DATA-DRIVEN INVESTIGATION OF POPCART'S MARKETING CAMPAIGNS

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Problem

PopCart, as a brand, has been wanting to investigate certain parameters that surround their digital marketing campaigns and how they can optimally market their products. In particular areas, the key areas that needed to be investigated are:

1. **Product Popularity:** Determine which product type generates the most sales and is optimal for more product lines to be made in the future. This can be measured by looking at it within the context of other parameters, such as customer demographics like age, gender, and region.
2. **Campaign Performance** – Apart from evaluating success or failure of product categories, it is crucial to know these products or product lines and how they are being marketed. For this specific campaign analysis, the group is tasked to investigate if gender is a basis for campaign success or is unrelated.
3. **Location-based Engagement:** Understanding the geographical distribution of PopCart's customer base is essential for utilizing location as a basis for targeted product and/or product line campaigns. This section aims to identify the regions where customers reside, providing valuable metrics for future marketing strategies.

Methodology

I. Data Cleaning

The first step of analysis involved cleaning the 'marketing_impressions' and 'sales_data' .csv files to make them suitable for further analysis. Overall, the group opted to use SQL as the primary tool for data cleaning. This was chosen due to its ability to handle and manipulate data through sorting, filtering and editing.

During the data cleaning and preparation stage, the group focused on addressing six questions or prerequisites set by the stakeholders of PopCart. The six questions/prerequisites were as follows:

Question 1: What is the overall click-through rate (CTR) for the campaigns launched by the company?

Requirements: Here, it is crucial to know the Click-through rate (CTR) formula. The formula is as follows:

$$CTR= (Number\ of\ clicks\ /Number\ of\ impressions)\ x100\%$$

Approach: Through SQL, the query is inputted as:

```
Query   Query History
1   SELECT
2       ROUND(SUM(is_click)/COUNT(session_id) * 100, 2) AS overall_ctr
3   FROM marketing_impressions
```

Result:

	overall_ctr numeric
1	38.71

Question 2: What is the CTR for each product category?

Requirements: Now that the CTR is retrieved, it is important to filter the data based on the provided product categories.

Approach: Through SQL, the query is inputted as:

```
Query   Query History
1   SELECT
2       product_category,
3       ROUND(SUM(is_click)/COUNT(session_id)*100, 2) AS ctr_product
4   FROM marketing_impressions
5   GROUP BY product_category
6   ORDER BY ctr_product DESC
```

Results:

	product_category character varying	ctr_per_product numeric
1	Electronics and gadgets	47.67
2	Health and beauty	43.33
3	Home and garden	40.33
4	Sports and outdoors	35.71
5	Apparel and accessories	30.93

Question 3*:* What percentage of the total revenue generated during campaign periods is contributed by female customers?

Requirements: Here, what should be analyzed is the percentage of female consumers and its share to the total revenue across all campaign periods.

Approach: Through SQL, the query is inputted as:

```
Query  Query History  Messages  Notifications
1  SELECT ROUND(( SUM(CASE
2                     WHEN mi.gender = 'Female' THEN sd.total_php
3                     ELSE 0
4                 END) / SUM(sd.total_php) ) * 100, 2) AS female_revenue_percentage
5  FROM marketing_impression AS mi
6        JOIN sales_data sd
7          ON mi.session_id = sd.session_id
8
```

Results:

Data Output

	female_revenue_percentage numeric
1	13.65

Question 4: Which campaign has generated the most impressions?

Requirements: Here it is important to filter the campaign name and the distinct count of session IDs.

