

ANALYSIS ON ONLINE SALE DATA

1.PROBLEM DESCRIPTION

The online perfume and cosmetic industry has grown substantially in recent years, and many customers now make purchases online. The Chief Marketing Officer of a leading beauty care company wants to better understand customer behavior in order to segment the market and engage customers more effectively in marketing campaigns. The company recognizes the importance of developing strong brand loyalty and has collected basic behavioral characteristics from online purchases to develop successful market segmentation strategies. The company believes that focusing on single large purchases rather than on other behavioral variables overlooks important factors such as the frequency of visits, the recency of purchases, and the overall customer lifetime monetary value.

The objective is to assist the company in improving its marketing strategy by gaining a deeper understanding of its customers. To achieve this, we will begin by performing exploratory data analysis to gather insights and conduct relevant analyses. The research criteria for conducting cluster analysis will involve exploring variables such as Recency, Frequency, and Monetary value of transactions.

2.DATA DESCRIPTION

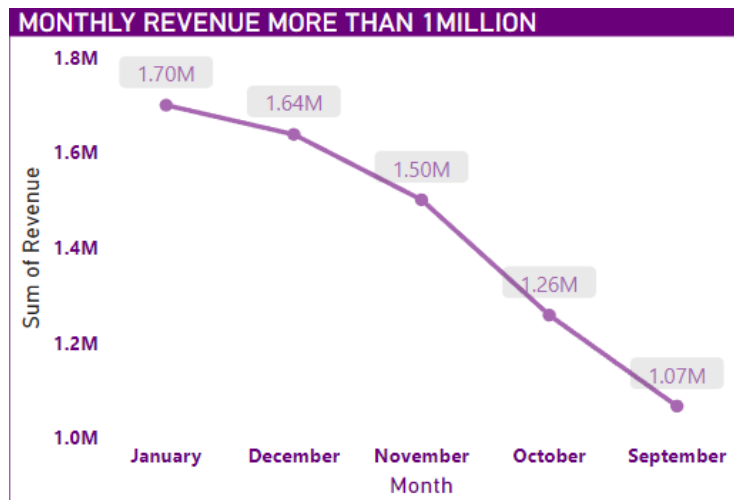
2.1About the Dataset:

The dataset contains 250,000 records (observations) and includes important variables such as customer ID, the number of products purchased, the unit price of purchased products, total revenue per customer transaction, and a description of the purchased products.

2.2Dataset Description:

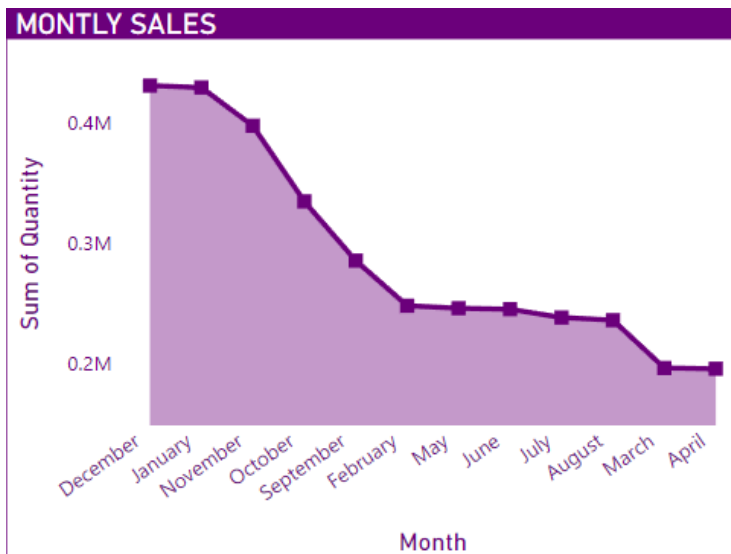
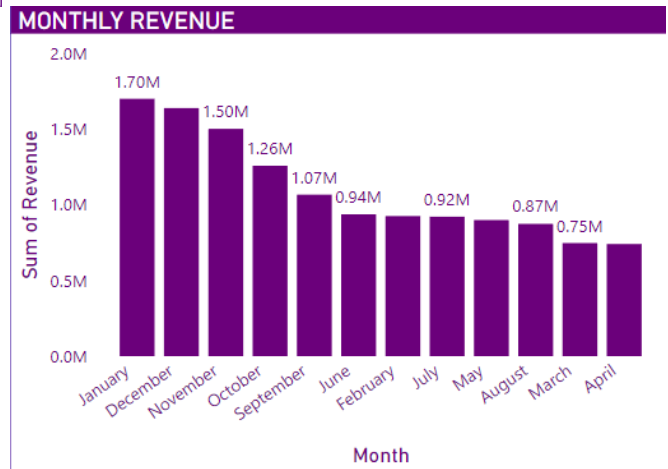
1. Transaction No - Unique Transaction Number of Each Online Sale
2. Customer ID - Number Assigned to the customer who purchased the product
3. Quantity - Number of Products Purchased in the Transaction
4. UnitPrice - Price per Unit for the product purchased
5. Revenue - A calculated field representing the total revenue per transaction
6. Transaction Date - Date of the Online Sale Occurred
7. Product Description - Description of the product purchased online
- 8.

