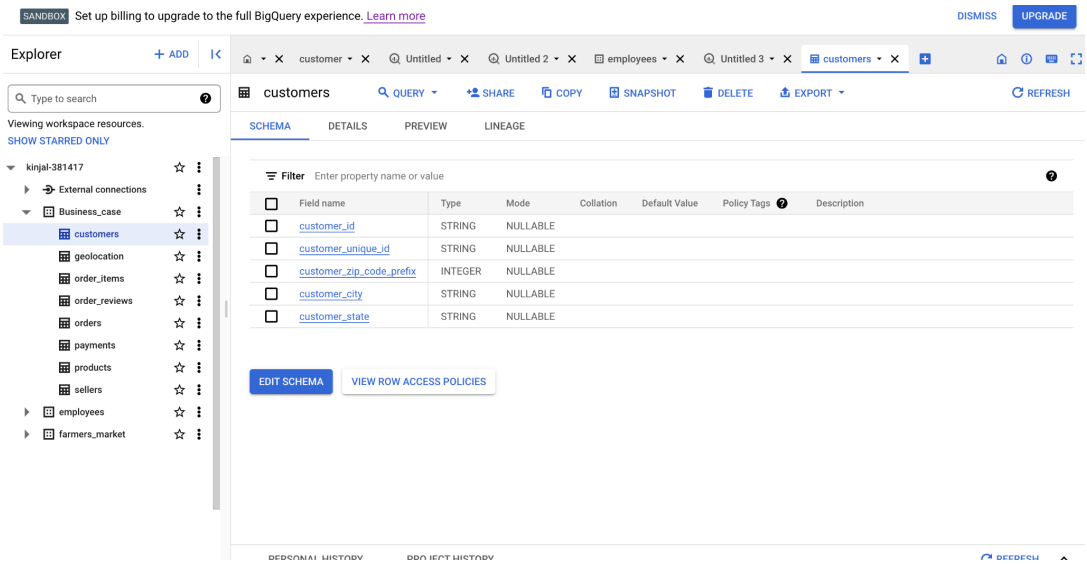
BUSINESS CASE: TARGET SQL

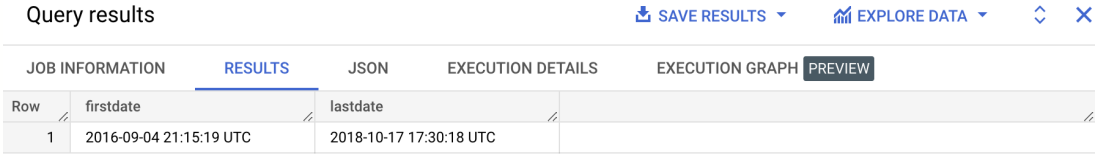
1. **Import the dataset and do usual exploratory analysis steps like checking the structure & characteristics of the dataset**
    1. Data type of columns in a table-

        In BigQuery, you can view the data types of the columns in a table by clicking on the table name in the left-hand navigation panel and then selecting the "Schema" tab in the main work area. This will display a list of all the columns in the table, along with their respective data types.



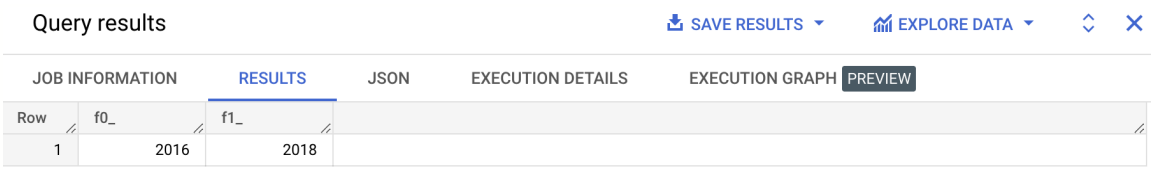
    2. Time period for which the data is given–

```
select min(order_purchase_timestamp) as
firstdate,max(order_purchase_timestamp) as lastdate

from `Business_case.orders`
```



OR

```
select min(extract(year from order_purchase_timestamp)),max(extract(year
from order_purchase_timestamp))

from `Business_case.orders`
```



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

```
with minmx as (

select min(order_purchase_timestamp) as
firstdate,max(order_purchase_timestamp) as lastdate

from `Business_case.orders`)



select  distinct customer_id, customer_city,customer_state

from `Business_case.customers`

where customer_id in (

select customer_id from `Business_case.orders`

where order_purchase_timestamp between (select firstdate from minmx) and
(select lastdate from minmx))
```

Query results

SAVE RESULTS

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXECUTION GRAPH | PREV

Row	customer_id	customer_city	customer_state
1	0735e7e4298a2ebbb4664934...	acu	RN
2	903b3d86e3990db01619a4eb...	acu	RN
3	38c97666e962d4fea7fd6a83e...	acu	RN
4	77c2f46cf580f4874c9a5751c2...	ico	CE
5	4d3ef4cfffb8ad4767c199c36a...	ico	CE
6	3000841b86e1fbe9493b52324...	ico	CE
7	3c325415ccc7e622c66dec4bc...	ico	CE
8	04f3a7b250e3be964f01bf22bc...	ico	CE
9	894202b8ef01f4719a4691e79...	ico	CE
10	9d715b9fb75a9d081c14126c0...	ico	CE
11	018184ac5f52a821bb00f3ef21...	ico	CE
12	1b079952d7f8ea0edc2babd69...	ipe	RS
13	8c8ebb03344906d2201f54daa...	ipe	RS
14	040cc0201a8b98d2c1ed270d6...	ipu	CE
15	8611feeeaa6d278ec4b4a5e4a...	ipu	CE

Load more

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?

