

# New wheels Data Analysis Report

## Project Overview

New Wheels is a pre-owned vehicle resale company offering end-to-end services—from vehicle listing to delivery and after-sales support—through a mobile application.

In the year 2018, New Wheels has experienced:

1. Declining sales
2. Increasing negative customer feedback
3. Reduced customer acquisition

To address these challenges, a quarterly business performance report covering customer behavior, revenue trends, order patterns, and operational efficiency.

This project uses SQL to analyse business data and derive actionable insights for leadership decision-making.

## Business Objectives

- Evaluate customer satisfaction trends
- Identify top-performing vehicle brands and regions
- Analyse revenue and order trends quarterly
- Assess operational efficiency, especially shipping delays
- Provide insights to support strategic business decisions

## Tools & Technologies

- Database: MySQL
- Language: SQL
- Techniques Used:
  - Joins
  - Window functions (RANK, LAG)
  - CTEs
  - Aggregations
  - Case statements
  - Date functions

## Database Schema

The analysis is based on the following tables:

- Customer\_t – Customer demographic and payment details
- order\_t – Order, feedback, discount, revenue, and shipping data
- product\_t – Vehicle details (make, price, etc.)

## Dataset Description

The dataset contains transactional, customer, product, and logistics information captured through the New Wheels mobile application. It includes details related to vehicle orders, customer profiles, shipping partners, pricing, discounts, and customer feedback, organized at an order level.

### **Key entities include:**

- Customers (demographics, location, payment details)
- Products (vehicle attributes and pricing)
- Orders (order dates, quantities, discounts)
- Shipping (shipper details, shipping mode, delivery timelines)
- Feedback (customer experience and satisfaction)
- Time Dimensions (quarter-wise segmentation)

#### New Wheels Data Dictionary

```
shipper_id: Unique ID of the Shipper
shipper_name: Name of the Shipper
shipper_contact_details: Contact detail of the Shipper
product_id: Unique ID of the Product
vehicle_maker: Vehicle Manufacturing company name
vehicle_model: Vehicle model name
vehicle_color: Color of the Vehicle
vehicle_model_year: Year of Manufacturing
vehicle_price: Price of the Vehicle
quantity: Ordered Quantity
customer_id: Unique ID of the customer
customer_name: Name of the customer
gender: Gender of the customer
job_title: Job Title of the customer
phone_number: Contact detail of the customer
email_address: Email address of the customer
city: Residing city of the customer
country: Residing country of the customer
state: Residing state of the customer
customer_address: Address of the customer
order_date: Date on which customer ordered the vehicle
order_id: Unique ID of the order
ship_date: Shipment Date
ship_mode: Shipping Mode/Class
shipping: Shipping Ways
postal_code: Postal Code of the customer
discount: Discount given to the customer for the particular order by credit card in percentage
credit_card_type: Credit Card Type
credit_card_number: Credit card number
customer_feedback: Feedback of the customer
quarter_number : Quarter Number
```

## Key Business Questions Answered

### Customer Analysis

1. Distribution of customers across states
2. Average customer rating by quarter
3. Customer dissatisfaction trends over time
4. Top 5 preferred vehicle makers
5. Most preferred vehicle maker in each state

### Revenue & Orders

6. Quarterly trend of number of orders
7. Quarter-over-quarter (QoQ) revenue growth/decline
8. Combined trend of revenue and orders

### Operations & Shipping

9. Average discount by credit card type
10. Average shipping time per quarter

## Data Analysis & Findings

### 1. What is the distribution of customers across states?

```
SELECT COUNT(DISTINCT customer_id) AS total_customers FROM order_t;
```

```
SELECT state, COUNT(*) AS number_of_customers FROM customer_t GROUP BY state ORDER BY number_of_customers DESC;
```

	total_customers
▶	994

### 2. What is the average rating in each quarter? (Very Bad is 1, Bad is 2, Okay is 3, Good is 4, Very Good is 5)

```
SELECT AVG(rating) AS overall_avg_rating FROM  
(SELECT CASE WHEN customer_feedback = 'Very Bad' THEN 1  
WHEN customer_feedback = 'Bad' THEN 2  
WHEN customer_feedback = 'Okay' THEN 3  
WHEN customer_feedback = 'Good' THEN 4  
WHEN customer_feedback = 'Very Good' THEN 5
```

