MARKETING ANALYSIS

A/B TESTING

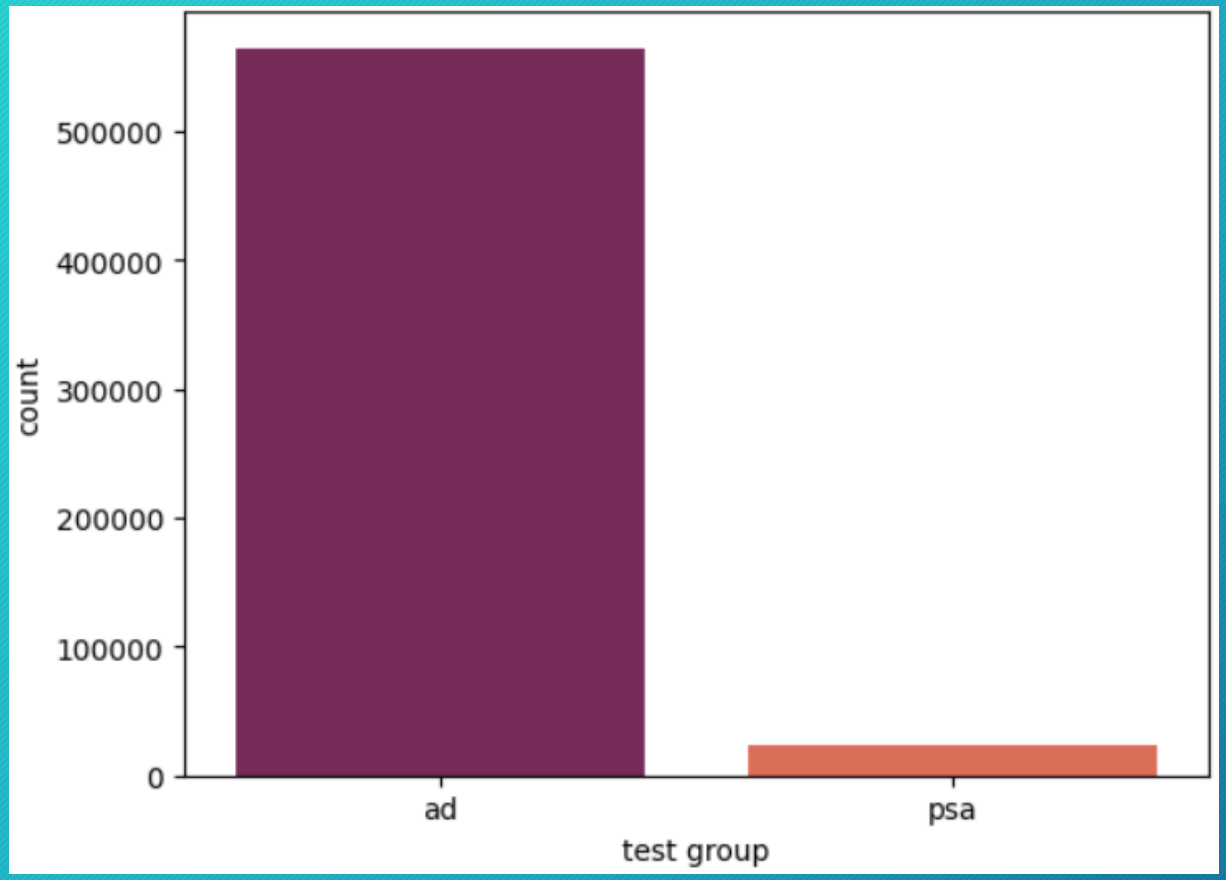
Problem Statement

Marketing companies want to run successful campaigns, but the market is complex and several options can work. So normally they tun A/B tests, that is a randomized experimentation process wherein two or more versions of a variable (web page, page element, banner, etc.) are shown to different segments of people at the same time to determine which version leaves the maximum impact and drive business metrics.

