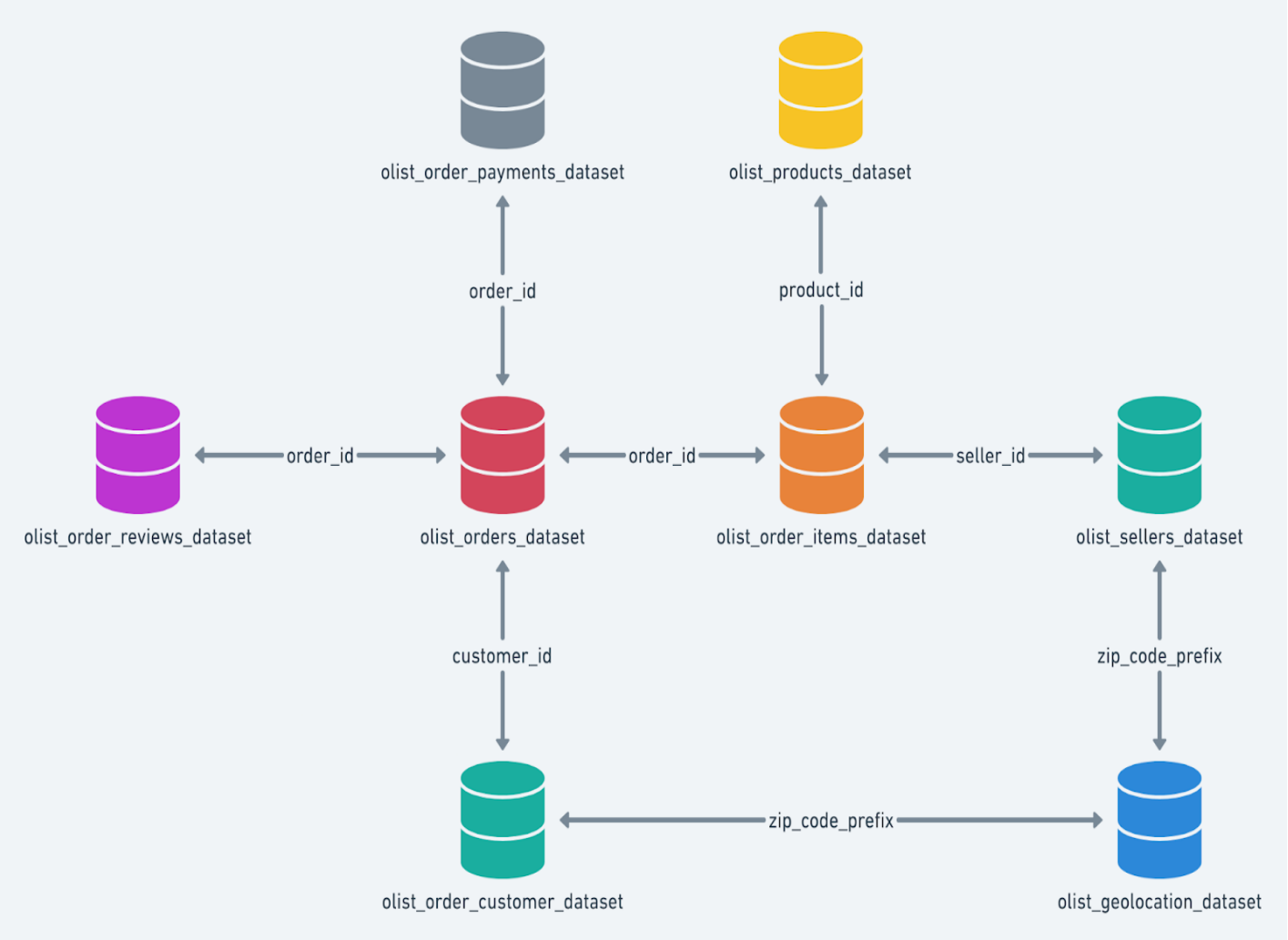
Business Case: Target SQL

Target is one of the world's most recognized brands and one of America's leading retailers. Target makes itself a preferred shopping destination by offering outstanding value, inspiration, innovation and an exceptional guest experience that no other retailer can deliver.
This business case has information of 100k orders from 2016 to 2018 made at Target in Brazil. Its features allows viewing an order from multiple dimensions: from order status, price, payment and freight performance to customer location, product attributes and finally reviews written by customers.



