Take-Home Test [Data Support Intern]

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A. Introduction

This report provides a detailed analysis of campaign performance data for three clients ABC, DEF, and XYZ from January 1, 2025, to January 31, 2025. The main objective of this analysis is to assess the effectiveness of each client's marketing campaigns by evaluating key performance indicators (KPIs) such as **Click-Through Rate (CTR)**, **Conversion Rate**, **Return on Investment (ROI)**, and **Cost Per Acquisition (CPA)**. This report includes insights based on visualizations of the data and offers actionable recommendations for optimization.

B. Dataset Information

The dataset includes performance metrics for each client (ABC, DEF, and XYZ) from January 1, 2025, to January 31, 2025. The data comprises the following fields:

- **Client Name**: Identifies the client (ABC, DEF, XYZ).
- **Cost (USD)**: The total cost associated with the marketing campaigns.
- **Clicks**: The number of times the ad was clicked by users.
- **Impressions**: The number of times the ad was shown to users.
- **Sales**: The number of products sold.
- **GMV (Gross Merchandise Value)**: The total sales revenue (not net profit) generated by the campaign.

These metrics were used to calculate KPIs, including CTR, Conversion Rate, ROI, and CPA for each client.

C. Approach Used

1. Analysis:

I calculated the following KPIs for each client:

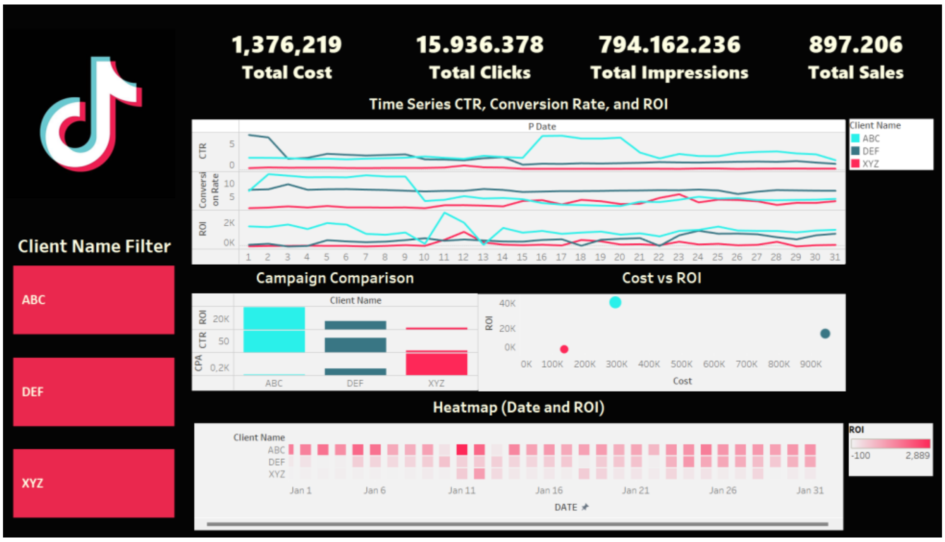
- **CTR (Click-Through Rate)**: (clicks / impressions) * 100
- **Conversion Rate**: (sales / clicks) * 100
- **ROI (Return on Investment)**: ((GMV * 0.20 - Cost) / Cost) * 100
- **CPA (Cost Per Acquisition)**: Cost / Sales

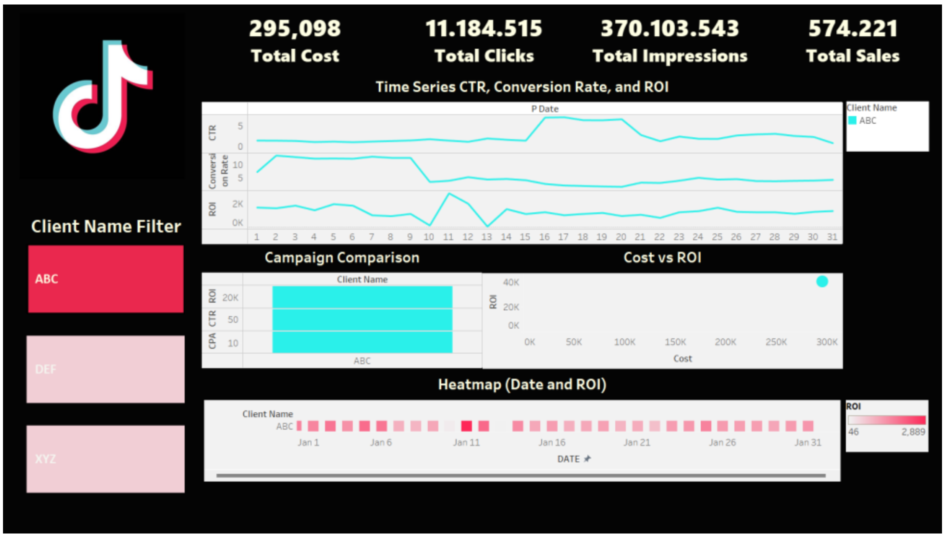
The analysis also involved time series comparisons, as well as cross-client comparisons to identify performance trends, patterns, and areas for improvement.

