Marketing Analytics Internship Project

ThredUP

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Data Description

- **Date**: the date when the advertising data was collected.
- **Channel**: the advertising channel where the ad was shown.
- **Total Spend**: the total amount spent on advertising for the given date and channel.
- **Acquisition Spend**: the portion of the total spend allocated for customer acquisition.
- **Total Sessions**: the number of website sessions (i.e., visits) during the given date and channel.
- **Acquisition Sessions**: the number of website sessions driven by customer acquisition (i.e., as a result of the ad).
- **1d Gross Rev**: the revenue generated within one day of the website session driven by the ad.
- **1d Orders**: the number of orders placed within one day of the website session driven by the ad.
- **1d Count of Items**: the total number of items purchased within one day of the website session driven by the ad.
- **1d discount $**: the total discount amount applied to orders placed within one day of the website session driven by the ad.
- **1d buyers**: the number of unique customers who purchased within one day of the website session driven by the ad.
- **7d Gross Rev**: the revenue generated within seven days of the website session driven by the ad.
- **7d Orders**: the number of orders placed within seven days of the website session driven by the ad.
- **7d Count of Items**: the total number of items purchased within seven days of the website session driven by the ad.
- **7d discount $**: the total discount amount applied to orders placed within seven days of the website session driven by the ad.
- **7d buyers**: the number of unique customers who purchased within seven days of the website session driven by the ad.
- **30d Gross Rev**: the gross revenue generated within 30 days of the website session driven by the ad.
- **30d Orders**: the number of orders placed within 30 days of the website session driven by the ad.
- **30d Count of Items**: the total number of items purchased within 30 days of the website session driven by the ad.
- **30d discount $**: the total discount amount applied to orders placed within 30 days of the website session driven by the ad.
- **30d buyers**: the number of unique customers who purchased within 30 days of the website session driven by the ad.

EDA

- The first step is printing the dataset's structure using the str() function and then summarizing it using the summary() function.
- The next step involves renaming the columns of the dataset using the rename_at() function and specifying the new names in a vector called new_names.
- The third step is removing all the dollar signs from the dataset using the gsub() function and a regular expression that matches the dollar sign.
- The fourth step involves removing duplicate rows using the unique() function and then removing any rows with missing values using the na.omit() function.
- Finally, the last step uses the mutate_all() function to remove any commas from the dataset, again using the gsub() function and a regular expression that matches commas.

ROAS

- Three metrics are calculated to evaluate the marketing campaign's effectiveness over three different periods, namely, 1D, 7D, and 30D.
- The Return on Advertising Spend (ROAS) for each period is calculated by dividing the gross revenue generated by the amount spent on acquisition. Then, the average ROAS is calculated for each period.
- Based on the calculations, the ROAS for 1D is 45%, the ROAS for 7D is 78%, and the ROAS for 30D is 118%. These metrics indicate how effectively the marketing campaign has generated revenue compared to the amount spent on the acquisition

	Channel	roas_1d	roas_7d	roas_30d
	<chr>	<dbl>	<dbl>	<dbl>
1	Bing Branded Search	165.	251.	398.
2	Connexity	10.5	18.3	23.7
3	Criteo	5.38	12.4	15.6
4	Facebook	12.2	19.8	33.6
5	Google Branded Search	406.	714.	1083.
6	Google PLA	40.3	55.1	73.2
7	Google Search	34.9	53.1	75.5
8	Influencer	8.06	20.0	Inf
9	Organic	47461.	82049.	124509.
10	Other	9.70	14.6	22.4
11	Tiktok	30.8	40.9	40.9

- Bing Branded Search: Exceeded ROAS goals for all time frames.

- Connexity: Did not meet ROAS goals for all time frames.
- Criteo: Exceeded ROAS goals for all time frames.
- Facebook: Exceeded ROAS goals for all time frames.
- Google Branded Search: Exceeded ROAS goals for all time frames.
- Google PLA: Exceeded ROAS goals for all time frames.
- Google Search: Exceeded ROAS goals for all time frames.
- Influencer: Exceeded ROAS goals for all time frames. (I got inf value for the 30D)
- Organic: Exceeded ROAS goals for all time frames.
- Other: Did not meet ROAS goals for all time frames.
- Tiktok: Exceeded ROAS goals for all time frames.