Insight 1: Monthly Revenue and Sales Analysis



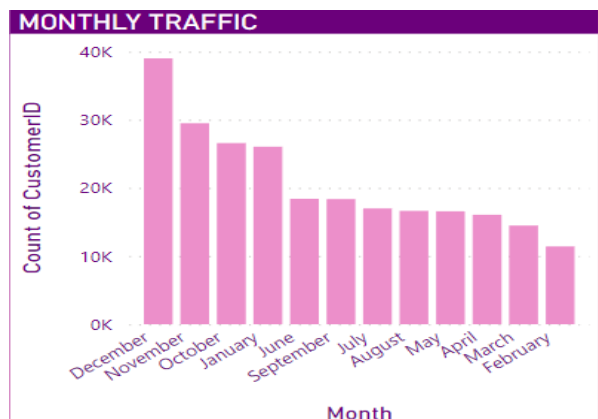
The graph shows the revenue for transactions exceeding 10,000 USD each month. It is evident that there is a spike in sales during the months of January and February, whereas sales are lower in the other months.

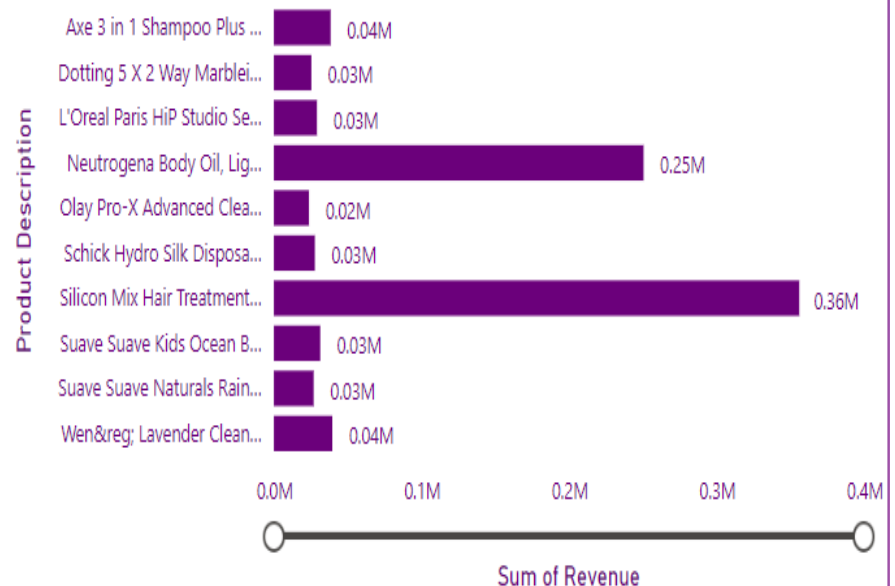
The graph displays the total revenue for all transactions in each month. It is evident that more revenue is generated in the initial and final months.



This graph shows the total quantity purchased in each month and it follows a similar trend as the revenue graph. It suggests that the number of items purchased is directly related to the total revenue generated.

