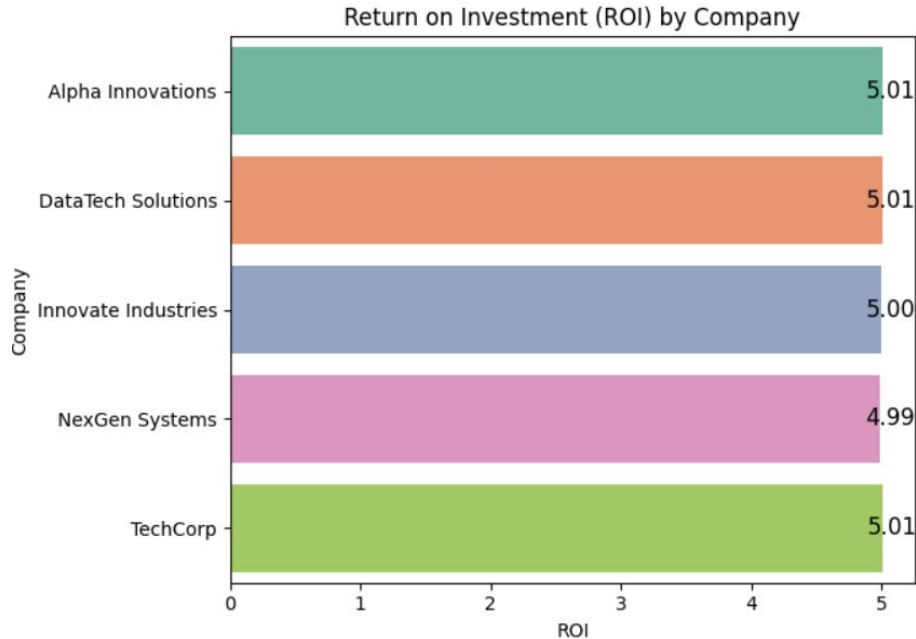
Alpha Innovations performed the best.

DataTech Solutions followed closely behind.

Innovate Industries came next.

NexGen Systems had the lowest ROI performance.

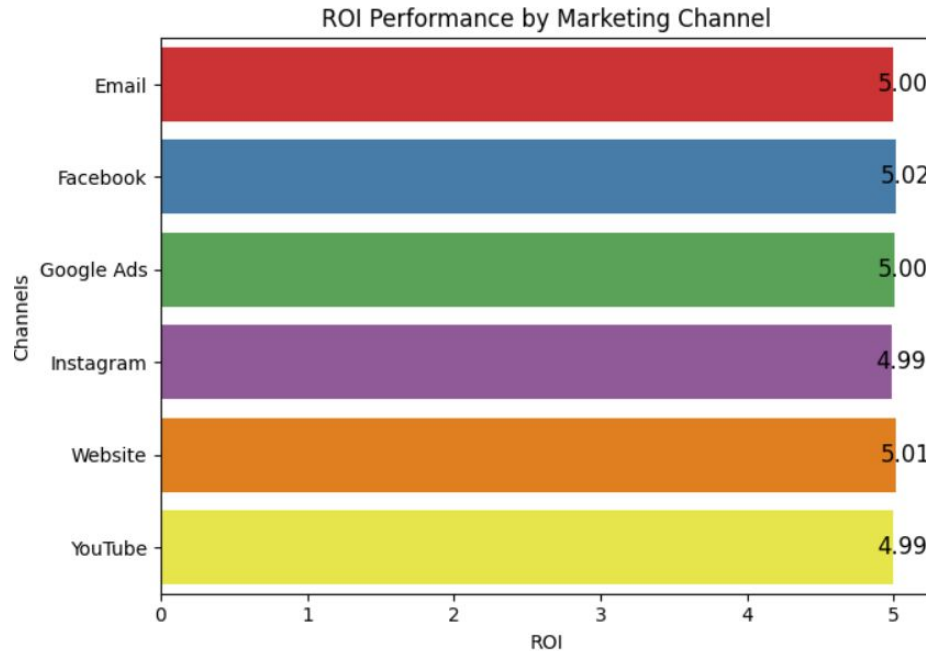# Findings & Insights

ROI Performance by Marketing Channel

Channel	ROI
Email	5.00
Facebook	5.02
Google Ads	5.00
Instagram	4.99
Website	5.01
YouTube	4.99

Facebook achieved the highest ROI, closely followed by **Website, Google Ads,** and **Email,** all delivering strong returns**.**

Instagram and **YouTube** had slightly lower ROI, indicating potential areas for optimization.