The companies are interested in answering two questions:

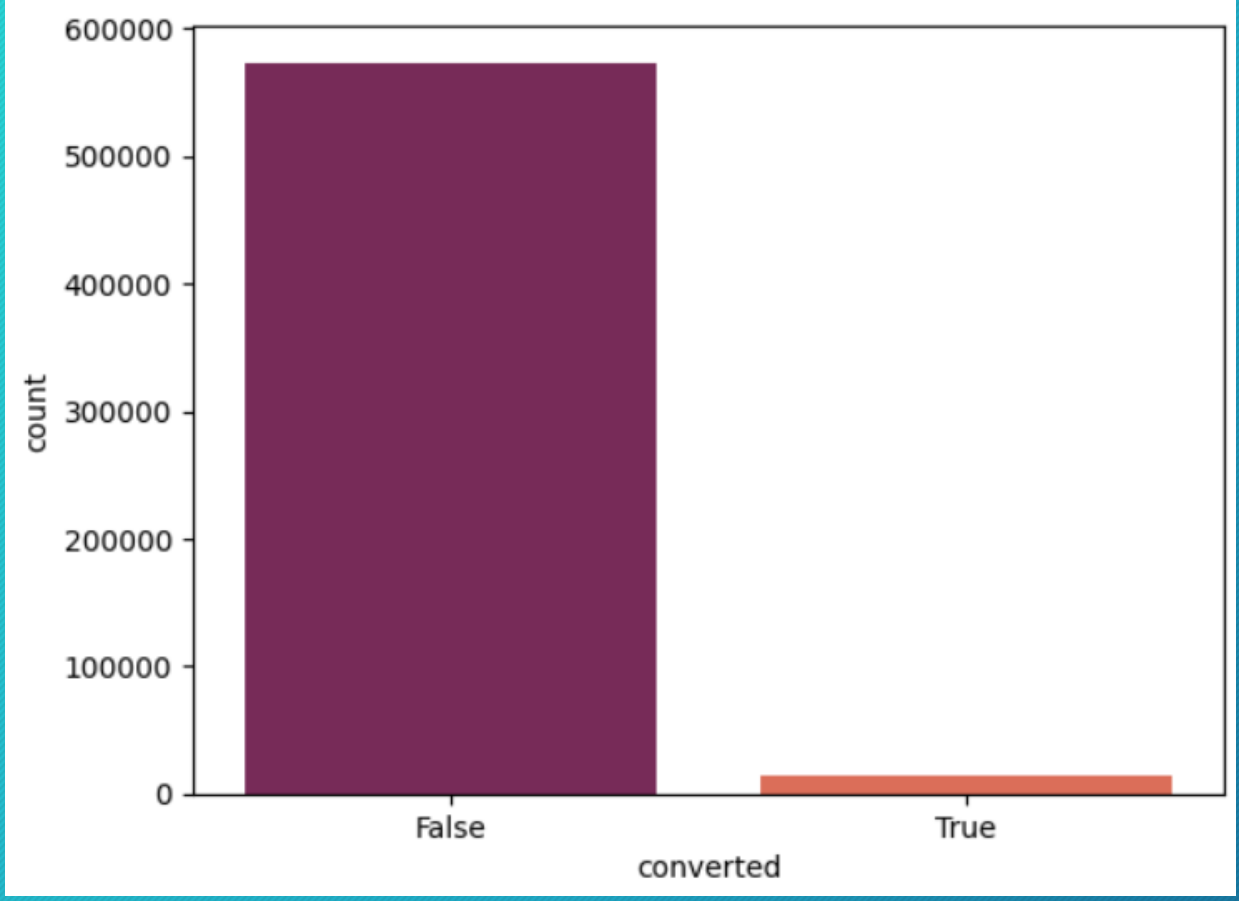
- Would the campaign be successful?
- If the campaign was successful, how much of that success could be attributed to the ads?

