

# Memo: Analysis of Public Channel Performance and Experimental Design for Incremental Cost Per First Deposit

## 1. Public Channel Performance

The public channel has been a significant contributor to user acquisition in the Legendary Universe. Based on the available data for marketing spend and user acquisitions, here's a summary of the channel's performance:

- **Total Spend for Public Channel:** \$62,497.25
- **Number of First Deposits for Public Channel:** 181
- **Incremental Cost per First Deposit (CPA):** \$345.29

### Key Insights:

- The public channel generated 181 first deposits with a total spend of \$62,497.25. This gives us an incremental cost per first deposit (CPA) of \$345.29.
- The CPA is an important metric to evaluate the efficiency of the public channel. In this case, the cost per acquisition is relatively high, which suggests that there might be potential inefficiencies in this marketing channel.
- The public channel may benefit from optimization in targeting, creative strategies, or timing to reduce this cost.

## 2. Estimating Incremental Cost Per First Deposit

We calculated the incremental cost per first deposit for the public channel using the following formula:

$$\text{Incremental CPA} = \frac{\text{Total Marketing Spend for Public Channel}}{\text{Number of First Deposits for Public Channel}}$$

This results in a CPA of \$345.29, which tells us how much marketing spend is required on average to acquire each new first deposit in this channel.

## 3. Experiment Design to Assess Channel Efficiency

To better assess the efficiency of the public channel, an A/B test experiment can be designed. The objective of this experiment will be to understand if we can optimize the cost per acquisition by testing different marketing strategies or changes to targeting. Here's the approach:

### A/B Test Plan for the Public Channel:

#### Experiment Groups:

- **Group A (Control Group):** Continue marketing as usual with the current strategy in the public channel.

- **Group B (Test Group):** Implement a new strategy with optimized targeting or a new creative approach for the public channel. This could include better audience segmentation, using different advertising channels, or trying out new ad creatives.

**Key Metrics to Track:**

- Cost per First Deposit (CPA) for both groups.
- Conversion Rate (number of users who made a first deposit after being exposed to the marketing campaign).
- Engagement Rate (how engaged the users are with the marketing content).
- Overall Revenue or Lifetime Value (LTV) of users acquired through the public channel.

**Duration of the Experiment:** The experiment should run for at least 4–6 weeks to ensure we gather sufficient data to make informed decisions.

**Evaluation Criteria:**

- If Group B has a lower CPA than Group A, it would suggest that the new marketing approach is more efficient at converting users at a lower cost.
- The conversion rate and engagement rate will help determine if users acquired through the public channel are more likely to convert and engage, providing insights into the long-term value of the channel.

**Statistical Significance:** To determine the significance of the results, a hypothesis test (e.g., t-test) can be used to compare the CPA of both groups. If the test results show that the difference in CPA is statistically significant, it will validate the hypothesis that one marketing approach is more efficient than the other.

## 4. Evaluation of Predictive Models for Marketing Decisions

In assessing the efficiency of the public channel and determining the future performance of marketing strategies, a predictive model can be used. Here's how:

**Metric to Evaluate the Model:** The mean squared error (MSE) or root mean squared error (RMSE) can be used to evaluate the predictive accuracy of the model in forecasting CPA or user conversion rates.

**Why MSE/ RMSE?:** These metrics measure the difference between the predicted and actual values. A lower MSE or RMSE indicates that the model is providing accurate predictions, which can then inform future marketing decisions (e.g., adjusting budgets, targeting strategies, or creative approaches).

**Using the Model:** Once the model is trained and validated, it can help identify the most important factors driving the CPA. This could include channel-specific variables like the type of content, targeting strategies, or external factors like seasonality. This can guide marketing teams in optimizing their strategies.

## Conclusion and Recommendations

- **Current Public Channel Performance:** The incremental CPA of \$345.29 for the public channel indicates room for improvement. The channel's performance should be optimized to reduce costs and improve efficiency.
- **Experiment Design:** An A/B test with two groups (current strategy vs. optimized strategy) is recommended to assess the potential for reducing CPA.
- **Use of Predictive Models:** Use predictive models (evaluated through MSE/RMSE) to guide future marketing strategies and make data-driven decisions about how to allocate resources effectively.

With the above steps, you can assess the public channel's performance, experiment with optimizations, and guide future marketing decisions based on predictive insights.