Other Metrics

Other metrics were calculated for each channel in a marketing campaign, including CR (conversion rate), CPV (cost per visit), CAC (cost per acquisition), GRND (gross revenue net of discounts), CPA (cost per acquisition), and CPS (cost per session). The various metrics are calculated using mathematical formulas, such as dividing the acquisition spend by the acquisition sessions to get the CPA or dividing the total spend by the total sessions to get the CPS.

Finally, aggregated the mean values of each metric by channel, excluding NaN values, and combined them into a single dataframe called "mean_by_channel". The results are printed to the console, showing each metric's mean values for each campaign channel.

	Channel	CR	CPV	CAC	GRND	CPA	CPS
1	Bing Branded Search	1.969765	0.3763518686	0.3765138324	222.666667	37.65138324	37.63518686
2	Connexity	1.811187	0.4913160303	0.5022457818	82.566667	50.22457818	49.13160303
3	Criteo	4.590414	1.0384205776	1.0385143763	8.766667	103.85143763	103.84205776
4	Facebook	1.536146	0.6996145302	0.8905105907	991.233333	89.05105907	69.96145302
5	Google Branded Search	1.216079	0.1667255810	0.1667474569	1799.133333	16.67474569	16.67255810
6	Google PLA	2.767439	0.6316045473	0.6442632665	3996.200000	64.42632665	63.16045473
7	Google Search	1.323031	0.7926669920	0.8078280253	1265.900000	80.78280253	79.26669920
8	Influencer	1.449853	2.3537922742	2.4302459109	445.766667	243.02459109	235.37922742
9	Organic	1.410224	0.0004298501	0.0006135602	4719.900000	0.06135602	0.04298501
10	Other	1.374057	1.7747382957	1.7747322088	338.033333	177.47322088	177.47382957
11	Tiktok	3.369285	0.1804931982	0.1862138112	278.900000	18.62138112	18.04931982

Insights (ROAS)

- The ROAS calculations for 1D, 7D, and 30D exceeded the company's set goals of 37%, 60%, and 86%, respectively, for overall performance. The ROAS achieved for 1D, 7D, and 30D were 45%, 78%, and 118%, respectively. This shows that the marketing campaigns for the company were successful in generating revenue beyond the set targets, indicating a positive outcome.

Insights (Other Metrics)

- The highest conversion rate (CR) is observed in Criteo (4.59), followed by Google PLA (2.77) and Bing Branded Search (1.97). The lowest CR is observed in Google Branded Search (1.22) and Google Search (1.32).
- The highest cost per view (CPV) is observed in Influencer (2.35), followed by Connexity (0.49) and Facebook (0.70). The lowest CPV is observed in Google Branded Search (0.17).
- The highest cost per acquisition (CAC) is observed in Influencer (2.43), followed by Connexity (0.50) and Facebook (0.89). The lowest CAC is observed in Google Branded Search (0.16) and Organic (0.00).
- The highest gross revenue net of discounts (GRND) is observed in Google PLA (3996.20), followed by Google Branded Search (1799.13) and Facebook (991.23). The lowest GRND is observed in Criteo (8.77).
- The highest cost per action (CPA) is observed in Influencer (243.02), followed by Other (177.47) and Facebook (89.05). The lowest CPA is observed in Google Branded Search (16.67) and Organic (0.06).

- The highest cost per sale (CPS) is observed in Influencer (235.38), followed by Other (177.47) and Facebook (69.96). The lowest CPS is observed in Google Branded Search (16.67) and Organic (0.04).