Ad Content Distribution



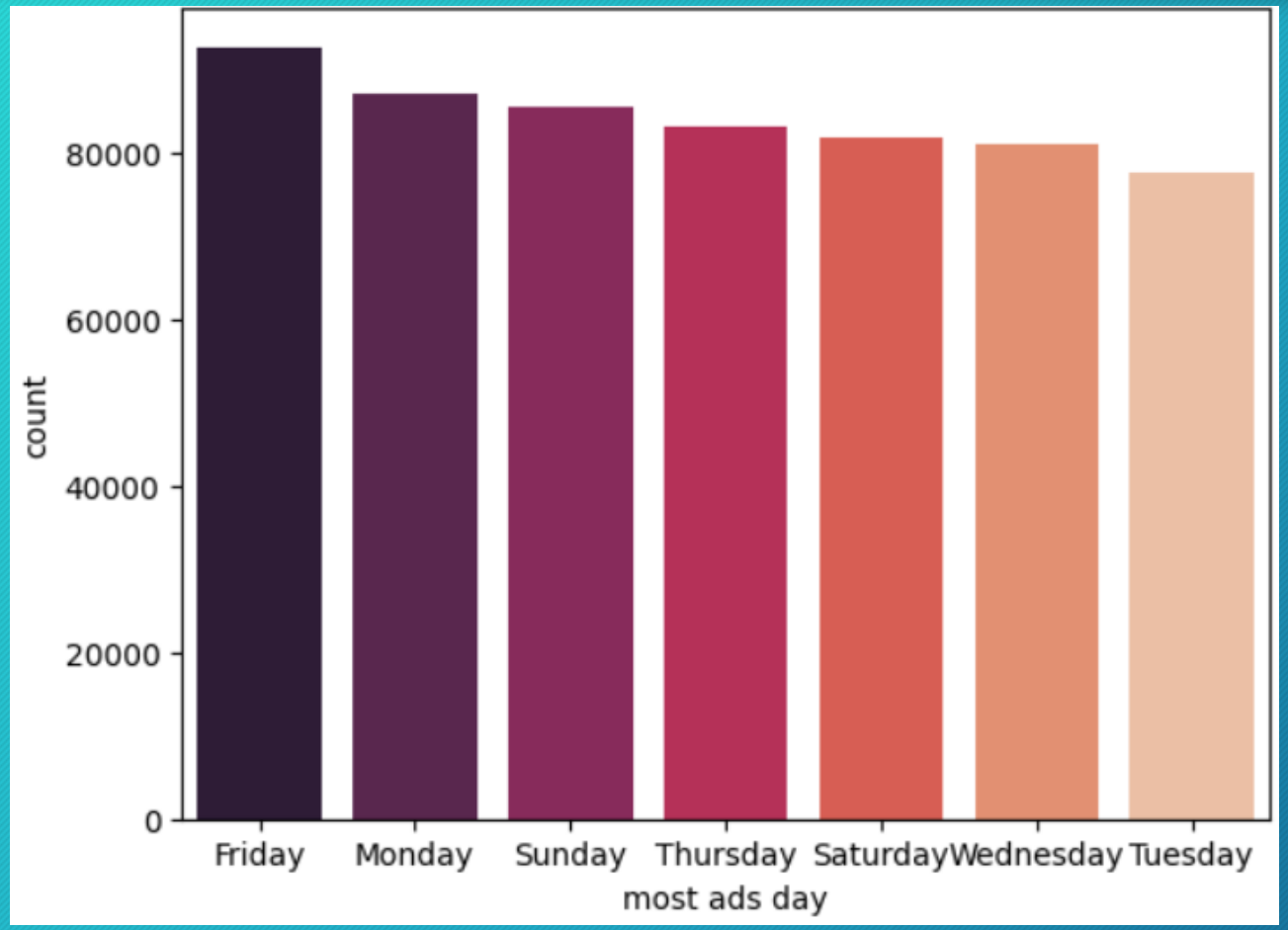
The majority of the test group has been exposed to advertisements, accounting for 96% of the total content shown, with the remaining 4% consisting of Public Service Announcements (PSAs).