Approach: Through SQL, the query is inputted as:

```
Query    Query History
1   SELECT campaign_name, COUNT(DISTINCT session_id) AS ctr_per_campaign
2   FROM marketing_impressions
3   GROUP BY campaign_name
4   ORDER BY ctr_per_campaign DESC
```

Results:

	campaign_name character varying	ctr_per_campaign bigint
1	12 Days of Christmas Deals	36191
2	Tech Madness Sale	19717
3	Mid-Year Mega Sale	14568
4	Flash Sale	12276
5	Summer Splash Sale	11946
6	Year-End Clearance Sale	8808
7	1.2.3 Super Shopping Day	7279
8	Cyber Monday Madness	7088
9	Back-to-School Deals	6514
10	Spring Deals	4471

Question 5: How many unique users per location viewed the campaign with the most impressions?

Requirements: Other than taking note of the regions, the 12 Days of Christmas Deals should be integrated in the query (as is it is the campaign with the highest CTR).

Approach: Through SQL, the query is inputted as:

```
Query    Query History
1   SELECT
2       region,
3       COUNT(DISTINCT user_id) AS distinct_user_count
4   FROM marketing_impressions
5   WHERE campaign_name LIKE '12 Days of Christmas Deals'
6   GROUP BY region
7   ORDER BY distinct_user_count DESC
```

Results:

	region character varying	distinct_user_count bigint
1	Metro Manila	6403
2	Mindanao	6397
3	Visayas	6351
4	South Luzon	6310
5	North Luzon	6238

Question 6 (Bonus Question): What are the total impressions and CTR for each product category per user segment? Suggest a marketing strategy that utilizes this information.

Requirements: Here, not only must total impressions and CTR be acknowledged, but also each product category per user segment (age, gender, region).

Approach: Through Microsoft Excel, a dashboard is made with filter options that reflect age group, gender, and region:
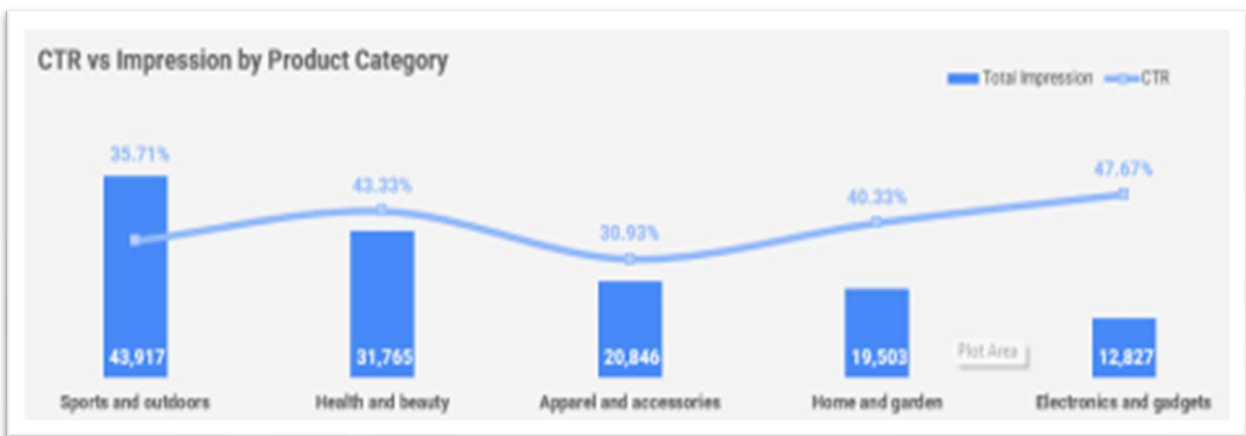
Filter by Segment

Gender

Female | Male

Region

Metro Manila | Mindanao | North Luzon | South Luzon | Visayas

Age Level

0-17 years | 18-24 years | 25-34 years | 35-44 years | 45-54 years | 55-64 years | 65 years a...