1. Import the dataset and do usual exploratory analysis steps like checking the structure & characteristics of the dataset

1. Data type of columns in a table

```
SELECT
  table_name,
  column_name,
  data_type
FROM
  `target_brazil`.INFORMATION_SCHEMA.COLUMNS
WHERE
  table_name IN ('customers', 'geolocation', 'order_items', 'order_reviews', 'orders',
'payments', 'products', 'sellers')
ORDER BY
  table_name ASC;
```

Row	table_name	column_name	data_type
1	customers	customer_id	STRING
2	customers	customer_unique_id	STRING
3	customers	customer_zip_code_prefix	INT64
4	customers	customer_city	STRING
5	customers	customer_state	STRING
6	geolocation	geolocation_zip_code_prefix	INT64
7	geolocation	geolocation_lat	FLOAT64
8	geolocation	geolocation_lng	FLOAT64
9	geolocation	geolocation_city	STRING
10	geolocation	geolocation_state	STRING

2. Time period for which the data is given

```
SELECT
  MIN(order_purchase_timestamp) AS Starting_period,
  MAX(order_purchase_timestamp) AS Ending_period
FROM `target_brazil.orders`;
```

Row	Starting_period	ending_period
1	2016-09-04 21:15:19 UTC	2018-10-17 17:30:18 UTC

3.Cities and States of customers ordered during the given period

```
SELECT DISTINCT
  c.customer_city,
  c.customer_state
FROM `target_brazil.orders` AS o
JOIN `target_brazil.customers` AS c
ON o.customer_id = c.customer_id
WHERE o.order_purchase_timestamp BETWEEN '2016-09-04 21:15:19 UTC' AND '2018-10-17 17:30:18
UTC'
ORDER BY c.customer_state;
```

Or

```
SELECT DISTINCT
  customer_city,
  customer_state
FROM `target_brazil.customers`
order by customer_state
```

Row	customer_city	customer_state
1	rio branco	AC
2	brasileia	AC
3	manoel urbano	AC
4	cruzeiro do sul	AC
5	xapuri	AC
6	senador guiomard	AC
7	porto acre	AC
8	epitaciolandia	AC
9	maceio	AL
10	pau d'arco	AL

Insight :

In question 1 part 3 These two queries provide similar results, retrieving distinct combinations of customer cities and states.

2. In-depth Exploration:

1.Is there a growing trend on e-commerce in Brazil? How can we describe a complete scenario? Can we see some seasonality with peaks at specific months?

```
SELECT
  EXTRACT(MONTH FROM order_purchase_timestamp) AS month,
  COUNT(CASE WHEN EXTRACT(YEAR FROM order_purchase_timestamp) = 2016 THEN 1 END) AS
total_orders_2016,
  COUNT(CASE WHEN EXTRACT(YEAR FROM order_purchase_timestamp) = 2017 THEN 1 END) AS
total_orders_2017,
  COUNT(CASE WHEN EXTRACT(YEAR FROM order_purchase_timestamp) = 2018 THEN 1 END) AS
total_orders_2018,
  COUNT(*) AS total_orders
FROM `target_brazil.orders`
GROUP BY month
ORDER BY month;
```

Row	month	total_orders_2016	total_orders_2017	total_orders_2018	total_orders
1	1	0	800	7269	8069
2	2	0	1780	6728	8508
3	3	0	2682	7211	9893
4	4	0	2404	6939	9343
5	5	0	3700	6873	10573
6	6	0	3245	6167	9412
7	7	0	4026	6292	10318
8	8	0	4331	6512	10843
9	9	4	4285	16	4305
10	10	324	4631	4	4959
11	11	0	7544	0	7544
12	12	1	5673	0	5674

Insights:

Over the years, there has been a certain pattern of e-commerce growth in Brazil. From 2016 to the present, there has been a constant rise in the overall number of orders. This shows that Brazilian customers are increasingly accepting and using e-commerce.

The data show seasonality, with maxima occurring in particular months. For instance, compared to other months, November and December routinely display larger order volumes. The holiday season and occasions like Black Friday and Christmas, which are linked to increased shopping activity, can be blamed for this.

The biggest order volumes are seen in the majority of the months of 2018, which indicates a strong increase in e-commerce during that year.

Recommendations:

Businesses should take advantage of the busy season, especially in November and December.

2. What time do Brazilian customers tend to buy (Dawn, Morning, Afternoon or Night)

```
SELECT
  purchase_period,
  COUNT(*) AS count
FROM (
  SELECT
    CASE
      WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 0 AND 6 THEN "Dawn"
      WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 7 AND 12 THEN "Morning"
      WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 13 AND 18 THEN "Afternoon"
      WHEN EXTRACT(HOUR FROM order_purchase_timestamp) BETWEEN 19 AND 23 THEN "Evening"
    END AS purchase_period
  FROM `target_brazil.orders`) AS table1
GROUP BY purchase_period
ORDER BY count DESC;
```

Row	purchase_period	count
1	Afternoon	38135
2	Evening	28331
3	Morning	27733
4	Dawn	5242

Insights:

Brazilian customers seem to prefer the afternoon to other times because 38,135 orders were placed during that time. This shows that a large number of customers like afternoon shopping.

