

Executive Summary

This analysis examined the effectiveness of Rocket Fuel's pilot ad campaign, and subsequently presented evidences of a positive Return-On-Investment by measuring the incremental lift on Conversion Rate. The analysis further draws attention to the fact that, the online purchase behaviors among 588,101 targeted users are significantly impacted by variables, including the number of ads displayed, days of the week, and times of the day, providing a clear means for TaskaBella to ensure an effective reallocation of Ad budget for future campaign implications. It is recommended that TaskaBella's future ad deliveries should focus on keeping total impressions per unique users in an area between 120 to 220 impressions, with a timeframe propensity between 2 p.m to 5 p.m. and 7 p.m. to 9 p.m through Monday to Wednesday. The report also investigates the fact that the analysis conducted has limitations, such as limited identified variables that impact consumer behaviors. Lastly, the reports provide Rocket Fuel with recommendations for future digital campaign strategies to avoid excessive opportunity costs.

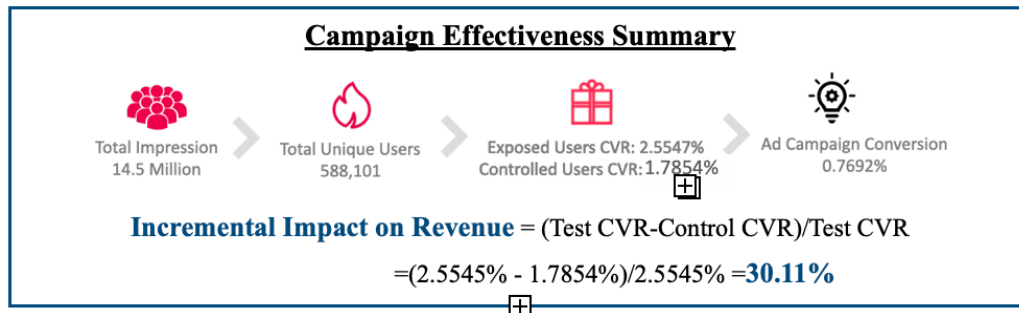
Campaign Background & Methodology

Rocket Fuel Inc., founded in 2008, provides digital advertising services through a focus on utilizing *Big Data* and *Artificial Intelligence* to exploit the potential of real-time bidding(RTB) and ad exchanges. By allowing businesses to take the most appropriate marketing actions with a particular person at a particular moment in time, Rocket Fuel's programmatic media-buying platform successfully determines the likelihood a consumer will engage in the desired action for a greater ***Return of Investment (ROI)***. In September 2015, TaskaBella Inc., a manufacturer of women's luxury accessories, approached Rocket Fuel to run a pilot campaign for a newly released handbag model. With a platform that helps campaigns adapt in a millisecond, TaskaBella expects to optimize advertising performances with deeper visibility on Rocket Fuel's platform effectiveness. Based on TaskaBella's desired objective of targeting half a million online consumers with its new handbag, Rocket Fuel was tasked with precisely reaching the target audiences at scale and driving accountability based on the ***Conversion Rate (CVR)***. Given the marginal revenue of \$100 for each handbag and the costs associated with each unit, a converted user is on average worth \$40. It's crucial for Rocket Fuel to reach sufficiently high levels of CVR, and provide TaskaBella with appropriate marketing insights for future implications. Further, the campaign results would directly impact TaskaBella's reallocation on advertising budget spent on handbags and related accessories lines.

For a manufacturer with a strong social media presence, it's vital for Rocket Fuel to understand the attributed conversions are not resulted by its sizable social media attention. Based on TaskaBella's expectation of achieving sufficiently high conversions with an estimated cost of \$10-\$15 per conversion, Rocket Fuel leveraged a controlled experiment that randomly assigning Internet users to a public service announcement(PSA) or TaskaBella's newly released handbag ad based on cookies that uniquely identify each user visiting a site. Based on the unique user IDs, Rocket Fuel was able to track which user eventually purchased a handbag from TaskaBella, allowing to discern the effectiveness of the campaign.