Results:

In Visualization:

CTR vs Impression by Product Category

|	Sports and outdoors	Health and beauty	Apparel and accessories	Home and garden	Electronics and gadgets
CTR	35.71%	43.33%	30.93%	40.33%	47.67%
Total Impression	43,917	31,765	20,846	19,503	12,827

In SQL:

	product_category character varying	region character varying	age_level character varying	gender character varying	ctr_per_product numeric
1	Apparel and accessories	Metro Manila	0-17 years	Female	0.00
2	Apparel and accessories	Metro Manila	0-17 years	Male	0.00
3	Apparel and accessories	Mindanao	0-17 years	Female	0.00
4	Apparel and accessories	Mindanao	0-17 years	Male	0.00
5	Apparel and accessories	North Luzon	0-17 years	Male	66.67
6	Apparel and accessories	South Luzon	0-17 years	Male	33.33
7	Apparel and accessories	Visayas	0-17 years	Male	0.00
8	Electronics and gadgets	Metro Manila	0-17 years	Male	0.00
9	Electronics and gadgets	Mindanao	0-17 years	Male	100.00
10	Electronics and gadgets	North Luzon	0-17 years	Male	100.00
11	Electronics and gadgets	Visayas	0-17 years	Male	100.00
12	Health and beauty	Metro Manila	0-17 years	Male	50.00
13	Health and beauty	Mindanao	0-17 years	Male	0.00

II. Data Visualization

    After cleaning the data and exporting them into .xlsx files, the next step that the group took was to visualize the data via Microsoft Excel. In doing so, the main objective of the data visualization is to create an interactive and dynamic dashboard driven by pivot tables. Here, this data visualization dashboard was able to answer and visualize what was being asked in the bonus question as well as the previous questions.
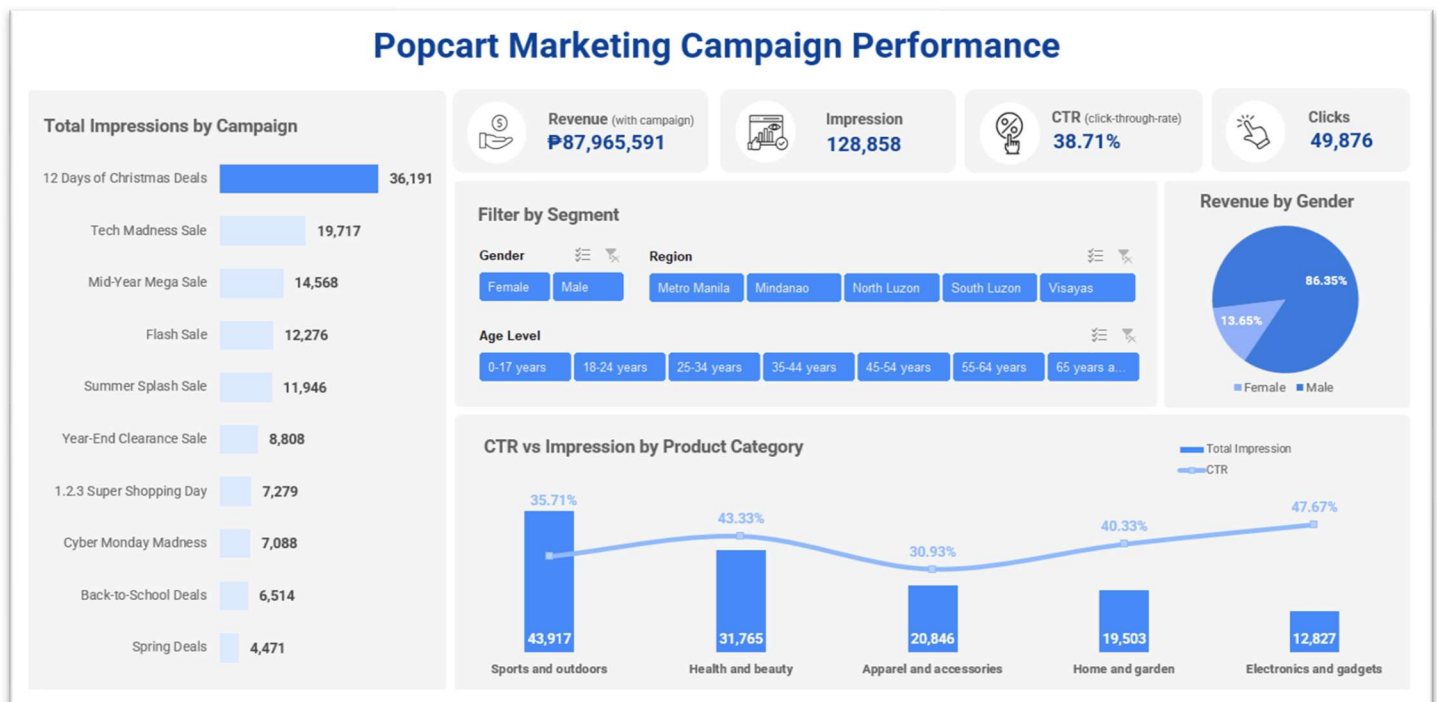
    As shown above, the dashboard reflects the key areas mentioned in the context section. Firstly, **product popularity** is expressed with regards to CTR and Impressions. Secondly, **campaign performance** is expressed with regards to 1) total impressions per campaign and 2) campaign revenue by gender. Third and last, **location-based performance** is expressed as one of the filters by segment parameters and its relation with revenue, clicks, impressions, and CTR (i.e., Region).