Code & Methodology

```python
# Grouping by Campaign_Type and calculating sum (for Clicks, Impressions) and mean (for Conversion_Rate, ROI, CPC)
aggregated_data = data.groupby('Campaign_Type').agg({
    'Clicks': 'sum',
    'Impressions': 'sum',
    'Conversion_Rate': 'mean',
    'CPC': 'mean',
    'ROI': 'mean',
    'CTR': 'mean'
}).reset_index()

# Display the aggregated data
print(aggregated_data)
```

```
   Campaign_Type    Clicks  Impressions  Conversion_Rate        CPC       ROI  \
0        Display  22031837    220080744         0.080088  31.923411  5.006497
1          Email  21898130    220147995         0.079787  32.039734  4.994274
2     Influencer  22038185    220771844         0.080315  32.102645  5.011040
3         Search  22032144    221415139         0.080021  31.960865  5.008357
4   Social Media  21957371    219073236         0.080132  32.014830  4.991781

         CTR
0  14.126483
1  13.948757
2  14.030083
3  13.993587
4  14.103856
```

```python
#Unique values in Target_Audience column
unique_target_aud = data['Target_Audience'].unique()
unique_target_aud
```

```
array(['Men 18-24', 'Women 35-44', 'Men 25-34', 'All Ages', 'Women 25-34'],
      dtype=object)
```

```python
#unique channels used
marketing_channels = data['Channel_Used'].unique()
marketing_channels
```

```
array(['Google Ads', 'YouTube', 'Instagram', 'Website', 'Facebook',
```

```python
#Calculating the average CTR, CPC, and Conversion Rate for each channel
data.groupby('Channel_Used')[['CTR', 'CPC', 'Conversion_Rate', 'ROI']].mean()
```

	CTR	CPC	Conversion_Rate	ROI
Channel_Used				
Email	14.054269	31.881471	0.080282	4.996487
Facebook	14.049724	32.129366	0.079990	5.018672
Google Ads	13.918943	32.308459	0.080181	5.003126
Instagram	14.003691	32.080786	0.079886	4.988706
Website	14.096941	31.779148	0.080182	5.014114

```python
#Calculating the average CTR, CPC, and Conversion Rate for each Location
data.groupby(['Location'])[['CTR', 'CPC', 'Conversion_Rate', 'ROI']].mean()
```

	CTR	CPC	Conversion_Rate	ROI
Location				
Chicago	14.045011	32.055853	0.080131	5.001555
Houston	14.059033	31.829355	0.079949	5.007174
Los Angeles	14.067175	32.078189	0.080013	5.010876
Miami	14.024957	32.152425	0.080047	5.012282
New York	14.006619	31.923819	0.080203	4.980185

Conclusion

In conclusion, TechCorp and DataTech Solutions demonstrated strong efficiency in balancing acquisition costs and ROI, with TechCorp excelling in effectiveness and DataTech Solutions in cost efficiency. Miami emerged as a high-performing location, while Display and Influencer campaigns proved most effective. Channels like Facebook and Website contributed to better engagement and ROI, enhancing overall campaign performance.

Recommendations

Scale Successful Campaigns:

- Prioritize **Influencer** and **Display** campaigns as they provide the best returns, CTR, and Conversion Rates.
- Increase investments in **Facebook** and **Website** channels, which deliver strong ROI and cost-effectiveness.
- Focus more marketing efforts on **Miami** to maximize ROI and replicate its success in other locations.

Optimize Underperforming Campaigns:

- Revise **Email** campaigns by improving targeting, content, and design to boost CTR and Conversion Rates. Testing new strategies may help maximize their potential.

Monitor Key Performance Metrics:

- Continuously track and optimize **CTR**, **CPC**, and **Conversion Rate** across all campaigns. Regularly review and adjust strategies to ensure improved **ROI** and overall efficiency.