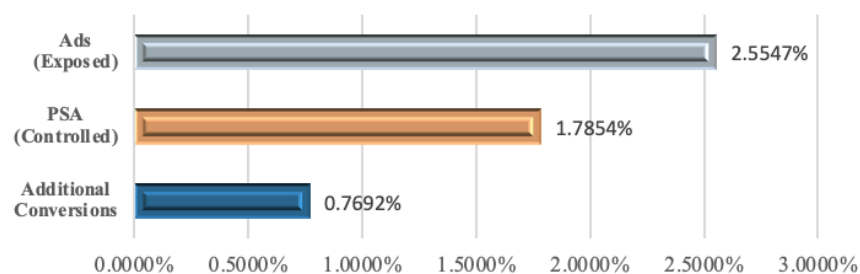
Evaluation on Campaign Effectiveness

Rocket Fuel's digital campaign strategy of establishing a controlled group provide measurable shifts in key brand metrics, where the methodology further allows TaskaBella to put the evaluation data in context. The following section presents a summary of all key campaign benchmarks, which aid the analysis of campaign effectiveness with a focus on consumer purchase consideration.



The 4-month pilot campaign roughly generated **14.5 million** impressions, at an average Cost-Per-Million (CPM) of \$9. Out of the approximately 590,000 unique users identified, **14,423** unique users were successfully converted into TaskaBella's consumers, measured by the purchase behaviors. The data suggests the digital campaign was effective in that evidence of increased purchase behaviors were recorded for those exposed to TaskaBella's handbag ad. As Figure.1 reveals an induced behavioral change among Internet users, an increased percentage change in conversions evaluating the treatment and control groups suggests a **0.7692 %** conversion lift made as a result of seeing the handbag ad. Further, the investment of establishing a 4% controlled group to isolate consumer behavioral measures suggests an incremental impact on revenue of **30.11%**, highlights the overall effectiveness of the campaign. Given TaskaBella's relatively small campaign that involves counted touchpoint, incrementality allows the business to understand how much value Rocket Fuel is adding from a revenue-focused standpoint. Resulted in heavy ad treatment, the positive incrementality returns has eventually increased Rocket Fuel's platform accountability.

Figure.1 Conversion Rate



Evaluation on Campaign Profitability

In the field of marketing, it is now widely recognized that one of the main determinants of a campaign is **Return of Investment (ROI)**. Moreover, establishing a causal link between campaign strategy and tactics based on the specific operational metric allows TaskaBella to assess the strategy's impact on the true value generated for the company. With a target population that TaskaBella had in

mind, Rocket Fuel estimated that at an estimated Cost-Per-Million*CPM) of roughly \$10 would translate to a cost of \$10-\$15 per conversion, and eventually bring an average value of \$40 per converted user. The following summary section provides an overview of the key metrics, including campaign profitability, ROI, the opportunity cost of the controlled group, etc.

Campaign Profitability Summary

$$\text{Campaign Profitability} = \text{Additional Consumer Converts} * \text{Total Number of Exposed Users} * \text{Value of Converted Users} \\ = (2.5545\% - 1.7854\%) * 564,577 * \$40 = \textbf{\$173,719.21}$$

$$\text{Campaign Spends} = \text{Total Impression} / 1000 * \text{Average Cost-Per-Thousand (CPM)} \\ = 14,597,182 / 1000 * \$9 = \textbf{\$131,374.64}$$

$$\text{ROI} = \text{Net Profits} / \text{Campaign Spends} \\ = 42,344.57 / 131,374.64 * 100 = \textbf{32.231\%}$$

$$\text{Control Group Cost} = \text{Total Impression of Controlled User} * \text{CPM} / 1000 \\ = 58,2481 * 9 / 1000 = \textbf{\$5242.33}$$

$$\text{Opportunity Cost} = \text{Additional Consumer Converts} * \text{Number of Users in Control Group} * \text{Value of Converted User} \\ = (2.5545\% - 1.7854\%) * 23,524 * \$40 = \textbf{\$7238.29}$$

Powered by sufficient data and rigorous analytic methodology as reflected in the Summary section, TaskaBella has generated a total profit of **\$173,719.21** from a total of 564,577 exposed users who saw the handbag ad. Campaign spends, another critical benchmark in evaluating the effectiveness of TaskaBella's digital campaign strategy, gives a clear picture of overall brand presence among the half million targeted users. Multiplying the CPM by the total impression consisted of the controlled PSA and the ad treatment group, the results indicate a total spend of **\$131,374.64** for exposing 96% ad treatment and the 4% control group mix.