Recommendations (Other Metrics)

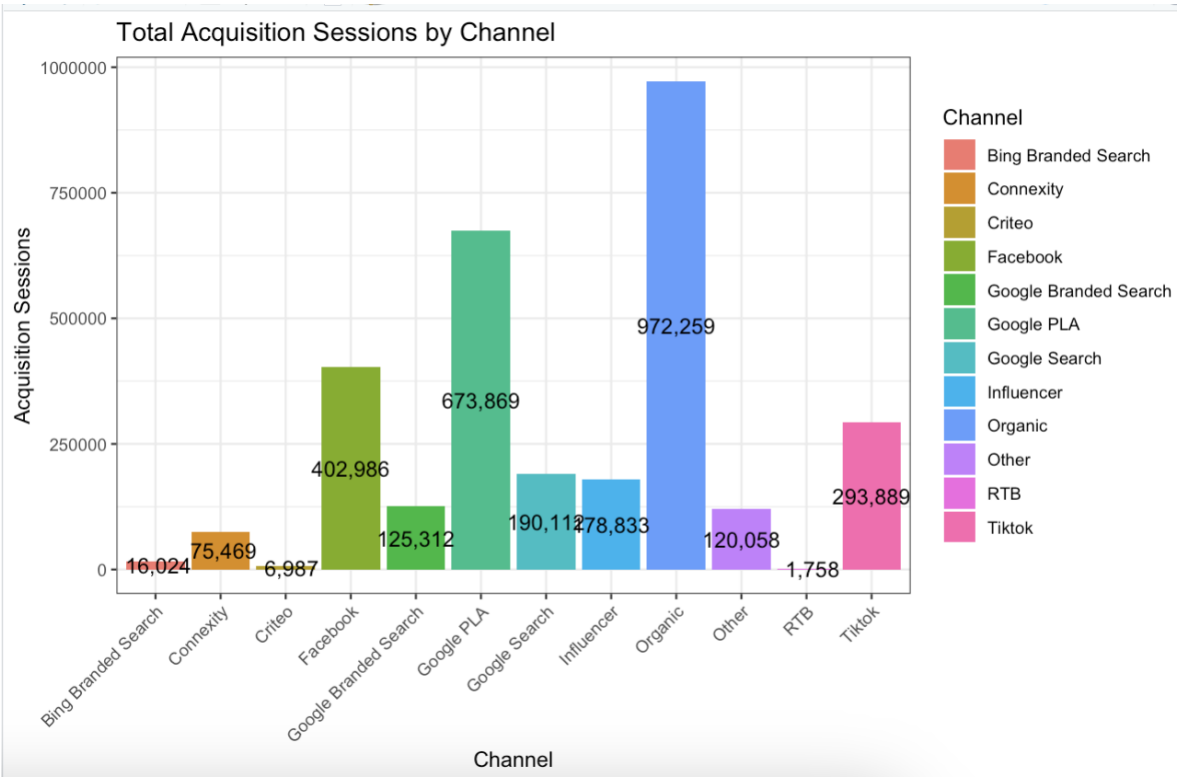
1. Increase investment in Criteo, Google PLA, and Bing Branded Search, as these channels have the highest conversion rates. Improve the campaigns on Google Branded Search and Google Search, as they have the lowest conversion rates.
2. Consider reducing investment in Influencer, Connexity, and Facebook, as they have the highest cost per view, acquisition, action, and sale. Increase investment in Google Branded Search, Organic, and Facebook, as they have the lowest cost per acquisition, cost per action, and cost per sale.
3. Maximize revenue by investing more in Google PLA, Google Branded Search, and Facebook, as they have the highest gross revenue net of discounts.
4. Conduct further analysis to understand the reasons behind the high and low metrics observed and identify opportunities for improvement.

