



SQL REPORT

A PROJECT REPORT

Submitted by

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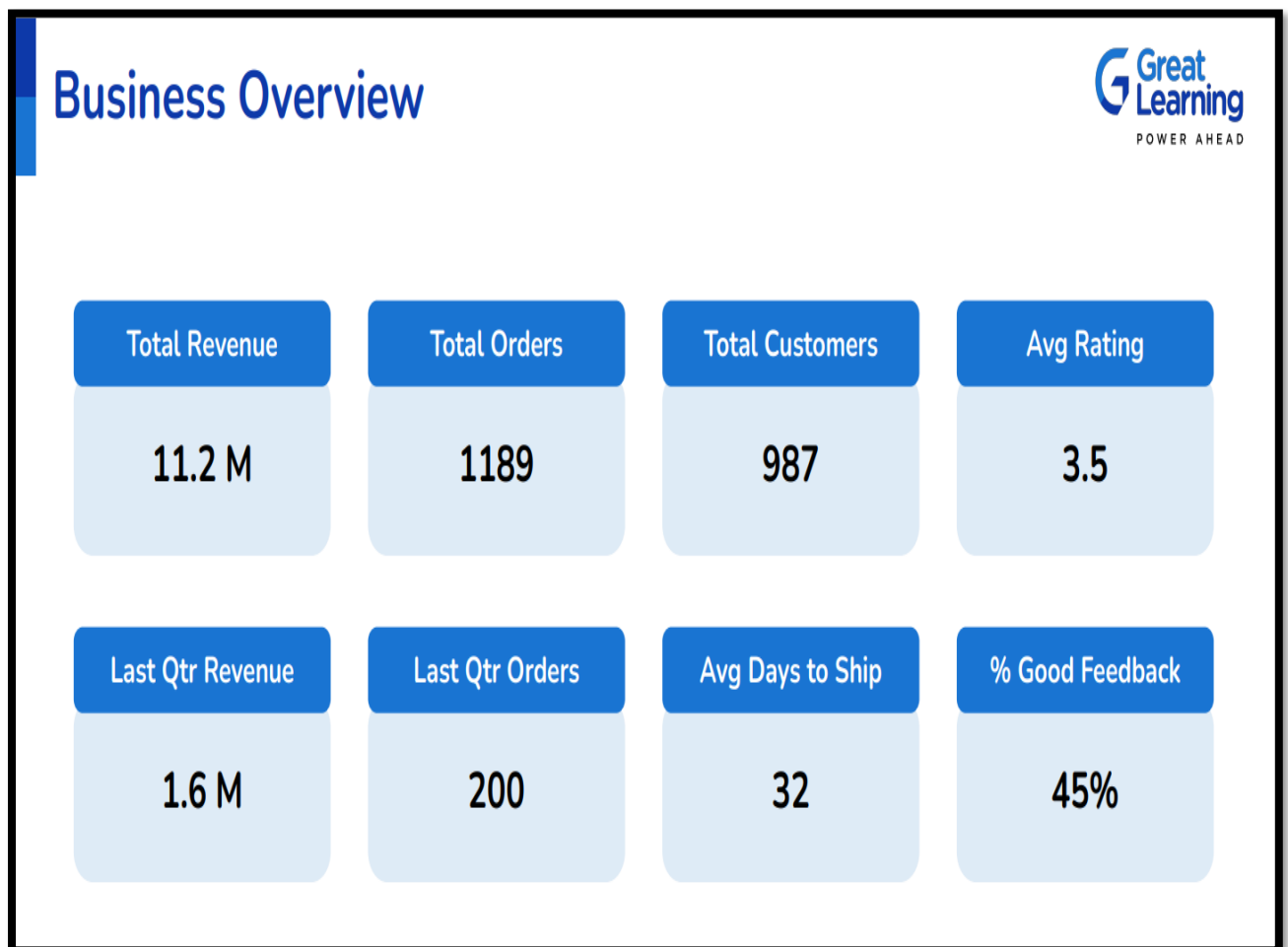


Business Context:

A lot of people in the world share a common desire: to own a vehicle. A car or an automobile is seen as an object that gives the freedom of mobility. Many now prefer pre-owned vehicles because they come at an affordable cost, but at the same time, they are also concerned about whether the after-sales service provided by the resale vendors is as good as the care you may get from the actual manufacturers. New Wheels, a vehicle resale company, has launched an app with an end-to-end service from listing the vehicle on the platform to shipping it to the customer's location. This app also captures the overall after-sales feedback given by the customer.

Problem Statement:

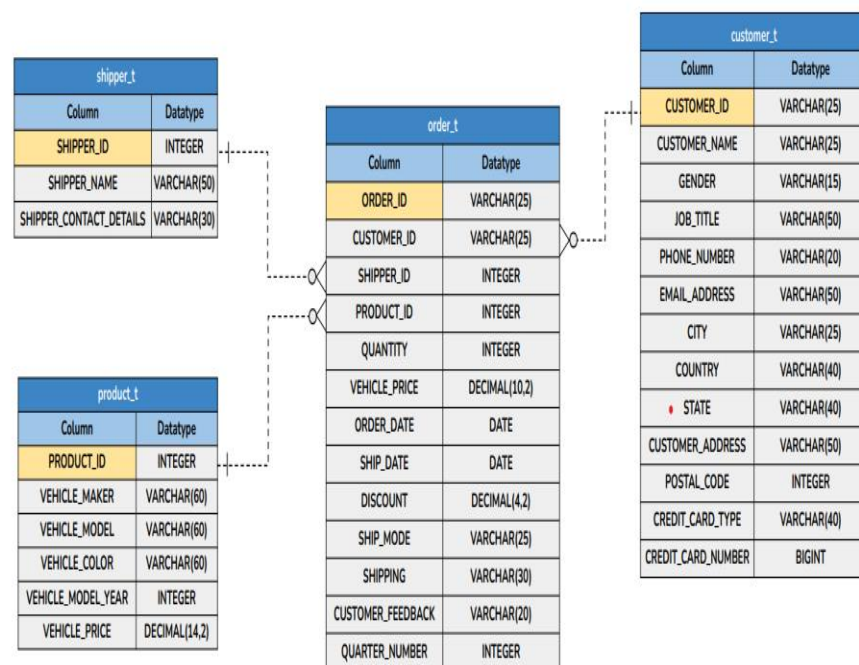
New-Wheels sales have been dipping steadily in the past year, and due to the critical customer feedback and ratings online, there has been a drop in new customers every quarter, which is concerning to the business. The CEO of the company now wants a quarterly report with all the key metrics sent to him so he can assess the health of the business and make the necessary decisions.