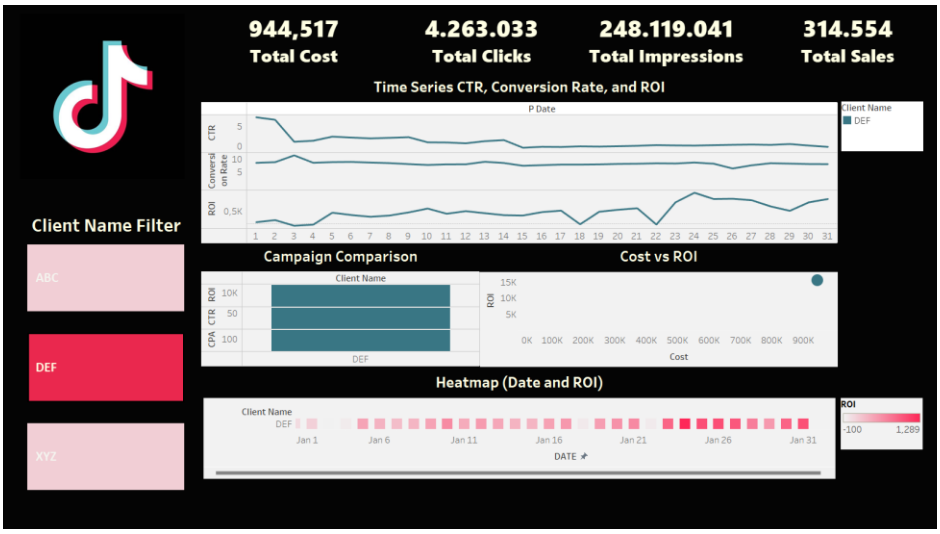
2. Visualization:

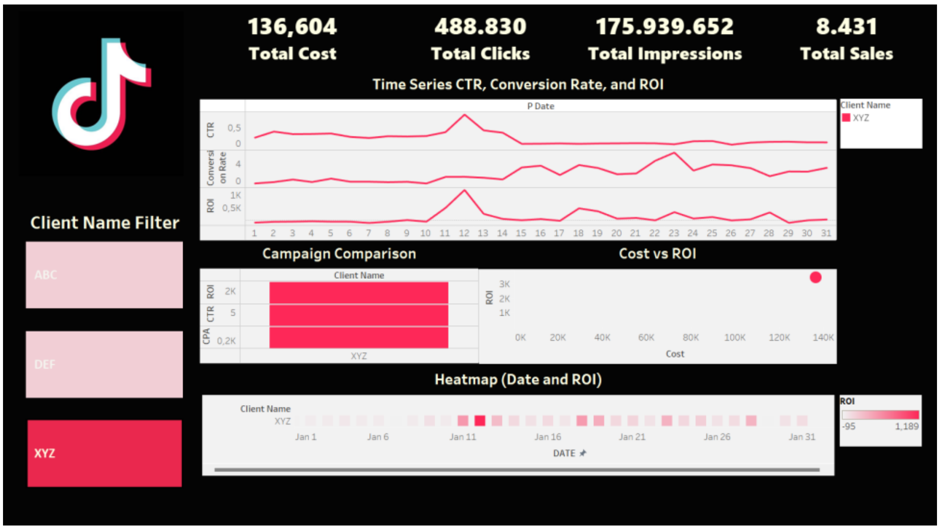
I used **Tableau** for visualization, which helped present the data and insights clearly. The key visualizations included:

- **Time Series**: Displaying trends in CTR, Conversion Rate, and ROI over the course of January.
- **Campaign Comparison**: A comparison of key metrics (CTR, ROI, and CPA) across clients.
- **Cost vs ROI**: A scatter plot showing the relationship between campaign cost and ROI for each client.
- **Heatmap**: Representing the ROI on a day-by-day basis for each client, helping to identify fluctuations.