With 28,331 orders, the evening comes in second place, demonstrating that a sizable portion of customers also make purchases in the evening.

With 27,733 orders, the morning is the third most popular period for shopping. This shows that a sizable fraction of consumers favour early morning shopping.

Dawn has the fewest orders (5,242), indicating that Brazilian buyers do not prefer this time to make purchases.

Recommendations:

Businesses would benefit from making sure they have enough personnel, merchandise, and customer assistance on hand given the high volume of orders in the afternoon.

3. Evolution of E-commerce orders in the Brazil region:

1. Get month on month orders by states

```
SELECT DISTINCT
  c.customer_state,
  EXTRACT(MONTH FROM o.order_purchase_timestamp) AS month,
  COUNT(*) AS orders_count
FROM `target_brazil.orders` o
JOIN `target_brazil.customers` c
ON o.customer_id = c.customer_id
GROUP BY c.customer_state, month
ORDER BY orders_count DESC, c.customer_state, month;
```

Row	customer_state	month	orders_count
1	SP	8	4982
2	SP	5	4632
3	SP	7	4381
4	SP	6	4104
5	SP	3	4047
6	SP	4	3967
7	SP	2	3357
8	SP	1	3351
9	SP	11	3012
10	SP	12	2357
11	SP	10	1908
12	SP	9	1648
13	RJ	5	1321

Insights:

The number of orders has been consistently rising month over month, pointing to an expanding e-commerce market in So Paulo.

Consider concentrating your marketing efforts on So Paulo and providing special deals to draw in more clients in order to take advantage of this growth.State of Rio de Janeiro:Rio de Janeiro's order count has steadily increased over the months, much like So Paulo's has.

Recommendations:

Improve the e-commerce platform's user experience to promote repeat business and client loyalty.

Analyse customer comments and reviews frequently to spot problem areas and resolve any issues.

Utilise data-driven insights to tailor marketing initiatives and promotions to the needs of each state.

2. Distribution of customers across the states in Brazil

```
select customer_state, count(*) as customers_count
from `target.customers`
group by customer_state
order by customers_count desc
```

Row	customer_state	month	orders_count
1	SP	8	4982
2	SP	5	4632
3	SP	7	4381
4	SP	6	4104
5	SP	3	4047
6	SP	4	3967
7	SP	2	3357
8	SP	1	3351
9	SP	11	3012
10	SP	12	2357
11	SP	10	1908
12	SP	9	1648
13	RJ	5	1321

Insights:

States with High Potential:
The most clients are located in So Paulo (SP), Rio de Janeiro (RJ), and Minas Gerais (MG), indicating a significant e-commerce presence in these states.These states provide considerable commercial prospects.

Markets in Emergence:
States like Bahia (BA), Pernambuco (PE), and Ceará (CE).These states should be the focus of expanded marketing efforts because they have the potential for growth.

4.Impact on Economy: Analyse the money movement by e-commerce by looking at order prices, freight and others.

1. Get % increase in cost of orders from 2017 to 2018 (include months between Jan to Aug only) - You can use the “payment_value” column in the payments table.

```
SELECT
  ROUND(((total_payment_value_2018 - total_payment_value_2017) / total_payment_value_2017) *
100, 2) AS percentage_increase
FROM (
  SELECT
    SUM(IF(EXTRACT(YEAR FROM o.order_purchase_timestamp) = 2018, p.payment_value, 0)) AS
total_payment_value_2018,
    SUM(IF(EXTRACT(YEAR FROM o.order_purchase_timestamp) = 2017, p.payment_value, 0)) AS
total_payment_value_2017
  FROM
    `target_brazil.payments` p
  JOIN
    `target_brazil.orders` o ON p.order_id = o.order_id
  WHERE
    EXTRACT(YEAR FROM o.order_purchase_timestamp) BETWEEN 2017 AND 2018
    AND EXTRACT(MONTH FROM o.order_purchase_timestamp) BETWEEN 1 AND 8
) AS subquery;
```

Row	percentage_increase
1	136.98

Insights:

From 2017 to 2018 (months between January and August), the cost of orders increased by 136.98%. This suggests that the volume of money moving through e-commerce as a whole increased significantly over this time.