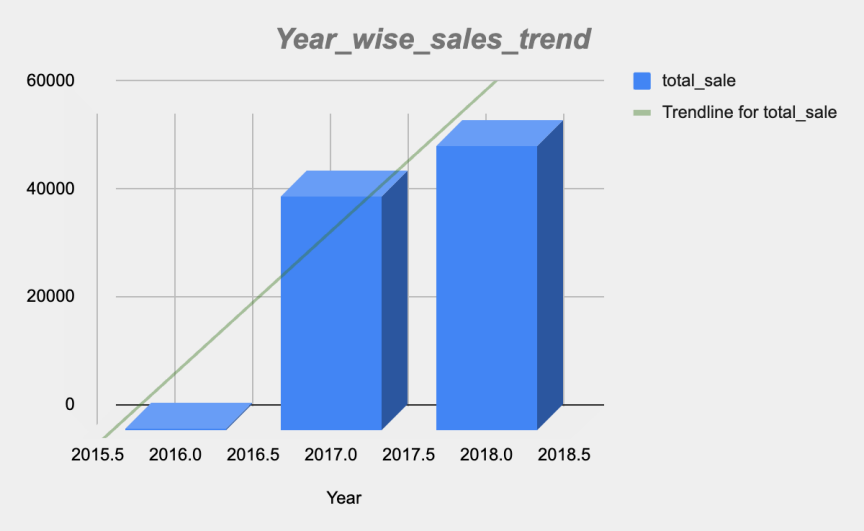
```
select  yp as Year,count(mcd) as total_sale

from

(

select extract(year from order_purchase_timestamp) as yp,extract(month
from order_delivered_customer_date)as mcd

from `Business_case.orders` o left join `Business_case.customers` c on
c.customer_id = o.customer_id

) as a

group by yp
```

```
order by yp,total_sale desc
```

Query results

JOB INFORMATION | RESULTS

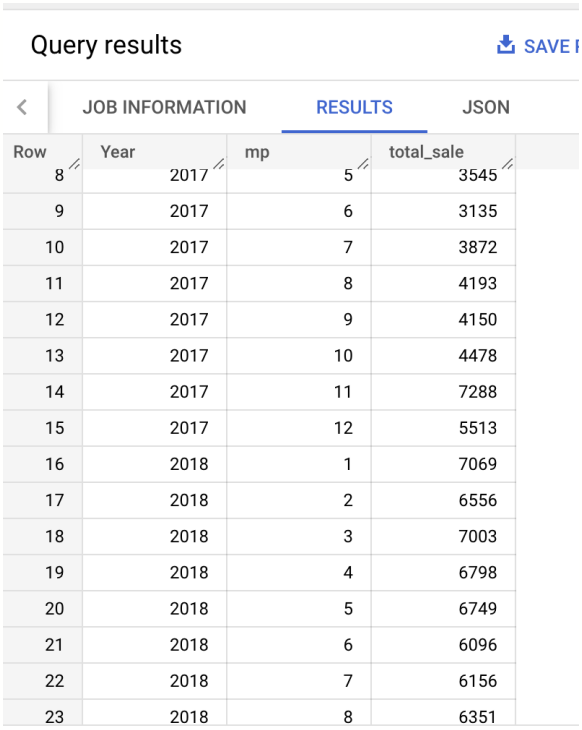
Row	Year	total_sale
1	2016	272
2	2017	43426
3	2018	52778



AND

```
select  yp as Year,mp,count(mcd) as total_sale

from

(
```

```
select extract(year from order_purchase_timestamp) as yp,extract(month
from order_purchase_timestamp) as mp,extract(month from
order_delivered_customer_date)as mcd

from `Business_case.orders` o left join `Business_case.customers` c on
c.customer_id = o.customer_id

) as a

group by yp,mp

order by yp,mp
```



Query results SAVE

JOB INFORMATION | RESULTS | JSON

Row	Year	mp	total_sale
8	2017	5	3545
9	2017	6	3135
10	2017	7	3872
11	2017	8	4193
12	2017	9	4150
13	2017	10	4478
14	2017	11	7288
15	2017	12	5513
16	2018	1	7069
17	2018	2	6556
18	2018	3	7003
19	2018	4	6798
20	2018	5	6749
21	2018	6	6096
22	2018	7	6156
23	2018	8	6351

Insights-

Based on the analysis of the year-wise sales trend from 2016 to 2018, it appears that the e-commerce business in Brazil is experiencing growth each year, as evidenced by the rise in the number of sales. The data also shows that the months of June and July have the highest sales, which can be attributed to the major festivals in Brazil, namely Festa Junina and Parintins Folklore Festival, during which customers tend to purchase

decorations and festival-related items.However, it's worth noting that the increase in sales between 2017 and 2018 was only 21.5%, indicating a potential area for improvement. To further boost sales, it may be necessary to identify and address factors that may be limiting growth.