3. Assumptions and Considerations:

- **Profit Margin** assumption 20% on GMV

```
df['ctr'] = (df['clicks'] / df['impressions']) * 100
df['conversion_rate'] = (df['sales'] / df['clicks']) * 100
df['roi'] = ((df['gmv'] * 0.20 - df['cost']) / df['cost']) * 100
df['cpa'] = df['cost'] / df['sales']
```

- **No external factors considered**, such as seasonality or market events, which may have impacted performance.

D. Process and Implementation

The following steps were taken to perform the analysis:

- **Data Cleaning**: The raw data was imported and cleaned to ensure consistency. Any missing data points were filled in or assumed based on the context.

- **Calculation of KPIs**: Calculated fields for the required KPIs were created using Tableau, which included **CTR**, **Conversion Rate**, **ROI**, **CPA**.
- **Visualization**: Various Tableau charts, such as time series, bar charts, scatter plots, and heatmaps, were used to visualize trends and relationships within the data.
- **Dashboard Creation**: A comprehensive dashboard was built in Tableau to display the calculated KPIs for each client in an easily digestible format.

E. Challenges Faced

Some challenges encountered during the analysis included:

- **Data Inconsistencies**: While the dataset was largely complete, there were minor issues with the accuracy of certain metrics (e.g., ROI using GMV instead of profit).
- **Understanding ROI**: The use of GMV for ROI calculation was misleading in some cases, as it doesn't account for all expenses like product costs or fees.
- **Fluctuations in XYZ's Performance**: **XYZ** showed a lot of variability in performance metrics, particularly in **CTR** and **ROI**, which made the analysis more complex.

F. Insights and Explanations

1. **ABC's Consistent ROI and High Efficiency**

   ABC displayed consistently high ROI and Conversion Rates throughout January 2025. Their CTR remained stable, and they maintained the best cost efficiency compared to both DEF and XYZ. This suggests that ABC's campaign strategy was highly effective, optimizing ad spend for maximum return. Their success can be attributed to strong engagement with their audience, resulting in excellent returns on every dollar spent. The ability to maintain high engagement and conversion rates indicates that ABC's ads were targeted well, resonating with their audience and leading to successful outcomes. The stability in CTR and ROI further confirms that their marketing efforts were consistently aligned with audience interests and needs, ultimately making ABC's campaigns the most cost-efficient and effective.

2. **XYZ's Inconsistent Performance and High Costs**

   XYZ experienced significant fluctuations in CTR, Conversion Rate, and ROI during January. Despite generating high CTR initially, XYZ's ROI was negative on multiple occasions, and their costs were higher compared to both ABC and DEF. This indicates that while their ads were successful in attracting attention, they were not converting that traffic into sales effectively. The high CPA combined with negative ROI signals inefficiencies in their marketing strategy. XYZ needs to address these inefficiencies by focusing on optimizing their Conversion Rates, as the high costs associated with their campaigns are not justified by the returns. This underperformance points to potential issues with targeting or ad quality that should be investigated to enhance overall campaign performance.

3. **DEF's Moderate Performance with High Costs**

   DEF showed steady performance in terms of CTR and Conversion Rates, but their CPA was higher compared to ABC, and their ROI was stable, though less impressive than that of ABC. While DEF’s results were more balanced than XYZ’s, the higher CPA indicates that they were spending more per acquisition than necessary, which ultimately impacted the overall ROI. Although DEF managed to maintain steady performance, there is room for improvement in terms of cost-efficiency. To boost profitability, DEF should focus on reducing CPA by optimizing their ad spend and refining their audience targeting. This would help them achieve a more favorable ROI, bringing them closer to the efficiency demonstrated by ABC.

