GLOBOX

ANALYZE AN A/B TEST-RESULT

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ANALYSIS OF GLOBOX'S A/B TEST

1. GloBox's overview covers its background and mission, analyzing the sales market, user demographics, and sales model. The company's analytical focus includes specific objectives and a defined scope, with transparent data collection methods for strategic enhancement.

2. The focus is on data extraction and cleaning, utilizing SQL queries for uncovering hidden trends. Inferential statistics, powered by Spreadsheets, drive hypothesis calculation and confidence interval determination for comprehensive data insights.

3. The final stage involves presenting results and recommendations through visually impactful graphs and result tables.

4. Additional material.

GLOBOX'S OVERVIEW

SUMMARY

GloBox, a distinguished e-commerce entity specializing in curated and high-quality products, has undergone significant expansion in recent months. This report highlights one of the strategic initiatives to amplify user engagement and drive revenue growth.

Founded with a commitment to offering exceptional products, GloBox has emerged as a prominent player in the e-commerce industry. Its journey is defined by a focus on quality, innovation, and a diverse product portfolio.

STRATEGIC INITIATIVE: A/B TEST

As part of its ongoing commitment to innovation, GloBox recently conducted an A/B test focused on the mobile website. The objective was to increase awareness and revenue within the **food and drink category.**

TEST DESIGN AND DURATION

Users visiting the site during the 12-day (from January 26 to February 6) test period were randomly assigned to control or test groups. The control group experienced the original site, while the test group saw a **food and drink banner**. The primary metrics of interest were the conversion rate and the average amount spent per user.

DATA COLLECTION AND ANALYSIS

Approximately 49,000 users participated in the test, providing valuable data on group assignments, purchase behavior, and user characteristics. Rigorous data analysis revealed a significant increase in the conversion rate for the test group.

HIDDEN TRENDS

Device-wise Analysis:

- iOS users: resulting in a significant 10.6% increase in conversion rates. However, it caused a slight 3% decrease in the average amount spent by iOS users.
- On Android: the Treatment Group exhibited a notable 27% increase in conversion rates and a positive 7% impact on the average amount spent.

Country Analysis (top users):

1. USA: 7,309 users in the c. group and 7,463 users in the t. group.
2. Brazil: 4,805 users in the c. group and 4,629 users in the t. group.
3. Mexico: 2,815 users in the c.group and 2,923 users in the t.group.
4. Germany: 1,906 users in the c. group and 1,948 users in the t. group.

HYPOTHESIS TESTING WITH SPREADSHEETS

In this step, the focus shifts to data extraction and cleaning, utilizing SQL queries to unveil hidden trends, complemented by inferential statistics powered by Spreadsheets. The objective is to calculate hypothesis tests for conversion rates and average spending in GloBox's A/B test.

DATA OVERVIEW:

The A/B test involved 48,943 users, split between the Control (24,343) and Test (24,600) groups. Control group conversion rate: 3.923%, Test group conversion rate: 4.630%. Average spend in Control: $3.37, Test: $3.39. While **a statistically** significant difference was observed in conversion rates**, no significant** difference was **found in average spending**.

HYPOTHESIS TESTING FOR CONVERSION RATE

A significance level of 0.05 was set. Null hypothesis (H0): p1 = p2 (equal conversion rates); Alternative hypothesis (HA): p1 ≠ p2 (unequal conversion rates). The pooled proportion was 0.04278, leading to a standard error of 0.00183. The test statistic was 3.8643, resulting in a p-value of 0.000111. With $P < \alpha$, the null hypothesis was rejected, **signifying a significant difference in conversion rates between groups.**

95% Confidence Interval for Conversion Rate:

The confidence interval for the difference in conversion rates was approximately [0.0035, 0.0107].

HYPOTHESIS TESTING FOR AVERAGE SPENT:

A Welch's t-test with a significance level of 0.05 was employed. Null hypothesis (H0): $\mu1 = \mu2$ (equal average spending); Alternative hypothesis (HA): $\mu1 \neq \mu2$ (unequal average spending). The t-test resulted in a p-value of 0.944. Failing to reject the null hypothesis **indicated no significant difference in average spending between groups.**

95% Confidence Interval for Average Spent:

The confidence interval for the difference in average spending was approximately [-0.439, 0.471].

