SPEEDCAR
GARAGE

2022 - 2023

Speedcar Garage

Sales Performance & Business Recommendations

www.speedcargarage.com

Content

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EXECUTIVE SUMMARY

TOTAL REVENUE (2022 - 2023)

$ 671,525,465

REVENUE GROWTH (2022 - 2023)

23,59 %

TRANSACTION PER MONTH

996

REVENUE PER TRANSACTION

$ 28,090

BUSINESS ISSUE TREE

REVENUE (2022)

$ 300,340,345

23,59 % ↑

REVENUE (2023)

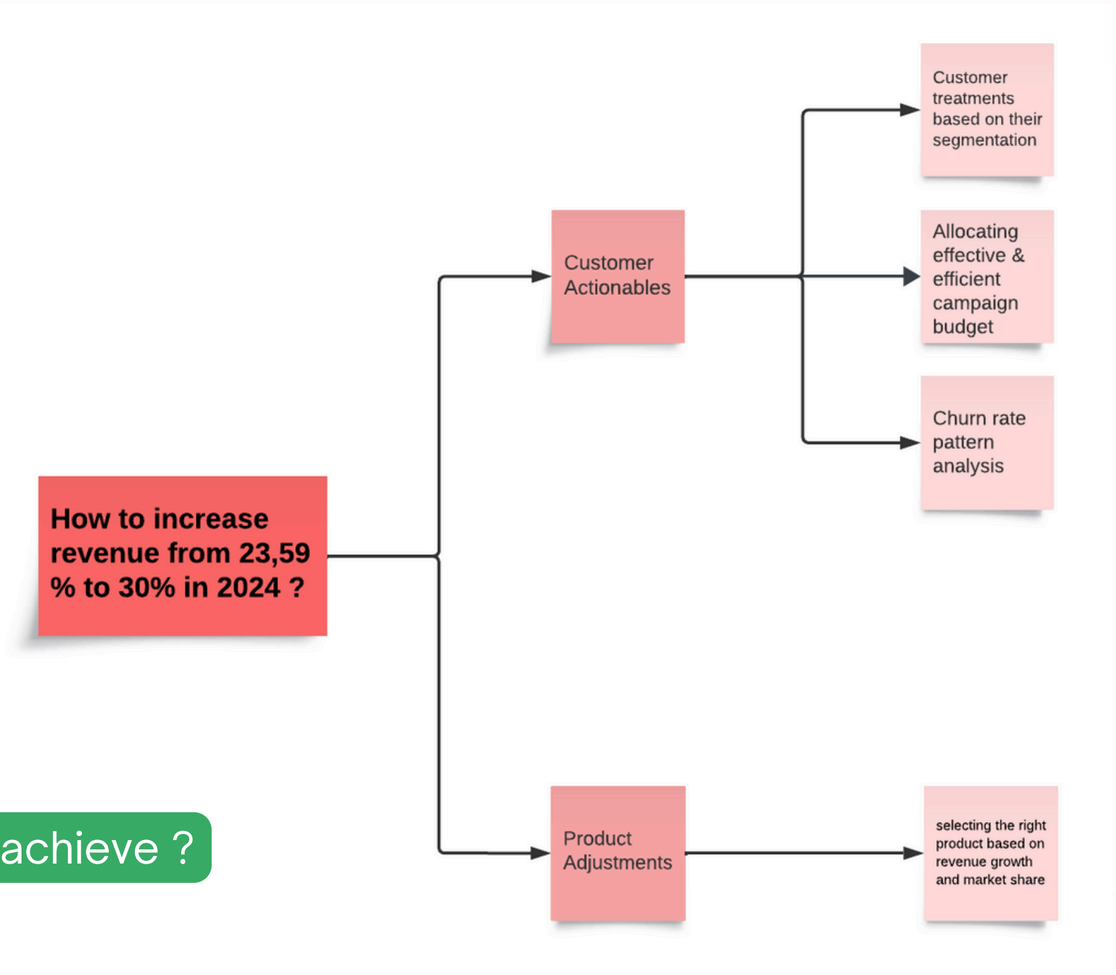
$ 371,185,120

30,00 % ↑

REVENUE (2024)

$ 390,442,449

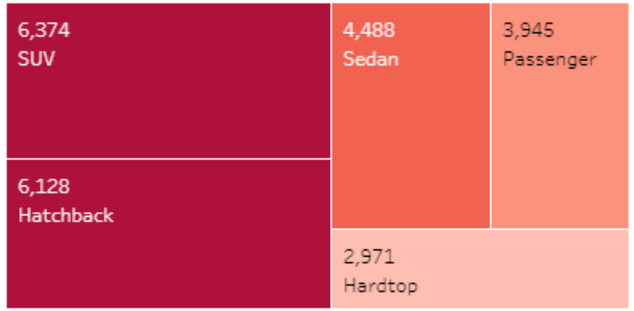
How to achieve ?



Overview

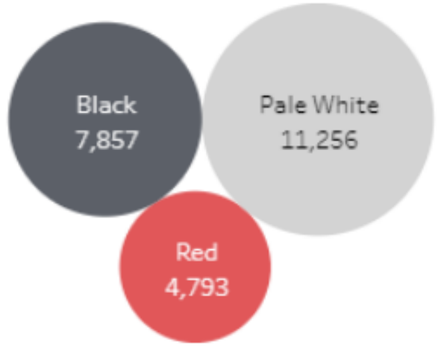
Most Purchased Body Style

find out what type of car do americans like



Most Purchased Color

what's our taste ?

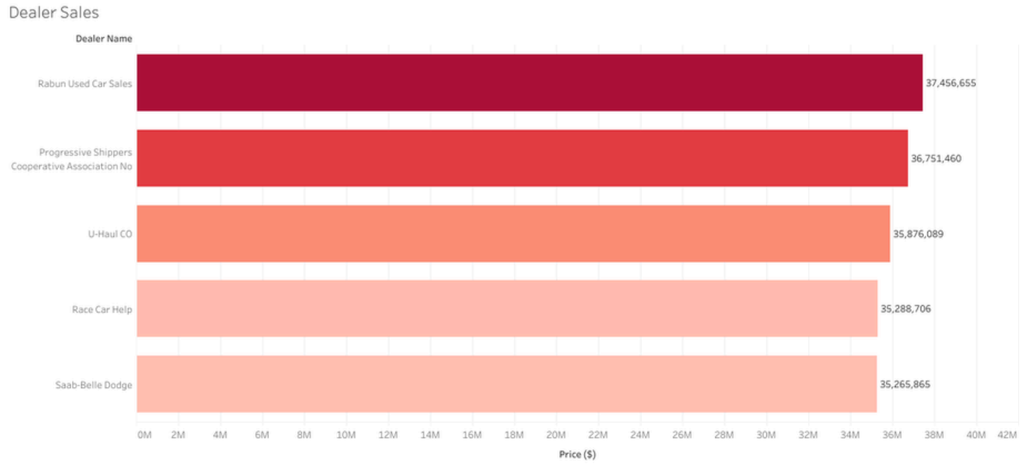


Top Spender

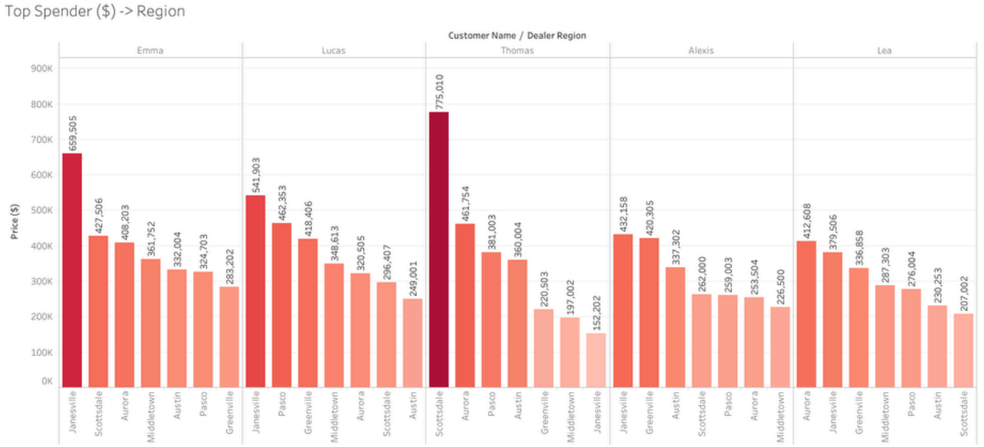
our most valued ones

Top Spender ($) -> Sales Only

Customer Name	
Emma	2,796,875
Lucas	2,637,188
Thomas	2,547,478
Alexis	2,190,772
Lea	2,129,534