Although TaskaBella's digital campaign yields a Return-on-Investment (ROI) of **32.231%**, which was notable greater than the Campaign Spends; there was a lost opportunity that would have produced a greater return if invested into the campaign - the 4% control group. As RocketFuel set out to capture consumer behavioral data to provide evidences that demonstrate the fundamental impact of the ad campaign, taking the value of each converted user into consideration, TaskaBella spent **\$5242.33** by assigning 23,524 users exposed to the PSA campaign. Eventually, a conversion rate of **1.7854%** among the controlled users yielded an opportunity cost of **\$7238.29** to show ads indeed affect consumer behaviors, which accounted for **5.44%** of the total Campaign Spends. However, according to Demidenko, the technical account manager at Rocket Fuel, conversion rates in display advertising are typically low compared to other experimental settings requiring a sizable control group to detect life. In addition, the insufficient control group size would dampen a more profound analysis with potentially significant different segments of the population. Hence, the investment in establishing a control group provided unquantifiable insights into the campaign results, which will be beneficial for future marketing endeavors. Regarding to the overall promising ROI, Rocket Fuel's digital campaign was considered to be profitable.

Influence of Number of Impression On Campaign Effectiveness

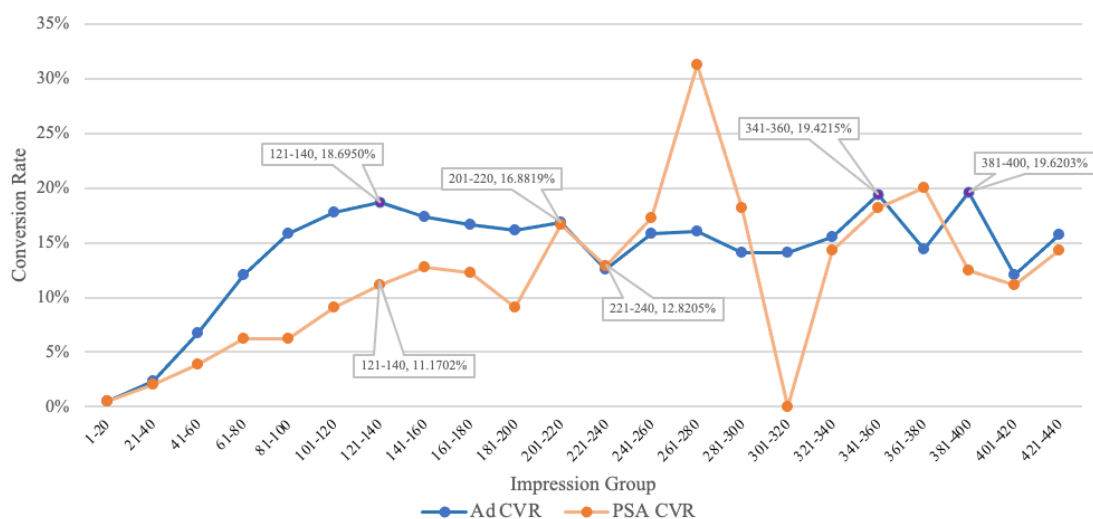
To analyze the impact of the number of impressions on the campaign effectiveness, unique users with specific ranges of impressions have been grouped together, as necessary to obtain a meaningful plot. Starting from 1-20 impressions and going up in 20's until 440 impressions. As Table.2 demonstrated, there are far fewer people who viewed more than 400 impressions, and hence those data points are being eliminated from the analysis. Conversion rate among users in the control group and users who were exposed to the ad serves as the benchmark metric, which is calculated as the number of conversions in the group divided by the number of unique users. Further, Table.2 has demonstrated that, a majority of impressions and conversions occur in the **1-200** impressions intervals for those for both groups.

Table.2 Data Showcase

Impression Group	1-100	101-200	201-300	301-400	401-500
Control Group Conversion	22,514	752	166	48	25
Ad Group Conversion	542,523	16,360	3389	1229	510

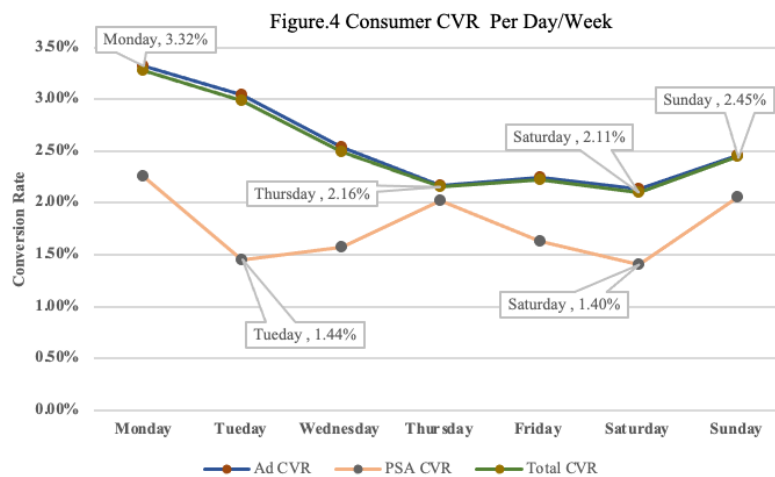
As Figure.3 has shown below, conversion rates increased initially as the number of impressions people are exposed to. However, it seems to reach a turning point at about **121-140** impressions, where the overall conversion rate seems to diminish to a very minimal percentage after **201-220** impressions. From there on out, it seems that the more number of impressions there were, the less likely people would be converted. Moreover, large numbers of impressions reflected a fluctuated conversion rate, which is hard to capture a trend line among each data point. For the design of future campaign, TaskaBella's ad deliveries should focus on keeping total impressions per unique users in an area below 220 impressions, depending on the ad budgets.