Insights (Plots)

- we can see a plot titled "Acquisition Sessions by Channel," which shows the total acquisition sessions by channel. We can see the number of acquisition sessions for each channel and which channel has the highest and lowest acquisition sessions. By analyzing this plot, we can identify which channels are performing well in acquiring sessions and which channels may need to be optimized to improve their performance. Based on the analysis, Organic has the highest number of acquisition sessions (972259), followed by Google PLA (673,869) and Facebook (402,986). The insights from the plot are that the Organic channel is performing the best in acquiring sessions, with almost double the number of acquisition sessions compared to the second-best channel, Google PLA. This suggests that the Organic channel is a strong performer, likely driving significant website traffic.
- The plot “Revenue by Channel and Time Period” shows how the revenue generated by each channel changes over time. By analyzing the plot, we can identify which channels generate the most revenue and which periods are the most profitable. The top three channels that generate the most revenue are Organic, Google PLA, and Google Branded Search. Based on the insight that Organic, Google PLA, and Google Branded Search generate the most revenue, a recommendation could be to optimize these channels further to increase their revenue potential.
- This code produces a plot titled "Total Discount Percentage by Channel and Discount Type". The plot displays the total discount percentage for each channel, broken down by discount type, which includes 1-day, 7-day, and 30 days discounts. Organic, Google PLA, and Google Branded Search have the highest total discount percentage.

- This plot, "Channel Performance by Revenue per Session," shows the revenue per session for each channel. The plot helps identify which channels bring the most revenue per session and how they compare. The plot shows that the most profitable channels per session are Bing Branded Search, Google Branded Search, Google Search, and Google PLA. In contrast, other channels like RTB, Criteo, and organic have lower revenue per session.
- The plot “Total Spend by Channel” shows how much money was spent on each channel during the analyzed time period. By analyzing the plot, we can identify which channels are the most expensive and the least expensive. The plot shows that the top three most expensive channels are Facebook (832285), Google PLA(681180), and Influencer(496471). Therefore, if the company wants to reduce its expenses, it may want to reconsider its advertising strategy on these channels and focus more on the less expensive ones like Bing Branded Search and Organic.
- This plot displays the total sessions and acquisition sessions by channel in a stacked bar chart. The green part represents the total sessions, while the yellow part shows the acquisition sessions. The channel with the highest number of total sessions and acquisitions is Organic. One potential recommendation from this plot is to focus on optimizing campaigns for Organic, as it has the highest acquisition sessions.

