



MEASURING CAMPAIGN EFFECTIVENESS: A PRE AND POST ANALYSIS STUDY OF TEST AND CONTROL GROUPS

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ABSTRACT

Assessing the success of marketing efforts is vital, for improving tactics and achieving results. This research delves into utilizing pre/post analysis with test and control groups as a technique for gauging the impact of campaigns. Regions where campaigns were conducted are divided into test and control groups for comparison purposes. Prior to the campaign launch data is gathered from both groups to establish a baseline. After the campaign concludes, the same metrics are used to evaluate any shifts, in behavior or outcomes that can be attributed to the campaign. When examining the differences, in outcomes between the test and control groups using this approach helps account for influences and enables an accurate assessment of the campaigns impact itself. Various statistical methods like analyzing changes, in percentages or comparing differences over time are used to verify and confirm the findings credibility. This paper demonstrates how this methodology was applied on a real tie case where radio ads were aired and what was the benefit out of that.

Keywords: Campaign Effectiveness, Pre-and-Post Analysis, Test-and-Control Groups, Marketing ROI, Data Science, Business Analytics, analyzing campaign, success of a campaign

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INTRODUCTION

Measuring the effectiveness of marketing campaigns is crucial for organizations seeking to optimize their strategies and maximize return on investment. One of the most reliable methods for assessing campaign impact is the use of pre/post analysis with test and control groups. This approach allows researchers to find significant differences on key metric between test and control groups. By implementing a test group that is exposed to the campaign and a control group that remains unexposed, researchers can gather baseline data prior to the campaign's launch and then compare it with post-campaign data. This comparative analysis not only helps in identifying the direct effects of the campaign but also controls for external factors that could influence outcomes, such as market trends or seasonal variations. As businesses face increasingly competitive environments and consumer preferences evolve rapidly, understanding the effectiveness of marketing initiatives through such systematic evaluation becomes essential for strategic planning and sustained growth. Pre/Post analysis helps to explore the impact of the campaign and can get it verified with the deeper exploration of how test and control groups behaved due to the marketing incidence applied to them

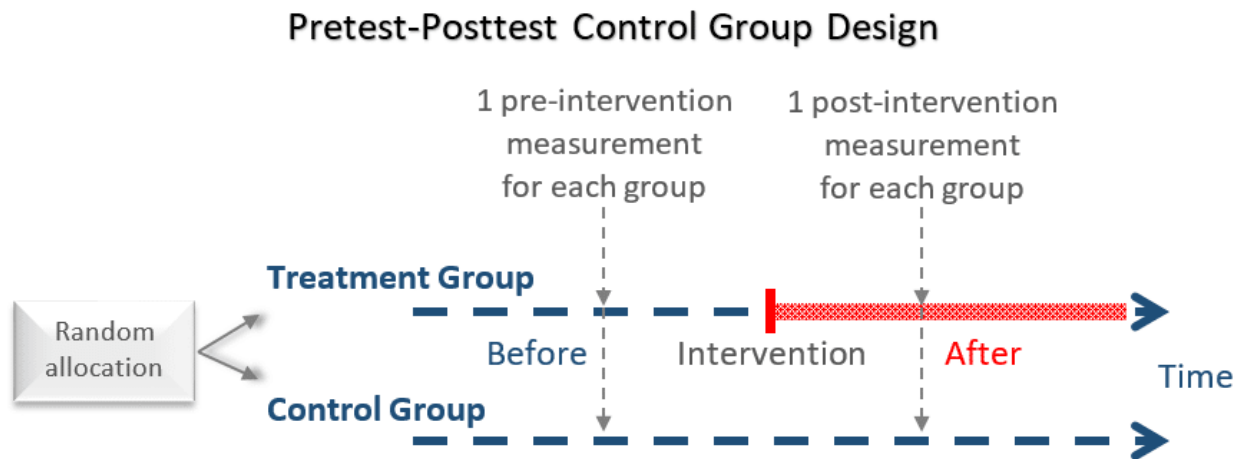


Figure 1 Approach for Pre/Post analysis with test/control group

PROBLEM STATEMENT

In today's competitive marketplace, businesses are under constant pressure to demonstrate the effectiveness of their marketing campaigns and justify their expenditures. However, many organizations struggle with accurately measuring the impact of their campaigns due to a lack of robust evaluation methods. Traditional metrics, such as sales figures or website traffic, often fail to isolate the effects of specific marketing activities from other influencing factors, leading to inconclusive results. This ambiguity can hinder decision-making, as companies may continue investing in ineffective strategies or fail to capitalize on successful initiatives. Moreover, without a clear understanding of what drives consumer behavior, businesses risk misaligning their marketing efforts with customer needs and preferences