Objective:

As a data scientist, you see that there is an array of questions that are being asked at the leadership level that need to be answered using data. Import the dump file that contains various tables that are present in the database. Use the data to answer the questions posed and create a quarterly business report for the CEO

Entity-Relationship Diagram



Customer Metrics

Q1. What is the distribution of customers across states, Show 5 states with most customers.

Ans: Distribution of Customers across States

The below graph indicates five states with no of customers per state

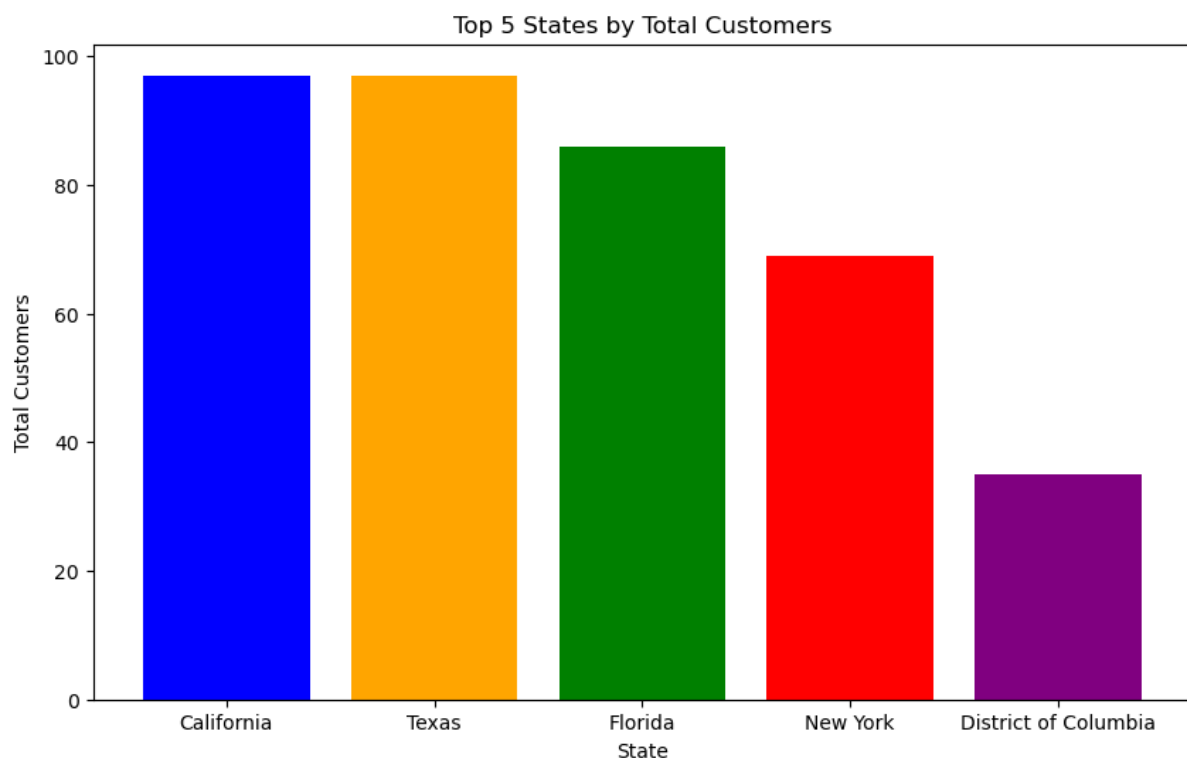


Fig1: Top 5 States with Highest Number of Customers

OBSERVATION AND FINDINGS:

California and Texas Lead with the Highest Number of Customers:

- I see that California and Texas have the highest number of customers, with each state having **97 customers**. It's interesting to see how these two states have such a large customer base compared to another state.

Florida Follows Closely as the Third Largest Customer Base:

- Florida has secured the third position among the top states with a substantial customer base of 86.

New York ranks fourth in terms of customer count, with a significant number of customers:

- New York is the fourth state with a significant customer base of 69 people.

District of Columbia Rounds Up the Top Five:

- Interesting, the District of Columbia is ranked fifth and has a customer base of 35.

Distribution of Top States:

The top five states with the largest customer bases are spread across different regions of the United States.

Strategic Business Considerations:

- California, Texas, and Florida being ***the top three states***, offer substantial opportunities for business growth and market presence.
- New York and the District of Columbia also present significant markets and may be areas for strategic business initiatives.

Q2.What is the average rating in each quarter?