Recommendations-

Focusing on non-festival months could be beneficial to tap into untapped sales potential and explore opportunities for growth throughout the year. By analyzing the year-month-sales trend and understanding the impact of festivals on sales, businesses can strategize and optimize their marketing and sales efforts accordingly. This may involve offering special promotions or discounts during non-festival months, diversifying product offerings to cater to customer needs beyond festivals, or implementing targeted marketing campaigns to attract customers during slower sales periods. By identifying and addressing these factors, the e-commerce business in Brazil can continue to thrive and sustain its growth trajectory.

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

```
select period,count(*) as number_of_customers from

(

select *,

case

when extract(hour from order_purchase_timestamp)>19 then 'Night'

when extract(hour from order_purchase_timestamp)>13 then 'Afternoon'

when extract(hour from order_purchase_timestamp)>7 then 'Morning'

else 'Dawn'

end as period
```

```
from `Business_case.orders`)

group by period
```

Query results

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS

Row	period	number_of_customers
1	Morning	33020
2	Dawn	6473
3	Afternoon	37599
4	Night	22349

Period- it represents the a single day category which is done on the basis as follows:

0-6 ->Dawn

7-13 ->Morning

14-18 ->Afternoon

19-23 -> Night

Number of customers- it represents the total number of customers who has done active purchases and tend to buy in given category of period.

Insights-

Based on the period-wise number of customers table, it appears that customers in Brazil tend to browse and make purchases on e-commerce websites mostly during the afternoon, followed by the morning period.

Recommendations-

Businesses can focus their marketing and promotional activities during the afternoon and morning periods to capitalize on the higher customer engagement during these times. This may include sending targeted email campaigns, running

social media ads, or offering special discounts during the afternoon and morning periods to attract and retain customers.Also businesses can ensure that their customer service and support teams are adequately staffed during peak browsing and purchasing times to provide prompt assistance to customers and enhance their overall experience.

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

1. Get month on month orders by states

```
select  customer_state,mp as month,count(mp)as count_of_orders,count(mcd) as total_sale

from

(

select  customer_state,extract(month from order_purchase_timestamp) as mp,extract(month from order_delivered_customer_date)as mcd

from `Business_case.orders` o left join `Business_case.customers` c on c.customer_id = o.customer_id

) as a

group by customer_state,mp

order by customer_state,mp
```

Query results

SAVE

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXECU

Row	customer_state	month	count_of_orders	total_sale
10	AC	10	6	5
11	AC	11	5	5
12	AC	12	5	5
13	AL	1	39	38
14	AL	2	39	39
15	AL	3	40	37
16	AL	4	51	48
17	AL	5	46	45

Results per page:

Insights-

Based on the state-wise month-over-month sales vs. total orders table, it appears that the purchase orders in most states are effectively converting into sales on a monthly basis.This can be a positive sign for e-commerce businesses, as it suggests that their sales processes are effective in converting potential customers into paying customers.

Recommendations-

However, it's important to note that conversion rates can vary depending on various factors, such as product type, pricing, website usability, customer service, and competition. It's essential for businesses to continuously monitor and analyze their conversion rates and identify areas for improvement, if any.This may involve identifying patterns or trends in states with higher conversion rates and replicating those strategies in other states with lower conversion rates. It could also involve identifying any barriers to conversion in specific states and addressing them, such as improving website usability, streamlining the checkout process, or providing additional incentives for purchase completion.

2. Distribution of customers across the states in Brazil

```
select customer_state,count(seller_id) as count_of_stores,
count(customer_id) as count_of_customers

from `Business_case.customers`c left join `Business_case.sellers`s  on s.
seller_zip_code_prefix =c.customer_zip_code_prefix

group by customer_state

order by count_of_stores
```

Query results

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS

Row	customer_state	count_of_stores	count_of_custor
1	PA	0	975
2	TO	0	280
3	PI	0	495
4	AL	0	413
5	RR	0	46
6	AP	0	68
7	AM	2	148
8	SE	5	350
9	MA	12	747
10	AC	14	81
11	MT	16	907
12	RO	18	253
13	RN	25	485
14	MS	30	715
15	PB	34	536

Load more

Insights-

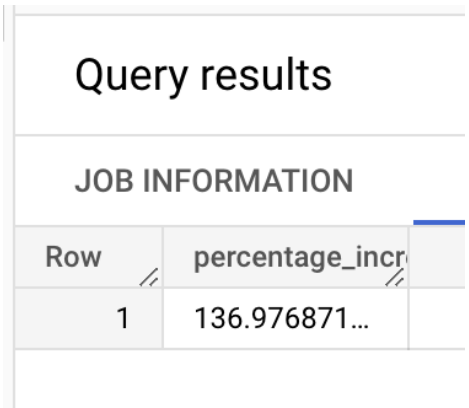
Based on the observation that there are some states in Brazil with a low number of stores or even zero stores, yet a relatively high number of customers for purchasing, while there are other states with a sufficient number of stores to support their customer base, it could indicate potential opportunities for e-commerce businesses to expand their operations and reach in these underserved markets.

Recommendations-

E-commerce businesses could leverage this opportunity to enter these markets by expanding their store network or increasing their online presence through targeted marketing campaigns, promotions, and partnerships with local businesses.Moreover, businesses operating in states with a sufficient number of stores could prioritize optimizing their existing stores to enhance customer experience and retention, while also exploring opportunities to expand their presence in new markets.

