Ad Effectiveness Assessment and Strategic Recommendations for BrownlowReviews

This report evaluates ad design effectiveness using experimental data and recommends adopting the alternative layout based on its superior performance across key user actions.

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Background

BrownlowReviews (BR) is an online platform where users can search for restaurants, read and write reviews, and interact with businesses through calls or reservations. BR's primary source of revenue comes from selling advertisements to restaurants. The purpose of this analysis is to evaluate the effectiveness of BR's ad offerings: a control group with no ad treatment, a group exposed to the current ad, and a group shown an alternative ad design. The key performance indicators analyzed include reservations, calls, and pageviews, with reservations seen as the most direct indicator of demand, and thus central to the platform's revenue strategy.

Descriptive Analytics and Statistical Profiling of KPIs

To provide foundational insights, a series of descriptive analyses were conducted to explore distribution patterns, restaurant-type variations, and treatment-based differences in the three core KPIs prior to inferential testing.

Pageviews featured a close to normal distribution across both restaurant types, with chain restaurants receiving higher page views overall, as reflected in both the distribution histograms and boxplots. Independent restaurants showed a tighter distribution, suggesting a more consistent but generally lower level of visibility. This disparity suggests chains may naturally attract more attention due to recognisability or broader reach, a context useful when assessing ad impact.

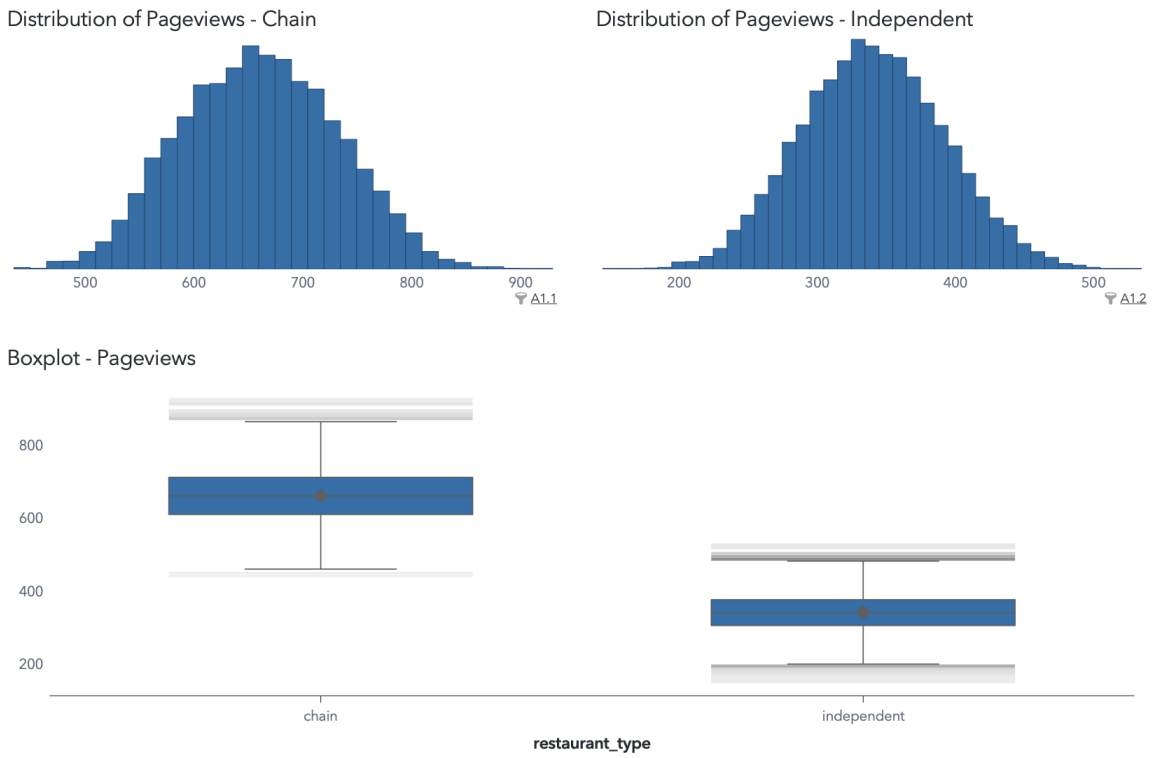


Figure 1 - Pageviews

The distribution of **Calls** in chain restaurants was slightly right-skewed and again showed greater variability in the number of calls received, while independents clustered around a narrower midrange. This indicates that while calls were more frequent among chains, independent restaurants had more consistent engagement. It provided an early hint that the alternative ad might benefit independents more evenly.