Average Customer Ratings by Quarter

	quarter_number	average_rating
0	1	3.55
1	2	3.35
2	3	2.96
3	4	2.40

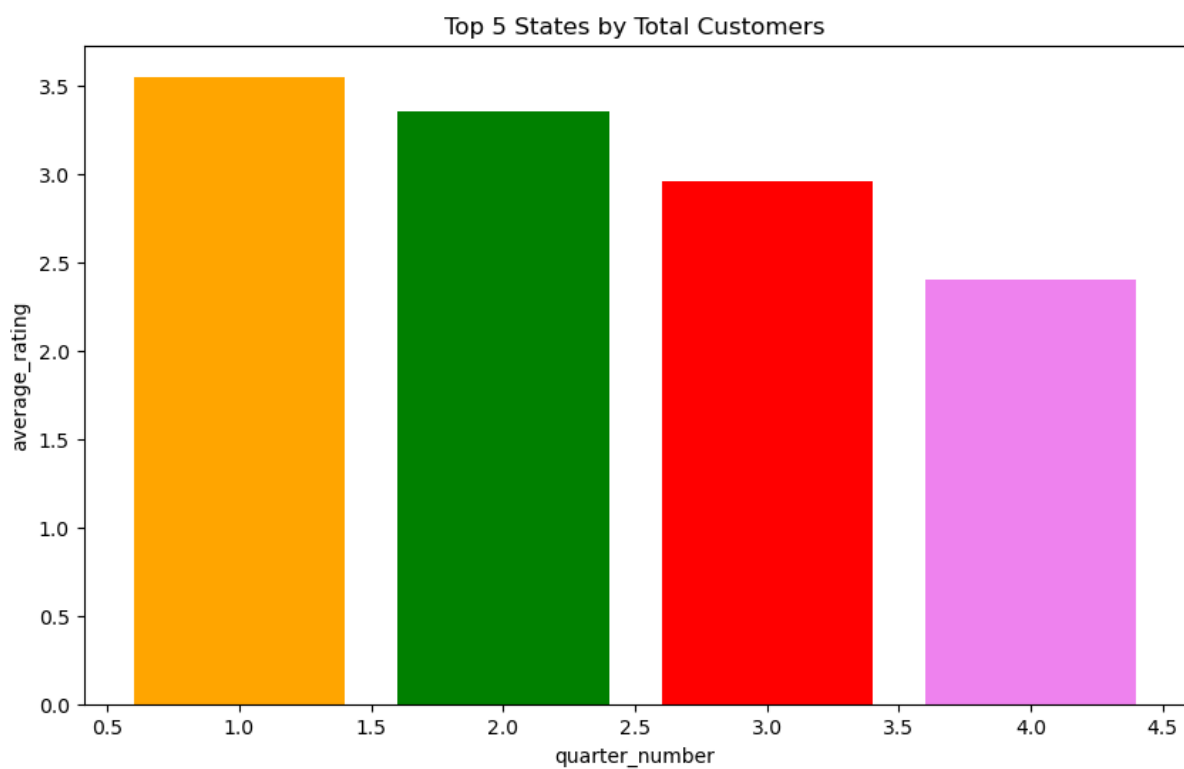


Fig 2:Average rating of Top 5 states by Total Customers

Observation and Findings

- There is a consistent decline in average customer ratings across the four quarters.
- The first quarter starts with a relatively high average rating of 3.55, but there is a noticeable decrease in the second quarter to 3.35.
- The decline continues in the third quarter with an average rating of 2.96, and there is a further reduction in the fourth quarter to investigate
- The downward trend in ratings indicates a potential decline in customer satisfaction over the observed quarters.
- It's crucial to investigate the factors contributing to this decline and take corrective actions to address customer concerns and improve satisfaction levels.

Q3.Are customers getting more dissatisfied over time?

	quarter_number	very_good	good	okay	bad	very_bad
0	1	0.30	0.29	0.19	0.11	0.11
1	2	0.29	0.22	0.20	0.14	0.15
2	3	0.17	0.21	0.22	0.23	0.18
3	4	0.10	0.10	0.20	0.29	0.31

Quarterly Distribution of Ratings:

- During Quarter 1, the highest percentage of ratings was given to "Very Good" (30%), followed closely by "Good" (29%).
- In Quarter 2, the rating for "Good" remained high at 22%, but there was a slight decrease in "Very Good" to 29%.
- Quarter 3 saw a significant drop in "Very Good" (17%), with a more balanced distribution among other categories.

- Finally, Quarter 4 experienced a notable decline in all positive categories, with "Very Good" and "Good" receiving fewer ratings compared to the previous quarters." each at 10%.

Trends and Patterns:

Here are some trends and patterns that I have noticed:

- The percentage of "Very Good" and "Good" ratings has consistently decreased over the quarters.
- The proportion of "Bad" ratings has increased significantly from 11% in Quarter 1 to 29% in Quarter 4.
- Similarly, "Very Bad" ratings have shown a substantial rise from 11% to 31% over the same period.
- The percentage of "Okay" ratings has remained relatively stable in the first three quarters but has increased to 20% in Quarter 4.