4. **Impact on Economy: Analyze 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 “payment_value” column in payments table

```
with cost as(select extract(year from o.order_purchase_timestamp) as
year, ROUND(sum(p.payment_value), 2) as cost_order

from `Business_case.orders` o

JOIN `Business_case.payments` p ON o.order_id = p.order_id

where extract(MONTH from o.order_purchase_timestamp) between 1 and 8

GROUP BY 1

ORDER BY 1)



select (((select cost_order from cost where year=2018 )-(select
cost_order from cost where year=2017 ))*100/(select cost_order from cost
where year=2017 )) as percentage_increase_cost_of_orders
```



Insights-

Based on the observation that the sales trend increased from 2017 to 2018, while the sellers also increased the product price by 136.97%, but this increase in price did not significantly impact the purchases or sales, there

could be several reasons for this phenomenon-competetive pricing,customer loyalty,Demand elasticity,value perception,etc.

Recommendations-

Conducting a deeper analysis of customer attracting factors such as competitive pricing, customer loyalty, demand elasticity, value perception, and market growth can help sustain the pace of growing sales in an e-commerce business in Brazil.

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

```
select distinct customer_state,round(avg(price)over(partition by customer_state),2) as mean_price,sum(price)over(partition by customer_state)as sum_price,

round(avg(freight_value)over(partition by customer_state),2)as mean_freight_value,sum(freight_value)over(partition by customer_state)as sum_freight_value

from `Business_case.order_items` oi left join `Business_case.orders` o on oi.order_id=o.order_id

left join `Business_case.customers` c on o.customer_id=c.customer_id

order by customer_state
```

Query results

SAVE RESULTS

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXECUTION GRAPH

Row	customer_state	mean_price	sum_price	mean_freight_va	sum_freight_valu
1	AC	173.73	15982.95	40.07	3686.75
2	AL	180.89	80314.81	35.84	15914.59
3	AM	135.5	22356.84	33.21	5478.89
4	AP	164.32	13474.3	34.01	2788.5
5	BA	134.6	511349.99	26.36	100156.68
6	CE	153.76	227254.71	32.71	48351.59
7	DF	125.77	302603.94	21.04	50625.5
8	ES	121.91	275037.31	22.06	49764.6
9	GO	126.27	294591.95	22.77	53114.98
10	MA	145.2	119648.22	38.26	31523.77
11	MG	120.75	1585308.03	20.63	270853.46
12	MS	142.63	116812.64	23.37	19144.03
13	MT	148.3	156453.53	28.17	29715.43
14	PA	165.69	178947.81	35.83	38699.3
15	PB	191.48	115268.08	42.72	25719.73

Load more

Insights-

Based on the data provided, it appears that the mean price of products and the mean freight value have a high margin, with the freight value being considerably lower compared to the product price.

Recommendations-

This information could have several implications for the e-commerce business in Brazil:

i.Profit margins: The high margin between the mean price of products and the freight value could indicate that the business is able to generate a significant profit on each sale. This may suggest that the pricing strategy is effective in covering costs and generating a healthy profit margin.

ii.Customer perception of shipping costs: The relatively low freight value compared to the product price could positively impact customer perception of shipping costs. If customers perceive the shipping costs as reasonable or low,

it could lead to higher customer satisfaction and potentially increased customer loyalty.

iii.Pricing strategy: The high margin between the product price and the freight value could also provide opportunities for optimizing the pricing strategy. For example, the business could consider adjusting product prices or freight charges to find the right balance that maximizes profitability while remaining attractive to customers.

iv.Operational efficiency: The data indicating a high margin between the product price and the freight value could also suggest that the business has efficient logistics and shipping processes in place, allowing for cost-effective freight charges. This could reflect positively on the overall operational efficiency of the e-commerce business.

5. Analysis on sales, freight and delivery time

1. Calculate days between purchasing, delivering and estimated delivery

```
select customer_id, order_id,
date_diff(order_purchase_timestamp,order_estimated_delivery_date,Day) as
estimated_days_of_delivery, date_diff(order_purchase_timestamp,
order_delivered_customer_date,Day) as customer_actual_days_of_delivery,

date_diff(order_estimated_delivery_date,
order_delivered_customer_date,Day) as
estimated_actual_days_of_delivery_diff

from `Business_case.orders`

where order_status='delivered'
```