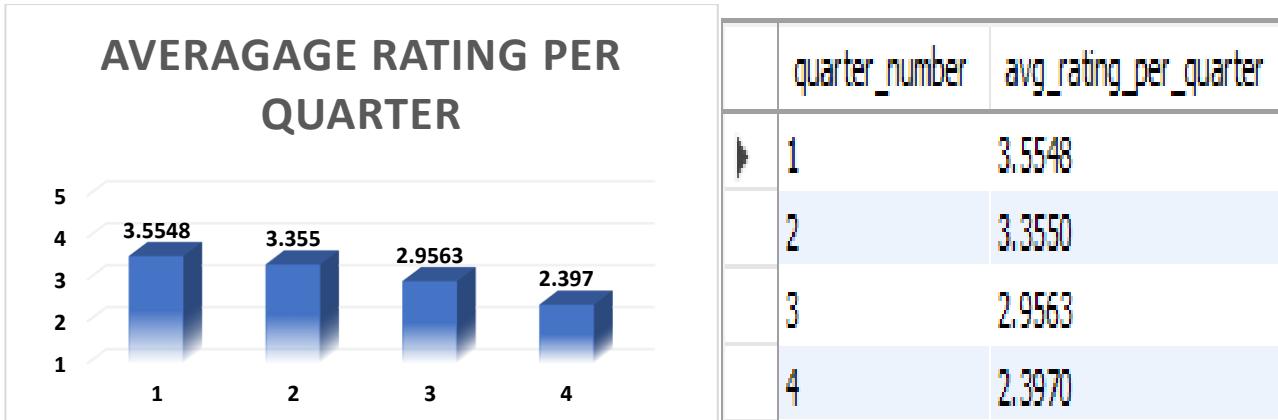
```

END AS rating FROM order_t ) AS ratings;

select distinct customer_feedback from order_t;

SELECT quarter_number, AVG(rating) AS avg_rating_per_quarter FROM
(SELECT quarter_number,
CASE
WHEN customer_feedback = 'Very Bad' THEN 1
WHEN customer_feedback = 'Bad' THEN 2
WHEN customer_feedback = 'Okay' THEN 3
WHEN customer_feedback = 'Good' THEN 4
WHEN customer_feedback = 'Very Good' THEN 5
END AS rating FROM order_t ) AS ratings
GROUP BY quarter_number
ORDER BY quarter_number;

```



### 3. Are customers getting more dissatisfied over time?

```

SELECT quarter_number,
SUM(CASE WHEN customer_feedback = 'Very Bad' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS
very_bad_percentage,
SUM(CASE WHEN customer_feedback = 'Bad' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS bad_percentage,
SUM(CASE WHEN customer_feedback = 'Okay' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS okay_percentage,

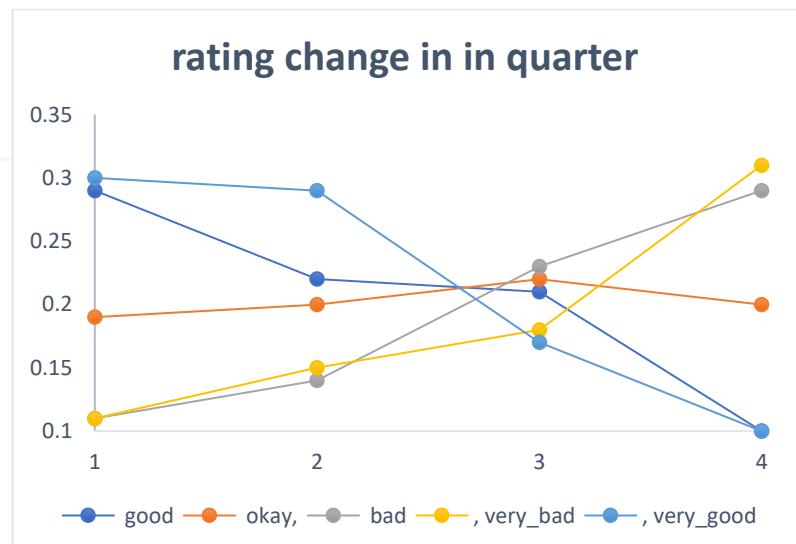
```

```

SUM(CASE WHEN customer_feedback = 'Good' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS good_percentage,
SUM(CASE WHEN customer_feedback = 'Very Good' THEN 1 ELSE 0 END) * 100.0 / COUNT(*) AS
very_good_percentage
FROM order_t
GROUP BY quarter_number
ORDER BY quarter_number;
WITH cust_feed AS
(SELECT
quarter_number,
ROUND(SUM(CASE WHEN customer_feedback = 'very good' THEN 1 ELSE 0 END), 2) AS very_good,
ROUND(SUM(CASE WHEN customer_feedback = 'good' THEN 1 ELSE 0 END), 2) AS good,
ROUND(SUM(CASE WHEN customer_feedback = 'okay' THEN 1 ELSE 0 END), 2) AS okay,
ROUND(SUM(CASE WHEN customer_feedback = 'bad' THEN 1 ELSE 0 END), 2) AS bad,
ROUND(SUM(CASE WHEN customer_feedback = 'very bad' THEN 1 ELSE 0 END), 2) AS very_bad,
ROUND(COUNT(customer_feedback), 2) AS total_feedback
FROM order_t
GROUP BY 1
ORDER BY 1 ASC
)
SELECT
quarter_number,
ROUND((very_good/total_feedback), 2) AS very_good,
ROUND((good/total_feedback), 2) AS good,
ROUND((okay/total_feedback), 2) AS okay,
ROUND((bad/total_feedback), 2) AS bad,
ROUND((very_bad/total_feedback), 2) AS very_bad
FROM cust_feed
GROUP BY 1
ORDER BY 1 ASC;