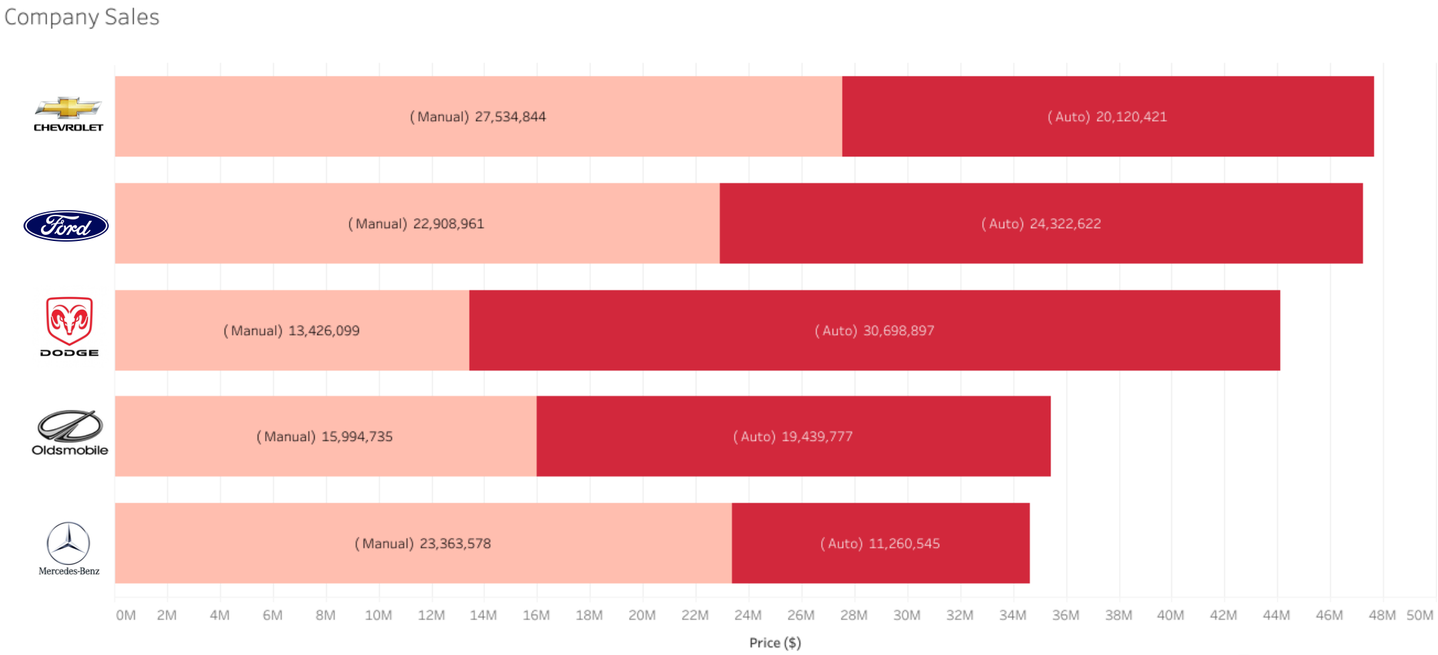
Which garage produced the most for our revenue ?



Our most spending customers, and where did they shop ?

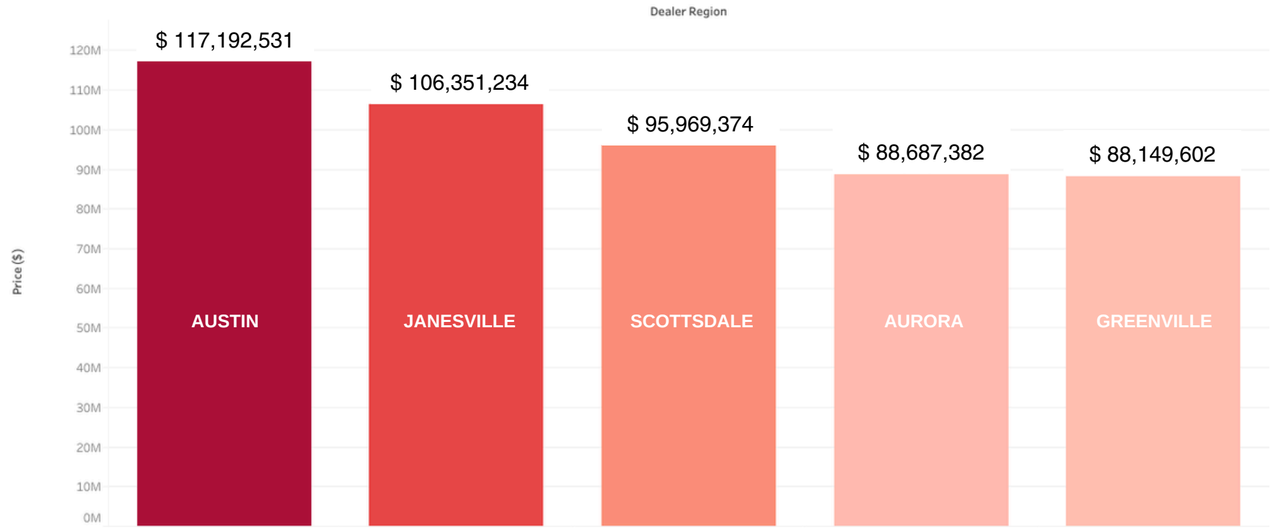
Overview

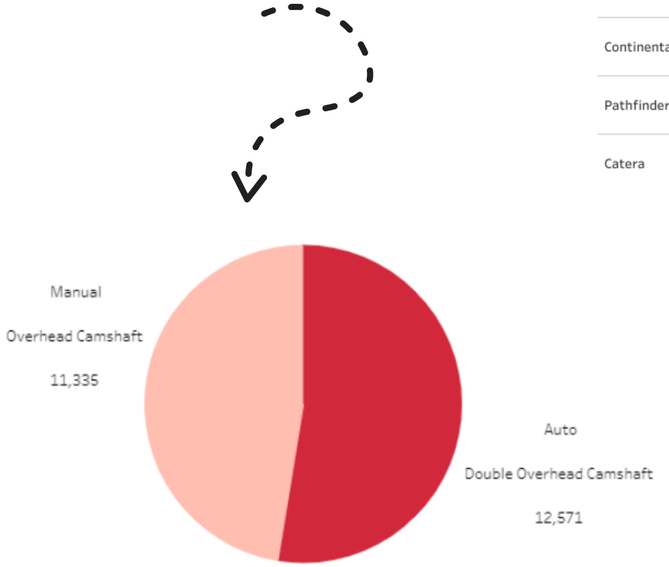
- **Chevrolet** is the most performing brand on the market by sales
- Car with **automatic** transmission still dominated cust' preference
- Looks like that our valued customers spent the most on the city of **Aurora**



Highest Priced Car

Model	Company	
Eldorado	Cadillac	85,800
RAV4	Toyota	85,600
A6	Audi	85,500
S-Class	Mercedes-B	85,250
Malibu	Chevrolet	82,800
Tacoma	Toyota	82,750
C70	Volvo	82,600
Continental	Lincoln	82,500
Pathfinder	Nissan	75,700
Catera	Cadillac	75,600





BUSINESS BACKGROUND

In the purpose of business development with a very fast market phase, our company Speedcar Garage is targeting to open new branches in several regions in the United States, with the hope of supporting effective operations and of course achieving sales targets. The data team is expected to be able to provide recommendations so that this goal can be achieved

Scope of Analysis :

- Records of car sales from year of 2022 to 2023
- Geospatial coverage of United States of America
- Type of car body styles included on the data are : hardtop, hatchback, passenger, sedan, and SUV

DARCI

RESPONSIBLE

Data & Marketing Team

DECISION MAKER

Chief Finance Officer

CONSULTED

Sales & Marketing Head

ACCOUNTABLE

Data & Marketing Head

INFORMED

Sales, Marketing, & Data Team, and C - Levels BOD

Disclaimers :

- Speedcar Garage is fictitious company that was only made for this assignment purpose
- Data used on this report is taken from public source, which most likely had been masked before it was published
- Incomes are assumed to be 10% of Revenue in this case, and investment is set to be 30% of Total Income

BUSINESS PROBLEM & OBJECTIVE

Problem Statements

- **How to increase yearly income growth of car sales from 23,59% to 30%, by the end of 2024 ?**
  - Which car company should be prioritized on procurementships ?
  - What kind of treatments should we conduct to customers in order to increase revenue ?
  - How much budget should be spent on campaign ?

Objective

To find the ideal investment distribution on car companies, what kind of campaign should be conducted, and how much budget should we spend on that campaign, to increase yearly revenue growth from 23,59% to 30 % by the end of 2024

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Analysis Framework

Defining the problem

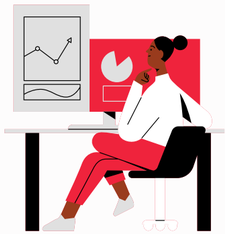
- Understanding the data
- Determine the user using DARCI :
  - Chief Executive Officer
  - Chief Finance Officer
  - Head of Marketing

Data Cleaning & Preparation

- Data cleaning & preparation using Google Spreadsheet
- Advanced data preparation using SQL and Python

Exploratory Data Analysis

- Exploratory data analysis through Spreadsheet, Python, and Tableau

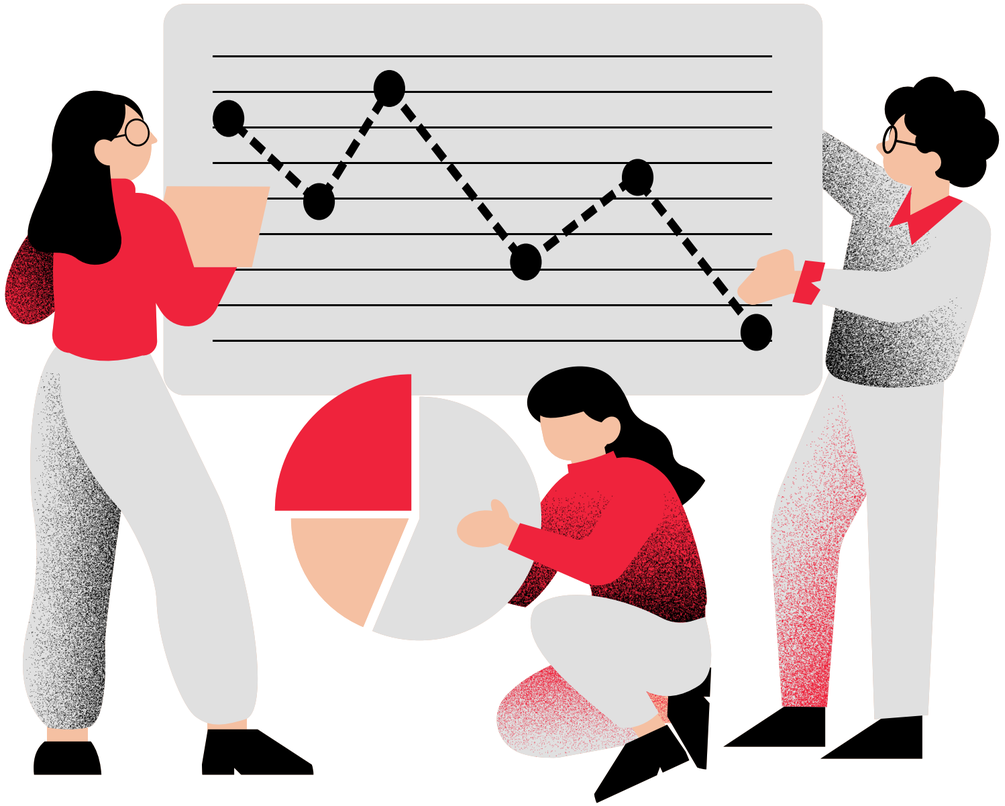


Data Analysis

- Product recommendation : **BCG Matrix**
- Retention rate : **Cohort Analysis**
- Customer Segmentation : **RFM & K-Means Clustering**
- Campaign Budget : **Logistic Regression Propensity Model**