Ad Conversion Rate Analysis



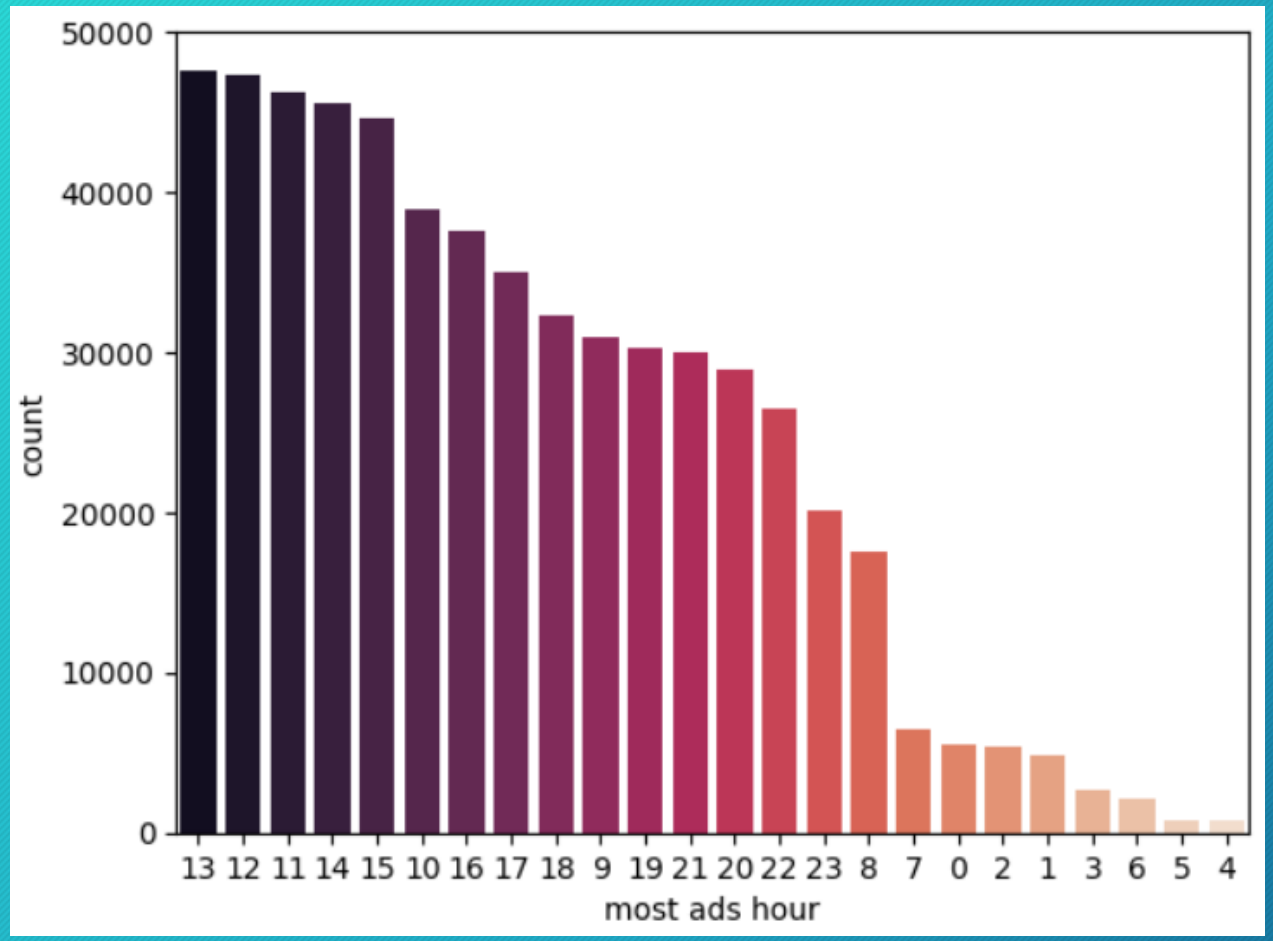
Of the ads shown, only 2% have resulted in conversions (sales or revenue), indicating a low conversion rate.