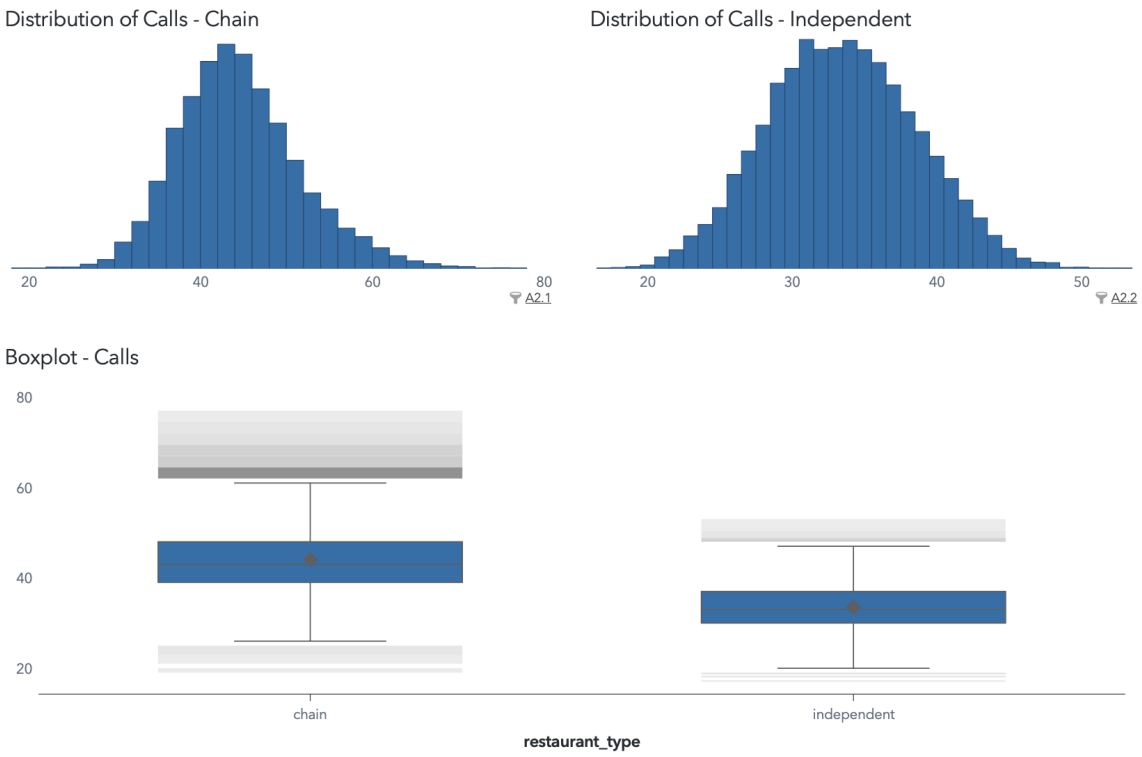


Figure 2 - Calls

The **reservation** data followed a similar trend, with chain restaurants experiencing a wider spread and independents remaining more clustered. Despite the lower spread, independents showed a modest uptick in median reservations under the alternative ad design. The distribution was more right-skewed compared to pageviews and calls, with most restaurants receiving lower engagement potentially because of the fact that some customers may go to the restaurant without making reservations after initial engagement on the BR platform.