Insight & Recommendation

- Provide business recommendations, such as product recommendation, campaign based on customer segment, and efficient campaign budget

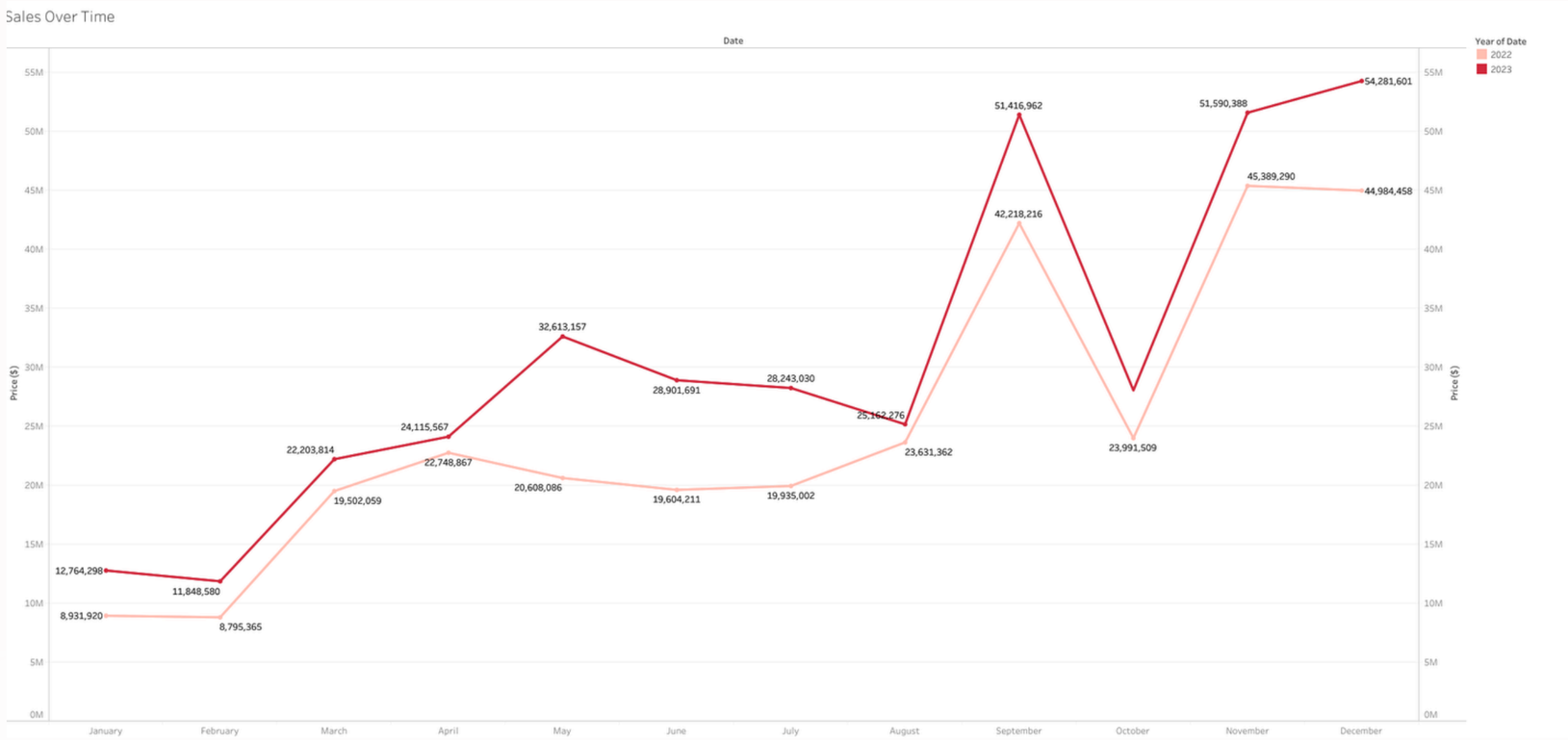


Analysis

- BCG Matrix
- Cohort Analysis
- RFM & K-Means Customer Segmentation
- Determine Cost Effective & Effecient Campaign Budget

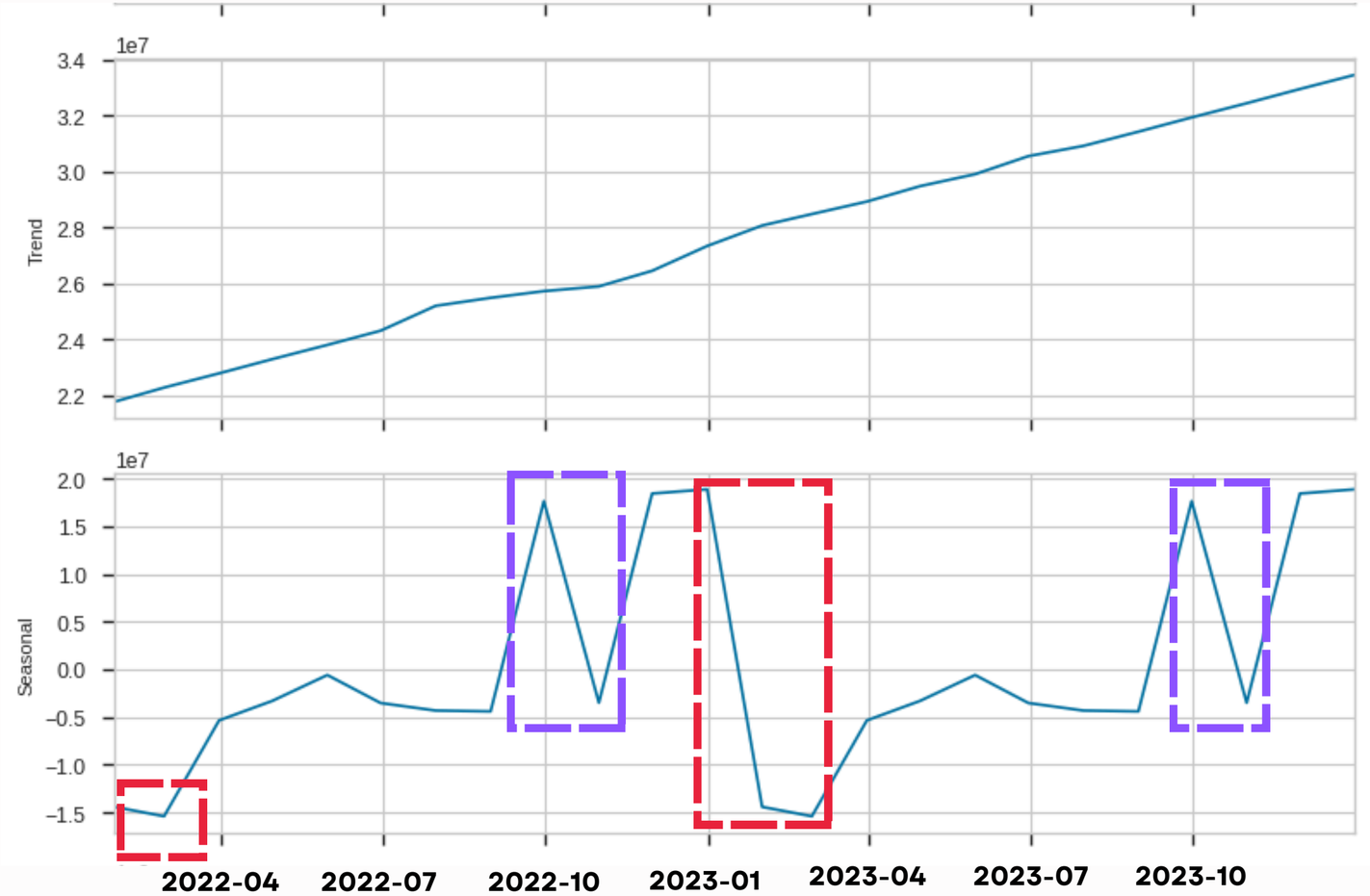
  Using Logistic Regression Propensity Model