Ad View Distribution by Day of the Week



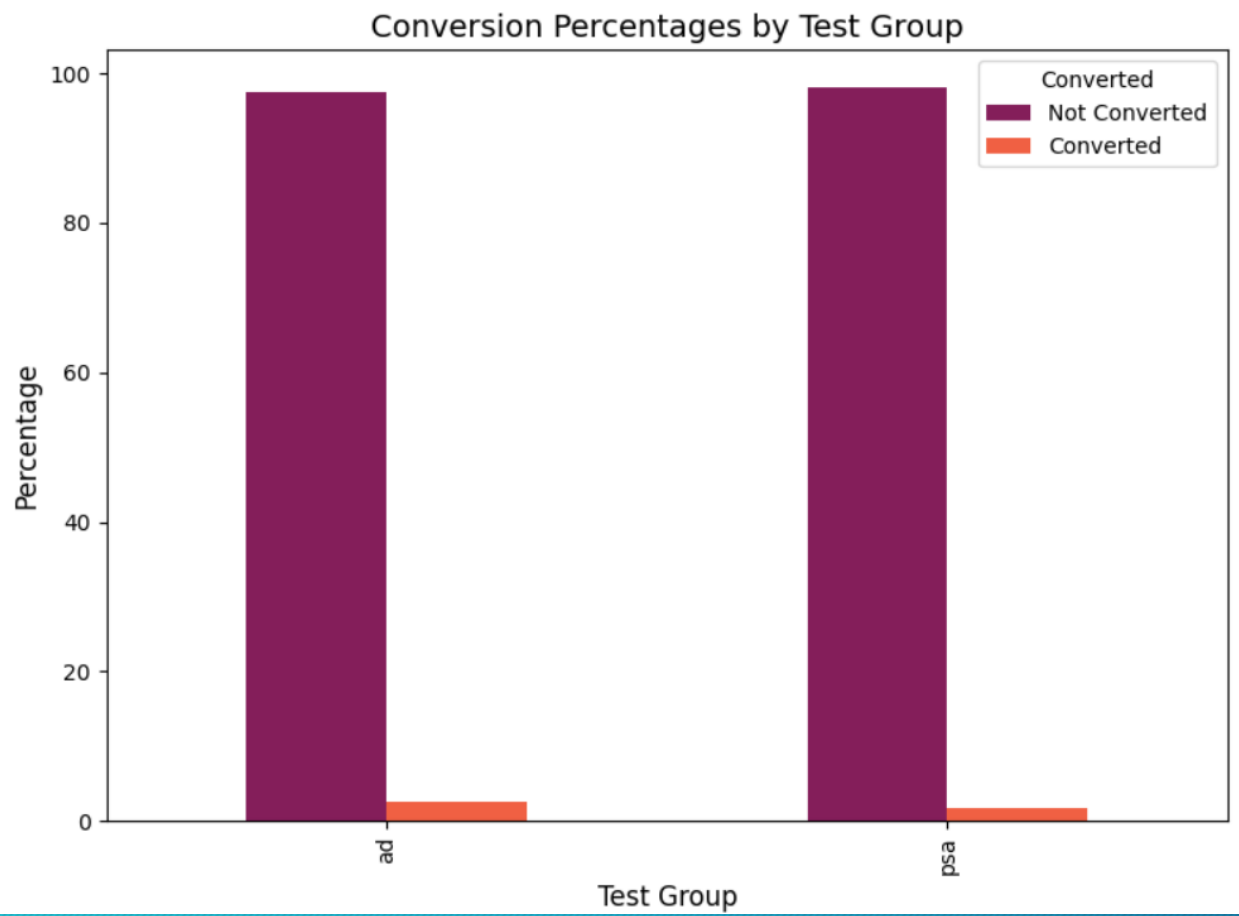
- There is a relatively consistent distribution of ads viewed throughout the week.
- However, Friday stands out as the day with the highest ad exposure, representing 16% of total ads viewed, while Tuesday has the least, with 13%.