```

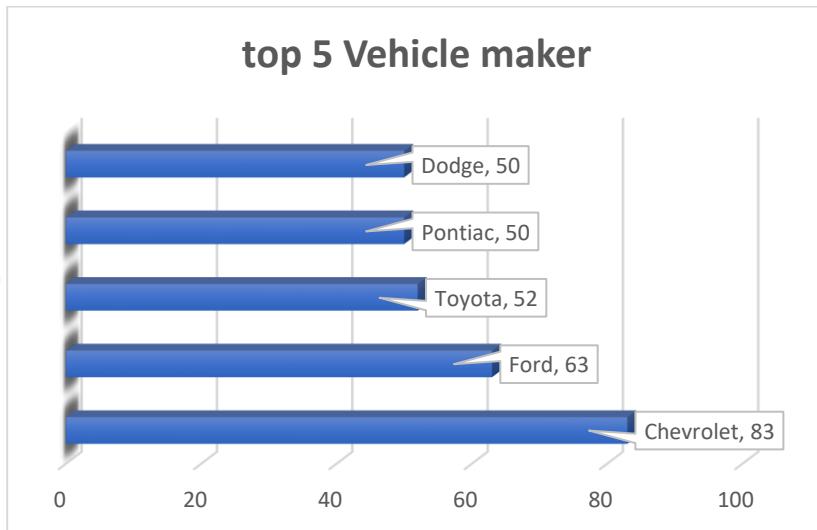
	quarter_number	very_good	good	okay	bad	very_bad
1	0.30	0.29	0.19	0.11	0.11	
2	0.29	0.22	0.20	0.14	0.15	
3	0.17	0.21	0.22	0.23	0.18	
4	0.10	0.10	0.20	0.29	0.31	



#### 4. Which are the top 5 vehicle makers preferred by the customer.

```
SELECT vehicle_maker, COUNT(*) AS num_orders
FROM order_t
JOIN product_t ON order_t.product_id = product_t.product_id
GROUP BY vehicle_maker
ORDER BY num_orders DESC
LIMIT 5;
```

vehicle_maker	num_orders
Chevrolet	83
Ford	63
Toyota	52
Pontiac	50
Dodge	50



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

```
SELECT *
FROM
(
    SELECT
        state,
        vehicle_maker,
        COUNT(customer_id) AS total_customers,
        RANK() OVER (PARTITION BY state ORDER BY COUNT(customer_id) DESC) AS ranking
    FROM product_t
    JOIN order_t USING(product_id)
    JOIN customer_t USING(customer_id)
    GROUP BY 1,2
) AS preferred_vehicle
WHERE ranking = 1
ORDER BY 3 DESC;
```

	state	vehicle_maker	total_customers	ranking
►	Texas	Chevrolet	9	1
	Florida	Toyota	7	1
	California	Ford	6	1
	California	Dodge	6	1
	California	Audi	6	1
	California	Nissan	6	1
	California	Chevrolet	6	1
	Ohio	Chevrolet	6	1
	Alabama	Dodge	5	1
	Colorado	Chevrolet	5	1
	Maryland	Ford	5	1
	New York	Toyota	5	1
	New York	Pontiac	5	1
	Virginia	Ford	5	1
	Washing...	Chevrolet	5	1
	District o...	Chevrolet	4	1
	Indiana	Mazda	4	1
	Missouri	Chevrolet	4	1
	Arizona	Pontiac	3	1
	Arizona	Cadillac	3	1
	Georgia	Toyota	3	1
	Illinois	Ford	3	1