    Overall, why the group opted to go for a dashboard is due to the overall interactive interface that the dashboard provides. In terms of visualization, the group deduced that it is crucial for all data to be visualized to be expressed in one page to emphasize how certain parameters can affect the overall data results. An example of

this is the 'Filter by Segment' window, wherein the PopCart stakeholders can toggle and visualize data through the different data values per segment.

Pivot 1-4:

1. What is the overall click-through rate (CTR) for the campaigns launched by the company

Campaign Name ▼	CTR	
1.2.3 Super Shopping D	31.35%	
12 Days of Christmas [	33.62%	
Back-to-School Deals	38.49%	
Cyber Monday Madnes	23.46%	
Flash Sale	51.92%	
Mid-Year Mega Sale	41.03%	
Spring Deals	42.14%	
Summer Splash Sale	42.08%	
Tech Madness Sale	42.53%	
Year-End Clearance Sa	40.96%	
Grand Total	**38.71%**	38.71%

2. What is the CTR for each product category

Product Category ▼	CTR
Apparel and accessorie	30.93%
Electronics and gadget	47.67%
Health and beauty	43.33%
Home and garden	40.33%
Sports and outdoors	35.71%
Grand Total	**38.71%**

3. What percentage of the total revenue generated during campaign periods is contributed by female customers?

Gender ▼	Percentage Total of Revenue
Female	13.65%
Male	86.35%
Grand Total	**100.00%**

4. Which campaign has generated the most impressions

Campaign Name ⊤	Sum of Impression
12 Days of Christmas [	36,191
Grand Total	**36,191**

9

Pivot 5-6 (Bonus question)

5.How many unique users per location viewed the campaign with the most impressions?

campaign_name   12 Days of Christmas Deals

Region	Total User	Distinct Count of user_id
Metro Manila	7,328	6,403
Mindanao	7,358	6,397
North Luzon	7,099	6,238
South Luzon	7,175	6,310
Visayas	7,231	6,351
Grand Total	**36,191**	**24,308**

Bonus Question

gender	(All)
age_level	(All)
region	(All)

| Product Category	Total Impression	CTR
Sports and outdoors	43,917	35.71%
Health and beauty	31,765	43.33%
Apparel and accessori	20,846	30.93%
Home and garden	19,503	40.33%
Electronics and gadge	12,827	47.67%
Grand Total	**128,858**	**38.71%**

The group also found it conducive to also visualize the aforementioned six questions cleaned and answered using Excel. This was also done through the use of Pivot Tables as shown above, which we used in data visualization.

| is_Campaig	Count of session_id	Revenue
0	75,079	265,645,770
1	24,920	87,965,591
Grand Total	**99,999**	**353,611,361**

As seen in the diagram above, one of the constraints the group had to consider when sorting the data out are the '0' and '1' indicators. '0' meaning that the session ID counts and total revenue is not associated with the marketing campaigns and '1' meaning that the session ID counts and total revenue are associated with the marketing campaigns. This diagram alone provides a justification for the need to better improve the marketing campaign disseminations (to be looked into later).