Peak and Off-Peak Ad Viewing Times



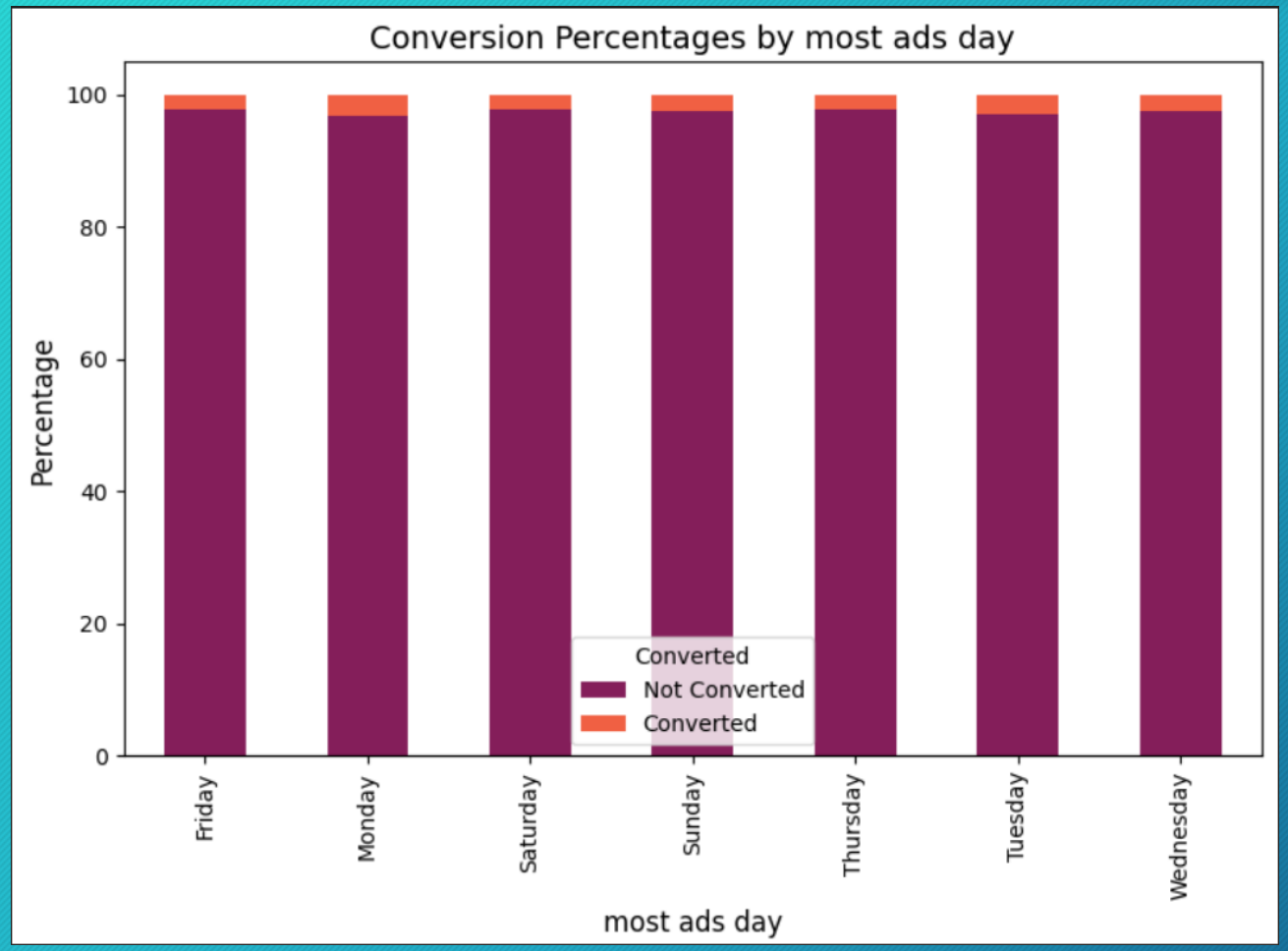
- The majority of ad views occur around 1:00 PM, marking the peak time for ad exposure.
- On the other hand, ad views are minimal between 1:00-5:00 AM, representing the least active time for ad engagement.