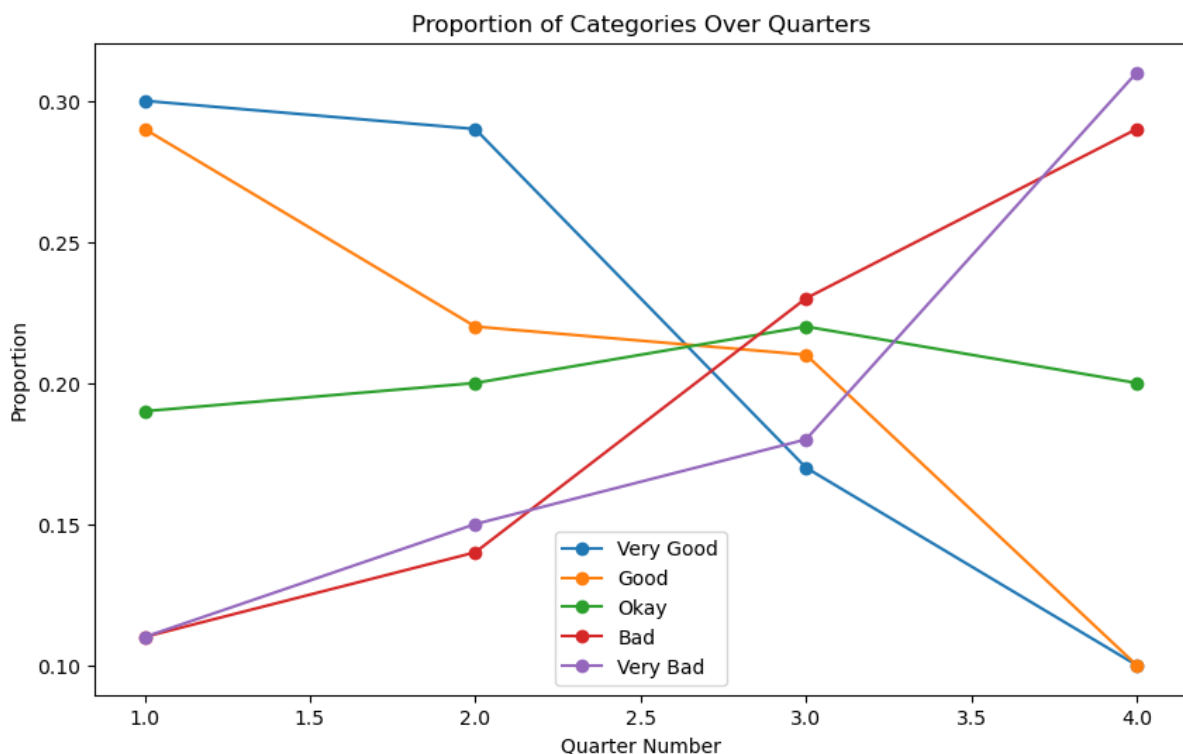


Fig 3: Proportion of categories over Quadrants

Concerns and Areas for Improvement:

- The decrease in favorable ratings, coupled with a rise in unfavorable ratings, may point towards possible issues or dissatisfaction among customers.
- It is crucial to pinpoint and tackle the factors that are contributing to the drop in customer satisfaction, particularly in the later parts of the year.
- The uptick in "Okay" ratings could be indicative of a shift from positive to neutral sentiments, underscoring the necessity of enhancing the customer experience.



Fig 3.1:Heatmap of Categories over Quadrants

Actionable Insights:

- Conducting customer feedback surveys or qualitative analysis can help gain a better understanding of the specific areas that need improvement.
- After identifying the pain points, targeted strategies can be implemented to enhance customer satisfaction.
- It is important to continuously monitor feedback trends over time to track the effectiveness of the implemented changes and ensure a positive customer experience.

Q4. Which are the top 5 vehicle makers preferred by the customer?

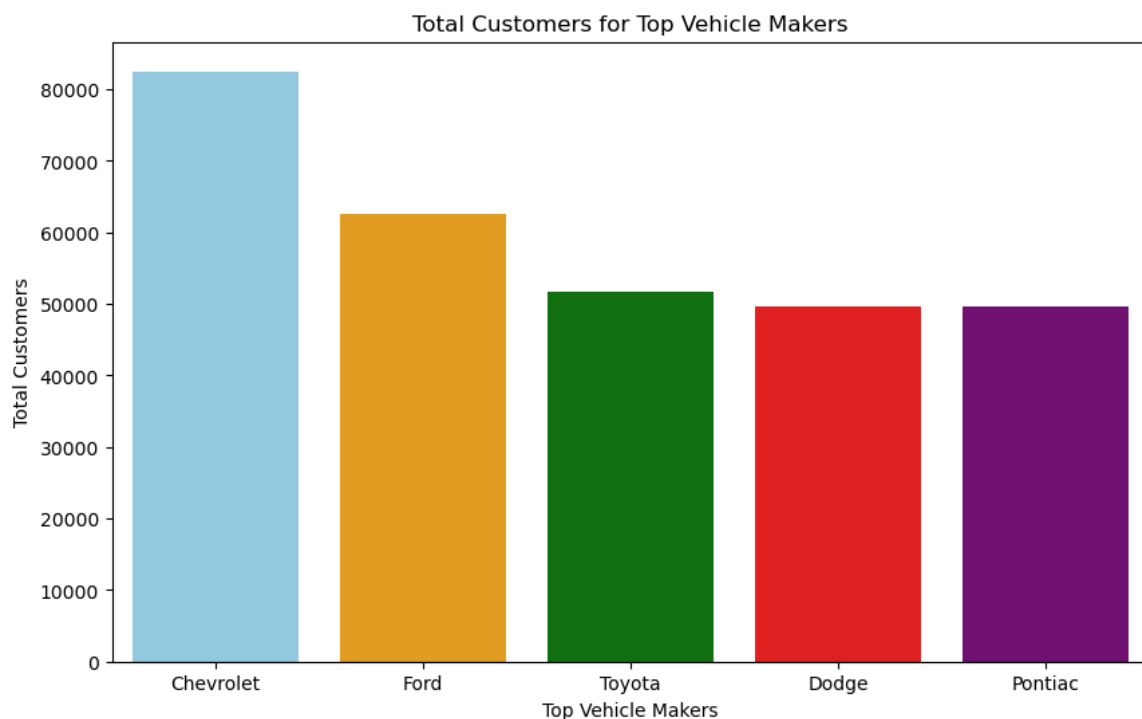


Fig 4: Total Customers for Top Vehicle Makers

Top Vehicle Makers and Customer Base:

- Chevrolet is the leading vehicle manufacturer with the highest customer base, which is a whopping 82,502.
- Following closely is Ford, with a substantial customer count of 62,622.
- Toyota stands at the third position among the top vehicle makers, attracting 51,688 customers.
- The fourth position is shared by Dodge and Pontiac, each having 49,700 customers.

Customer Distribution Among Top Vehicle Makers:

- The popularity and market presence of Chevrolet and Ford are reflected in the higher customer counts compared to Toyota, Dodge, and Pontiac.

Market Dynamics and Brand Loyalty:

- The data indicates strong market presence and potential brand loyalty for Chevrolet and Ford due to their higher customer counts. Toyota, as the third-ranked manufacturer, also boasts a considerable customer base, indicating its popularity in the market.

Strategic Considerations:

- Businesses affiliated with Chevrolet and Ford have an opportunity to target their marketing, engage with customers, and create brand loyalty programs due to their strong market positions.
- Analysing factors contributing to the popularity of *Chevrolet* and *Ford* can provide ***insights into customer preferences and guide marketing strategies.***

Competitive Landscape:

- The automotive industry can be affected by the competitive landscape among top vehicle makers, which can impact market share, brand perception, and customer preferences. Strategic decisions and adaptations can be informed by continuous monitoring of customer trends and market dynamics.