SOLUTION

Pre-and-Post Analysis

Analyzing data before and after a campaign is crucial, in data science to evaluate the impact of campaigns by measuring changes in performance indicators (such as sales or engagement). This process starts by gathering baseline data that includes metrics like sales figures and engagement levels prior, to launching the campaign. Sometimes after a marketing campaign concludes there is a "cooling period " followed by the post campaign period, we can keep that period to settle down the impacts of the treatment, although the pre and post periods are meant to be of equal duration time wise. After the campaign ends, these metrics are reevaluated to detect any changes. To strengthen the reliability of this analysis test and control groups are frequently employed. The test group is subjected to the campaign while the control group remains untouched to serve as a comparison point. This configuration assists, in managing factors and isolating the influence of the campaign effectively Using methods like comparing percentage variances helps maintain the accuracy of outcomes and address any potential influencing elements by utilizing these approaches data analysts can offer precise and practical observations, about the campaigns impact leading strategic choices and enhancing upcoming marketing endeavors

Uses

1. **Impact Assessment:** Pre/post analysis helps quantify the direct impact of a campaign on key performance indicators such as sales, engagement, and conversion rates.
2. **Strategic Optimization:** Insights gained from pre/post analysis inform strategic decisions, enabling data-driven adjustments to future campaigns for improved effectiveness.
3. **Hypothesis Testing:** It serves as a framework for testing hypotheses about campaign strategies, validating assumptions with empirical data.
4. **Baseline Establishment:** By collecting data before the campaign, it establishes a baseline for comparison, allowing for a clearer understanding of changes attributable to the campaign.
5. **Control for External Factors:** When combined with test and control groups, it helps isolate the campaign's effects from other external influences, ensuring more accurate results.
6. **Long terms impact Analysis:** This method allows for the assessment of long-term effects of a campaign also, providing insights into sustained impacts on audience behavior.
7. **Resource Allocation:** By understanding which elements of a campaign drive the most impact, organizations can better allocate resources and budget towards high-performing strategies.
8. **Customer Insights:** Analyzing pre/post data can reveal shifts in customer preferences and behaviors, offering deeper insights into audience dynamics.
9. **Performance Benchmarking:** It provides a benchmark for evaluating the relative success of different campaigns, facilitating performance comparisons over time.
10. **Risk Mitigation:** By understanding potential negative impacts early, organizations can mitigate risks associated with campaign strategies.

Impact

Analyzing the effectiveness of a campaign through pre analysis and post analysis is essential, for making decisions based on data insights. Pre analysis includes establishing goals and defining performance indicators (KPIs) as well as setting a baseline to comprehend the starting conditions before launching the campaign. This process aids in developing a comparison framework to ensure that the metrics align, with the objectives of the campaign. Throughout the campaign duration data is monitored to enable adjustments when necessary. After the evaluation phase is complete the focus shifts, to assessing how the campaign performed based on the specified performance indicators (KPIs). This process includes examining patterns in consumer behavior and determining the return on investment (ROI). By comparing data from before and, after the campaign companies can pinpoint strategies identify target audiences that responded well and highlight areas that require enhancement. This thorough method not confirms the success of the campaign. Also offers useful insights, for improving upcoming marketing plans which can result in making better decisions and allocating resources more effectively in the future.

Scope

Pre- and post-analysis for measuring campaign effectiveness can be applied across multiple industries, including:

1. **Retail:** To assess the impact of promotions or new product launches on sales and customer engagement.
2. **Healthcare:** For evaluating the success of public health campaigns or new treatment protocols.
3. **Finance:** To measure the effectiveness of marketing campaigns for new financial products or services.
4. **Telecommunications:** For analyzing customer response to new plans or service offerings.
5. **Entertainment:** To gauge the impact of promotional campaigns for movies, shows, or events.
6. **Automotive:** For assessing the success of advertising campaigns on car sales and brand perception.
7. **Technology:** To evaluate the effectiveness of product launch campaigns and user acquisition strategies.
8. **Travel and Hospitality:** For measuring the impact of seasonal promotions or loyalty programs on bookings and customer retention.
9. **Education:** To assess the effectiveness of campaigns aimed at increasing enrollment or engagement in courses.
10. **Non-profit:** For evaluating the success of awareness campaigns or fundraising initiatives.