SEASONALITY PATTERN ANALYSIS



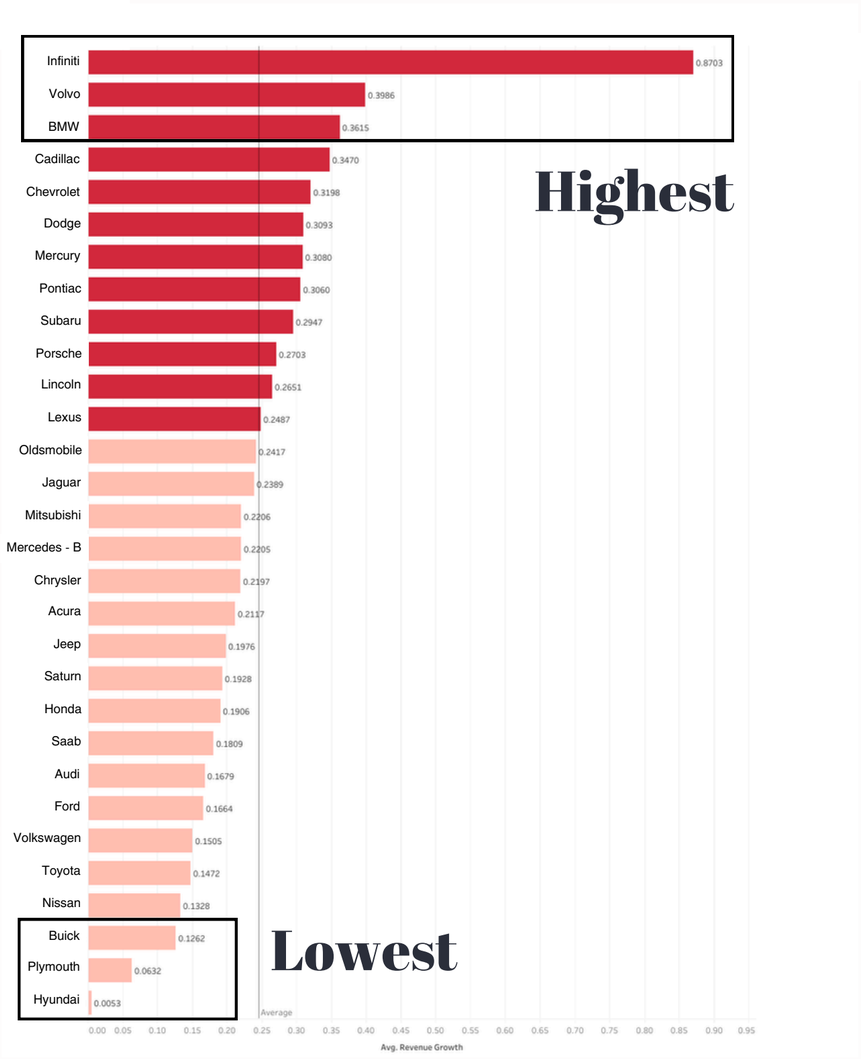
The revenue earned every month in 2023 is greater than in 2022, We will breakdown our revenue **trendline** and it's **seasonality**

SEASONALITY PATTERN ANALYSIS



- Seasonality drop tends to happen on :
  - **The beginning of the year between January and March**
  - **The end of the year between October and November**
- It is recommended that we conduct campaign on these seasonality drop periods to maximize our earning revenues
- However, our revenue trendline already shows positive growth.

Overall Revenue Growth

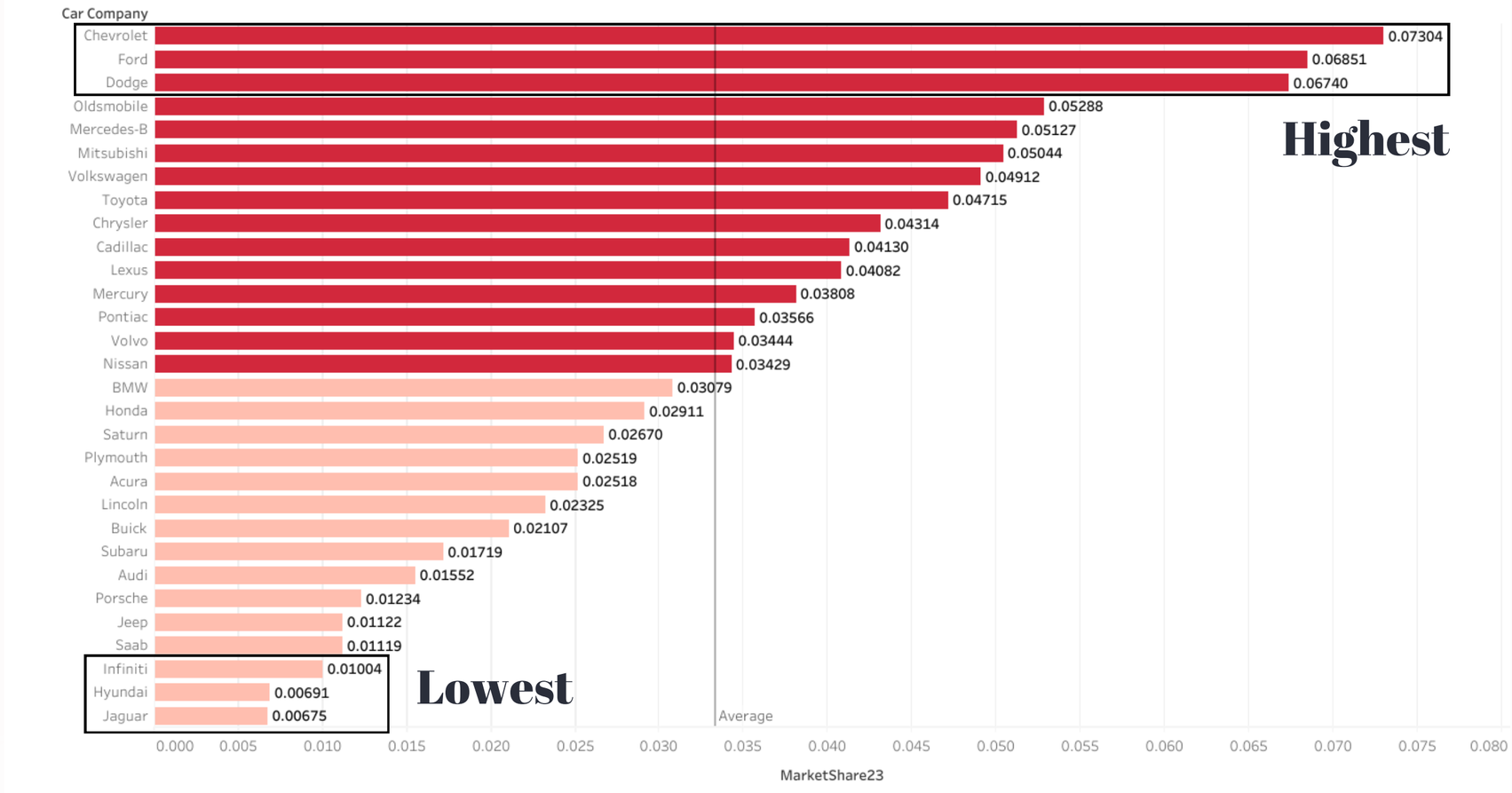


- Top 3 car companies with highest revenue growth from 2022 to 2023 are : **Infinity (87,03%), Volvo (39,86%) and BMW (36,15%)**, this extraordinary growth on Infinity might indicates high product demand in the market, or succesful marketing strategy on previous campaigns.

- Meanwhile bottom 3 car companies with lowest revenue growth from 2022 to 2023 are **Buick (12,62%), Plymouth (6,32%), and Hyundai (0,53%)**. Suggesting challenge on the market demand and strategic positioning for these car brands

- Hence, the aggregate expansion in automotive sales revenue exhibited no negative percentage, indicating favorable market stability.

Overall Marketshare



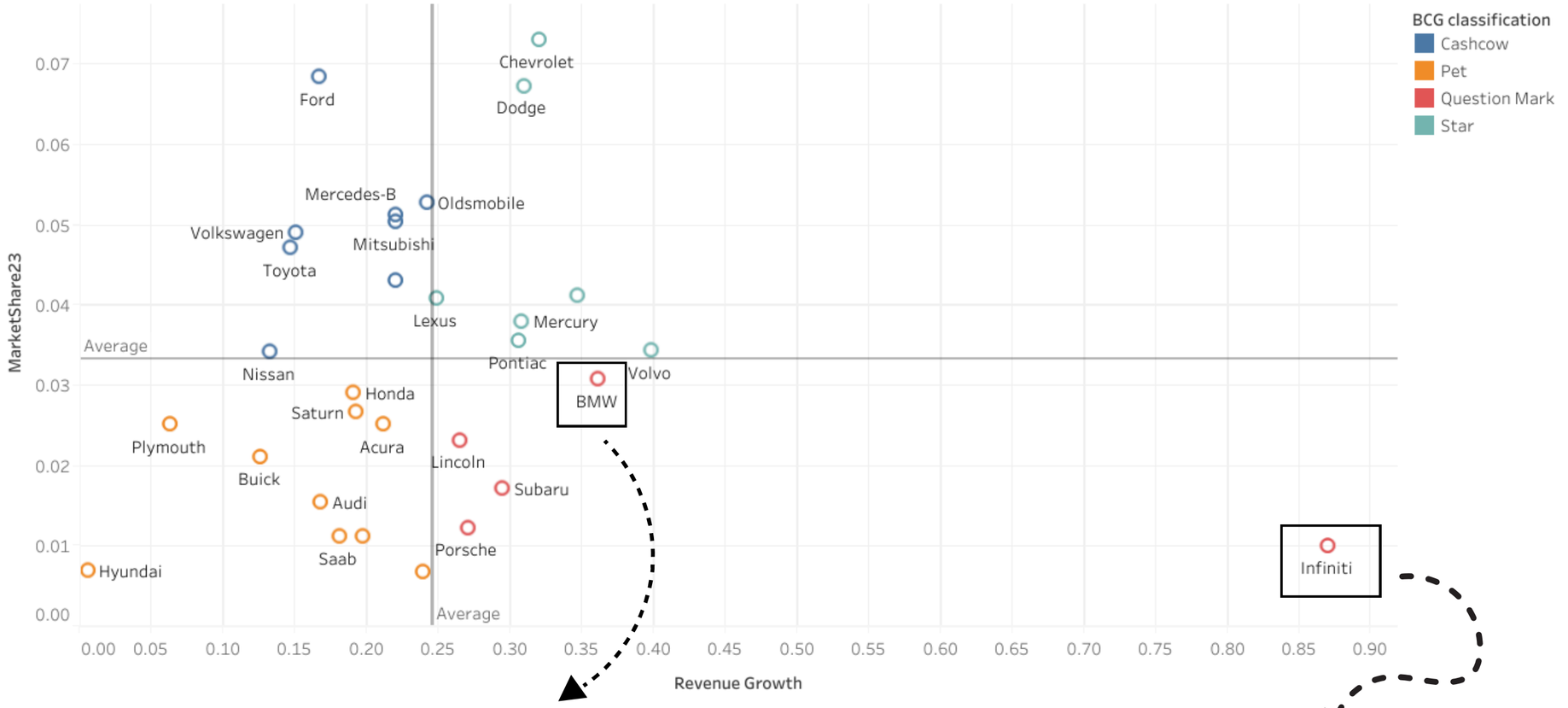
- Top 3 car companies with highest marketshare from 2022 to 2023 are : Chevrolet **(7,30%), Ford (6,85%) and Dodge (6,74%)**