In this Bar plot, we can see the traffic generated each month. We have the highest number of visits in December followed by November.





Insight 3 - Exploring Low-Performing Products, Customer Spending Weekly Sales

Trends:

Product With Total Quantity Purchase Less than 10

aqua glycolic facial cleanser 6 fl oz 177 ml	motion cpr critical protection and repair treatment conditioner 15 ounce	reviva liquid mascara brown 0 25 oz	herbal salt scrub lavender 20 50 ounces	one n only argan oil hydrating mask derived from moroccan argan trees 8 3 ounce
china glaze nail polish jungle queen 0 5 fluid ounce	rockland luggage rockland 2 piece cosmetic set	coppertone sensitive skin lotion spf 50 sunscreen 6oz	fran wilson moodmatcher lipstick 10 pack	freetress equal lace front wig nikki color 1b off black
eminence stone crop serum 1 ounce	softsheen carson dark and lovely permanent hair colors vivacious red	hard candy lash ink 4 day lash stain	sleek look sealing serum by matrix 4 2 ounce	love potion reg heart strings 1 3 fl oz concentrated perfume oil for women
garnier sleek and shine sleek finish 5 in 1 serum spray for sleek finish	bath amp body works signature collection moonlight path body lotion 8 fl oz new packaging	keratin complex shine 1 7 oz	smashbox camera ready bb cream spf 35 fair	charlie red by revlon for women 3 4 ounce efs spray
			dermalogica skin smoothing cream 6 fluid ounce	

In this treemap, we have products with less than 10 quantities purchased.

	Product_Description	Total_Revenue	Total_Quantity
	All	All	[...]
1	fran wilson moodmatcher lipstick 10 pack	28.90	6
2	freetress equal lace front wig nikki color 1b off black	36.00	6
3	sleek look sealing serum by matrix 4 2 ounce	34.10	6
4	love potion reg heart strings 1 3 fl oz concentrated perf...	33.45	5
5	smashbox camera ready bb cream spf 35 fair	14.77	5
6	charlie red by revlon for women 3 4 ounce efs spray	20.48	4
7	dermalogica skin smoothing cream 6 fluid ounce	17.95	3
8	aveda volumizing tonic with aloe	3.15	1
9	kyoku for men lava masque 5 ounce	8.25	1
10	no purchase	0.00	0

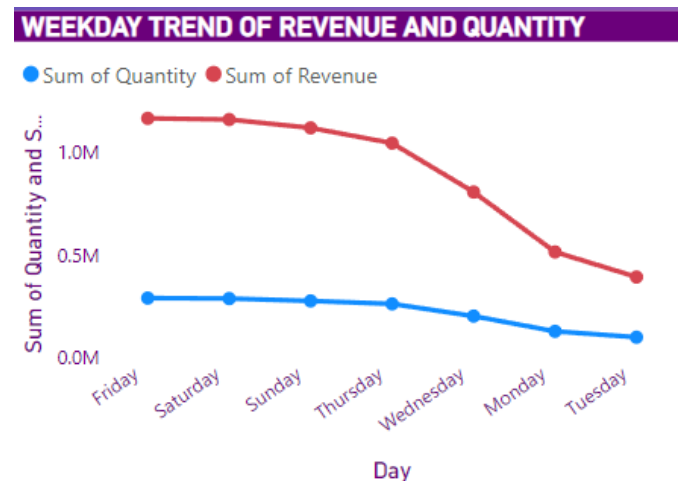
In the above table we can see top 10 products that have less purchase and less revenue generated.