ANALYSIS OF REAL TIME CASE STUDY

Case study was done to find effectiveness of the radio campaigns, it was a niche area on the radio campaign was established to increase awareness of business services and also to increase sales. Objective was to find the revenue benefit from the campaign, was there any increase in client customer base or total revenue increase in test regions compared to control

Solution approach was based upon the supplied data, which consisted of aggregated monthly sales data by customer and included their location, industry information, and sales totals per LOB(line of business). Pre-campaign and a post-campaign time period was designed and was looked across four geographic regions Charlotte, New Orleans, Pittsburgh and Nashville. We mainly had three line of business construction, food and hotel industry and Pre / post analysis was performed on all three LOB independently. We also find that Nashville can be our ideal control group that has all similar characteristics in terms of population, income, buying power like other three cities and the radio campaign was not aired in this location,

Findings Related to Construction Industry:

The aggregated sales in the post campaign period is observed to be slightly lesser than that in the pre campaign period. This could be due to the "Christmas vacation" and the month February having fewer days than the other months considered.

The percentage decrease in sales among Charlotte and New Orleans is lesser than that in Nashville. This can be attributed to the radio campaign

City	CHARLOTTE	NASHVILLE	NEW ORLEANS	PITTSBURGH
Pre Sales	263,296	207,283	257,999	618,169
Post Sales	250,540	195,059	258,472	568,436
%increase	-4.8	-5.9	0.2	-8.0

Figure 2 Construction industry: Pre vs Post sales comparison

Findings related to Food industry:

Following is the aggregated sales pre campaign and post campaign by different regions:

It is evident that the campaign has had a positive impact on the Food industry for all the regions that were exposed to the campaign. The percentage increase in sales post campaign is as shown in the table above. The following table shows the performance of these regions when compared to the control group.

City	% more than Control
CHARLOTTE	5.4%
NEW ORLEANS	9.2%
PITTSBURGH	7.8%

Figure 3 Percentage increase compared to control group

City	CHARLOTTE	NASHVILLE	NEW ORLEANS	PITTSBURGH
Pre Sales	413,848	379,842	539,968	491,891
Post Sales	411,311	356,952	557,311	500,729
%increase	-0.6	-6.0	3.2	1.8

Figure 4 Food industry: Pre vs Post sales comparison

Findings related to Hotel industry:

Although our previous analysis showed that Nashville is not a good control group for the Hotel industry, we have analyzed the performance of the test groups against Nashville which is our control group:

City	CHARLOTTE	NASHVILLE	NEW ORLEANS	PITTSBURGH
Pre Sales	68,308	52,658	112,255	122,964
Post Sales	58,377	64,839	142,007	130,776
%increase	-14.5	23.1	26.5	6.4

Figure 5 Hotel industry pre and post sales comparison

If Nashville were a true control group for all the above regions, then campaign had negative effect on Charlotte and Pittsburgh and a slightly positive effect on New Orleans

The Following graph shows the Percentage increase in sales for the test regions by different industries and compares it with Nashville which is our control group.

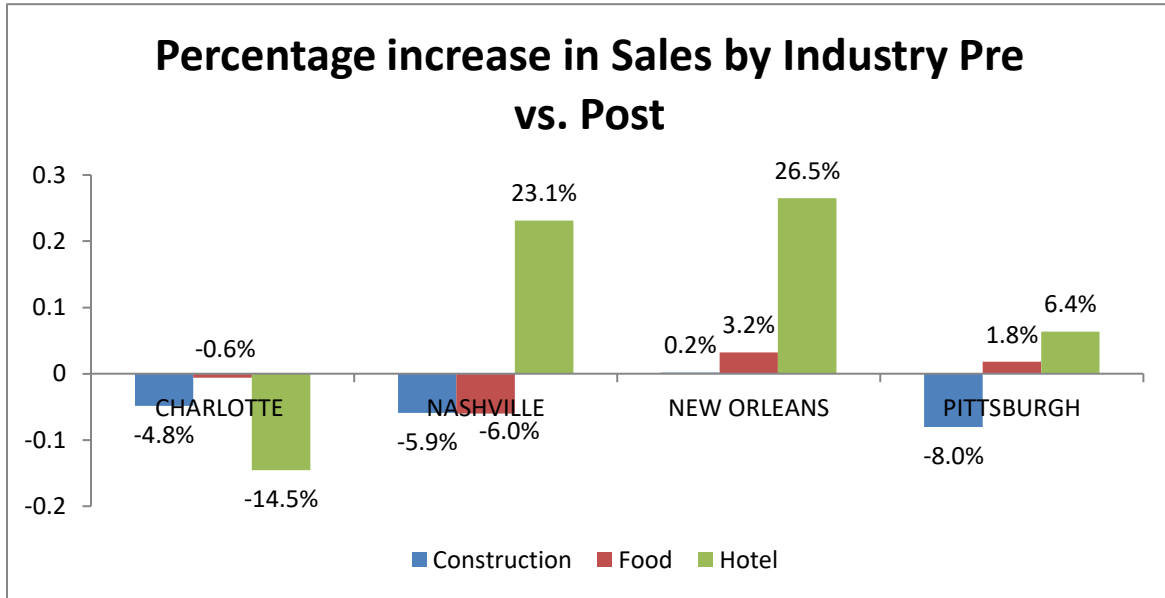


Figure 6 Percentage Increase comparison for test vs control regions

2 Year over year growth

To consolidate our findings from the pre-post analysis (section 4.2), we carried out a year over year analysis. Considering that the test groups and Nashville were exposed to the same marketing strategy for same time period except for the radio campaign, we can analyze the increase in sales post the campaign against the sales