- Meanwhile bottom 3 car companies with lowest marketshare from 2022 to 2023 are **Infiniti (1,04%), Hyundai (0,69%), and Jaguar (0,67%)**.

- The percentage of marketshare seems to be more balancely distributed than the revenue growth

PRODUCT RECOMMENDATION / DEPRIORITIZATION (BCG MATRIX)

BCG Matrix



BMW still has the potential to reach the “Star” tier product.

infinity shows extraordinary revenue growth but low on marketshare, this might indicates, that some small proportion of specific customers, made a huge purchase on this product

- Referring to the left-bottom quadran of the matrix, which is the “Pet”, these car companies indicate slower growth and low revenue potential. They are : **Hyundai, Plymouth, Buick, Audi, Saab, Honda, Saturn, Acura.**

- On the opposite side, the right-top quadran of the matrix, these car companies indicate very promosing growth of revenue, as well as high marketplace proportion. They are : **Oldsmobile, Lexus, Chevrolet, Dodge, Mercury, Pontiac, Volvo**

Product Recommendations

for procurement of new branch

PRODUCT RECOMMENDATION / DEPRIORITIZATION (BCG MATRIX)

Monthly Retention Cohort

			Diff Month																					
Year o..	Month of Fi..	Cohort Size	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
2022	January	296	100.00	16.22	37.16	45.27	48.31	59.80	33.45	32.09	61.82	39.86	58.45	71.62	34.80	30.74	50.34	49.32	63.51	51.35	53.38	43.24	65.54	33.45	57.43	54.05
	February	239	100.00	29.71	47.70	36.40	58.16	42.26	23.85	57.74	34.31	66.95	60.67	50.21	26.78	38.08	46.03	61.92	54.81	52.30	52.30	66.53	39.75	59.00	57.32	
	March	361	100.00	23.82	42.11	23.55	52.08	27.15	43.77	34.63	54.29	48.75	31.86	30.47	36.84	32.96	45.15	50.97	46.26	34.07	57.89	26.04	42.38	48.48		
	April	280	100.00	20.36	12.14	19.64	50.71	31.43	25.00	35.36	31.79	5.71	17.86	43.21	17.50	17.50	47.86	30.00	30.36	46.79	29.64	31.43	48.57			
	May	177	100.00	3.95	18.08	19.21	41.24	12.99	33.90	29.94	10.73	7.91	25.42	34.46	25.42	11.30	24.29	12.43	36.72	12.99	28.25	41.24				
	June	97	100.00	4.12	8.25	34.02	32.99	26.80	30.93	3.09	2.06	6.19	21.65	20.62	9.28	8.25	5.15	21.65	15.46	28.87	25.77					
	July	50	100.00	2.00	8.00	4.00	16.00	10.00	6.00	2.00	4.00	2.00	12.00	18.00	6.00	2.00	16.00	8.00	16.00	22.00						
	August	102	100.00	30.39	8.82	15.69	30.39	18.63	18.63	3.92	8.82	6.86	1.96	9.80	23.53	10.78	7.84	35.29	26.47							
	September	147	100.00	21.09	57.14	38.10	12.93	3.40	6.12	2.72	9.52	18.37	8.84	17.69	44.22	26.53	41.50	21.09								
	October	87	100.00	48.28	48.28		1.15	4.60	3.45	6.90	17.24	14.94	16.09	16.09	41.38	31.03	50.57									
	November	106	100.00	26.42	4.72	2.83	3.77	6.60	11.32	8.49	30.19	23.58	12.26	19.81	30.19	33.96										
	December	78	100.00	2.56	5.13	2.56	6.41	2.56	3.85	8.97	12.82	11.54	8.97	20.51	11.54											
2023	January	19	100.00		10.53	10.53	15.79	5.26	15.79	5.26	26.32	5.26	21.05	31.58												
	February	22	100.00	4.55		18.18			4.55	27.27	9.09	18.18	27.27													
	March	44	100.00	4.55	9.09	4.55		4.55	11.36	6.82	9.09	11.36														
	April	66	100.00	3.03	3.03	1.52	3.03	7.58	1.52	9.09	7.58															
	May	132	100.00	4.55	4.55	4.55	9.85	3.03	9.85	7.58																
	June	72	100.00	1.39	1.39	9.72	5.56	5.56	4.17																	
	July	53	100.00	5.66	7.55	7.55	15.09	5.66																		
	August	56	100.00		3.57	3.57	12.50																			
	September	42	100.00	2.38	7.14	4.76																				
	October	87	100.00	10.34	10.34																					
	November	215	100.00	6.05																						
	December	194	100.00																							

Reffering to the Cohort analysis, the **number of customer acquisition in the first quarter of 2022 is very high**, it also shows good retention rate with over **50% of average percentage of coming-back customers**. this might indicate that previous campaign that was conducted on this period is a major success, If certain strategies or initiatives were particularly effective in improving retention among the first quarter of 2022 cohort, consider **replicating or expanding these approaches to other cohorts**. This could involve rolling out similar marketing campaigns, introducing popular product features to other cohorts, or enhancing customer service standards across the board.

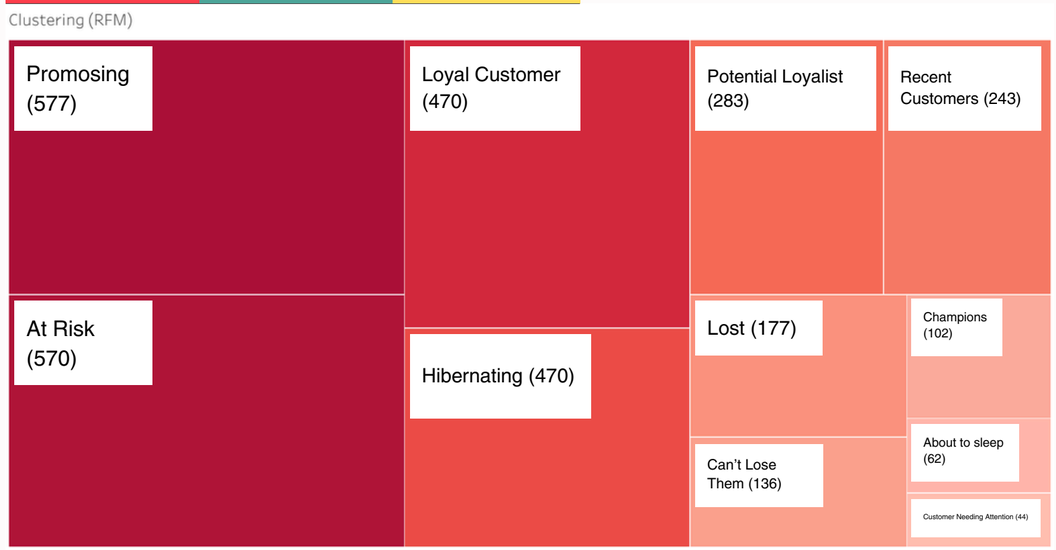
Customer Segments Characteristic (RFM)

Date	Customer Name	Price ($)
1/2/2022	Geraldine	26000
1/2/2022	Gia	19000
1/2/2022	Gianna	31500
1/2/2022	Giselle	14000
1/2/2022	Grace	24500

Date (Recency)
the time difference from the last purchase to the previous purchase.