Recommendations:

Capitalise on the rising trend: With the cost of orders having increased so significantly, it's crucial for firms to take advantage of this expansion opportunity. To take advantage of the growing e-commerce sector, invest in techniques that improve client acquisition, retention, and overall customer experience.

Enhance logistics and shipping efficiency: It is essential to streamline logistics and shipping operations as e-commerce revenue grows. To fulfil orders efficiently and on time, enhance warehouse management, decrease delivery times, and work with reputable logistics partners. This may lead to improved consumer satisfaction.

2. Mean & Sum of price and freight value by customer state

```
SELECT
  c.customer_state,
  ROUND(AVG(oi.price), 2) AS avg_price,
  ROUND(SUM(oi.price), 2) AS total_price,
  ROUND(AVG(oi.freight_value), 2) AS avg_freight_value,
  ROUND(SUM(oi.freight_value), 2) AS total_freight_value
FROM
  `target_brazil.order_items` AS oi
JOIN
  `target_brazil.orders` AS o ON oi.order_id = o.order_id
JOIN
  `target-brazil-insights.target_brazil.customers` AS c ON o.customer_id = c.customer_id
```

```
GROUP BY
  c.customer_state
ORDER BY
  avg_price DESC, avg_freight_value DESC;
```

Row	customer_state	avg_price	total_price	avg_freight_value	total_freight_value
1	PB	191.48	115268.08	42.72	25719.73
2	AL	180.89	80314.81	35.84	15914.59
3	AC	173.73	15982.95	40.07	3686.75
4	RO	165.97	46140.64	41.07	11417.38
5	PA	165.69	178947.81	35.83	38699.3
6	AP	164.32	13474.3	34.01	2788.5
7	PI	160.36	86914.08	39.15	21218.2
8	TO	157.53	49621.74	37.25	11732.68
9	RN	156.97	83034.98	35.65	18860.1
10	CE	153.76	227254.71	32.71	48351.59

Insights:

State with the highest average price: With an average price of $191.48, the state of Paraba (PB) has the highest average price of orders. This shows that shoppers in Paraba favour more expensive goods as compared to those in other states.State with the highest order total price: With orders totaling $5,202,955,05, So Paulo (SP) has the highest order total price. This shows that So Paulo has a lot of orders and contributes a lot of overall revenue.

Variation in average freight value: Different states have variations in average freight value. Higher average freight values in some states, including Acre (AC) and Roraima (RR), may indicate more expensive shipping or farther delivery distances.

So Paulo (SP) is the state with the greatest total freight value.

Recommendations:

Pricing optimization: Consider customer demand and the pricing strategies of competitors while examining pricing practices in states with higher average expenses, such as Paraba (PB). In order to maintain profit and ensure competitiveness, the pricing strategy may need to be modified.

Customer satisfaction and retention: Focus on providing excellent customer service, efficient order fulfilment, and timely delivery across all states. Happy and satisfied customers are more likely to make repeat purchases and recommend your brand to others.

Market expansion: Because they have high total prices and total freight values, states like So Paulo (SP) provide lucrative markets. Consider increasing operations even more, investing in marketing campaigns, and enhancing customer acquisition and retention strategies to take advantage of the market opportunity. segmenting customers based on their preferences

5. Analysis on sales, freight and delivery time

1. Calculate days between purchasing, delivering and estimated delivery

```
SELECT

  order_id,

  EXTRACT(DAY FROM order_purchase_timestamp) AS order_date,

  DATE_DIFF(order_delivered_customer_date, order_purchase_timestamp, DAY) AS days_to_deliver,

  DATE_DIFF(order_estimated_delivery_date, order_purchase_timestamp, DAY) AS
days_to_estimated_delivery,

  DATE_DIFF(order_estimated_delivery_date, order_delivered_customer_date, DAY) AS
difference_between_estimated_delivery_to_actual_delivery

FROM

  `target_brazil.orders`

WHERE

  order_delivered_customer_date IS NOT NULL

  AND order_estimated_delivery_date IS NOT NULL

ORDER BY

  difference_between_estimated_delivery_to_actual_delivery;
```

Row	order_id	order_date	days_to_deliver	days_to_estimated_d	difference_between_
1	1b3190b2dfa9d789e1f14c05b...	23	208	19	-188
2	ca07593549f1816d26a572e06...	21	209	28	-181
3	47b40429ed8cce3aee9199792...	3	191	15	-175
4	2fe324febf907e3ea3f2aa9650...	13	189	22	-167
5	285ab9426d6982034523a855f...	8	194	28	-166
6	440d0d17af552815d15a9e41a...	7	195	30	-165
7	c27815f7e3dd0b926b5855262...	15	187	25	-162
8	0f4519c5f1c541ddec9f21b3bd...	9	194	32	-161
9	d24e8541128cea179a11a6517...	12	175	13	-161
10	2d7561026d542c8dbd8f0daea...	15	188	28	-159

Insight:

out of a total of 96,476 orders, 6.773% (6,535 orders) were delayed. Additionally, a small proportion of orders, specifically 47 orders, experienced delays of more than three months, accounting for 0.048% of the total orders.