Ad vs. PSA Conversion Rates



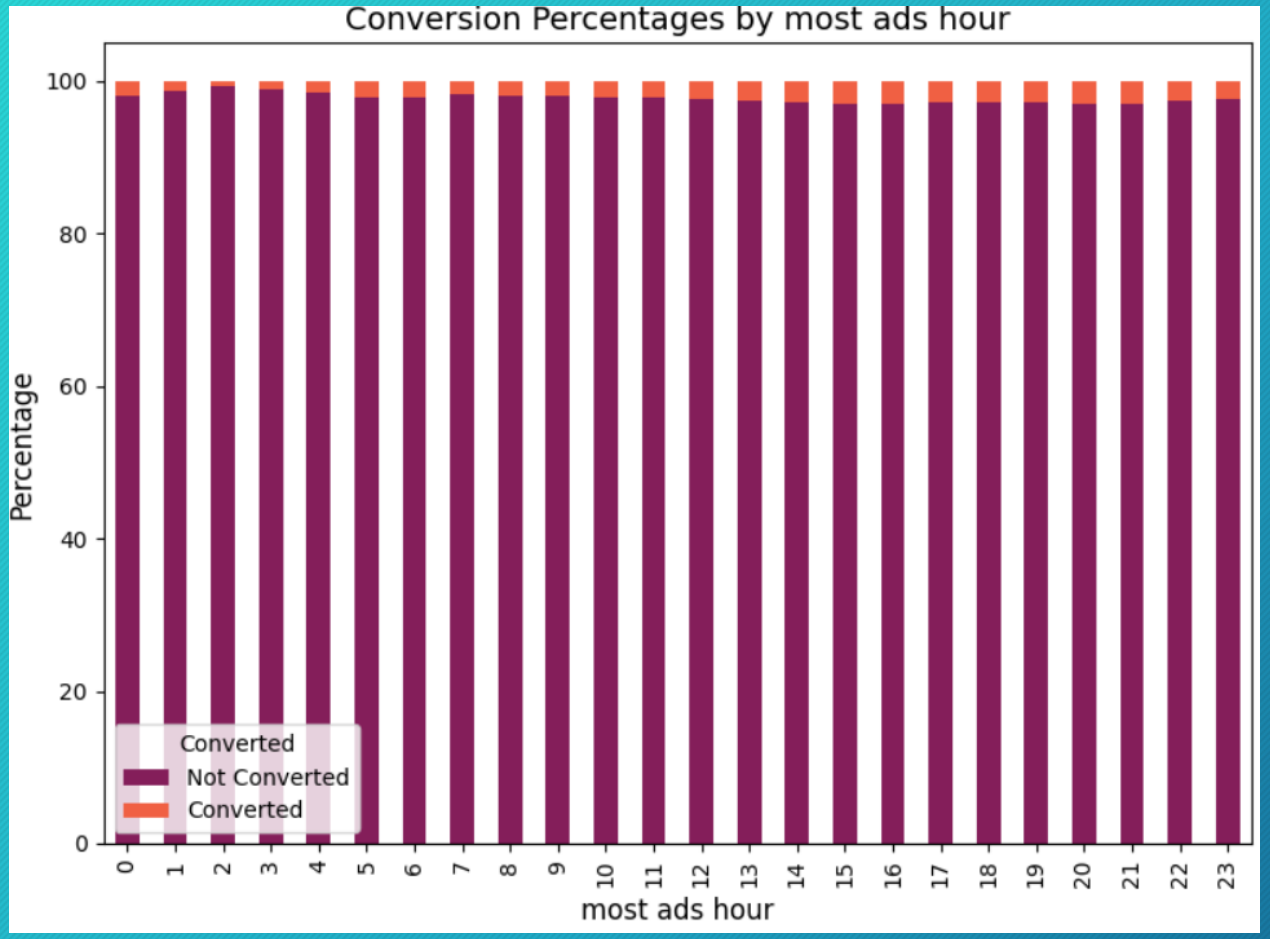
- Conversion rates for Ads stand at 2.5%, while PSAs have a conversion rate of 1.8%.
- This indicates a 0.7% increase in conversions or product purchases for ads compared to PSAs.

Weekly Conversion Rate Trends



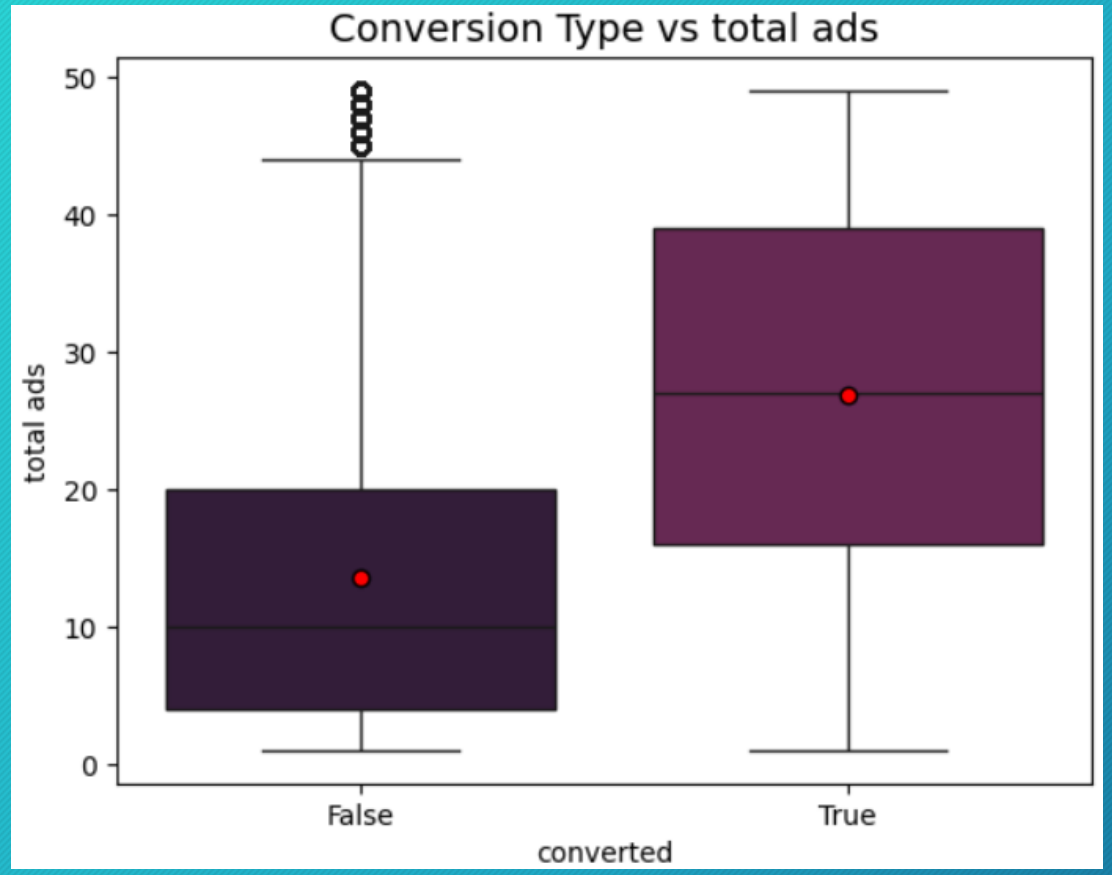
- Conversion rates remain relatively consistent throughout the week, with Monday and Tuesday showing slightly higher rates at 3%, while Saturday has the lowest rate at 2%.
- This indicates minimal variation in performance across days.