Query results

SAVE RESULTS | EXPLORE DATA

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXECUTION GRAPH PREVIEW

Row	customer_id	order_id	estimated_days	customer_actual_days_of_delivery	estimated_actual_days_of_deliver
1	7a34a8e890765ad6f90db76d0...	635c894d068ac37e6e03dc54e...	-32	-30	1
2	065d53860347d845788e041c...	3b97562c3aee8bdedcb5c2e45...	-33	-32	0
3	0378e1381c730d4504ebc07d2...	68f47f50f04c4cb6774570cfde...	-31	-29	1
4	d33e520a99eb4cfc0d3ef2b6ff...	276e9ec344d3bf029ff83a161c...	-39	-43	-4
5	a0bc11375dd3d8bdd0e0bfcbc...	54e1a3c2b97fb0809da548a59...	-36	-40	-4
6	8fe0db7abbccaf2d788689e91...	fd04fa4105ee8045f6a0139ca5...	-35	-37	-1
7	22c0028cdec95ad1808c1fd50...	302bb8109d097a9fc6e9cefc5...	-28	-33	-5
8	dca924c5e55e17bdba2ad42ae...	66057d37308e787052a32828...	-32	-38	-6
9	1c7a9b908094192a2dfae2819...	19135c945c554eebfd7576c73...	-33	-36	-2
10	a1fa003a1a17fc47164251e0e...	4493e45e7ca1084efcd38ddeb...	-33	-34	0
11	f5c36ac199073a62861ebda86...	70c77e51e0f179d75a64a6141...	-31	-42	-11
12	53504e2e5940107ff1e2e52a0...	d7918e406132d7c81f1b84527...	-31	-35	-3
13	ff1201e402a4b1a1bfae1d0abf...	43f6604e77ce6433e7d68dd86...	-25	-32	-7
14	2128bfdcc221a8085d9532893...	37073d851c3f30deebe598e5a...	-22	-31	-9
15	897d0a8c75b989370dca7f88b...	d064d4d070d914984df257750...	-28	-29	0

Customer_actual_days_of_delivery- it represent total number of day from the actual purchase date to actual delivery date.

estimated_days_of_delivery-it represent total number of day from the actual purchase date to estimated delivery date.

estimated_actual_days_of_delivery_diff-it represent total number of day from the estimated delivery date to actual delivery date.

2. Find time_to_delivery & diff_estimated_delivery. Formula for the same given below:
    - time_to_delivery = order_purchase_timestamp-order_delivered_customer_date
    - diff_estimated_delivery = order_estimated_delivery_date-order_delivered_customer_date

```
select customer_id, date_diff(order_purchase_timestamp,
order_delivered_customer_date,Day) as time_to_delivery,

date_diff(order_estimated_delivery_date,
order_delivered_customer_date,Day) as diff_estimated_delivery

from `Business_case.orders`

where order_status='delivered'
```

Query results

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXI

Row	customer_id	time_to_delivery	diff_estimated_delivery
1	7a34a8e890765ad6f90db76d0...	time_to_delivery	1
2	065d53860347d845788e041c...	-32	0
3	0378e1381c730d4504ebc07d2...	-29	1
4	d33e520a99eb4cfc0d3ef2b6ff...	-43	-4
5	a0bc11375dd3d8bdd0e0bfcbc...	-40	-4
6	8fe0db7abbccaf2d788689e91...	-37	-1
7	22c0028cdec95ad1808c1fd50...	-33	-5
8	dca924c5e55e17bdba2ad42ae...	-38	-6
9	1c7a9b908094192a2dfae2819...	-36	-2
10	a1fa003a1a17fc47164251e0e...	-34	0
11	f5c36ac199073a62861ebda86...	-42	-11
12	53504e2e5940107ff1e2e52a0...	-35	-3
13	ff1201e402a4b1a1bfae1d0abf...	-32	-7
14	2128bfdcc221a8085d9532893...	-31	-9
15	897d0a8c75b989370dca7f88b...	-29	0

For point 1 & 2-

Insights-

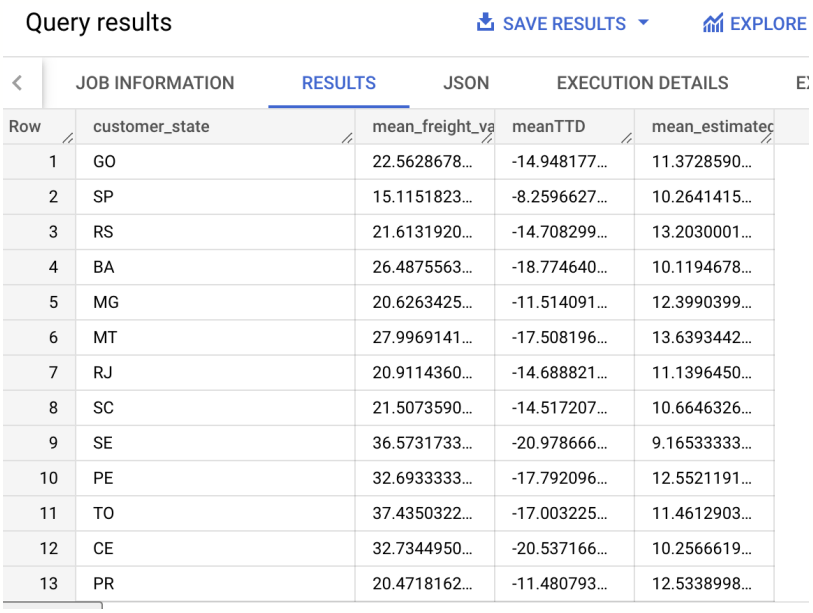
Based on the provided data on estimated and actual delivery of products, it appears that there is a significant variation in the delivery times for different orders. Some orders are delivered with a minimum 1-day delay, while a significant portion of orders are delivered many days before the estimated or committed delivery date, with a difference gap that can reach over 100 days.

Recommendations-

Based on the analysis of the estimated and actual delivery data, it appears that the e-commerce business in Brazil needs to pay more attention to various aspects of delivery management, customer satisfaction, order fulfillment, logistics, and continuous improvement to ensure customer retention and loyalty.