Appendix


Total Acquisition Sessions by Channel
Acquisition Sessions
1000000
750000
500000
250000
0
16,024
75,469
6,987
402,986
125,312
673,869
190,112
178,833
972,259
120,058
1,758
293,889
Bing Branded Search
Connexity
Criteo
Facebook
Google Branded Search
Google PLA
Google Search
Influencer
Organic
Other
RTB
Tiktok
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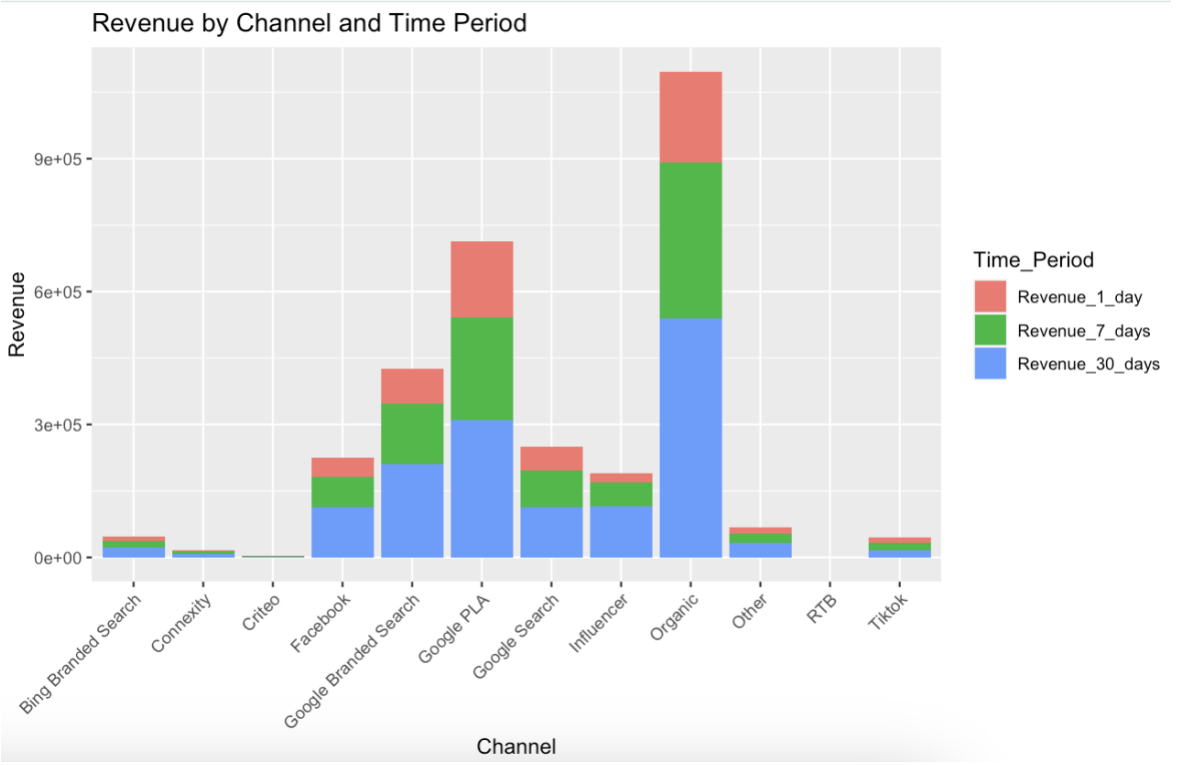
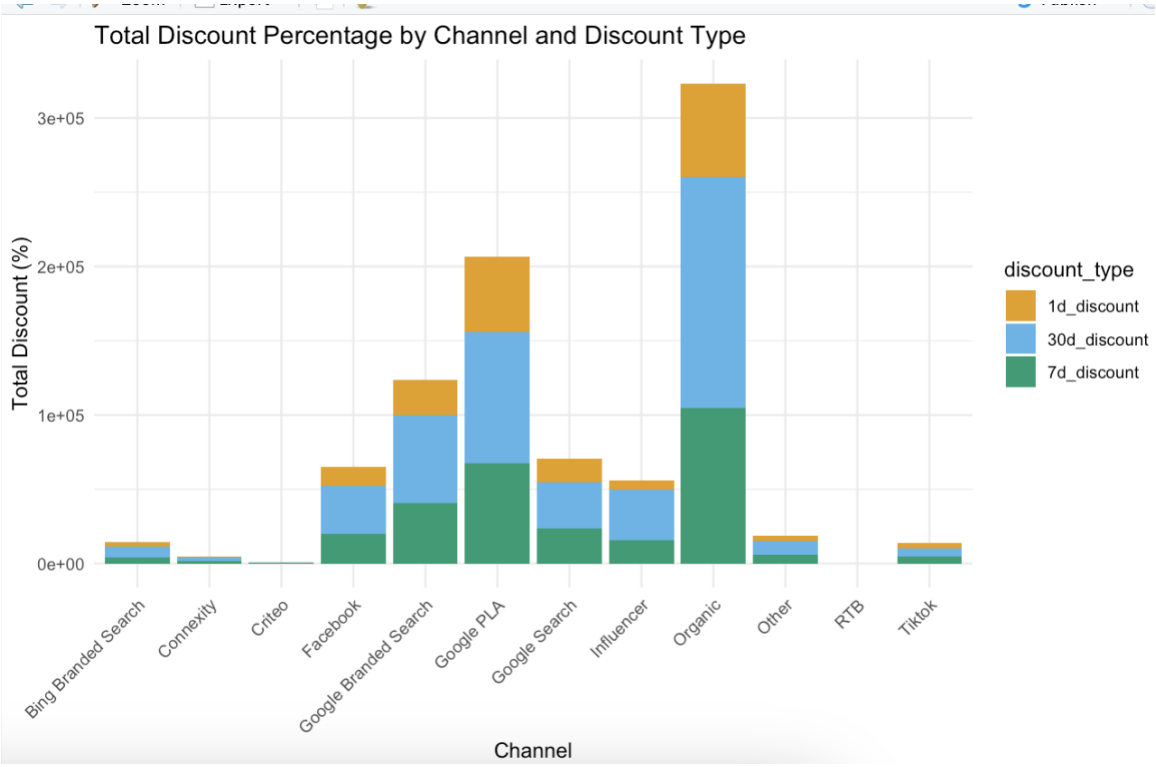