Q5. What is the most preferred vehicle make in each state?

Most preferred vehicle-make in each state

	state	vehicle_maker	total_customers	ranking
8	Alabama	Dodge	5	1
30	Alaska	Chevrolet	2	1
18	Arizona	Pontiac	3	1
52	Arkansas	Suzuki	1	1
2	California	Ford	6	1
9	Colorado	Chevrolet	5	1
31	Connecticut	Chevrolet	2	1
35	Delaware	Mitsubishi	2	1
15	District of Columbia	Chevrolet	4	1
1	Florida	Toyota	7	1

Fig 5:Dataset of most preferred in market

Dominant Vehicle Makers:

- ***Chevrolet*** has emerged as the dominant vehicle maker, securing the top ranking in several states, including ***Texas, California, and Ohio, among others.***
- Ford also holds a substantial presence by ranking first in states like ***New York, Maryland, and Virginia.***
- Other manufacturers such as ***Dodge, Toyota, Pontiac, GMC, Mercedes-Benz, and Mazda*** are also featured as top-ranking choices in specific states

Regional Preferences:

- The dataset provides insights into regional preferences for vehicle manufacturers, indicating that customer choices vary based on their ***geographical location***.
- Different states showcase different brand loyalties and preferences, which highlights the diversity of the automotive market.
- The dataset includes ***both domestic and international vehicle manufacturers***, suggesting a varied market landscape.
- ***Maybach, Buick, and Hyundai*** also appear in the dataset, although with a ***lower customer count*** and limited presence in specific states.

State-Specific Rankings:

- Interesting point. It's fascinating to see how regional brand loyalty can influence consumer choices when it comes to car brands.
- Brand reputation and marketing strategies can also play a significant role in the decision-making process.

Strategic Insights:

- Automotive businesses can use customer data to make strategic decisions like ***targeted marketing campaigns, expanding dealerships, and regional brand promotion***.
- The customer counts for each vehicle maker provide insights into market share and competition in different states.

Considerations for Market Expansion:

- High customer counts and rankings in certain states can signal opportunities for market expansion and investment for vehicle makers.
- Understanding regional preferences is key to tailoring marketing strategies and meeting specific market needs.

REVENUE METRICS

Q6. What is the trend of number of orders by quarters?

Trend of purchases by Quarter

	quarter_number	total_orders
0	1	310
1	2	262
2	3	229
3	4	199

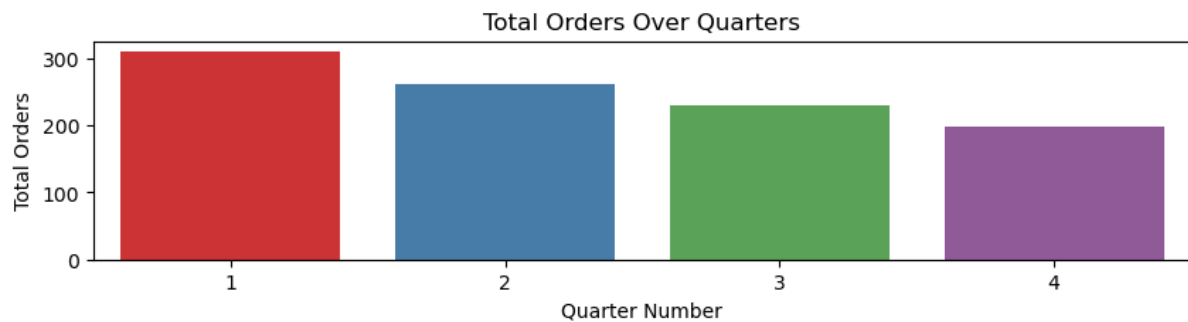


Fig 6: Total orders over Quarters

Observation and Findings

Quantitative Comparison:

- The bar plot visually compares total orders for each quarter.

Visualizing Decline:

- It seems like the height of the bars from
- **Quarter 1 to Quarter 4 is decreasing**, which might indicate a decline in total orders.

Magnitude of Decline:

- I have noted that **Quarter 1** appears to have the **highest bar** at **310**, followed by a **decrease** in **height** for subsequent bars (**262** in **Q2**, **229** in **Q3**, and **199** in **Q4**).

Comparative Analysis:

- The plot allows for a direct comparison of total orders, indicating a ***continuous decline***.

Strategic Considerations:

- I believe that the bar plot is a very useful tool for strategic planning, especially for businesses.
- It can help highlight any observed decline and bring attention to the need for adjustments in ***operational or marketing strategies***.

Visual Impact:

- The bars' decline visually reinforces the trend's significance, leading to proactive measures by businesses.

Q7. What is the quarter over quarter % change in revenue?

	quarter_number	revenue	previous_revenue	qoq_perc_change
0	1	39421580	NaN	NaN
1	2	32715830	39421580.0	-0.17
2	3	29229896	32715830.0	-0.11
3	4	23346780	29229896.0	-0.20