Hourly Conversion Rate Patterns



- Conversion rates show minimal variation throughout the day, similar to the trends observed across the week.
- However, 4 PM and 8 PM stand out with a slightly higher conversion rate of 3%, while 2 AM records the lowest rate, falling below 1%, likely due to the reduced number of ads seen during this time, as highlighted earlier.

Impact of Ad Exposure on Conversions



- There is a notable difference in conversion rates based on the total ads seen by an individual.
- On average, a person views approximately 27 ads for a conversion or sale to occur.
- Notably, conversions are not observed when fewer than 20 ads are seen, emphasizing the importance of achieving a minimum threshold of ad exposure.

A/B testing

- A/B testing with the help statistical test. Here Chi-square test is used.

Null Hypothesis (H_0): The conversion rate remains consistent regardless of the test group, the day with the most ads, or the hour with the most ads.

Alternative Hypothesis (H_1): The conversion rate varies based on the test group, the day with the most ads, or the hour with the most ads.

- If P-value is less than alpha, then we reject the null hypothesis.

Conclusions from A/B Test and Analysis

- **Minimal Impact of Ad Exposure:** While ad exposure does have an effect, it leads to only minor variations in conversion rates across the test groups, indicating that other factors may play a more significant role in driving conversions.

- **Day of the Week Influences Effectiveness:** The performance of ads is influenced by the day of the week, with certain days showing higher conversion rates. Understanding this pattern can help optimize ad delivery for better results.

- **Timing Plays a Crucial Role:** The time of day when ads are shown has a significant impact on conversion rates. Tailoring the timing of ads to align with peak engagement hours can enhance overall performance.

Recommendations

Focus on High-Performing Days:

- Given the current conversion rate of 0.7% for the ads campaign, it would be advantageous to increase ad exposure on high-performing days, such as Monday and Tuesday, which already show higher conversion rates.
- By optimizing ad placements on these days, we can capitalize on higher engagement and potentially boost conversions.

Experiment on Low-Performing Days:

- Consider running targeted or experimental ads on Saturday, which currently shows lower conversion rates. This approach will help investigate the reasons behind the performance gap and uncover potential opportunities to improve engagement and conversions on days with weaker results.
- While experimentation can be valuable, the primary focus should be on amplifying ads on the highest-performing days.

Recommendations

Target High-Performing Time Slots:

- 4 PM and 8 PM stand out as time slots with slightly higher conversion rates (3%). These periods represent optimal windows for ad exposure and are key for maximizing engagement and conversions.
- Increasing ad spend during these hours can lead to more effective outcomes.

Minimize Exposure During Low-Performing Time Slots:

- Conversion rates are significantly lower during 1-2 AM, likely due to reduced ad visibility and engagement. Reducing or avoiding ad exposure during these hours will allow for better allocation of budget and resources, ensuring ads are shown at times when users are more likely to engage.
- To improve conversion rates, it is essential to ensure that individuals are exposed to a minimum of 20 ads. Conversions are not observed below this threshold, so increasing ad frequency for users who have seen fewer than 20 ads could significantly boost conversions.