MOST LOYOL CUSTOMERS

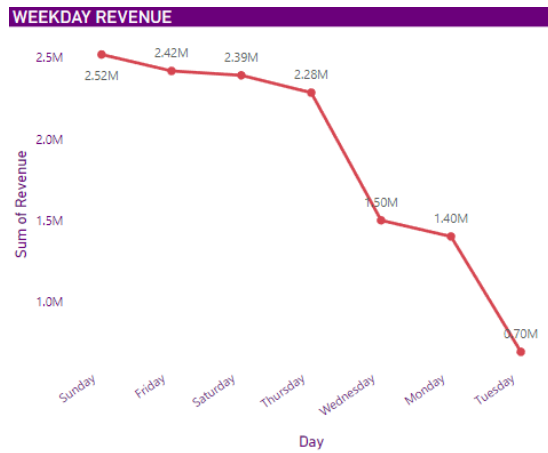
CustomerID	Sum of Revenue	Sum of Quantity
29292	715,374.07	193475
32892	354,749.34	80993
24830	296,661.84	76290
29822	259,720.11	69324
24692	247,871.42	74213
28312	234,372.07	55131
27388	206,262.04	62176
33368	179,607.66	49701
28596	173,284.11	55070
32058	163,090.31	39725
Total	2,830,992.97	756098

In this table we can see the top 10 customer IDs and Total amount they have spent in the store.

This bar plot illustrates the quantities of products purchased and Revenue on each weekday. The highest number of purchases were made on Sunday, with a total of 2,517,638. Conversely, the least amount of products were purchased on Tuesday, with only 696,275.

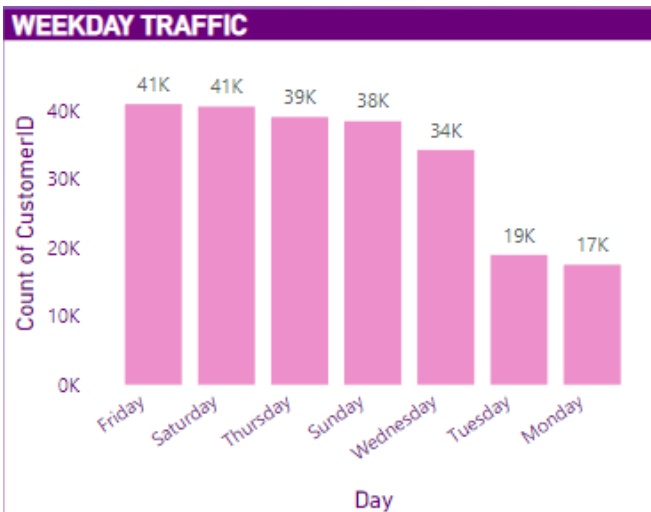
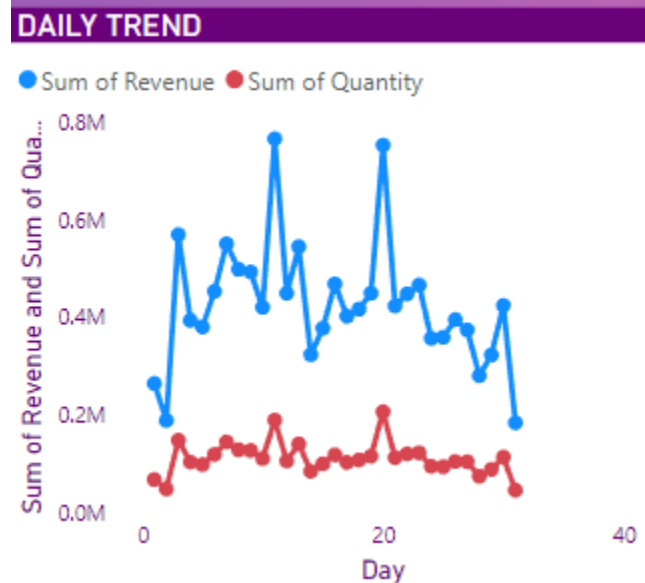


Insight 4: Analysis of Revenue and Visits by Day of the Week.