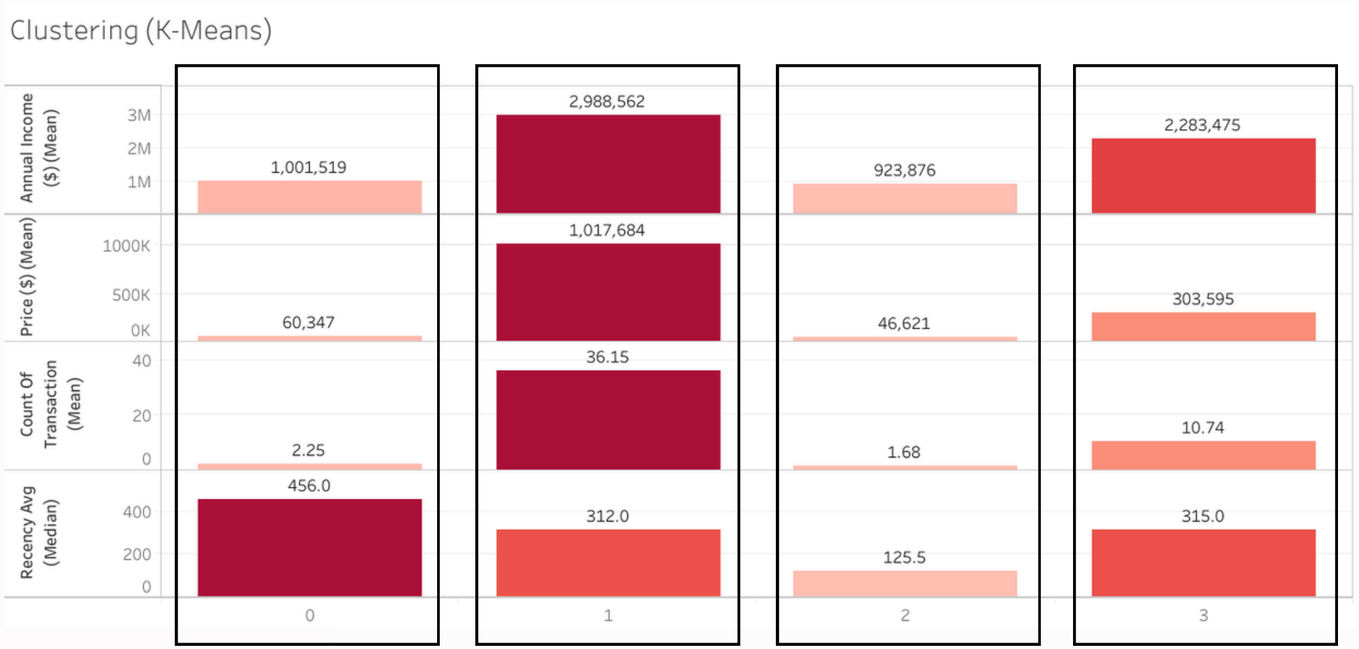
Count of Transaction grouped by Customer Name (Frequency)
How many times have our customers made a purchase

Price ($) / Spending (Monetary)
How much have they spent on car purchase



Segment	Activity	Actionable
Champions	Bought recently, buy often and spend the most!	Reward them. Can be early adopters for new products. Will promote your brand.
Loyal Customers	Spend good money with us often. Responsive to promotions.	Upsell higher value products. Ask for reviews. Engage them.
Potential Loyalist	Recent customers, but spent a good amount and bought more than once.	Offer membership / loyalty program, recommend other products.
Recent Customers	Bought most recently, but not often.	Provide on-boarding support, give them early success, start building relationship.
Promising	Recent shoppers, but haven't spent much.	Create brand awareness, offer free trials
Customers Needing Attention	Above average recency, frequency and monetary values. May not have bought very recently though.	Make limited time offers, Recommend based on past purchases. Reactivate them.
About To Sleep	Below average recency, frequency and monetary values. Will lose them if not reactivated.	Share valuable resources, recommend popular products / renewals at discount, reconnect with them.
At Risk	Spent big money and purchased often. But long time ago. Need to bring them back!	Send personalized emails to reconnect, offer renewals, provide helpful resources.
Can't Lose Them	Made biggest purchases, and often. But haven't returned for a long time.	Win them back via renewals or newer products, don't lose them to competition, talk to them.
Hibernating	Last purchase was long back, low spenders and low number of orders.	Offer other relevant products and special discounts. Recreate brand value.
Lost	Lowest recency, frequency and monetary scores.	Revive interest with reach out campaign, ignore otherwise.

Customer Segments Characteristic (K-Means)



Cluster 0 customers tend to have the worst churn rate by showing highest number of recency, spending and count of transaction are also considered low

High value for all indicator : annual income, spending, and transactions indicates the customer from cluster 1, except for recency.

Lowest value of all indicators except for recency, is the characteristic for customers from cluster 2

The closest competitior for cluster 1, with some good numbers of indicators, which is cluster 3

0

Budget Buyers

Long recency, low number of transaction, low number of sales, medium number of annual income

1

High-End Enthusiasts

Long recency, high number of transaction, high number of sales, high number of annual income

2

Occasional Buyers

Short recency, low number of transaction, low number of sales, low number of annual income

3

Middle Market

Long recency, medium number of transaction, medium number of sales, medium number of annual income

Business Recommendation Based on Customer Segmentation (K - Means)

Cluster	Recommendations
Budget Buyers	• Offer a range of affordable car options with competitive pricing and financing options. • Highlight value for money, emphasizing fuel efficiency, low maintenance costs, and reliability.
High-End Enthusiasts	• Showcase luxury and high-performance vehicles prominently in your inventory. • Provide exclusive VIP services such as concierge delivery, personalized financing, and extended warranties. • Host special events or VIP experiences for this segment, such as test drive weekends or invitation-only launch parties for new models.
Occasional Buyers	• Focus on building trust and rapport with personalized customer service to overcome price sensitivity. • Offer flexible financing options tailored to customers with lower incomes, such as longer loan terms or lower down payments. • Provide transparent pricing and value-added services, such as free maintenance or extended warranties, to alleviate concerns about reliability and ownership costs.
Middle Market Shoppers	• Provide a diverse range of vehicle options that cater to different preferences and budgets. • Offer competitive pricing and financing options to appeal to the middle-income demographic. • Implement a customer loyalty program to incentivize repeat business and referrals.

Benefit - Cost Analysis (Logistic Regression Propensity Model Based)

COST

Income assumed to be **10% of Company's total revenue generated from year 2022 to 2023**. 30% of **Income** will be allocated to fund the next coming campaign, by evenly distributing the budget to all existing customers.

Considering the *propensity model prediction*, what is the benefit cost ratio ? is the campaign worth doing ? how much money should be allocated for each customer ?

Total Income = 10% x Total Revenue

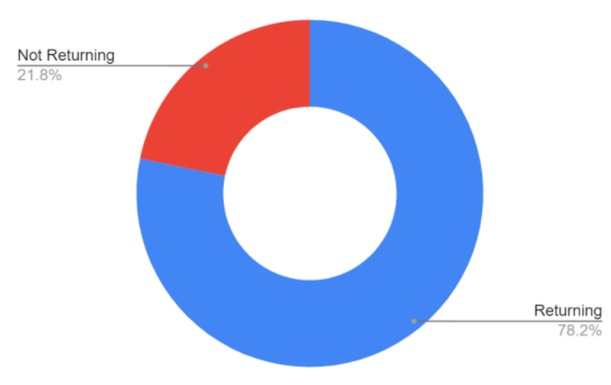
$ 67,152,546

Campaign Budget = 30% x Total Income

$ 20,145,764

BENEFIT

Based on Propensity Model prediction, it is calculated that predicted returning customers are **2363 out of 3021 existing customers.**



B/C RATIO
2,64

Return on Investment is 264%, which is quite high and very recommended

Predicted income is :

Expected Returning Cust. x (Revenue per Transaction x Transaction per Cust.)

Revenue per Customer

$ 531,013,360 --> Income = 10% x $531,013,360 = **$ 53,101,336**

LOGISTIC REGRESSION PROPENSITY MODEL

INSIGHTS & RECOMMENDATIONS SUMMARY

- Car companies product for branch procurement recommendations based on revenue growth and marketshare are : **Chevrolet, Ford, Dodge, Oldsmobile, Mercedez, Mitsubishi, Volkswagen, Toyota, Volvo, Nissan, Lexus, BMW, Mercury, Pontiac**
- Customer's who frequently **cameback** to purchase cars mostly came from the **first quartile batch of 2022**, is there any campaign that conducted on this periode ? if so, **repetition** might be recommended.
- Based on RFM analysis, we have a high number of **"At Risk"** and **"Hibernating"** customers, focusing our actionables on retaining these clusters are recommended to keep revenue's positive trend
- Based on K-Mean analysis, Cluster **0** & **2** which are **"Budget Buyers"** and **"Occasional Buyers"** segments, might be our top priorites to retain as for the puropose of keeping our revenue's positive trend
- **Allocating 30% of Total Income (from 2022 to 2023) for Campaign's Budget purpose**, are highly recommended as well, that the number shows promising **ROI (261 % or 2,61 B/C Ratio)**
- We can see from the seasonality trend linechart that our revenue tends to drop on **the first and the last quarter of each year**, therefore conducting campaign on this timing is recommended

END OF PRESENTATION

THANK YOU

Let’s Connect !