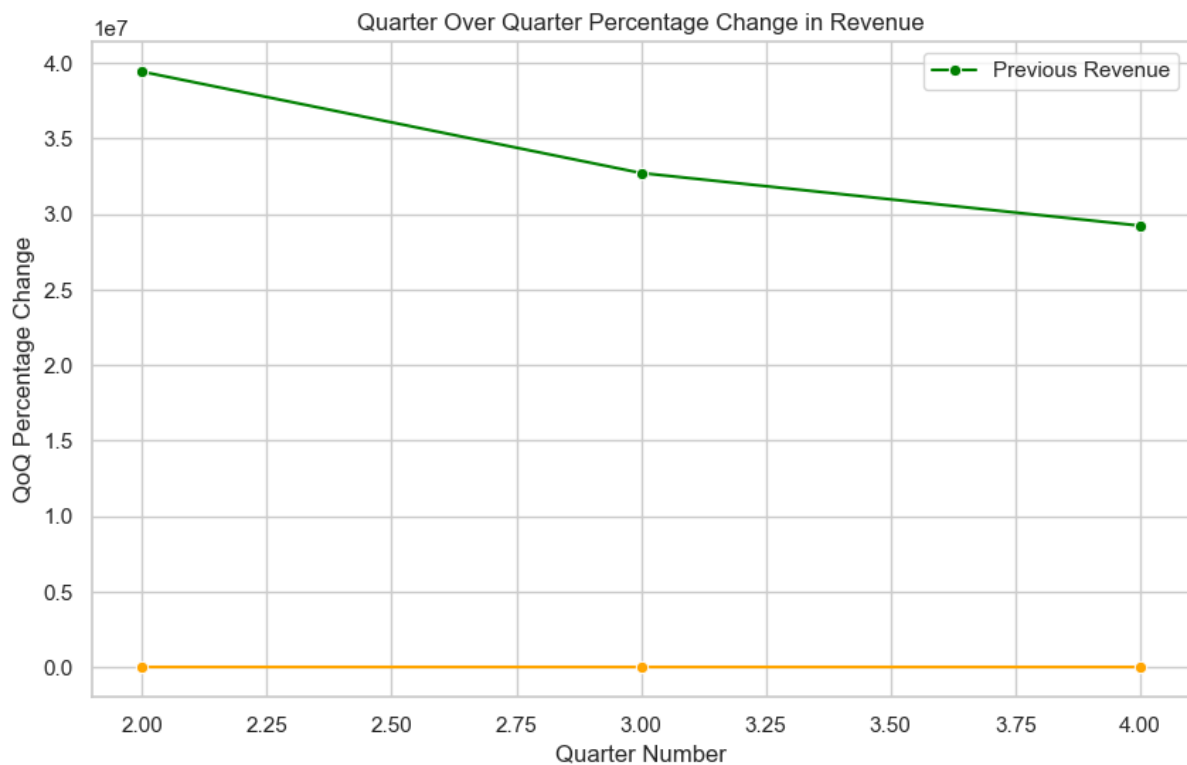


Fig 7: Quarter-over-quarter percentage change in Revenue

Revenue Decline:

- Revenue declined sequentially over four quarters, starting at \$39,421,580 in Quarter 1.

Quarterly Revenue Values:

- Quarter 1 seems to be the most profitable quarter with a revenue of **\$39,421,580**, followed by a decline in Quarter 2 with a revenue of **\$32,715,830**. Quarter 3 and Quarter 4 also saw a decrease in revenue with **\$29,229,896** and **\$23,346,780** respectively.

Quarter-over-Quarter Percentage Change:

- Quarter-over-quarter percentage change (QoQ) indicates the percentage decrease in revenue compared to the previous quarter.
- QoQ percentages for Q2, Q3 and Q4 are **-17%, -11%, and -20%** respectively.

Impact of Previous Revenue:

- The "previous revenue" column is used to track revenue continuity and calculate QoQ percentage change.

Negative Trends:

- Negative QoQ percentages suggest a decline in revenue and may raise financial concerns.

Q8. What is the trend of revenue and orders by quarters?