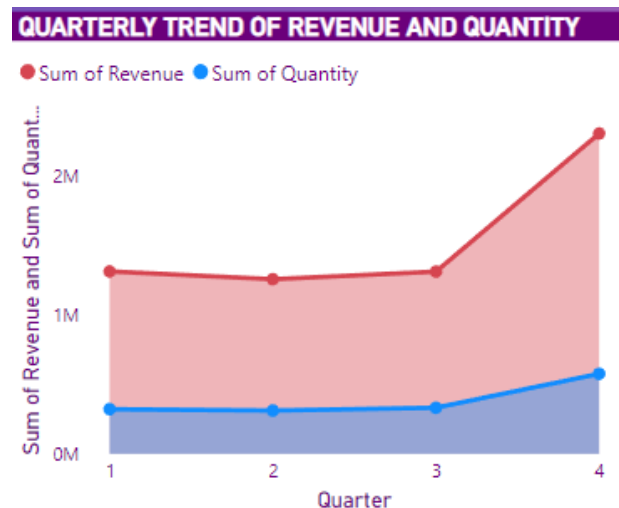
This Pie chart displays the proportion of revenue generated on each day, with Sunday having the highest revenue share of 19.1%, and Tuesday having the lowest with 5.27%.

In this line chart we can see how the revenue is generated across various days. We can see there are two spikes, one is around February end of 2020 and the other is around January end of 2021.



From this barplot, we can infer that the highest number of visits is on Saturday. However we have the highest revenue generated on Sunday.

From this Plot we can infer that quarter 4 has the highest Revenue and highest sales compared to other quarters.



5. ANALYSIS USEFULNESS

The analysis provided valuable insights into the company's sales and customer behavior, which can be used to inform its marketing strategy. By identifying the months with the highest sales spikes, the company can adjust its promotional and advertising efforts to capitalize on these opportunities. Additionally, by focusing on promoting and advertising its best-selling products, the company can increase the number of items purchased by customers.

The analysis also highlighted the popular product categories among customers, which can be used to tailor the company's product offerings and marketing messaging to better cater to customer preferences. Furthermore, by reevaluating the pricing and promotion strategies for products with less purchase and revenue generated, the company can increase their sales and revenue.

5.1 Recommendations

5.1.1 Customer perspective:

- Customers tend to purchase more items in the categories of hair, skin, makeup, and shampoo. The company can focus on these popular product categories and offer promotions or discounts to incentivize customers to purchase more items in these categories.
- Customers tend to make more purchases and generate more revenue on Sundays compared to other weekdays. The company can consider offering promotions or discounts on Sundays to attract more customers and increase sales.
- The company can improve its marketing strategy for products with less purchase and less revenue generated by reevaluating the pricing and promotion strategies for these products. This could include offering promotions or discounts for these products to incentivize customers to purchase them.

5.1.2 Target perspective:

- The company can focus on promoting and advertising its products more during the months of January and February, which have the highest sales spikes. Additionally, the company can consider offering promotions or discounts during the other months to increase sales.
- The company can focus on promoting and advertising its best-selling products to increase the number of items purchased by customers. This can include using targeted

marketing campaigns on social media or email marketing to highlight these products to customers who have shown interest in similar products.

- The company can use the insights gained from the analysis to improve its marketing strategy and better understand its customers. For example, by targeting its marketing efforts more on Sundays, the company can increase its revenue and attract more customers who are likely to make purchases on this day.

Overall, the analysis can be useful in informing the company's marketing strategy by providing insights into customer preferences, purchase behavior, and revenue generation. The company can use these insights to tailor its marketing efforts to better target its customers and increase sales.

6.CONCLUSION:

In conclusion, exploratory data analysis is a powerful tool that can provide valuable insights into customer behavior and preferences, which can inform a company's marketing strategy. By analyzing data on sales, revenue, product categories, customer behavior, and purchase trends, a company can tailor its marketing efforts to better meet the needs and preferences of its customers, leading to increased sales and revenue.

Through our analysis of the provided data, we were able to identify key trends and patterns that can inform the company's marketing strategy. We found that the highest sales spikes occur during the months of January and February, and the most revenue is generated from popular product categories such as hair, skin, makeup, and shampoo. We also identified best-selling products, top customer IDs, and days of the week with the highest revenue and purchase quantities.

From a customer perspective, the company can use these insights to better understand their preferences and tailor marketing efforts to increase customer satisfaction and loyalty. From a target perspective, the company can use this information to target its marketing efforts to increase sales and revenue.

In summary, the results of our exploratory data analysis can provide valuable insights into customer behavior and preferences, which can inform the company's marketing strategy and help drive increased sales and revenue.