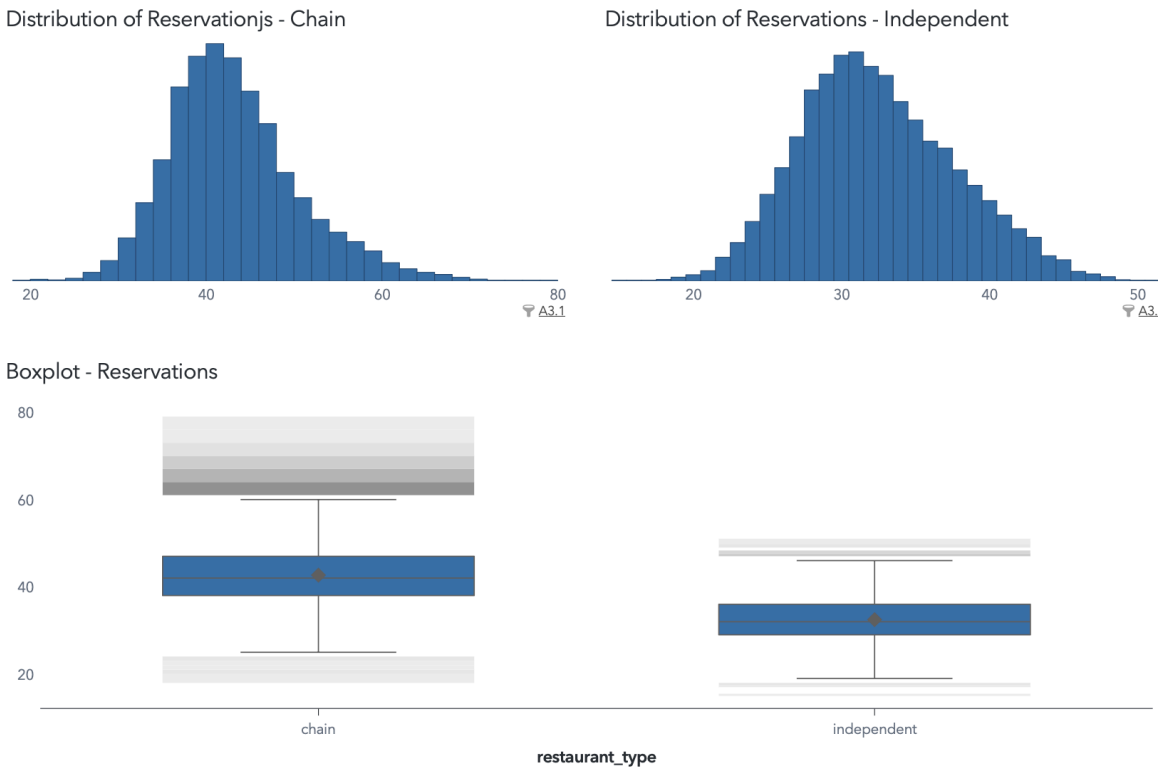


Figure 3 - Reservations

A clear positive correlation is visible among the KPIs — restaurants with more pageviews tend to also receive more calls and reservations. Independent restaurants appear to have a wider spread, potentially indicating more variation in engagement.