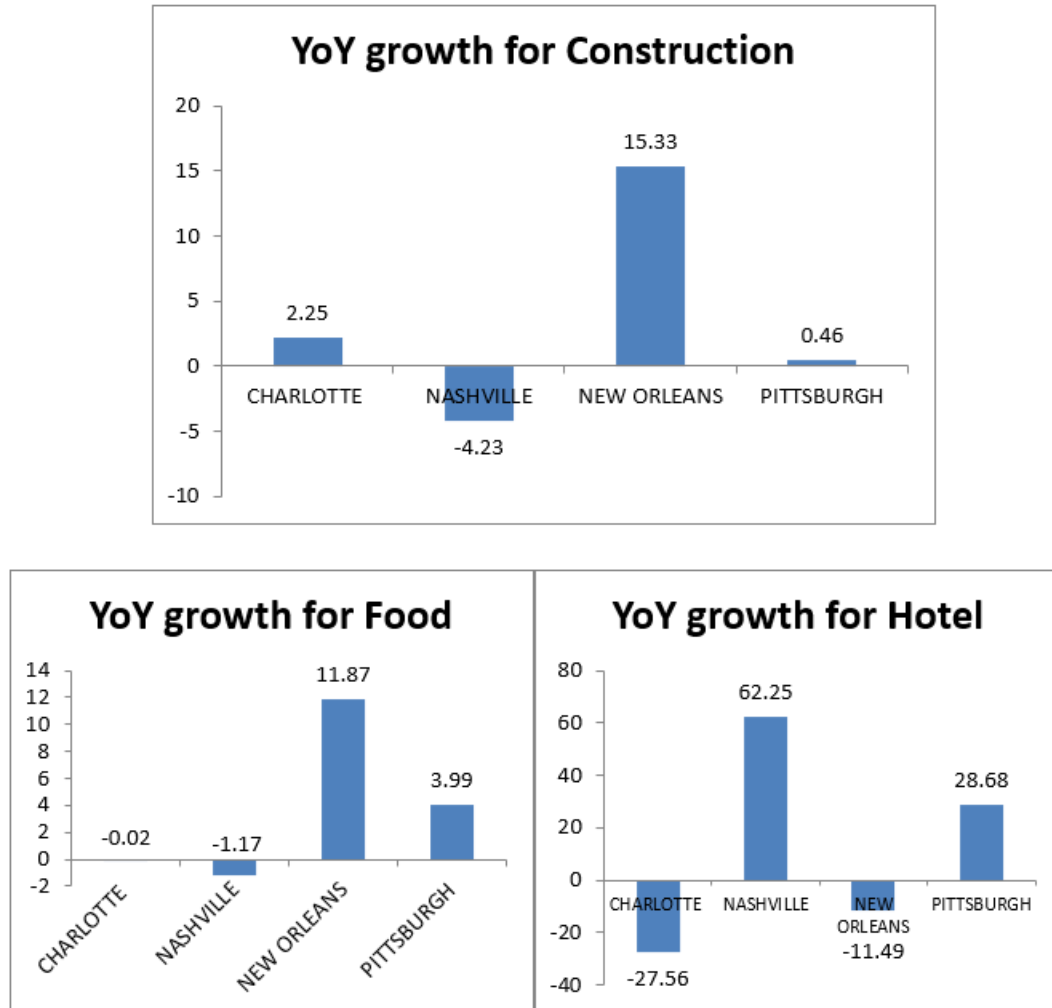


Figure 7 YoY growth comparison for different industries

As we can see, for Construction and Food industries, there has been a positive impact on sales in all the test groups. This is a sign that the campaign was effective. High magnitude of variance in the Hotel industry strengthens our hypothesis that Nashville isn't a good control group for the Hotel industry. However, New Orleans seems to have had the most positive effect among all regions for Food and Construction industries. This is in sync with the results shown for Pre-Post analysis in the previous section

Benefit occurred across revenue increase due to profitability as sales came out higher or less decrease in test group compared to control group and there were increase in customer base by 7%

CONCLUSION

Assessing campaign effectiveness is essential for modern businesses aiming to thrive in a competitive environment. By employing pre-and-post analysis alongside test-and-control groups, companies can obtain a clearer picture of their campaign impacts. These methodologies provide a foundation for data-driven decision-making, ultimately leading to enhanced business performance.

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