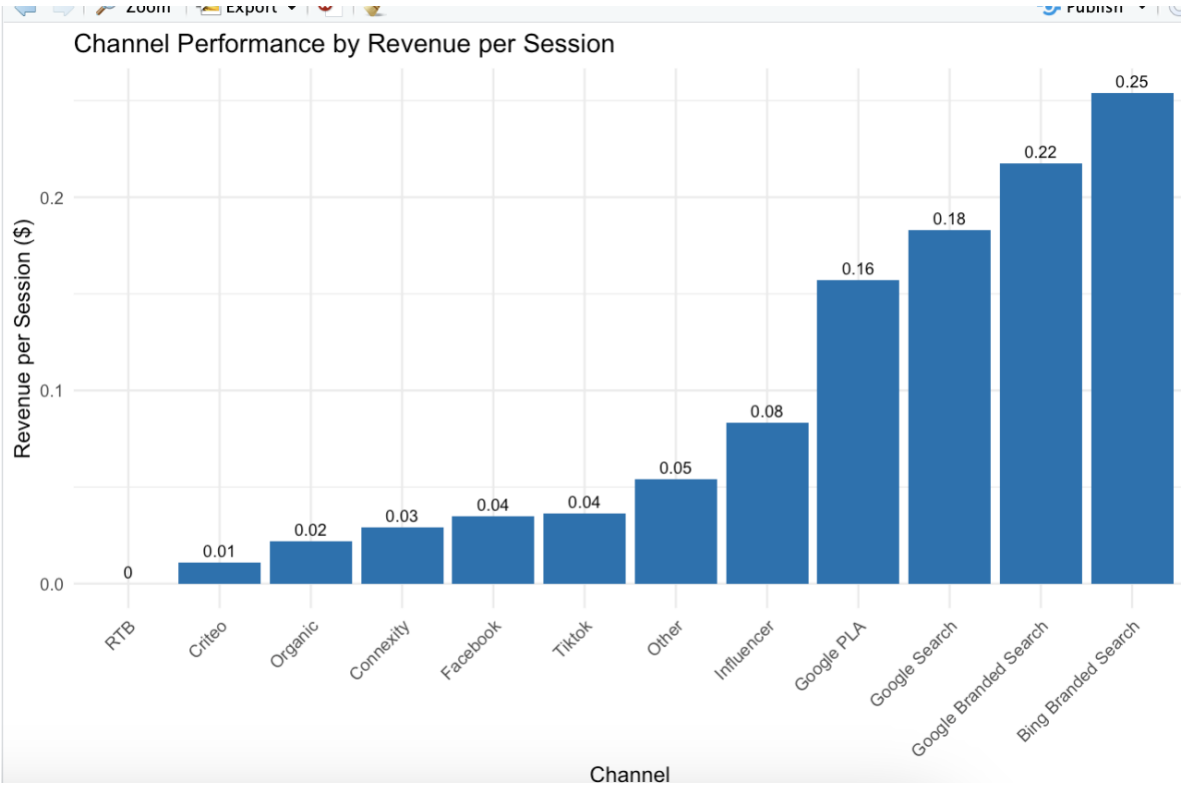
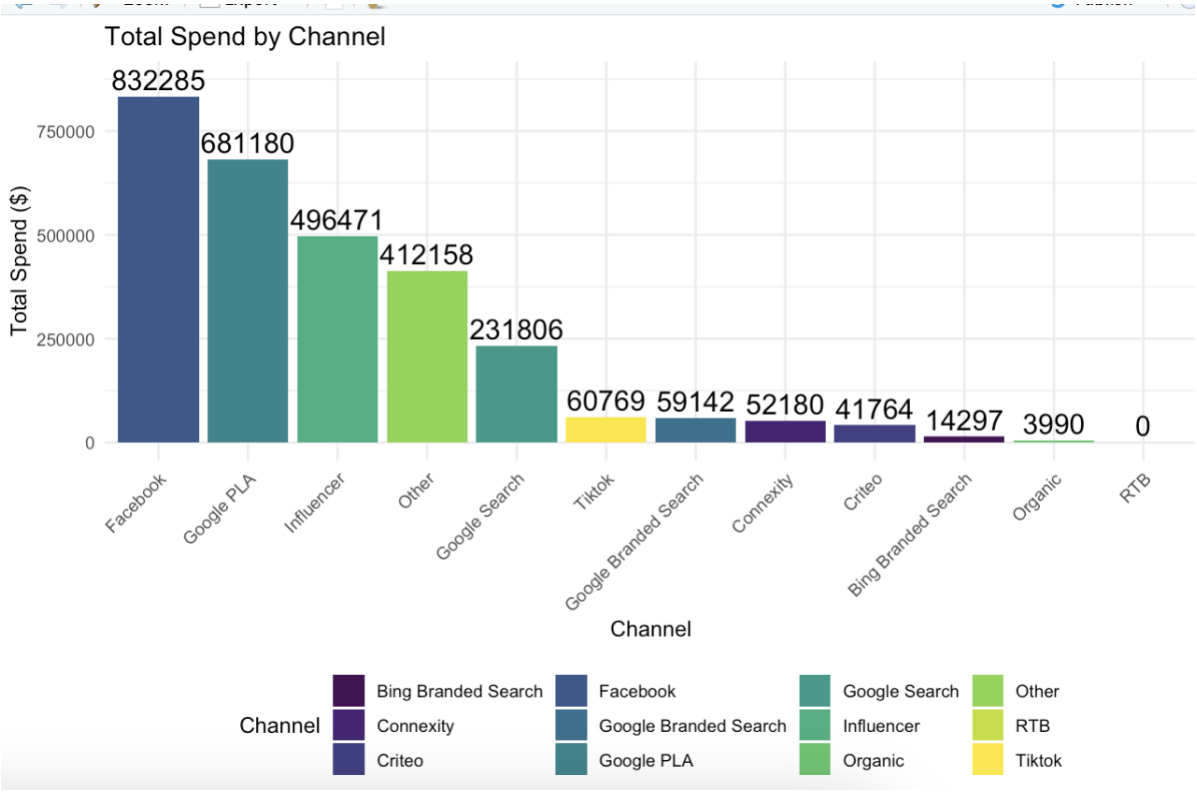
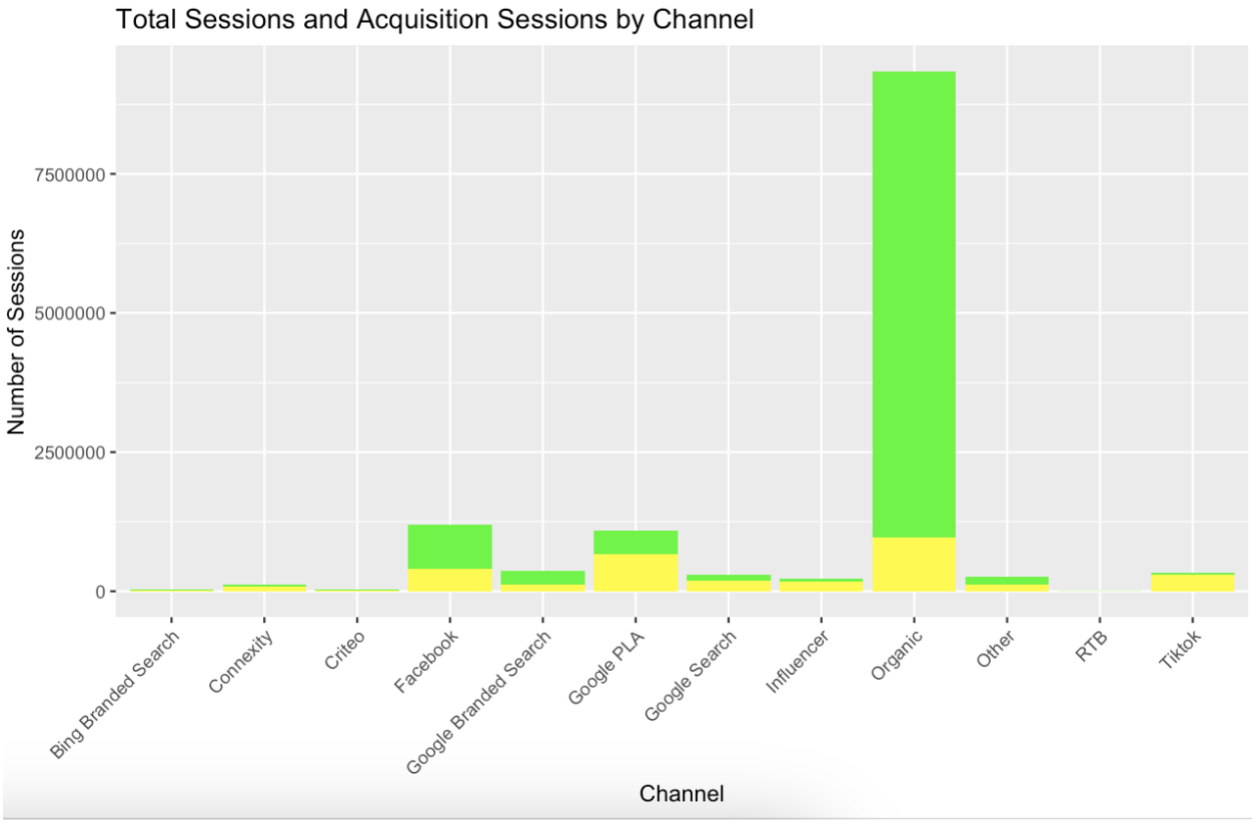
Facebook
Google Branded Search
Google PLA
Google Search
Influencer
Organic
Other
RTB
Tiktok