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

```
select customer_state,avg(freight_value)as mean_freight_value,
avg(n.time_to_delivery) as meanTTD,avg(n.diff_estimated_delivery)as
mean_estimated_delivery

from(

select date_diff(order_purchase_timestamp,
order_delivered_customer_date,Day) as time_to_delivery, customer_state,

date_diff(order_estimated_delivery_date,
order_delivered_customer_date,Day) as
diff_estimated_delivery,freight_value

from `Business_case.orders` o left join `Business_case.order_items` oi on
o.order_id= oi.order_id left join `Business_case.customers` c on
c.customer_id = o.customer_id

where order_status='delivered') as n

group by customer_state
```



Row	customer_state	mean_freight_va	meanTTD	mean_estimatec
1	GO	22.5628678...	-14.948177...	11.3728590...
2	SP	15.1151823...	-8.2596627...	10.2641415...
3	RS	21.6131920...	-14.708299...	13.2030001...
4	BA	26.4875563...	-18.774640...	10.1194678...
5	MG	20.6263425...	-11.514091...	12.3990399...
6	MT	27.9969141...	-17.508196...	13.6393442...
7	RJ	20.9114360...	-14.688821...	11.1396450...
8	SC	21.5073590...	-14.517207...	10.6646326...
9	SE	36.5731733...	-20.978666...	9.16533333...
10	PE	32.6933333...	-17.792096...	12.5521191...
11	TO	37.4350322...	-17.003225...	11.4612903...
12	CE	32.7344950...	-20.537166...	10.2566619...
13	PR	20.4718162...	-11.480793...	12.5338998...

Insights-

Based on the analysis of the data, it appears that there is variability in the mean freight values for the same cases of time to deliver. To achieve balanced profit margins, it may be beneficial for the e-commerce business to consider optimizing freight costs by exploring options for lower-cost freight providers or negotiating better freight rates with existing partners.

Recommendations-

Here are some potential strategies to achieve more consistent freight costs:

i.Compare and negotiate freight rates

ii.Optimize shipping methods

iii.Leverage partnerships

iv.Implement freight cost tracking and analysis

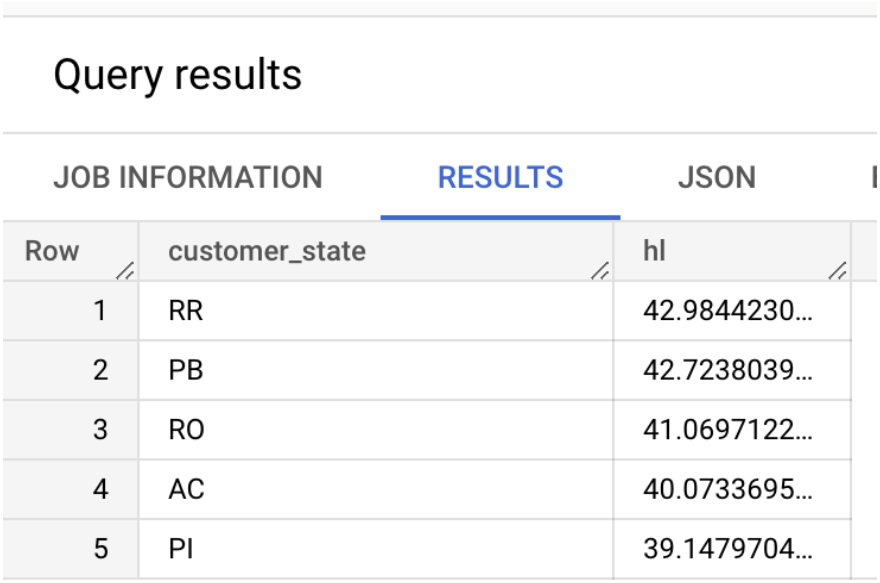
v.Optimize packaging and dimensioning

4. Sort the data to get the following:
5. Top 5 states with highest/lowest average freight value - sort in desc/asc limit 5

Top 5 States with Highest average freight value

```
with raw as(

select distinct customer_state,avg(freight_value) over(partition by
customer_state) as hl

from `Business_case.orders` o left join `Business_case.order_items` oi on
o.order_id= oi.order_id left join `Business_case.customers` c on
c.customer_id = o.customer_id)
```

```
select customer_state,hl

from raw

order by raw.hl desc

limit 5
```



Query results

JOB INFORMATION | RESULTS | JSON

Row	customer_state	hl
1	RR	42.9844230...
2	PB	42.7238039...
3	RO	41.0697122...
4	AC	40.0733695...
5	PI	39.1479704...

Top 5 States with Lowest average freight value

```
with raw as(

select distinct customer_state,avg(freight_value) over(partition by
customer_state) as hl

from `Business_case.orders` o left join `Business_case.order_items` oi on
o.order_id= oi.order_id left join `Business_case.customers` c on
c.customer_id = o.customer_id)
```

```
select customer_state,hl

from raw

order by raw.hl

limit 5
```

Query results

JOB INFORMATION | RESULTS | JSON

Row	customer_state	hl
1	SP	15.1472753...
2	PR	20.5316515...
3	MG	20.6301668...
4	RJ	20.9609239...
5	DF	21.0413549...

Insights-

Based on the analysis of the data, it appears that there is variation in the average freight values among different states in Brazil. The highest average freight value is in RR (Roraima) state, while the lowest average freight value is in SP (São Paulo) state. This information can provide insights for developing customer engagement activities and implementing new methods for negotiating freight costs.