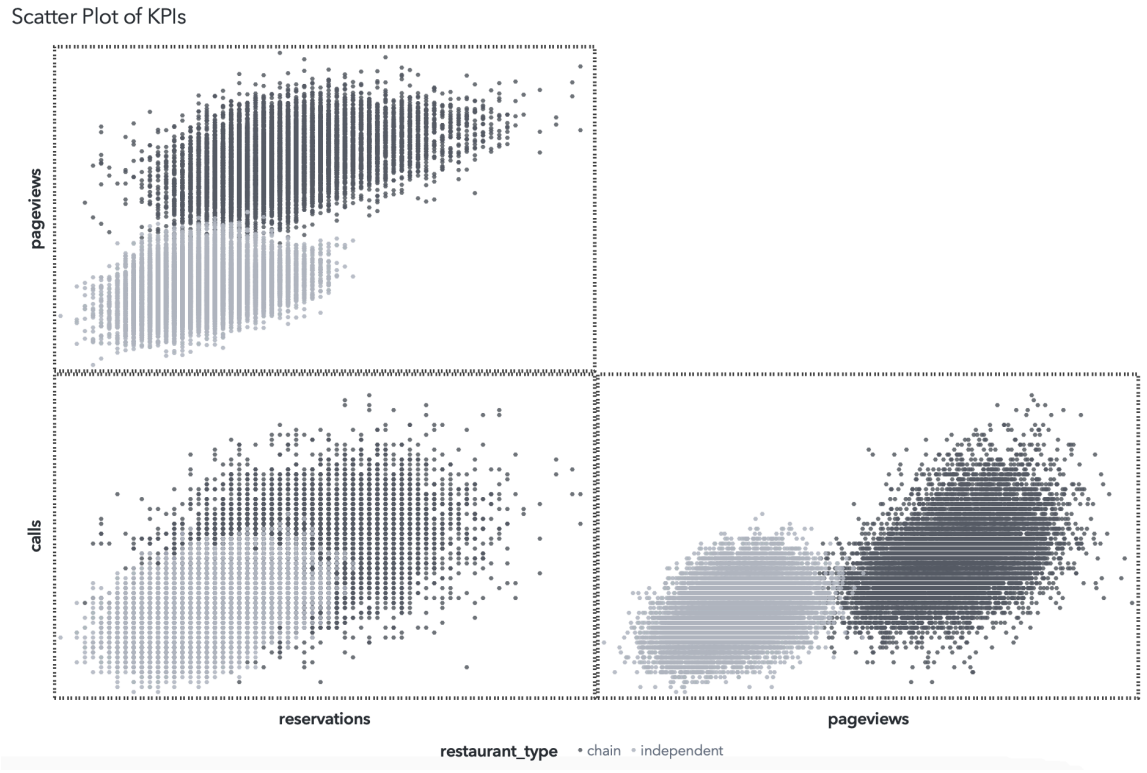


Figure 4 - Scatter Plot of KPIs

Treatment-Based Boxplots: The boxplots for each KPI across control, current Ad, and alternative Ad highlight several key insights. While **pageviews** peak under the current ad condition, suggesting that the original design may attract more initial attention, median values for **calls** and **reservations** are highest under the alternative ad treatment, indicating a practical advantage in prompting more solid user action.