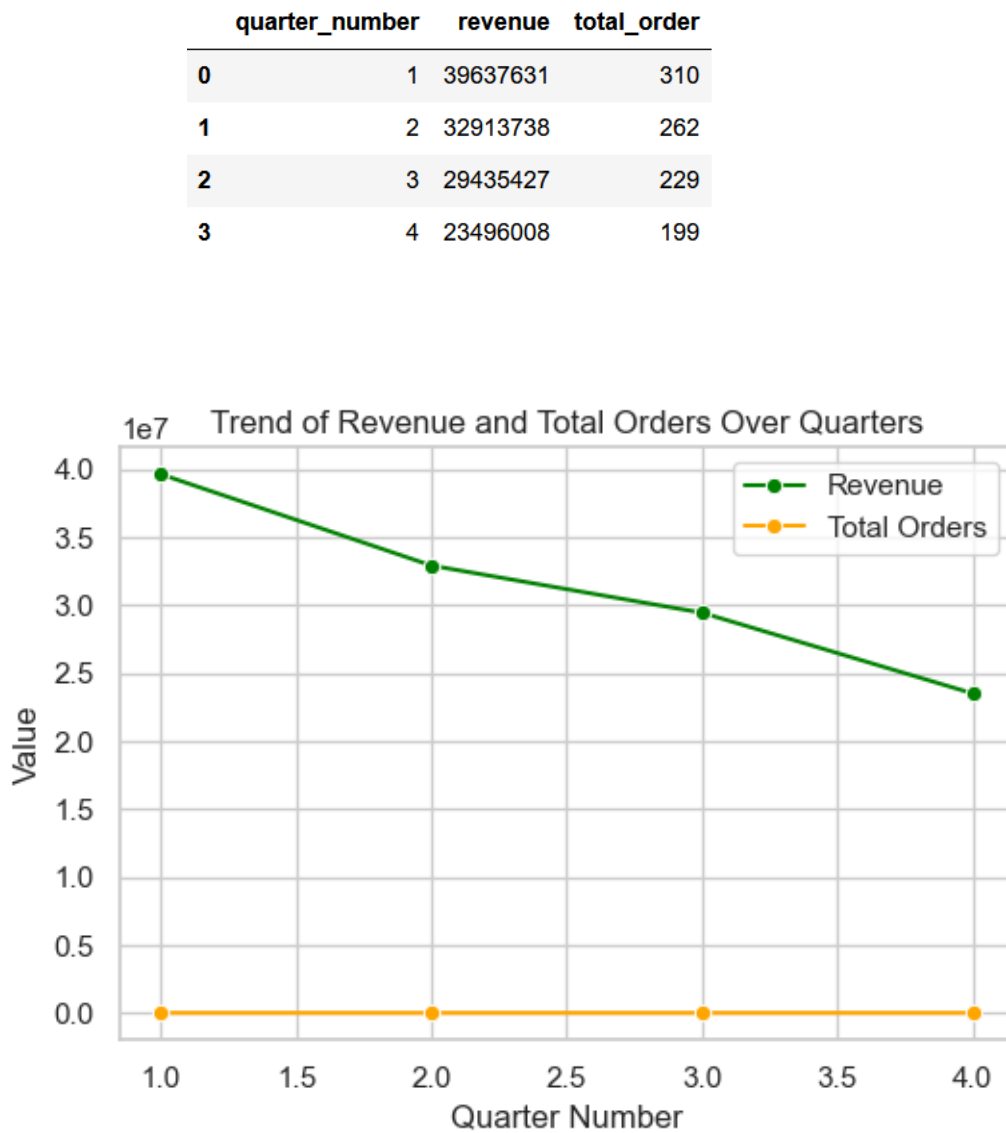


Fig 8: Trend of Revenue and Total order Over Quarters

Observation and Findings:

Revenue Decline with Total Orders:

- There was a consistent decline in revenue and total orders over the past year..

Quarterly Revenue Values:

- Quarter 1 generated the highest revenue at \$39,637,631, followed by decreasing values in Quarter 2 (\$32,913,738), Quarter 3 (\$29,435,427), and Quarter 4 (\$23,496,008).

Total Orders Trend:

- It seems like the number of orders has been decreasing over the quarters.
- According to the data, there were 310 orders in Quarter 1 and the number has been sequentially decreasing since then.

Impact of Total Orders on Revenue:

- The relationship between customer demand and overall business revenue is undeniable, as evidenced by the parallel decline in total orders and revenue.
- To ensure sustained success, businesses must stay attuned to the ever-evolving needs and preferences of their customers.
- By doing so, they can remain competitive and maintain a healthy revenue stream.

Relationship between Revenue and Orders:

- Confidently analyzing the relationship between revenue and total orders is essential for gaining a deep understanding of your business's financial performance and customer engagement.
- It is a crucial step that must be taken to make informed decisions that can help your business succeed. Start analysing your revenue and total orders today to achieve long-term growth and profitability.

Shipping Metrics

Q9. What is the average discount offered for different types of credit card?

	credit_card_type	average_discount
0	laser	0.64
1	mastercard	0.63
2	visa-electron	0.62
3	china-unionpay	0.62
4	americanexpress	0.62
5	maestro	0.62
6	instapayment	0.62
7	jcb	0.61
8	switch	0.61
9	diners-club-carte-blanche	0.61

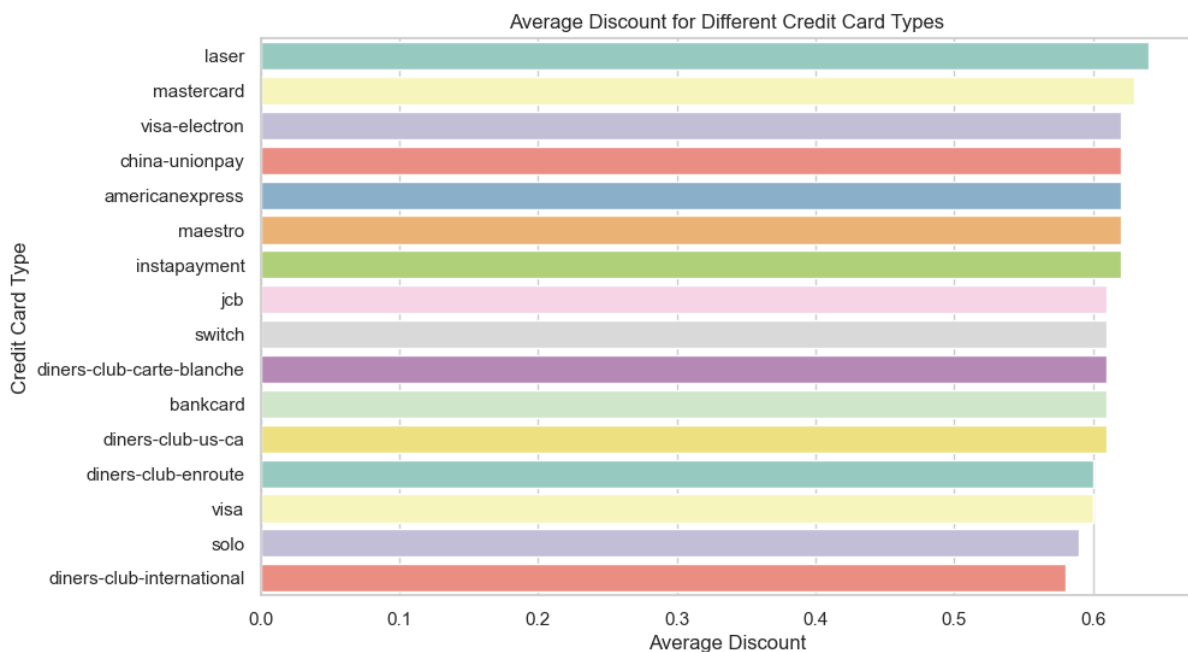


Fig 9: Average Discount for Different Credit Card

Observation and Findings:

Minor Variability:

- The data presented in the bar plot clearly demonstrates that there is only minor fluctuation in the average discounts offered by different credit card types.
- This information is critical for making informed decisions about which credit card to use in order to maximize savings

Top Performers:

- Are you aware that Laser and Mastercard credit cards offer slightly higher average discounts compared to other types of credit cards?
- This means that getting a **Laser or Mastercard credit card** could be a smart move if you want to save more on your purchases.

Consistency in Discounts:

- Several credit card types have similar average discount rates, such as “***Visa Electron, China UnionPay, American Express, Maestro, Instapayment, JCB, Switch, and Diners Club Carte Blanche.***”

Strategic Opportunities:

- By offering targeted marketing or loyalty programs for credit cards with higher average discounts, businesses can effectively increase their customer base and retain existing ones.
- This strategy is a proven way to enhance customer satisfaction and loyalty, while ensuring long-term growth and profitability for the business.