Recommendations-

In states with the lowest average freight values, such as SP state, the e-commerce business can focus on customer engagement activities to further boost sales. This may involve offering promotions, discounts, or special incentives to customers in SP state to encourage more purchases, increasing marketing efforts in the region, or providing excellent customer service to build customer loyalty. By enhancing customer engagement in states with lower freight costs, the e-commerce business can potentially attract more customers

and increase sales. On the other hand, in states with the highest average freight values, such as RR state, the e-commerce business may need to focus on negotiating freight costs to optimize shipping expenses. This may involve exploring options for negotiating better freight rates with existing logistics providers, seeking alternative logistics partners with more competitive rates, or leveraging partnerships or collaborations to gain access to discounted freight rates. By actively managing and negotiating freight costs in states with higher freight expenses, the e-commerce business can potentially reduce shipping costs and improve overall profitability.

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

Top 5 States with Highest average time to deliver

```
with record as (

select distinct customer_state,avg(n.time_to_delivery) over(partition by
customer_state) as HL

from

(select date_diff(order_purchase_timestamp,
order_delivered_customer_date,Day) as time_to_delivery, customer_state

from `Business_case.orders` o left join `Business_case.customers` c on
c.customer_id = o.customer_id

where order_status='delivered') as n)



select customer_state,HL from record

order by record.HL desc

limit 5
```

Query results

JOB INFORMATION | RESULTS | JSON

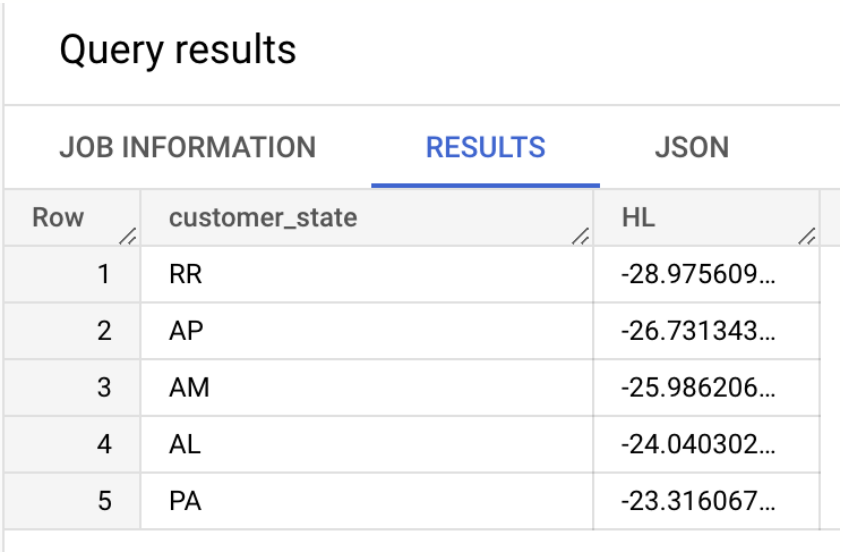
Row	customer_state	HL
1	SP	-8.2980935...
2	PR	-11.526711...
3	MG	-11.542187...
4	DF	-12.509134...
5	SC	-14.475183...

customer_state

Top 5 States with Lowest average time to deliver

```
with record as (

select distinct customer_state,avg(n.time_to_delivery) over(partition by
customer_state) as HL

from

(select date_diff(order_purchase_timestamp,
order_delivered_customer_date,Day) as time_to_delivery, customer_state

from `Business_case.orders` o left join `Business_case.customers` c on
c.customer_id = o.customer_id

where order_status='delivered') as n)



select customer_state,HL from record

order by record.HL
```

```
limit 5
```



Query results

JOB INFORMATION | RESULTS | JSON

Row	customer_state	HL
1	RR	-28.975609...
2	AP	-26.731343...
3	AM	-25.986206...
4	AL	-24.040302...
5	PA	-23.316067...

Insights-

Based on the analysis of the data, it appears that RR (Roraima) state has the highest average time to deliver, ranking as the top state with longer delivery times. On the other hand, SP (São Paulo) state has the lowest average time to deliver, ranking as the top state with faster delivery times.

Recommendations-

This information provides insights into the performance of delivery times in different states in Brazil. E-commerce businesses can utilize this data to understand which states may require more attention and improvement in terms of delivery time management. For RR state, where delivery times are longer, the e-commerce business may need to focus on addressing any logistical challenges or improving transportation networks to optimize delivery efficiency. This may involve working closely with logistics partners, streamlining order fulfillment processes, and exploring options for faster transportation methods. On the other hand, for SP state, where delivery times are shorter, the e-commerce business can leverage this advantage to attract more customers and promote faster delivery as a competitive advantage. This may involve highlighting the faster delivery times in marketing campaigns, offering expedited shipping options, or utilizing local fulfillment centers to enhance the speed of order

delivery.

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

   Top 5 states where delivery is really fast compared to estimated date

```
with record as (

select distinct customer_state,avg(diff_estimated_delivery)
over(partition by customer_state) as HL

from

(select date_diff(order_estimated_delivery_date,
order_delivered_customer_date,Day) as diff_estimated_delivery,
customer_state

from `Business_case.orders` o left join `Business_case.customers` c on
c.customer_id = o.customer_id

where order_status='delivered') as n)



select customer_state,HL

from record

order by record.HL desc

limit 5
```

Query results

JOB INFORMATION | RESULTS | JSON | E

Row	customer_state	HL
1	AC	19.7625
2	RO	19.1316872...
3	AP	18.7313432...
4	AM	18.6068965...
5	RR	16.4146341...