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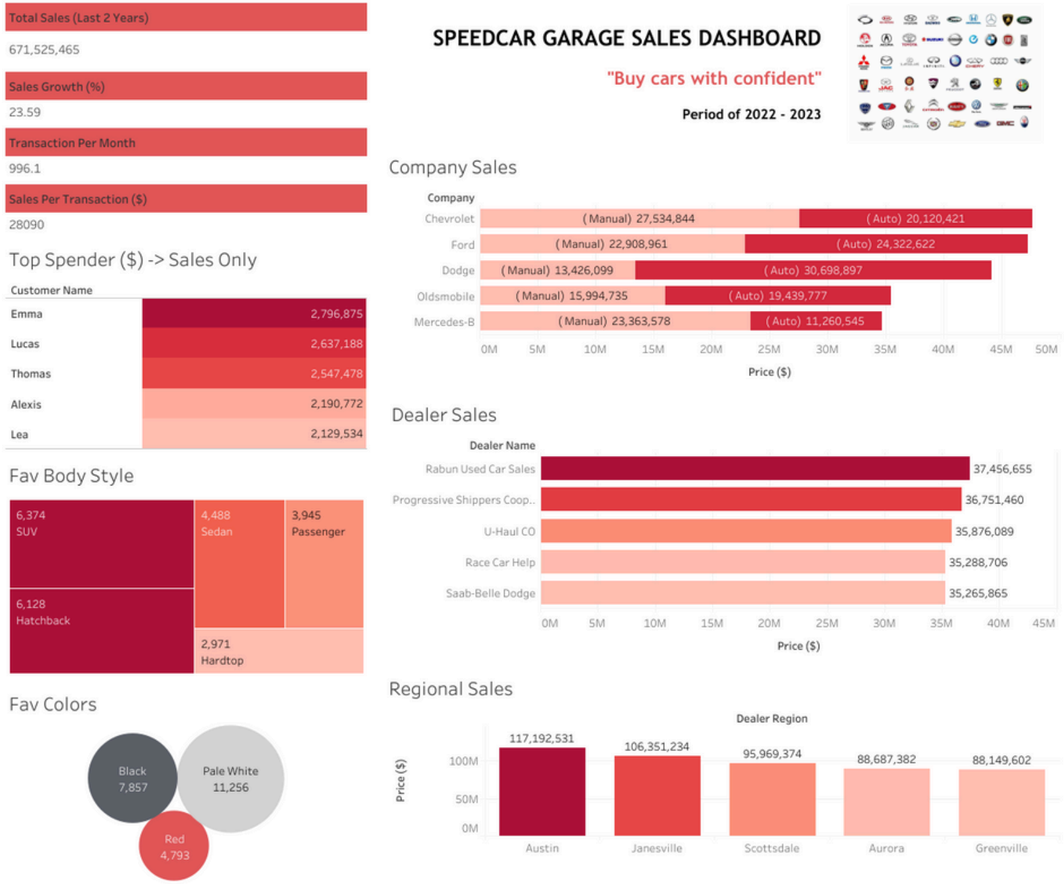
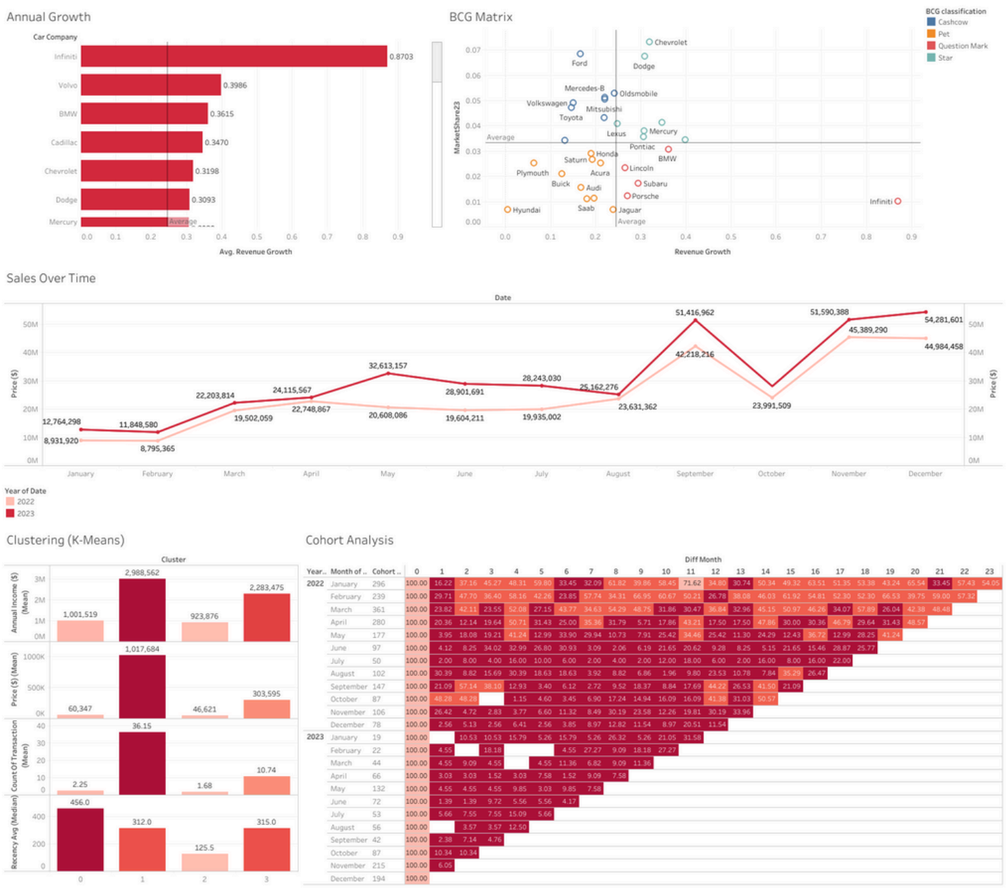
Jakarta

APPENDIX

Sales Dashboard Snapshot



Marketing Dashboard Snapshot



APPENDIX

BCG Matrix Analysis Syntax in SQL

```
WITH Rev22 as
(SELECT Company as car_company,
SUM(Price____) as Revenue22
FROM `revou-sql-class-406014.car_sales_cleaned.car_sales` car_sales
WHERE EXTRACT (YEAR FROM DATE (car_sales.Date)) = 2022
GROUP BY 1
ORDER BY 2 DESC),

Rev23 as
(SELECT Company as car_company,
SUM (Price____)as Revenue23
FROM `revou-sql-class-406014.car_sales_cleaned.car_sales` car_sales
WHERE EXTRACT (YEAR FROM DATE (car_sales.Date)) = 2023
GROUP BY 1
ORDER BY 2 DESC),

RevGrowth as
(SELECT Rev22.car_company as car_company,
Revenue22,
Revenue23,
(Revenue23-Revenue22)/Revenue22 as revenue_growth
FROM Rev22
LEFT JOIN Rev23
 ON Rev22.car_company = Rev23.car_company
),

Marketshare as
(SELECT car_company,
Revenue22/SUM(Revenue22) OVER () as MarketShare22,
Revenue23/SUM(Revenue23) OVER () as MarketShare23
FROM RevGrowth)

SELECT Marketshare.car_company,
RevGrowth.revenue_growth,
Marketshare.MarketShare23,


CASE WHEN
RevGrowth.revenue_growth > AVG(RevGrowth.revenue_growth) OVER () AND Marketshare.MarketShare23 > AVG
(Marketshare.MarketShare23) OVER () THEN 'Star'
WHEN RevGrowth.revenue_growth > AVG (RevGrowth.revenue_growth) OVER () AND Marketshare.MarketShare23 < AVG
(Marketshare.MarketShare23) OVER () THEN 'Question Mark'
WHEN RevGrowth.revenue_growth < AVG (RevGrowth.revenue_growth) OVER () AND Marketshare.MarketShare23 > AVG
(Marketshare.MarketShare23) OVER () THEN 'Cashcow'
ELSE 'Pet'
END AS BCG_classification
FROM RevGrowth
INNER JOIN Marketshare
 ON RevGrowth.car_company = Marketshare.car_company
```