Q10. What is the average time taken to ship the placed orders for each quarters?

	quarter_number	average_shipping_time
0	1	57
1	2	71
2	3	118
3	4	174

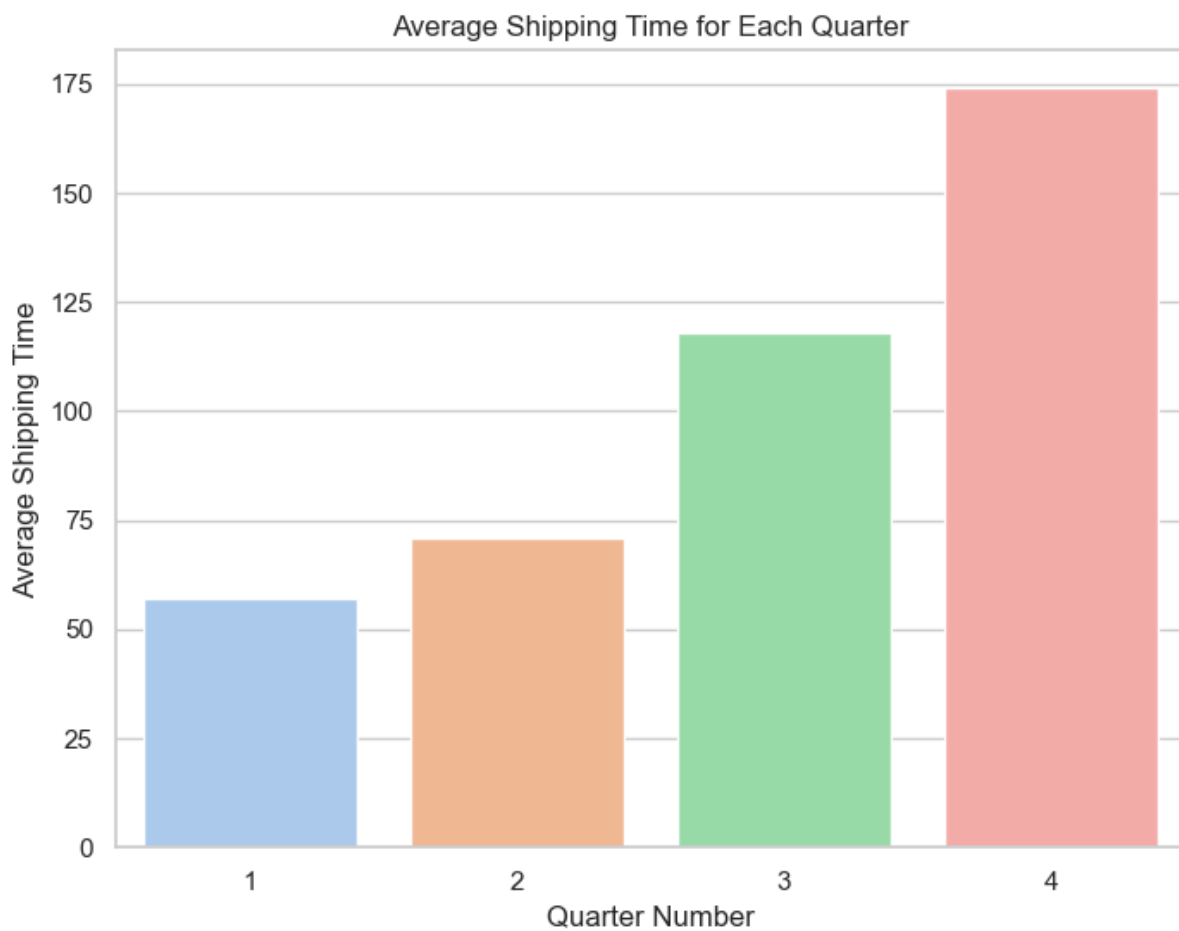


Fig 10:Average shipping Time for Each Quarter

Increasing Trend:

- It is imperative to take immediate action as there is a noticeable and concerning rise in the average shipping time across all four quarters.
- Don't overlook this issue, or face the consequences of delayed shipments and dissatisfied customers.

Quantitative Analysis:

- It's interesting to note that the average shipping time was the lowest in *Quarter 1 at 57*, and it gradually increased in the following quarters, reaching *71 in Q2, 118 in Q3, and 174 in Q4*

Significant Rise:

- The average shipping time shows a significant *increase in Q4*, indicating a *potential issue with fulfilment or delivery processes during that period.*

Potential Implications:

- The longer shipping times may affect customer satisfaction and require a *closer examination of the shipping process efficiency.*

Operational Considerations:

- Businesses must evaluate factors contributing to delayed shipping, such as logistics, carrier performance, and order processing efficiency.

Customer Communication:

- Transparent communication about potential shipping delays during busy periods can manage customer expectations and maintain satisfaction.

Recommendations:

Total Orders -Customers:

- Perform a detailed analysis to pinpoint factors contributing to the decline in total orders. Implement strategic adjustments in inventory management, marketing tactics, and resource allocation to adapt to changing market dynamics.

Quarterly Revenue:

- To address the consistent decline in quarterly revenue, we need to investigate factors behind it and develop strategic plans.
- Optimizing marketing initiatives, controlling costs, and enhancing products/services can help us improve our financial performance.

Revenue and Total Orders Trends:

- To tackle declining revenue, consider boosting customer engagement, enhancing marketing efforts, and aligning product offerings with customer demand.

Credit Card Types and Average Discounts:

- To stay ahead in the market, tailor promotions and loyalty programs based on credit card types' average discounts.
- Leverage this data to develop assertive marketing strategies that cater to customer preferences, maximize revenue, and improve satisfaction.

Average Shipping Time:

- Reduce shipping times by improving efficiency, logistics, and communication with customers.