Figure.3 Conversion Rate Per Impression Group

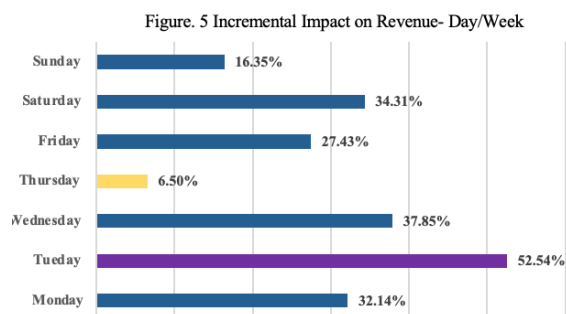


Influence of Day/Week On Consumer Behavior

In the retailing field, it has long acknowledged that consumers act differently around the presence of certain days of the week. Forecasting purchase patterns is useful for TaskaBella in order to identify the most profitable and loyal customers; and serve each one according to their purchase preferences. Analyzing TaskaBella's purchase behavior by 599,101 unique users per day over a 4-month pilot campaign period, this study finds evidence of a day of the week effect in consumer behavior. As Figure.4 has demonstrated in below, consumer response to TaskaBella's ad seems most encourage early in the weekdays, then fades off later on until increasing again slightly on Sunday. It's clearly shown that the most effective advertising day is **Monday**, with the highest total CVR of **3.28%**; while the least effective day is **Saturday**, with the lowest total CVR of **2.11%**. The significant difference provides a clear mean for TaskaBella to ensure effective marketing strategies to incentive expected consumer behavior.



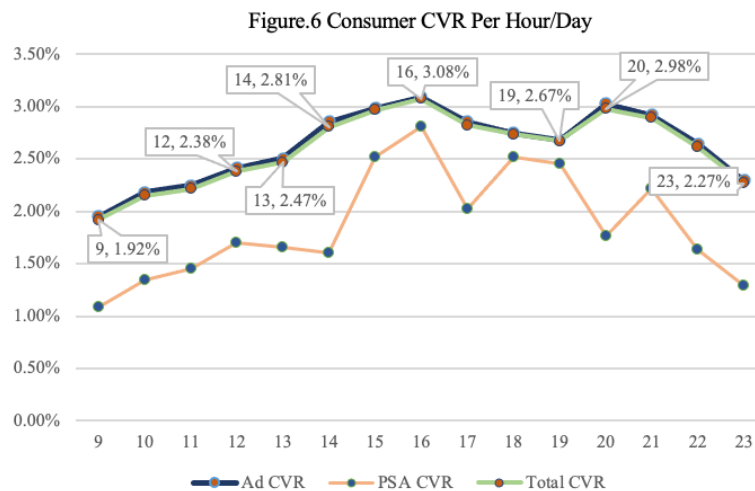
To further prove the insights, incrementality is measured to provide evidences of the native demands gained that would not have occurred without the campaign efforts. The difference between the native demand as the PSA controlled group has shown and the ad-driven sales represent an incremental impact on revenue, which is attributed to Rocket Fuel's campaign effort. In Figure.5, the incremental impact on revenue among each day is considered as one vital determination to measure the campaign effectiveness. With limited budget, it's essential to for TaskaBella determine which specific day the handbag campaign generated the most incremental lift. The visualization has complemented the previous claim, that advertising seems to be more effective at the start of the week. Further, it