## 6. What is the trend of number of orders by quarters?

```

SELECT
    quarter_number,
    COUNT(order_id) AS total_orders
FROM order_t
GROUP BY 1
ORDER BY 1;

```

	quarter_number	total_orders
►	1	310
	2	262
	3	229
	4	199

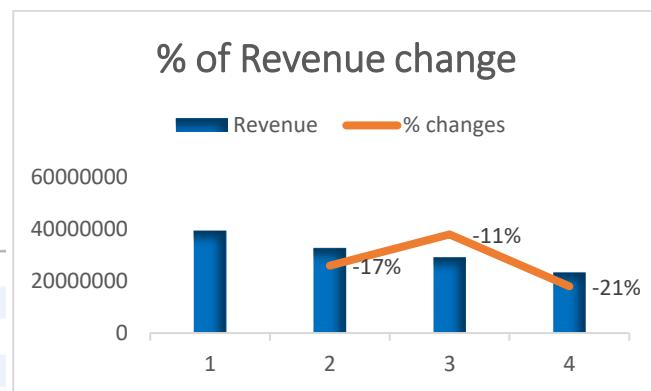


## 7 What is the quarter over quarter % change in revenue?

WITH QoQ AS

```
(  
    SELECT quarter_number,  
           ROUND(SUM(quantity * (vehicle_price - ((discount/100)*vehicle_price))), 0) AS revenue  
      FROM order_t  
     GROUP BY quarter_number)  
SELECT quarter_number, revenue,  
       ROUND(LAG(revenue) OVER(ORDER BY quarter_number), 2) AS previous_revenue,  
       ROUND((revenue - LAG(revenue) OVER(ORDER BY quarter_number))/LAG(revenue) OVER(ORDER BY  
quarter_number), 2) AS qoq_perc_change  
  FROM QoQ;
```

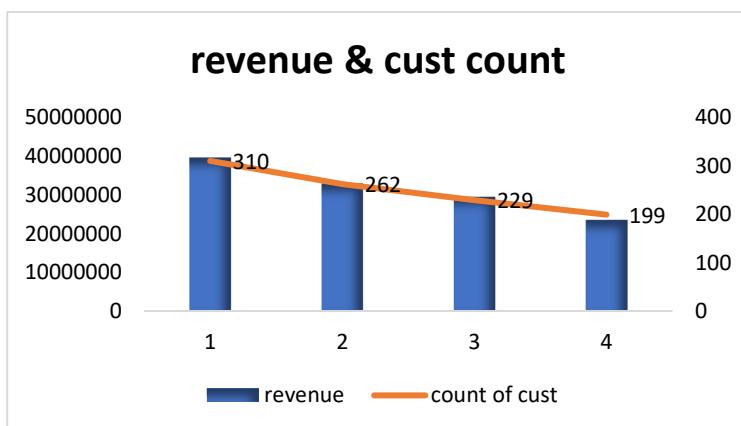
	quarter_number	revenue	previous_revenue	qoq_perc_change
▶	1	39421580	NULL	NULL
	2	32715830	39421580	-0.17
	3	29229896	32715830	-0.11
	4	23346780	29229896	-0.20



## 8. What is the trend of number of orders by quarters?

```
SELECT  
    quarter_number,  
    ROUND(SUM(quantity*vehicle_price), 0) AS revenue,  
    COUNT(order_id) AS total_order  
  FROM order_t  
 GROUP BY 1  
 ORDER BY 1;
```

	quarter_number	revenue	total_order
▶	1	39637631	310
	2	32913738	262
	3	29435427	229
	4	23496008	199