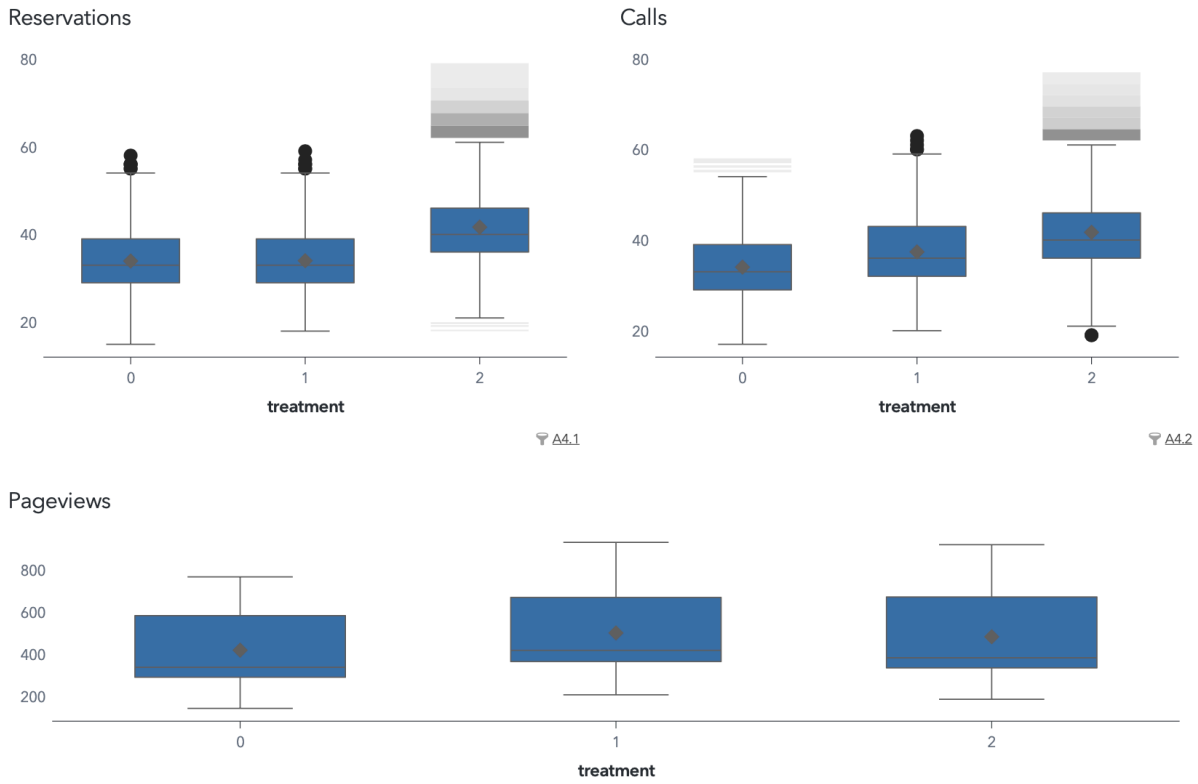


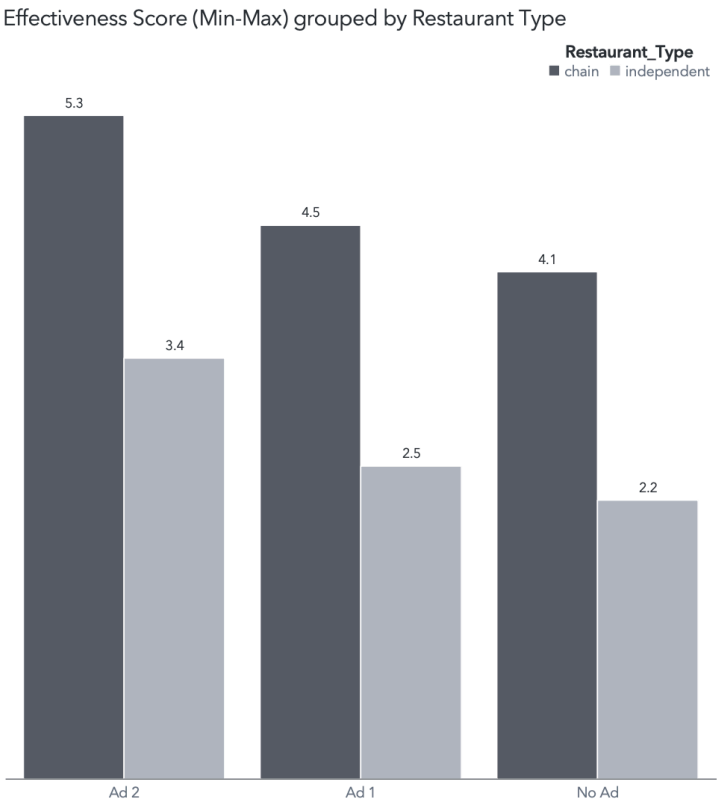
Figure 5 - Treatment-Based Boxplot

To integrate all three KPIs into a more comprehensive assessment system, a weighted score is calculated for each observation, using the weight of 1:4:5 for pageviews, calls and reservations respectively. As the magnitudes of three KPIs vary significantly, the values were normalised using the Min-Max normalisation method prior to calculating the final weighted score. The results strongly favour the **alternative ad (Ad 2)** across both **chain** and **independent** restaurants.

For **chain restaurants**, Ad 2 achieved the highest average effectiveness score (5.34), outperforming both the current ad (Ad 1: 4.45) and the control (No Ad: 4.08). Similarly, **independent restaurants** saw the greatest uplift under Ad 2 (3.39), compared to Ad 1 (2.52) and No Ad (2.24).

While the **current ad outperforms no ad** for both restaurant types, the difference is **incremental**. The effectiveness score gaps (0.37 for chains, 0.28 for independents)

suggest that although current ads do something, they **fall short of delivering strong engagement or conversion outcomes**.



Restaurant_Type	treatment	Effectiveness Score(Min-Max) ▲
independent	0	2.2429
independent	1	2.5166
independent	2	3.3852
chain	0	4.0796
chain	1	4.45325
chain	2	5.3374

Figure 6 - Overall Rating by Treatment and Restaurant Type

Inferential Statistics

To rigorously evaluate the effectiveness of BR's ads, inferential analyses were conducted using a one-way ANOVA and two independent samples t-tests. The statistical significance, effect sizes, and practical implications of these analyses provide a robust foundation for determining whether the alternative ad design should replace the current one.

One-Way ANOVA (All Three Groups)

A one-way ANOVA was conducted to compare the effect of ad treatments (No Ad, Current Ad, Alternative Ad) on three key performance indicators: pageviews, calls, and reservations. The overall F-statistics and p-values indicated statistically significant differences across all three groups for each metric.

Pageviews

Treatment Group	Mean Pageviews
Control (No Ad)	483.21
Current Ad (Treatment 1)	501.19
Alternative Ad (Treatment 2)	483.21

Table 1 - Pageview Means

$F(2, 29997) = 675.93$, $p < .001$

$\eta^2 = 0.043 \rightarrow$ Small effect size

The current ad produced the highest average pageviews, showing that it is effective in increasing visibility. However, the difference between the current and alternative ad is only 18 views, and the overall effect size is small. This suggests that while statistically significant, the difference in initial user attention (as measured by pageviews) may not translate into meaningful business outcomes.

Calls

Treatment Group	Mean Calls
Control (No Ad)	34.02

Current Ad (Treatment 1)	37.39
Alternative Ad (Treatment 2)	41.71

Table 2 - Call Means

$F(2, 29997) = 2779.68$, $p < .001$

$\eta^2 = 0.156 \rightarrow$ Large effect size

Call volumes show clear and meaningful increases across treatment groups. The alternative ad led to the highest average call count, with a sizable improvement of +4.33 over the current ad and +7.69 over the control group. The large η^2 value implies that ad treatment explains 15.6% of the variance in call activity, which is a substantial effect in behavioral data.