Top 5 states where delivery is not so fast compared to estimated date

```
with record as (

select distinct customer_state,avg(diff_estimated_delivery)
over(partition by customer_state) as HL

from

(select date_diff(order_estimated_delivery_date,
order_delivered_customer_date,Day) as diff_estimated_delivery,
customer_state

from `Business_case.orders` o left join `Business_case.customers` c on
c.customer_id = o.customer_id

where order_status='delivered') as n)

select customer_state,HL

from record

order by record.HL

limit 5
```

Query results

JOB INFORMATION | RESULTS | JSON | E

Row	customer_state	HL
1	AL	7.94710327...
2	MA	8.76847977...
3	SE	9.17313432...
4	ES	9.61854636...
5	BA	9.93488943...

Insights-

Based on the analysis of the data, it appears that AC (Acre) state has the highest percentage of orders being delivered before the estimated delivery date, indicating a better performance in terms of timely delivery commitments. This may contribute to a positive customer experience, as customers receive their orders earlier than expected, which can lead to increased customer satisfaction and loyalty. On the other hand, AL (Alagoas) state has the highest percentage of orders not reaching the estimated delivery date, indicating a lower performance in terms of meeting delivery commitments. This can potentially result in disappointment or frustration for customers who may have expected their orders to arrive by a certain date. This highlights the importance of improving logistics and delivery operations in AL state to ensure that orders are delivered on time as per the estimated delivery date.

Recommendations-

i.Improve logistics and supply chain management: Identify and address any bottlenecks or inefficiencies in the transportation and fulfillment process to ensure smooth and timely delivery of orders. This may involve optimizing transportation routes, improving warehouse operations, and streamlining order processing.

ii.Negotiate freight costs: For states with higher average freight values, explore opportunities to negotiate freight costs with logistics partners or seek alternative freight providers to reduce shipping costs and improve overall profitability.

iii.Focus on customer engagement: Implement customer-centric initiatives such as timely updates on order status, proactive communication on any delays or issues, and personalized customer service to build trust and loyalty. Keeping customers informed about their orders can help manage their expectations and minimize disappointment in case of delays.

iv.Monitor and measure delivery performance: Continuously monitor and measure delivery performance metrics such as delivery times, adherence to estimated delivery dates, and customer feedback. Use this data to identify areas of improvement and implement corrective actions.

v.Invest in logistics infrastructure: States with consistently poor delivery performance may require investment in logistics infrastructure, such as improving transportation networks, warehousing facilities, and last-mile delivery capabilities. This can help improve delivery efficiency and reduce delays.

vi.Collaborate with logistics partners: Collaborate closely with logistics partners to understand their challenges and work together to find solutions. Building strong partnerships with logistics providers can help in addressing issues related to delivery performance and ensuring smooth and timely order fulfillment.

6. Payment type analysis:

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

```
select  extract(month from order_purchase_timestamp) as
Month,payment_type,count(p.order_id) as count_of_orders

from `Business_case.orders` o right join  `Business_case.payments` p on
p.order_id = o.order_id

group by Month,payment_type
```

```
order by Month,count_of_orders desc
```

Query results

SAVE

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS | EXEC

Row	Month	payment_type	count_of_orders
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
11	3	voucher	591
12	3	debit_card	109
13	4	credit_card	7301
14	4	UPI	1783
15	4	voucher	572

Load more

Insights-

Based on the analysis of the data, it is evident that credit card payment types are the most commonly used payment method by customers in Brazil for online purchases, followed by UPI (Unified Payments Interface) which is a popular payment method in India as well.

Recommendations-

This information can be used by e-commerce businesses in Brazil to prioritize and optimize their payment processing systems, ensuring seamless acceptance of credit card payments and UPI transactions to cater to the preferences of their customers. This may involve partnering with reliable payment gateways, implementing robust security measures to protect customer payment information, and offering a user-friendly checkout process for credit card and UPI payments. Additionally, adding some credit card offers during the partnering and staying updated with the latest payment trends and customer preferences can help businesses adapt their payment processing strategies and stay competitive in the dynamic e-commerce landscape.

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

```
select payment_installments,count(order_id) as count_of_orders

from `Business_case.payments`

group by payment_installments

order by count_of_orders desc
```

Query results

JOB INFORMATION | RESULTS | JSON

Row	payment_installı	count_of_orders
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
11	12	133
12	15	74
13	18	27
14	11	23
15	24	18

Load more

Insights-

Based on the analysis of the data, it appears that the majority of customers prefer to place orders with 1-month payment installments, while a smaller number of customers opt for longer payment installment plans of 12 or 24 months.

Recommendations-

This information can be valuable for e-commerce businesses in Brazil to tailor their pricing and payment options to align with customer preferences. For instance, businesses may consider offering attractive discounts or incentives for customers who choose shorter payment installment plans to encourage more sales, while also ensuring that longer payment installment options are available for customers who prefer extended payment terms. Additionally, monitoring and analyzing customer payment preferences over time can help businesses make data-driven decisions on pricing, promotions, and payment options to optimize sales and customer satisfaction.