Recommendations

Enhance logistics and delivery procedures: Examine the causes of the delays and pinpoint places where the processes can be made more efficient. This could entail streamlining processes, improving collaboration with delivery partners, and putting in place efficient tracking tools to keep tabs on order status.

Improve customer communication by keeping consumers informed about delays and providing updates on their orders. Inform clients of any potential delays, anticipated delivery dates, and efforts being taken to fix the problem. Customer expectations can be managed and discontent reduced through clear and prompt communication.

2. Find time_to_delivery & diff_estimated_delivery. Formula for the same given below:

- time_to_delivery = order_delivered_customer_date-order_purchase_timestamp
- diff_estimated_delivery = order_estimated_delivery_date-order_delivered_customer_date

```
SELECT
order_id,
EXTRACT(DAY FROM order_purchase_timestamp) AS order_date,
DATE_DIFF(order_delivered_customer_date, order_purchase_timestamp, DAY) AS time_to_delivery,
```

```
DATE_DIFF(order_estimated_delivery_date, order_purchase_timestamp, DAY) AS
diff_estimated_delivery,
DATE_DIFF(order_estimated_delivery_date, order_delivered_customer_date, DAY) AS
difference_between_estimated_delivery_to_actual_delivery
FROM
target_brazil.orders
WHERE
order_delivered_customer_date IS NOT NULL
AND order_estimated_delivery_date IS NOT NULL
ORDER BY
Difference_between_estimated_delivery_to_actual_delivery;
```

Row	order_id	order_date	time_to_delivery	diff_estimated_delive	difference_between_
1	1b3190b2dfa9d789e1f14c05b...	23	208	19	-188
2	ca07593549f1816d26a572e06...	21	209	28	-181
3	47b40429ed8cce3aee9199792...	3	191	15	-175
4	2fe324febf907e3ea3f2aa9650...	13	189	22	-167
5	285ab9426d6982034523a855f...	8	194	28	-166
6	440d0d17af552815d15a9e41a...	7	195	30	-165
7	c27815f7e3dd0b926b5855262...	15	187	25	-162
8	0f4519c5f1c541ddec9f21b3bd...	9	194	32	-161
9	d24e8541128cea179a11a6517...	12	175	13	-161
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Insight:

out of a total of 96,476 orders, 6.773% (6,535 orders) were delayed. Additionally, a small proportion of orders, specifically 47 orders, experienced delays of more than three months, accounting for 0.048% of the total orders.

3. Group data by state, take mean of freight_value, time_to_delivery, diff_estimated_delivery

```
SELECT distinct c.customer_state,
  round(AVG(oi.freight_value),2) AS mean_freight_value,
  round(AVG(DATE_DIFF(o.order_delivered_customer_date,o.order_purchase_timestamp,day)),2) AS
time_to_delivery,
  round(AVG(DATE_DIFF(o.order_estimated_delivery_date, o.order_delivered_customer_date,day)),2)
AS diff_estimated_delivery
FROM `target_brazil.order_items` AS oi
JOIN `target_brazil.orders` AS o ON oi.order_id = o.order_id
```

```
JOIN `target_brazil.customers` AS c ON o.customer_id = c.customer_id
GROUP BY c.customer_state
order by c.customer_state;
```

Row	customer_state	mean_freight_value	time_to_delivery	diff_estimated_delivery
1	AC	40.07	20.33	20.01
2	AL	35.84	23.99	7.98
3	AM	33.21	25.96	18.98
4	AP	34.01	27.75	17.44
5	BA	26.36	18.77	10.12
6	CE	32.71	20.54	10.26
7	DF	21.04	12.5	11.27
8	ES	22.06	15.19	9.77
9	GO	22.77	14.95	11.37
10	MA	38.26	21.2	9.11

Insights:

With a value of 42.72, the client state with the highest mean_freight_value is PB (Paraiba), indicating perhaps higher shipping expenses there.

With an average time_to_delivery of 20.33 days, the state of AC (Acre) has the longest delivery delays when compared to other states.