Revenue by Channel and Time Period
Revenue
9e+05
6e+05
3e+05
0e+00
Bing Branded Search
Connexity
Criteo
Facebook
Google Branded Search
Google PLA
Google Search
Influencer
Organic
Other
RTB
Tiktok
Channel
Time_Period
Revenue_1_day
Revenue_7_days
Revenue_30_days


Total Discount Percentage by Channel and Discount Type
Total Discount (%)
3e+05
2e+05
1e+05
0e+00
discount_type
1d_discount
30d_discount
7d_discount
Bing Branded Search
Connexity
Criteo
Facebook
Google Branded Search
Google PLA
Google Search
Influencer
Organic
Other
RTB
Tiktok
Channel


Channel Performance by Revenue per Session
Revenue per Session ($)
0.2
0.1
0.0
0
0.01
0.02
0.03
0.04
0.04
0.05
0.08
0.16
0.18
0.22
0.25
RTB
Criteo
Organic
Connexity
Facebook
Tiktok
Other
Influencer
Google PLA
Google Search
Google Branded Search
Bing Branded Search
Channel


Total Spend by Channel
Total Spend ($)
0
250000
500000
750000
832285
681180
496471
412158
231806
60769
59142
52180
41764
14297
3990
0
Facebook
Google PLA
Influencer
Other
Google Search
Tiktok
Google Branded Search
Connexity
Criteo
Bing Branded Search
Organic
RTB
Channel
Channel
Bing Branded Search
Connexity
Criteo
Facebook
Google Branded Search
Google PLA
Google Search
Influencer
Organic
Other
RTB
Tiktok


Total Sessions and Acquisition Sessions by Channel
Number of Sessions
0
2500000
5000000
7500000
Bing Branded Search
Connexity
Criteo
Facebook
Google Branded Search
Google PLA
Google Search
Influencer
Organic
Other
RTB
Tiktok
Channel