Findings and Analysis

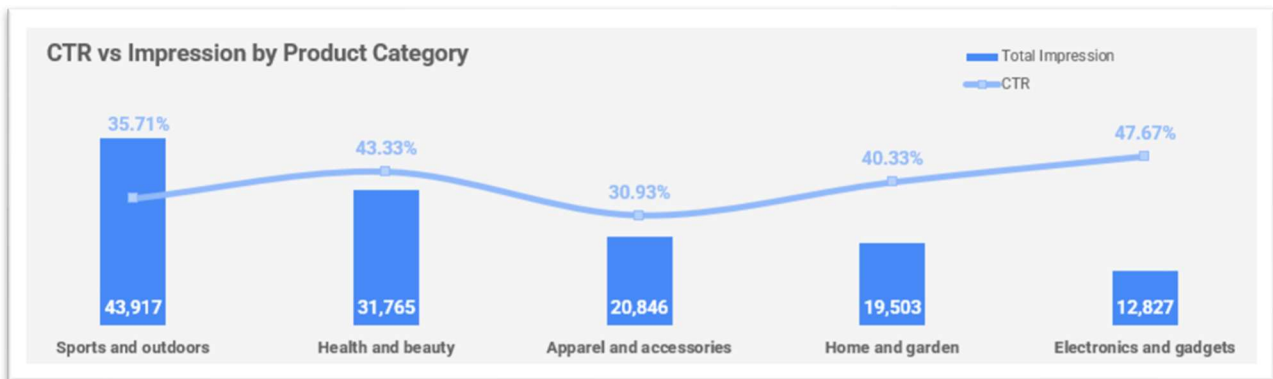For this selection, the findings are to be based on the data visualization results, vis-a-vis, the dashboard.
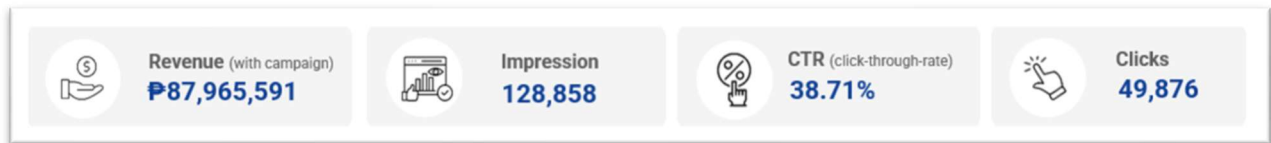
From the above diagram, it is deduced that the majority of the total generated revenue is not contributed by the campaigns. This is based on the total clicks to impressions (i.e., click-through rate).
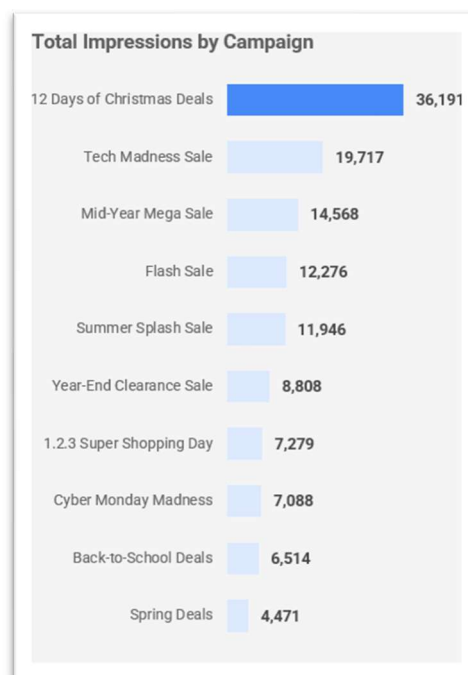
Whilst toggling the segment filters, the group has observed that amongst the different age groups, genders, and regions; it is consistent that the 12 Days of Christmas Deals and the Tech Madness Sale are the top two campaigns in terms of impressions. Here, it can be deduced that overall, PopCart employs a seasonal model when planning out the themes, promos, and marketing for the campaigns.