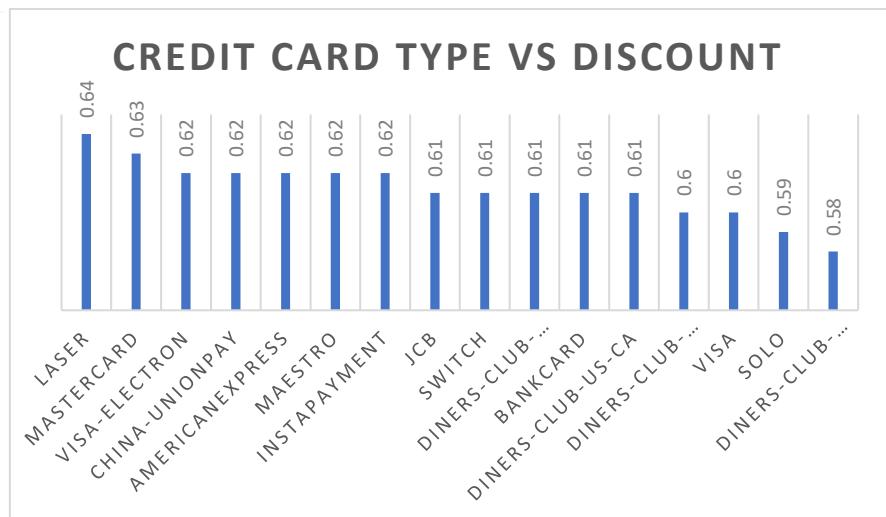


## 9. What is the average discount offered for different types of credit cards?

SELECT

```
credit_card_type,
ROUND(AVG(discount), 2) AS average_discount
FROM order_t t1
INNER JOIN customer_t t2
ON t1.customer_id = t2.customer_id
GROUP BY 1
ORDER BY 2 DESC;
```

credit_card_type	average_discount
laser	0.64
mastercard	0.63
visa-electron	0.62
china-unionpay	0.62
americanexpress	0.62
maestro	0.62
instapayment	0.62
jcb	0.61
switch	0.61
diners-club-carte-blanche	0.61
bankcard	0.61
diners-club-us-ca	0.61
diners-club-enroute	0.60
visa	0.60
solo	0.59
diners-club-international	0.58

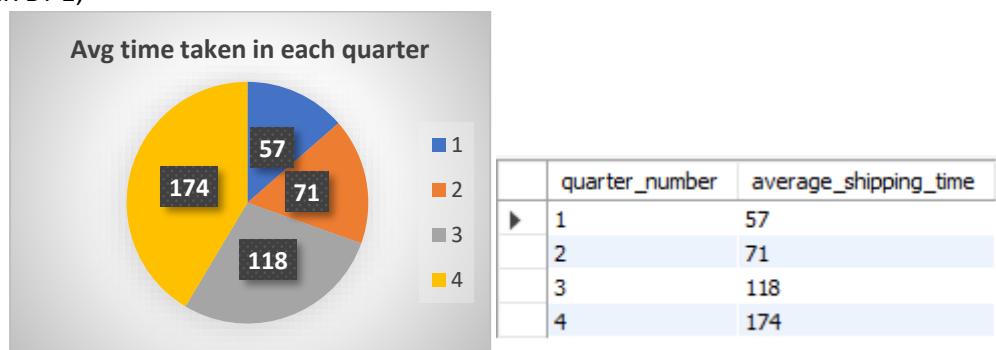


## 10. What is the trend of number of orders by quarters?

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

SELECT

```
quarter_number,
ROUND(AVG(DATEDIFF(ship_date, order_date)), 0) AS average_shipping_time
FROM order_t
GROUP BY 1
ORDER BY 1;
```





## Critical Insight

- Shipping delays increased 3x from Q1 to Q4
- Strong correlation with rising negative feedback
- Logistics inefficiency is a major driver of dissatisfaction



## Key Business Conclusions

- Customer satisfaction is declining sharply
- Orders and revenue are falling quarter-over-quarter
- Shipping delays are a critical operational bottleneck
- Discounts are not solving core business problems



## Strategic Recommendations

- Improve logistics and reduce shipping delays
- Strengthen after-sales support
- Focus on high-performing states and brands
- Redesign customer retention strategy
- Shift from discount-led growth to experience-led growth

## Conclusion

This project demonstrates the effective use of SQL to analyze business data and answer key analytical questions. By examining customer behavior, sales trends, product preferences, and operational metrics, the analysis highlights how structured queries can generate actionable insights. Overall, the project showcases SQL as a powerful tool for supporting data-driven decision-making and business performance evaluation.