Reservations

Treatment Group	Mean Reservations
Control (No Ad)	34.02
Current Ad (Treatment 1)	34.08
Alternative Ad (Treatment 2)	41.68

Table 3 - ReservationsMeans

$F(2, 29997) = 3884.87$, $p < .001$

$\eta^2 = 0.206 \rightarrow$ Very large effect size

Reservations show the strongest and most meaningful treatment effect. While the current ad shows no real improvement over the control (difference of just +0.06), the alternative ad produces a dramatic increase of +7.6 reservations on average. The very large $\eta^2 = 0.206$ indicates that over 20% of the variation in reservation activity is explained by the ad treatment, highlighting the alternative ad's effectiveness in driving conversions.

T-Test 1: Control vs Current Ad

Metric	Mean Diff.	p-value	Cohen's d
Pageviews	+81.41	< .001	0.514

Calls	+3.37	< .001	0.491
Reservations	+0.06	0.511	0.009

Table 4 - T-Test 1 Results

The current ad significantly improves visibility (pageviews) and engagement (calls) compared to no ad at all. However, the lack of any meaningful difference in reservations (p = 0.511) implies that visibility alone isn't enough to drive conversions.

T-Test 2: Current Ad vs Alternative Ad

Metric	Mean Diff.	p-value	Cohen's d
Pageviews	-17.98	< .001	0.106
Calls	+4.33	< .001	0.566
Reservations	+7.66	< .001	1.039

Table 5 - T-Test 2 Results

The alternative ad significantly outperforms the current ad on both calls and reservations. Although it results in slightly fewer pageviews, the practical impact is minimal. What stands out is the very large effect on reservations (Cohen's d = 1.039), indicating a powerful and meaningful uplift in user action.

Summary of Key Statistical Implications

Metric	Most Effective Treatment	Key Statistic	Practical Implication
Pageviews	Current Ad	d = 0.514 vs Control	Improves visibility
Calls	Alternative Ad	d = 0.566 vs Current	Drives stronger engagement
Reservations	Alternative Ad	d = 1.039 vs Current	Strongest driver of high-value actions

Table 6 - Key Statistics and Implications

The inferential analysis provides a clear and data-backed conclusion:

- The current ad is an improvement over no ad, but only for initial engagement metrics like pageviews and calls.

- The alternative ad consistently delivers stronger performance, especially in calls and reservations.
- The small decline in pageviews under the alternative ad is statistically significant but practically irrelevant when weighed against the substantial gains in conversions.
- These findings directly support the recommendation that BrownlowReviews should adopt the alternative ad design as the new standard.

Additional Data Collection Recommendations

The current experiment provides valuable insights into ad effectiveness at the restaurant level. However, to better understand how users interact with ads across their journey on BR, further data collection is essential. Since users can engage with restaurants in different ways - visiting a profile, calling, or making a reservation - capturing more granular data would allow for a deeper understanding of ad impact across varying touchpoints.

One key improvement would be to collect user-level engagement data, such as bounce rate, time spent on a restaurant page, and whether a user revisits a restaurant later. This would enable analysis of behavioural patterns beyond one-time actions. Additionally, incorporating Click-Through Rates (CTR) and conversion pathways would help distinguish between mere ad visibility and meaningful user engagement.

BR would also benefit from data on user demographics and device types, which could guide more personalised ad targeting and layout optimisation. Finally, tracking costs and estimating return on investment (ROI) per ad treatment would provide critical business metrics to support long-term ad strategy. Layering these insights with A/B testing of specific ad elements - like images or highlighted dishes - would empower BR to refine its ad offerings iteratively and with precision.

Conclusion

The analysis confirms that BR's advertising strategy meaningfully impacts restaurant visibility and user engagement—but not all ad designs are equally effective. While the current ad format improves pageviews and call rates compared to no ads, it does not significantly increase reservations, which are most directly tied to business outcomes.

In contrast, the alternative ad design produces significantly better results, especially in high-impact actions like calls and reservations, with large effect sizes and meaningful differences across both chain and independent restaurants. Despite a small drop in pageviews, the alternative design clearly delivers higher value based on the sample data.

These findings strongly support the adoption of the alternative ad as BR’s new default. It aligns better with strategic goals, encourages deeper engagement, and significantly boosts conversions.

To further enhance BR's ability to optimise its advertising strategy, future experiments should incorporate user-level engagement data and conversion pathways, allowing for a more nuanced understanding of how ads influence different types of user behaviour. With deeper data and iterative testing, BR can refine ad performance with even greater accuracy and maximise value for both users and restaurant partners.