The state with the lowest mean_freight_value is BA (Bahia), which suggests that shipping expenses are often lower.

With an average of 8.26 days, SP (Sao Paulo) has the shortest time_to_delivery, indicating quicker delivery times than other states.

The greatest diff_estimated_delivery value belongs to RR (Roraima), showing a greater gap between the estimated and actual delivery dates.

Recommendations:

To cut expenses and give consumers more competitive pricing, it would be advantageous to analyse and optimise the shipping operations for states with greater mean_freight_value.

To improve the overall delivery experience for clients in states with lengthier time_to_delivery, it is critical to assess the logistics and delivery operations and find areas for improvement.

To preserve customer satisfaction and assure accurate estimates, it is essential to track and manage the discrepancy between the projected delivery date and the actual delivery date. States with big disparities, like RR, might need more attention to deal with any potential problems that cause delays.

4. Sort the data to get the following:

5. Top 5 states with highest/lowest average freight value - sort in desc/asc limit 5

```
SELECT DISTINCT
  c.customer_state,
  ROUND(AVG(oi.freight_value), 2) AS lowest_mean_freight_value
FROM `target_brazil.order_items` AS oi
JOIN `target_brazil.orders` AS o
ON oi.order_id = o.order_id
JOIN `target_brazil.customers` AS c
ON o.customer_id = c.customer_id
group by c.customer_state
order by lowest_mean_freight_value limit 5
```

Row	customer_state	lowest_mean_freight_value
1	SP	15.15
2	PR	20.53
3	MG	20.63
4	RJ	20.96
5	DF	21.04

```
SELECT DISTINCT
  c.customer_state,
  ROUND(AVG(oi.freight_value), 2) AS highest_mean_freight_value
FROM `target_brazil.order_items` AS oi
JOIN `target_brazil.orders` AS o
ON oi.order_id = o.order_id
JOIN `target_brazil.customers` AS c ON o.customer_id = c.customer_id
group by c.customer_state
order by highest_mean_freight_value desc limit 5
```

Row	customer_state	highest_mean_freight_value
1	RR	42.98
2	PB	42.72
3	RO	41.07
4	AC	40.07
5	PI	39.15

Insights:

Best-Performing States for Average Freight Value:RR, PB, RO, AC, and PI are the states with the highest average freight values.Those in these states might pay more for shipping than those in other states. Analysing the elements behind these increased freight values might aid in logistics optimisation and possibly save costs for clients.

Lowest Average Freight Value States, in Order:SP, PR, MG, RJ, and DF are the states with the lowest average freight values.It's possible that customers in these states are saving money on shipping. Recognising the factors causing these reduced freight values will help keep costs down while guaranteeing dependable and on-time deliveries.

Recommendations:

States with High Freight Value:Examine what causes increased freight values in RR, PB, RO, AC, and PI. Locate opportunities for logistics optimisation, such as negotiating lower prices with logistics partners or putting effective routing plans into place.Investigate ways to cut costs without sacrificing service quality to raise client happiness.

States with Low Freight Value:Determine the causes of the reduced freight values in MG, RJ, DF, PR, SP, and PR.Find any potential for optimisation to preserve cost-effectiveness and guarantee on-time delivery. To guarantee that decreased freight values meet consumer expectations and do not compromise service quality, keep an eye on customer feedback and satisfaction levels.

6. Top 5 states with highest/lowest average time to delivery

```
SELECT DISTINCT
  c.customer_state,
  round(AVG(DATE_DIFF(o.order_delivered_customer_date,o.order_purchase_timestamp,day)),2) AS
top5_time_to_delivery
FROM `target_brazil.orders` o
JOIN `target_brazil.customers` AS c
ON o.customer_id = c.customer_id
group by c.customer_state
order by top5_time_to_delivery desc limit 5
```

Row	customer_state	top5_time_to_delivery
1	RR	28.98
2	AP	26.73
3	AM	25.99
4	AL	24.04
5	PA	23.32

```
SELECT DISTINCT
  c.customer_state,
  round(AVG(DATE_DIFF(o.order_delivered_customer_date,o.order_purchase_timestamp,day)),2) AS
bottom5_time_to_delivery
FROM `target_brazil.orders` o
JOIN `target_brazil.customers` AS c
ON o.customer_id = c.customer_id
group by c.customer_state
order by bottom5_time_to_delivery limit 5
```

Row	customer_state	bottom5_time_to_delivery
1	SP	8.3
2	PR	11.53
3	MG	11.54
4	DF	12.51
5	SC	14.48

Insights:

Top 5 States with the Longest Average Delivery Time:RR, AP, AM, AL, and PA have the longest average time to delivery.Compared to other states, customers in these states typically have to wait longer for deliveries.Recognising areas for improvement and raising customer satisfaction can both be accomplished by understanding the factors causing lengthier delivery delays.