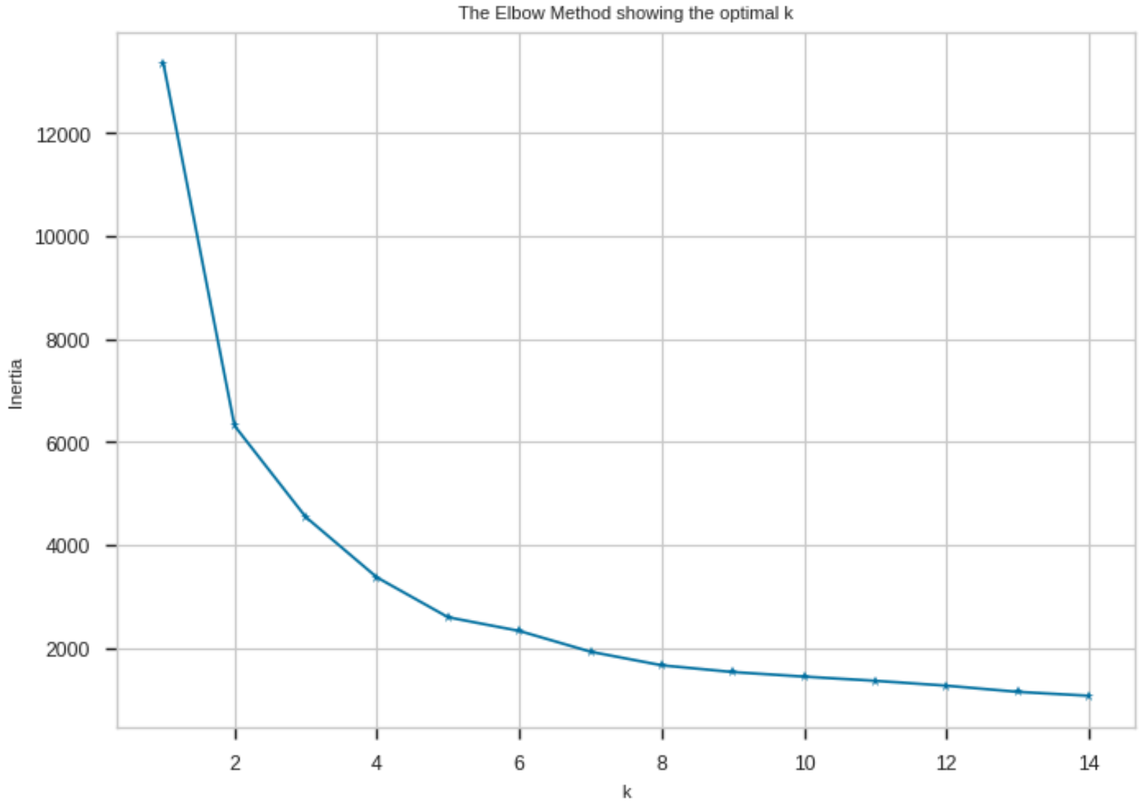
APPENDIX

Cohort Analysis Syntax in SQL

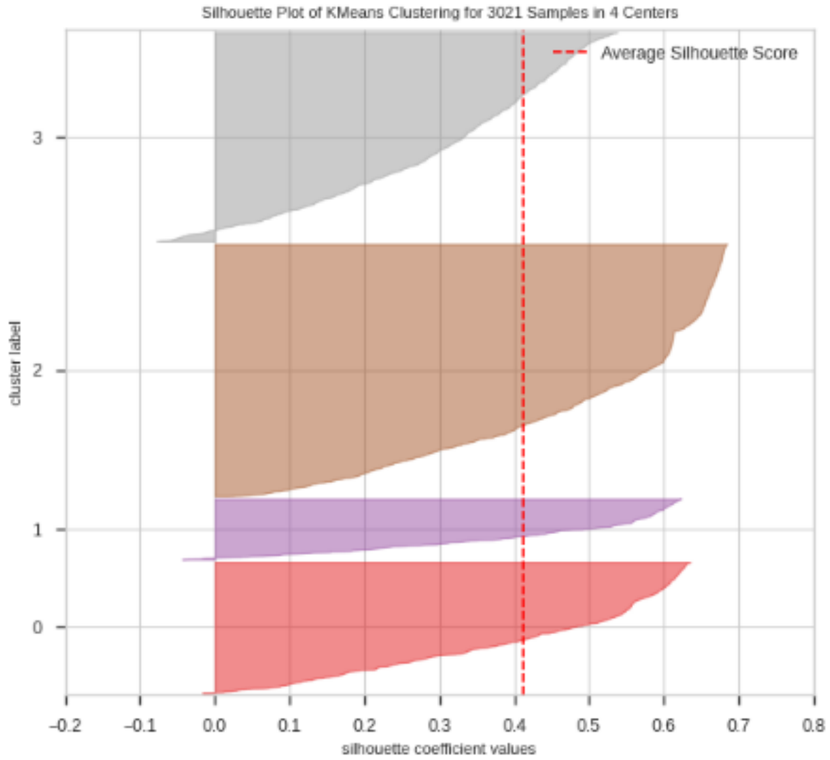
```
WITH first_cohort as (
 SELECT DISTINCT (Customer_Name),
 MIN (DATE_TRUNC (DATE (carsales.Date), MONTH)) OVER (PARTITION BY Customer_Name) as first_purchase,
 DATE_TRUNC (DATE(carsales.Date), MONTH) as next_purchase
 FROM `revou-sql-class-406014.car_sales_cleaned.car_sales` as carsales
 WHERE Customer_Name IS NOT NULL
 AND carsales.Date IS NOT NULL
 ),

 difference as(
SELECT *,
DATE_DIFF(next_purchase, first_purchase, MONTH) as diff_month,
COUNT (DISTINCT (Customer_Name)) OVER (PARTITION BY first_purchase) as cohort_size
FROM first_cohort
),

final_user as (
SELECT first_purchase,
diff_month,
cohort_size,
COUNT (DISTINCT (Customer_Name)) as total_user
FROM difference
WHERE DATE (first_purchase) >= '2022-01-01'
GROUP BY 1,2,3
ORDER BY 1,2
)

SELECT *,
total_user/cohort_size *100 as total_user_percent
FROM final_user
```

APPENDIX

Elbow Method Showing Optimal K For Clustering

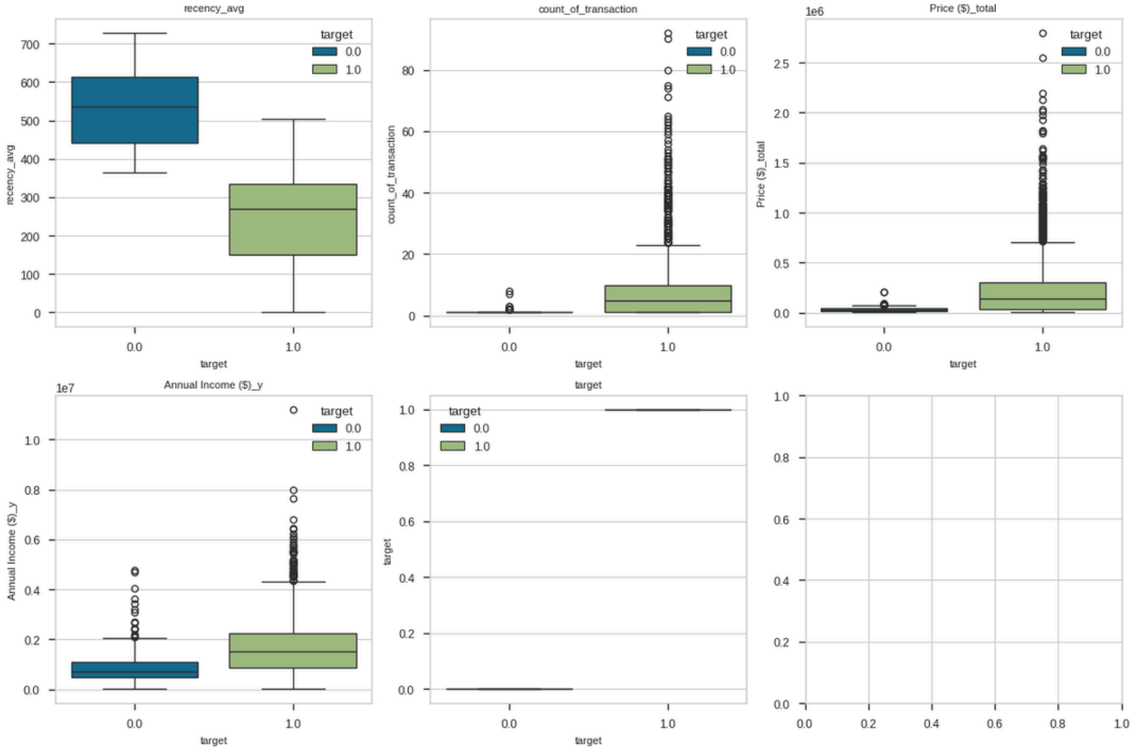


Silhoutte score of K-Means Clustering

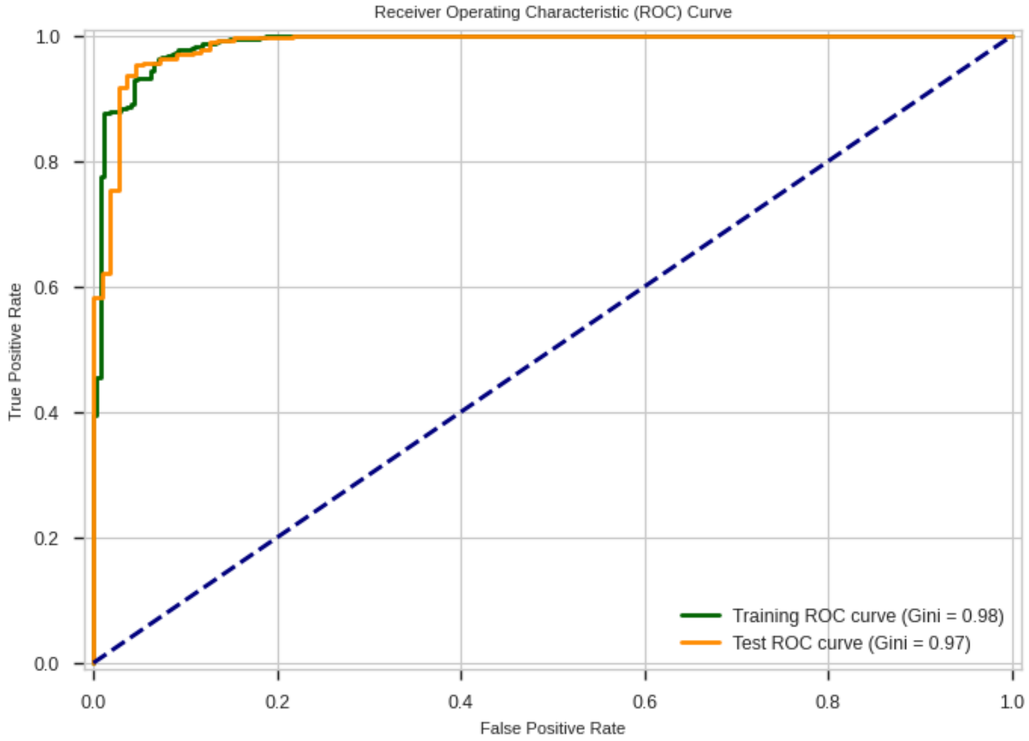


APPENDIX

Logistic Regression Characteristics



ROC-AUC Curve of Propensity Model



APPENDIX

Links

Colab (Python) for Customer Segmentation and Logistic Regression Propensity Model

https://colab.research.google.com/drive/1-8hOJVwycHIziW3f8N0kG185Jeadx5CG?usp=sharing

Cloud / BIgQuery (SQL) for BCG Matrix Analysis and Cohort Analysis

https://console.cloud.google.com/bigquery?sq=325695390342:7190b912ff5747cb8cc9d0e98cdafe73

Original Dataset

https://docs.google.com/spreadsheets/d/1Nd_-4PRbxoCi2fdTp_8J8MzsVxjL45oCss5EAmpO4Yk/edit?usp=sharing

Cleaned Dataset

https://docs.google.com/spreadsheets/d/1-Q06YEg2N3NmLNPvWJku8Hj8KpcRMqZybr0DpD1RBF0/edit?usp=sharing

Dashboard

https://public.tableau.com/views/DEEPP_FSDA_BARCELONA_TEAM1_MICHAEL/Dashboard1?:language=en-US&:sid=&:display_count=n&:origin=viz_share_link