

## # Executive Summary: A/B Test Results Analysis

This report presents the findings from our recent A/B test analysis, aimed at evaluating the impact of a new experimental treatment on user conversion rates. The control group consisted of users who did not receive the treatment, while the treatment group was exposed to the new feature.

### ## Key Findings

- **Conversion Rates:** Our analysis indicates that the conversion rate for the Control Group was 0.1204, and for the Treatment Group it was slightly lower at 0.1188. The difference in conversion rates amounts to -0.0016 or a relative lift of -1.31%.
- **Statistical Significance:** Given the observed difference in conversion rates, our P-value is 0.189883, which suggests that it is unlikely (but not impossible) that this result occurred by chance. However, a higher P-value indicates lower statistical significance and less confidence in our findings.

### ## Business Impact

- **Estimated Annual Revenue Impact:** If we extrapolate these results to the entire user base over an annual period, we expect the new treatment to generate approximately \$2,160,215 less in revenue compared to the control group. This is a substantial loss that should be carefully considered before proceeding.
- **Daily Additional Conversions:** Our analysis indicates that, on average, the new treatment will result in 79 fewer daily conversions compared to the control group.

### ## Diagnostic Checks

- **Sample Ratio Mismatch:** No significant imbalance was detected between the control and treatment groups.
- **Power Analysis:** With a power of 25.87%, our study has limited ability to detect real effects, which indicates that we may not be able to reliably determine whether the new treatment is effective or ineffective.
- **Data Quality:** The quality of the data used for this analysis was found to be satisfactory. However, there are some indications of heterogeneous effects across different user segments based on session duration.

### ## Advanced Insights

- **Session Duration Effects:** We observed a weak correlation between session duration and conversion rates (-0.0009). Additionally, we noted that the impact of the new treatment varies across different quartiles of session durations.
- **Heterogeneous Treatment Effects:** The analysis revealed that the effects of the new treatment may not be consistent across all user segments. Further investigation is required to understand these heterogeneous effects and potential causal factors.

### ## Recommendation

Given the insufficient evidence, low confidence in our findings, and substantial financial risk, we strongly recommend against proceeding with the implementation of this new treatment at this time. Instead, we propose further exploration into the underlying causes of these observed heterogeneous effects to better understand their potential impact on conversion rates.

### ## Appendix

For a more detailed technical report, including additional diagnostic plots and methodologies, please refer to our comprehensive A/B test analysis document. This report provides a deeper dive into the statistical modeling, data quality checks, and further insights that inform this executive summary.