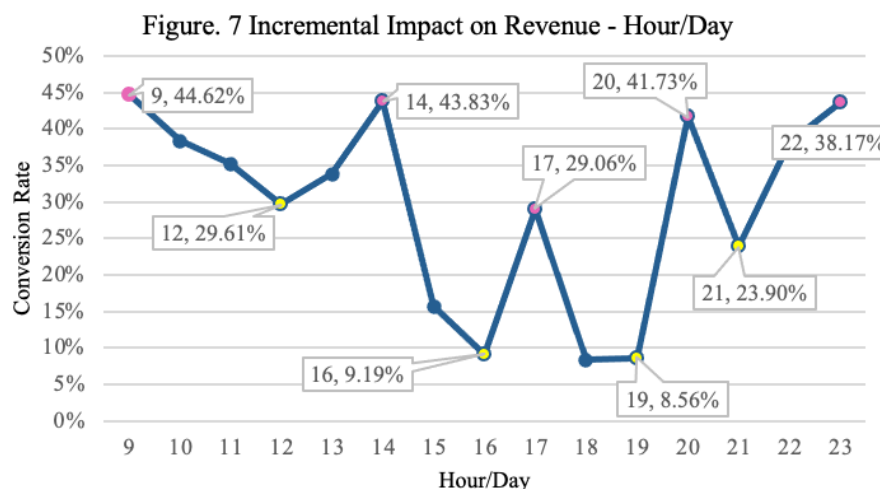
suggested that the campaign realized the most conversions lift on **Tuesdays**, while being the least effective on **Thursdays**, with the lowest incremental lift. As a primary focus of TaskaBella is about achieving sufficiently high conversion rates, the most efficient strategy on allocating advertising dollars is to distributed targeted ad with a focus through **Mondays to Tuesdays**, while investing the least on **Thursdays and Saturdays**.

Influence of Time/Day On Consumer Behavior

Consumers tend to have their various circadian rhythms, which can heavily affect advertising consumption and purchase behavior. Based on analysis on CVR across different time segments during a day, the significance of time on the consumer decision-making process has been revealed. The analysis below eliminates the period between midnight and 8 a.m.; to provide a clear visualization of consumer behavior. As Figure.6 has shown in below, TaskaBella's campaign is more effective from *mid-afternoon to the evening (14:00- 22:00)*. Within this particular timeframe, the total conversion rate in each subgroup is consistently above **2.5%**, and is at its maximum at **16:00** where shows a **3.08%** total conversion rate. Unsurprisingly, the advertising seems least effective in the early morning hours, reaching a trough at 9:00 where the conversion rate stands at 1.92%.



To ensure no biases are introduced, it is crucial for Rocket Fuel to deep-dive in the dataset with a clean framework, where the treatment and control sets of unique users are comparable. As Figure.7 has demonstrated the hourly incremental impact on revenue for launching a digital campaign. After comparing the incremental lift rate for the test group after exposure to the digital ad, TaskaBella received the most incremental lift at **43.83% and 41.73% at 2 p.m. and 8 p.m.** respectively, as a direct result of running the ad campaign. Even though the data point of 9 a.m. also reflected a powerful incremental lift; taking the low conversion rate for both the test and controlled group into consideration, the result is eliminated from further analysis. Building on the analysis results, TaskaBella is recommended to distribute advertisement with a focused timeframe between **2 p.m to 5 p.m. and 7 p.m. to 9 p.m.** where consumers feel more stimulated to external factors.



Recommendation on Future Campaign Strategy

Through an in-depth examination on the percentage of conversions that were received as a direct result of TaskaBella's advertising campaign, Rocket Fuel's strategy, which resulted in an incremental lift rate of 30.11%, is regarded as both effective and profitable. From this information, TaskaBella received 30.11% more conversions as a direct result of running the ad campaign. Had they not run this ad campaign, the conversion rate would be decreased by 30.11%. Deep-diving into variables, including impressions, days of the week, and times of the day; ***TaskaBella's future ad deliveries should focus on keeping total impressions per unique users in an area between 120 to 220 impressions, with a timeframe propensity between 2 p.m to 5 p.m. and 7 p.m. to 9 p.m through Monday to Wednesday.***

Area of Limitation

By analyzing the fundamentals of consumer behaviors, Rocket Fuel is able to provide TaskaBella with a more effective advertising service for future implication. However, there may be other variables and extraneous noises that may have deeply influenced consumer decision-making that this particular dataset may not tell, such as the framing of campaign message, consumer demographics, Website design, etc. Hence, delivering A/B testing of comparing two versions of marketing asset based on changing only one element, such as the framing of campaign message or targeted user profiles, will permit the possibility of overspending on establishing controlled group.

Supporting Data

<https://drive.google.com/file/d/1MMLGCin-4cwtih3bNMNWw3nFJEOtODtu/view?usp=sharing>