Revenue by Gender

86.35%
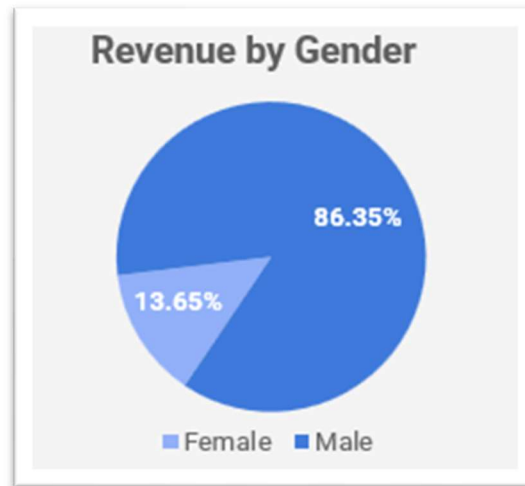
13.65%

Female Male

In general, despite procuring and selling unisex products ranging from health and beauty to sports and outdoors, the majority of the revenue and penetrated market are male consumers (86.35%) in comparison to female consumers (13.65%).

CTR vs Impression by Product Category

Total Impression

CTR

35.71%

43.33%

30.93%

40.33%

47.67%

43,917

31,765

20,846

19,503

12,827

Sports and outdoors Health and beauty Apparel and accessories Home and garden Electronics and gadgets

In trying to improve the engagement rate, it is important to weigh the relationship between CTR and Impression. In this case, the group deduced that it would be the most appropriate to analyze this relationship within the context of product categories. Here, it can be seen that the relationship between CTR and Impression is not proportionate, thus reflecting on the overall CTR rate. For example, the Electronics and Gadgets have the least total impressions (12,827) but contribute to the most CTR shares amongst the product categories (47.67%).

Marketing Insights and Recommendations

Delving into the first observation and fourth observation, PopCart's initiative to increase the overall click-through rates can be achieved through both Search Engine Optimization (SEO) and Search Engine Marketing (SEM). According to Search Engine Land (n.d.), SEO refers to the initiative of a firm to better their positioning in search engines in the eyes of users and consumers. Here, SEO covers organic searches, meaning searches directly inputted by users and not ads. On the other hand, SEM refers to the marketing of campaigns through the use of paid ads in a pay-per-click basis, in hopes to appear in a desirable position on Search Engine Results Pages (SERPs) (Localiq, n.d.). Looking at it from a short-term plan for immediate results, SEM is optimal given that the budget or such a project is sufficient. In terms of a more long-term plan, SEO is suitable, given that another plus is that it does not require a budget.

For the second observation, it was previously deduced that PopCart follows the seasonal campaign model. Here, PopCart bases their campaign themes based on holidays (Christmas, Spring, Mid-year). In terms of recommendations, PopCart should actually keep this model as it works for them. However, it can still be further improved. For example, the third observation being that the female consumer share is significantly smaller than the male consumers, perhaps PopCart can look into holidays that cater more to women (e.g., Mother's Day and Women's History Month).

Sources

Localiq (SEM): How to Do It Right | WordStream. (2022, September 24). WordStream. https://www.wordstream.com/search-engine-marketing

Search Engine Land. (2023, June 16). What Is SEO - Search Engine Optimization? https://searchengineland.com/guide/what-is-seo