4. **Cost vs ROI**

   ABC was able to achieve a high ROI with relatively low costs, making their campaign the most cost-effective among the three clients. In contrast, XYZ faced very high costs with low ROI, highlighting significant inefficiencies in their campaigns. This discrepancy indicates that ABC optimized their marketing spend effectively, ensuring that each dollar spent generated significant returns. On the other hand, XYZ needs to reconsider their budget allocation, as high costs without corresponding ROI suggest that they are not utilizing their resources in the most efficient way. A strategic reallocation of budget towards better-performing channels or ad sets could help improve XYZ’s cost-efficiency and increase their ROI.

5. **Heatmap: Daily Fluctuations**

   The heatmap visualization revealed that ABC showed consistent ROI throughout January, indicating a stable and well-executed campaign strategy. In contrast, XYZ displayed significant drops in ROI on several days throughout the month. This suggests that XYZ may have faced issues such as ad fatigue, ineffective targeting, or fluctuating ad performance at certain points. These daily fluctuations could indicate that XYZ's campaigns were not optimized consistently, which could lead to periods of underperformance. Identifying and addressing these fluctuations perhaps by refreshing ad creatives, adjusting bidding strategies, or improving targeting could help XYZ maintain a more consistent ROI throughout the campaign period.

G. Recommendations Based on Insights

1. **For Client ABC**

   Continue with the current campaign strategy as it is delivering strong ROI and high conversion rates. Ensure to monitor for signs of ad fatigue or audience saturation, and consider scaling up successful tactics.

2. **For Client XYZ**

   Focus on improving Conversion Rates. Despite high CTR, XYZ is struggling to convert clicks into sales. This could involve optimizing landing pages, improving the sales funnel, or refining the targeting strategy.

   Recommendation: Reevaluate campaign budget allocation. Given the high costs and low ROI, XYZ should optimize their ad spend and test different budget allocations across various channels.

3. **For Client DEF**

   Reduce CPA by optimizing customer acquisition strategies. Consider using more cost-effective advertising platforms or targeting strategies to improve ROI.

   Analyze specific areas where ROI could be improved without significantly increasing costs, especially by analyzing ad creatives, audience targeting, and bidding strategies.

H. Answers to Additional Questions

1. Would you please create a deck that consists of tables or charts to represent your top 3 insights from this data?

   a. ABC's Consistent ROI and High Efficiency
   ABC demonstrated consistently high ROI and Conversion Rates throughout January 2025. Their CTR remained stable, and they maintained the best cost efficiency when compared to both DEF and XYZ. This indicates that ABC's campaigns were well-optimized, effectively engaging their target audience, and producing excellent returns on ad spend. Their successful campaign strategy reflects an in-depth understanding of their audience, ensuring high engagement and conversions. The stability in their metrics over the month further suggests that their marketing efforts were precisely aligned with the audience’s preferences, contributing to the overall success of their campaigns.

   b. XYZ's Inconsistent Performance and High Costs
   XYZ, on the other hand, experienced significant fluctuations in CTR, Conversion Rate, and ROI throughout January. In several instances, their ROI was negative, and their costs were higher compared to ABC and DEF. Despite initially high CTR, XYZ struggled with low conversion rates and poor ROI, indicating that their ads were not effectively converting traffic into actual sales. The high costs associated with XYZ’s campaigns, without corresponding returns, pointed to inefficiencies in their marketing strategy. This highlights

the need for a closer review of XYZ’s ad creatives, audience targeting, and sales funnel to reduce costs and increase conversions.

c. DEF's Moderate Performance with High Costs
DEF showed steady performance in terms of CTR and Conversion Rates, but their CPA was higher compared to ABC. While their ROI was stable, it was not as impressive as ABC's. DEF’s performance suggests a more balanced, yet suboptimal, marketing strategy. Although they maintained consistent engagement and conversions, their acquisition costs were higher, affecting the overall ROI. To enhance their performance, DEF should focus on optimizing their customer acquisition strategies, potentially exploring more cost-effective advertising platforms or refining their targeting to improve ROI and reduce their CPA.