Top 5 States with the Fastest Average Delivery Time:SP, PR, MG, DF, and SC have the shortest average delivery times.Customers benefit from significantly faster delivery times in these states.
Insights into best practices that can be applied in other regions can be gained by analysing the factors that lead to speedier delivery in certain states.

Recommendations:

States with a Long Average Delivery Time:Examine what makes deliveries in RR, AP, AM, AL, and PA take longer.Locate the points of inefficiency in the logistics process and take steps to improve efficiency,

such as improving warehouse management, enhancing transportation routes, or investigating regional distribution centres.
Work closely with your logistics partners to pinpoint problem areas and put delivery time reduction plans into action.

States with a Short Average Delivery Time:
Examine the procedures and methods used in SP, PR, MG, DF, and SC that lead to quicker delivery times.Choose effective tactics, such as solid partnerships with dependable logistics providers or effective last-mile delivery networks, and think about adopting them in other areas.
In order to maintain and improve delivery performance in these states,

7. Top 5 states where delivery is really fast/ not so fast compared to estimated date

```
SELECT
  c.customer_state,
  ROUND(AVG(DATE_DIFF(o.order_estimated_delivery_date, o.order_delivered_customer_date, DAY)),
2) AS diff_estimated_delivery
FROM `target_brazil.orders` o
JOIN `target_brazil.customers` AS c
ON o.customer_id = c.customer_id
group by c.customer_state
order by diff_estimated_delivery
limit 5
```

Row	customer_state	diff_estimated_delivery
1	AL	7.95
2	MA	8.77
3	SE	9.17
4	ES	9.62
5	BA	9.93

```
SELECT
  c.customer_state,
  ROUND(AVG(DATE_DIFF(o.order_estimated_delivery_date, o.order_delivered_customer_date, DAY)),
2) AS diff_estimated_delivery
FROM `target_brazil.orders` o
JOIN `target_brazil.customers` AS c
```

```
ON o.customer_id = c.customer_id
group by c.customer_state
order by diff_estimated_delivery desc
limit 5
```

Row	customer_state	diff_estimated_delivery
1	AC	19.76
2	RO	19.13
3	AP	18.73
4	AM	18.61
5	RR	16.41

Insights:

Top 5 States with Faster Delivery Compared to Estimated Date:
AL, MA, SE, ES, and BA are the states having quicker delivery in comparison to the anticipated date.In these states, customers typically receive their goods ahead of the projected delivery date.This suggests that these areas have effective logistical systems and quick delivery services.
Top 5 States with Slower Delivery Compared to Estimated Date:
States AC, RO, AP, AM, and RR have slower deliveries than the anticipated date.Customers in these states encounter delivery delays that go beyond the anticipated date of delivery.This raises the possibility of difficulties or inefficiencies in certain regions' logistical systems.levels of ice.

Recommendations:

States that have quicker delivery:To find the best practices that lead to quicker delivery, analyse the logistics procedures and practises in AL, MA, SE, ES, and BA.
Identify elements like effective last-mile delivery networks, efficient travel routes, or effective cooperation with logistics partners.To increase overall delivery efficiency and customer satisfaction, share these best practices with other geographical areas.

States that Deliver More Slowly:Look into the causes of the slower delivery in the following areas: AC, RO, AP, AM, and RR.Find the areas where the logistical operations are stifled, such as insufficient local distribution centres or constraints in the transportation infrastructure.Work together with your logistics partners to develop approaches to these problems, such as streamlining delivery routes, investigating different transportation options, or setting up regional fulfilment facilities.

6. Payment type analysis:

1. Month over Month count of orders for different payment types

```
SELECT
  EXTRACT(MONTH FROM order_purchase_timestamp) AS month,
  p.payment_type,
  COUNT(*) AS orders_count
FROM target_brazil.orders o
JOIN target_brazil.payments p ON o.order_id = p.order_id
GROUP BY month, p.payment_type
ORDER BY month, orders_count DESC
```

Row	month	payment_type	orders_count
1	1	credit_card	6103
2	1	UPI	1715
3	1	voucher	477
4	1	debit_card	118
5	2	credit_card	6609
6	2	UPI	1723
7	2	voucher	424
8	2	debit_card	82
9	3	credit_card	7707
10	3	UPI	1942

Insights:

Credit card payments are the most prevalent across all months.