The analysis by gender:

- For females, the test group showed a slightly higher conversion rate of 5.44% compared to the control group's 5.14%. The average amount spent in the test group was slightly lower at $4.13 versus the control group's $4.46.
- In males, the test group demonstrated a higher conversion rate of 3.79% in contrast to the control group's 2.63%. The average amount spent was also higher in the test group at $2.60, whereas the control group spent $2.25.
- For users of other genders, the test group had a slightly lower conversion rate of 3.02% compared to the control group's 3.22%. The average amount spent was nearly identical in both groups, standing at $2.77.

NOVELTY TEST

After detecting **a significant difference in conversion rates between the control and test groups**, we initiated a Novelty Effect Test to explore the potential influence of novelty on user behavior. The Novelty Effect involves individuals responding more positively to new experiences, objects, or information. In our A/B test context, this investigation aimed to determine if the observed effect resulted from the novelty of the change rather than an intrinsic improvement. Examining the daily average conversion rate and site visits over time we identified a consistent downward trend in both metrics, **indicating no Novelty Effect**. The observed increase in the test group's **conversion rate is likely attributable to the new banner**, not merely a response to something new.

CONVERSION RATE OVER TIME

To delve deeper into the impact of the new banner on user behavior, we analyzed the conversion rates of the control and **test groups throughout the test period.** Our examination revealed a consistently higher conversion rate for the test group compared to the control group . Although there were two instances where the control group briefly surpassed the test group, these occurrences were infrequent, with the test group consistently outperforming on the majority of test days. **This analysis reinforces the A/B test results, affirming that the new banner consistently contributed to a higher conversion rate.**

SAMPLE SIZE CALCULATION

Utilizing Python, we computed the necessary sample size for a precise and reliable outcome. With a baseline conversion rate (p1) of 3.92% (0.0392), a minimum detectable effect (d) set at 5% of the baseline conversion rate (0.00196), a desired significance level (α) of 0.05, and a desired statistical power (1 - β) of 0.8, the recommended sample size was approximately 124,132 in each group. **This sample size is almost five times larger than the current test, ensuring robust results.**

RESULTS AND RECOMMENDATIONS

Upon conducting the A/B test, a substantial and statistically significant difference emerged in conversion rates between the control and test groups, signaling a positive influence of the new food and drink banner on user behavior. Notably, the test group exhibited a superior performance, surpassing the control group by around 12.47% in terms of conversion rate. While no significant variance was observed in the average amount spent per user between the two groups, the increased number of users making purchases in the test group **suggests a promising potential for heightened revenue.**

PROPOSED ACTIONS:

- International Rollout of the Fresh Banner:

Considering the impactful increase in the conversion rate observed in the test group, it is advisable to globally launch the new food and drink banner for all users. The immediate positive effect witnessed during the test period indicates an overall improvement in conversions and potential revenue enhancement.

- Extended Investigation and Experimentation:

To fortify the findings and instill confidence in the recommendation, it is recommended to conduct additional testing with a larger sample size. While the initial impact was significant, a more extensive sample size would provide greater reliability and certainty in the recommendation.

DECISION TIME: LAUNCH OR HOLD?"

Drawing from the in-depth analysis of A/B test results and supplementary insights, a resolute recommendation is to introduce the food and drink category banner. The conclusive test outcomes underscore a meaningful disparity in **conversion rates, affirming the positive influence of the banner on driving conversions.**

Recognizing the potential shift in user preferences toward more affordable items, it is strategically wise to prioritize user acquisition over immediate revenue gains. Introducing the banner holds the promise of attracting a broader user base, fostering increased brand engagement, and establishing long-term customer loyalty with repeated purchases.

ADDITIONAL MATERIAL.

DATA SOURCE

`postgres://Test:bQNxVzJL4g6u@ep-noisy-flower-846766 pooler.us-east-2.aws.neon.tech/Globox`.