2. **What are the additional core metrics that you feel are important to monitor their performance?**

a. CTR (Click-Through Rate)
CTR is a key metric used to measure the effectiveness of an ad or campaign in driving traffic to a website or landing page. It is calculated by dividing the number of clicks an ad receives by the number of impressions (how often the ad is shown). A high CTR indicates that the ad resonates well with the audience and effectively grabs their attention. It is a direct measure of ad engagement and can be used to evaluate the quality of the creative elements (images, copy, targeting). Monitoring CTR helps assess how relevant the ad is to the target audience and whether the messaging aligns with their interests.

b. Conversion Rate
Conversion Rate measures the percentage of visitors who take the desired action (usually making a purchase or completing a form) after clicking an ad. A high Conversion Rate signifies that the website, landing page, or offer is effective in turning visitors into customers. This metric is crucial for understanding the efficiency of the entire sales funnel, from ad click to purchase or desired action. A low Conversion Rate, even with a high CTR, suggests issues with the landing page, user experience, or the relevance of the offer.

c. ROI (Return on Investment)
ROI measures the profitability of an investment relative to its cost. In the context of marketing, it evaluates how much profit is generated for every dollar spent on the campaign. ROI helps determine whether a campaign is profitable or not. A positive ROI indicates that the campaign is generating more revenue than it costs, while a negative ROI suggests the opposite. This is one of the most important metrics for marketers, as it directly reflects the financial success or failure of a campaign. Monitoring ROI ensures that the marketing budget is being used effectively to generate a return.

d. CPA (Cost Per Acquisition)
   CPA calculates how much it costs to acquire a single customer or sale. It is derived by dividing the total campaign cost by the number of sales (or acquisitions). CPA helps determine the efficiency of an advertising campaign in terms of acquiring customers. A low CPA means that the company is spending less to acquire each customer, making the campaign more cost-effective. On the other hand, a high CPA could indicate inefficiency in the marketing strategy, whether through excessive spending on ads or low conversion rates. By optimizing CPA, marketers can improve the overall profitability of campaigns.

These core metrics provide a comprehensive view of a marketing campaign's performance. Together, they help marketers understand the full customer journey, from engagement (via CTR) and conversion (via Conversion Rate) to overall profitability (via ROI) and cost-effectiveness (via CPA). Monitoring these metrics enables more informed decision-making and campaign optimization to maximize marketing efficiency.

3. **Which clients drive the lowest profitability? What will be your recommendation to improve their performance?**

Based on the analysis, XYZ drives the lowest profitability among the three clients, as indicated by their negative ROI and high CPA. Despite generating traffic through ads (reflected in their CTR), XYZ struggles with effectively converting those clicks into sales, which results in poor profitability. The high CPA means that XYZ is spending significantly more on acquiring customers than the revenue they generate from those customers, leading to inefficiencies in their campaigns.

Recommendation:

a. Improve Targeting
   One of the main reasons XYZ is struggling with profitability is that their ads are not reaching the right audience, as evidenced by the high CPA and low conversion rates. To optimize this, XYZ should refine their audience segmentation by analyzing existing customer profiles and behavior. They can leverage data such as demographics, interests, and online behavior to create highly targeted campaigns. This will ensure that the ads are shown to users who are more likely to convert, thereby improving CTR and reducing CPA. Utilizing lookalike audiences or behavioral targeting could further enhance the precision of their campaigns.

b. Reallocate Budget

Given that XYZ's current ROI is negative, it’s essential to reassess their advertising budget allocation. XYZ should shift spending away from underperforming ads or channels and direct more of their budget toward campaigns or platforms that show a higher return.

Review the performance of ads on various platforms (e.g., social media, search engines, display networks) and allocate a larger portion of the budget toward the channels with the best cost-to-conversion ratio. If certain platforms consistently generate more conversions for lower costs, they should be prioritized.

Test different ad formats (e.g., carousel ads, video ads, sponsored posts) and evaluate which formats yield the highest CTR and conversion rates. Adjusting the content strategy for ads to resonate more effectively with the audience can also lead to better performance.

c. Improve Sales Funnel and Retargeting

It’s also important to enhance the post-click engagement process. Using retargeting or remarketing strategies will allow XYZ to re-engage users who clicked the ad but didn’t convert. By showing targeted ads to users who have already interacted with the brand, XYZ increases the chances of conversion without incurring additional acquisition costs.

d. Monitor and Adjust in Real Time

XYZ should continually monitor the performance of their campaigns in real-time and adjust strategies accordingly. Implementing a test-and-learn approach, such as running A/B tests, allows for ongoing optimization. This enables them to identify what works best and iterate on it, which is essential for staying competitive and ensuring sustained profitability.