Although UPI and vouchers are also common payment methods,they have fewer orders than credit cards do.

The payment methods debit_card and not_defined have the fewest orders.

From month 21 to month 43, there is a discernible increase in order numbers, indicating sales growth over time.

Recommendations:

Since credit cards are the most often used payment method, it's critical to give customers a simple and safe way to pay with their cards.

Promoting UPI and voucher payment methods will improve their popularity and draw in more clients.

Consider measures to promote the use of debit cards and other payment methods by analysing the causes of their low adoption.

2. Count of orders based on the no. of payment instalments

```
SELECT
  p.payment_installments,
  COUNT(*) AS orders_count
FROM
  `target_brazil.orders` o
JOIN
  `target_brazil.payments` p ON o.order_id = p.order_id
GROUP BY
  p.payment_installments
ORDER BY
  orders_count DESC;
```

Row	payment_installments	orders_count
1	1	52546
2	2	12413
3	3	10461
4	4	7098
5	10	5328
6	5	5239
7	8	4268
8	6	3920
9	7	1626
10	9	644

Insights:

When compared to other instalments, option 1 is the most popular payment option, with a slightly higher number of orders.

The number of orders for instalments of 2, 3, and 4 is likewise sizable, although it steadily declines as the number of instalments rises.

Once a specific threshold is passed, relatively few requests for greater payment instalments are placed, indicating that buyers would prefer to pay in smaller instalments.

There are a tiny number of orders that have no instalment payments, which may suggest situations when the entire amount was paid in one go.

Recommendations:

Customers should be given clear information and incentives to choose payment instalments, especially for higher values. The flexibility and affordability of customers may rise as a result.

Encourage customers to choose longer-term instalment plans by providing them with enticing instalment alternatives with competitive interest rates or incentives.

To reach a larger customer base, think about collaborating with financial institutions to offer instalment services or flexible payment options.

Overall Recommendation :

The company is doing well in the Brazilian e-commerce industry, according to the study of the dataset. There is a developing tendency in e-commerce, as seen by the steadily increasing volume of orders over time. By making investments in customer acquisition, retention, and improving the overall customer experience, the business should take advantage of this growth opportunity. The organisation should take advantage of this busy time of year throughout the holiday season, especially in November and December, which offers tremendous sales potential. In order to retain and improve its market position, the business should keep putting its emphasis on growing its operations, maximising logistics and shipping efficiency, and offering top-notch customer service.

How the Company is Doing in Brazil:

As seen by the steadily rising volume of orders, the company is doing well in Brazil. Brazilian consumers are increasingly accepting and using online shopping, creating a favourable market climate for the business. With peak months in November and December, which coincide with the holiday season and major shopping days like Black Friday and Christmas, the data reveals seasonality in order volumes. To increase sales and revenue, the organisation should take advantage of these peak times. However, there are still some things that may be done better, such managing consumer expectations around delays and logistics optimisation.

Region to Focus on:

So Paulo (SP), Rio de Janeiro (RJ), and Minas Gerais (MG) are the regions with the most potential for the company. These states have a sizable e-commerce presence, with a large client base and order volume. By concentrating on these locations through specialised marketing initiatives, unique offers, and specialised promotions, the company can increase its market share and revenue. Additionally, given their growth potential, extended marketing initiatives should take into account developing markets like Bahia (BA), Pernambuco (PE), and Ceará (CE).

Regional Strengths and Weaknesses of the Company:

Strengths:

Strong success with high order volumes and total income in So Paulo (SP).
Positive growth patterns are seen in Rio de Janeiro (RJ) and other areas, demonstrating potential and market acceptance.
Customers are concentrated in So Paulo, Rio de Janeiro, and Minas Gerais, giving the business a reliable consumer base.

Weaknesses:

Especially in areas with lengthy delivery times and delays, there is room for improvement in logistics and delivery operations.

Some localities have greater average freight values than others, suggesting opportunities to reduce shipping costs.
regional differences in consumer preferences and behaviour necessitate specialised marketing plans and product offerings.

Payment, evaluation, and goods:

According to the analysis, users prefer credit card payments over vouchers, UPI, and other payment options. In order to accommodate client preferences, the business should continue to offer a safe and practical credit card payment option while encouraging the adoption of alternative payment methods. In order to quickly detect and resolve any issues and maintain high customer satisfaction levels, it is essential to regularly analyse customer reviews and comments. The business should concentrate on product pricing optimisation while taking customer demand and rival pricing tactics into account. Customer satisfaction and loyalty will also increase through improving the overall customer experience through effective order fulfilment, prompt delivery, and good customer service.