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

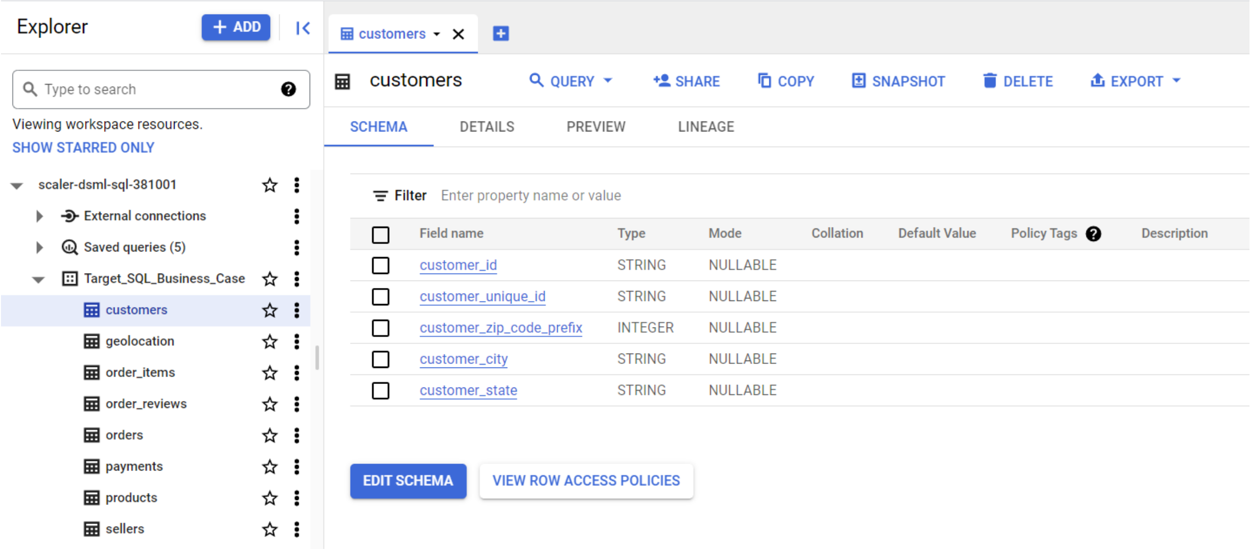
1.1 Data type of columns in a table

Assumption:

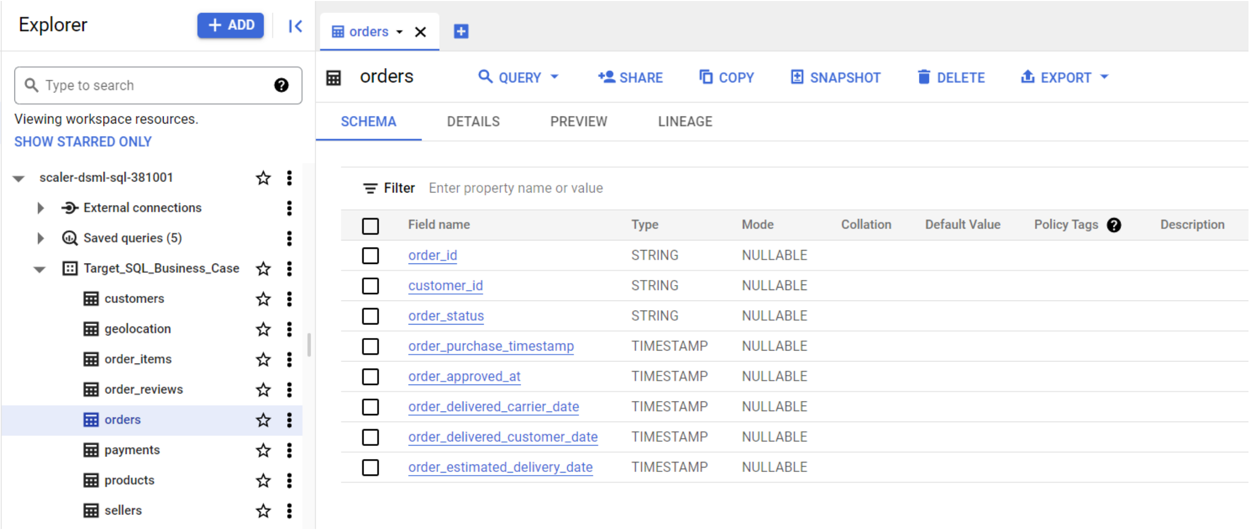
Data Type of columns in a table can be viewed by following the steps given below. Under Target_SQL_Business_Case Dataset → Click any table. I have clicked on orders table. The table schema contains details such as datatypes, column names/field names and Mode etc.

Insight:

The datatypes of customers table are string and integer.
The datatypes of geolocation table are integer, string and float.
The datatypes of order_items table are string, integer, timestamp and float.
The datatypes of order_reviews are string, integer and timestamp.
The datatypes of order table are string and timestamp.
The datatypes of payments table are string, integer and float.
The datatypes of products table are string and integer.
The datatypes of seller table are string and integer.



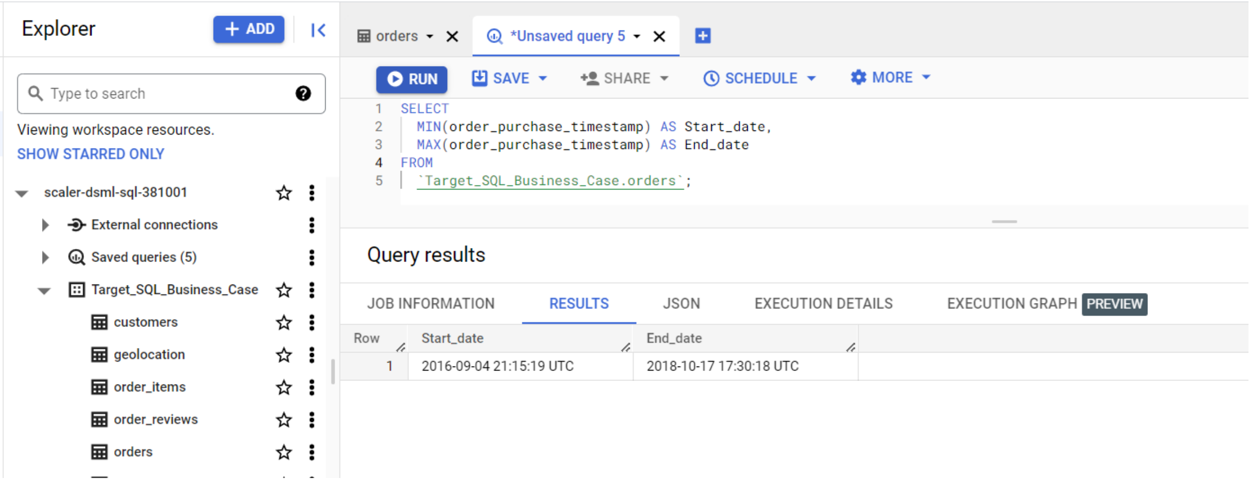
□	Field name	Type	Mode	Collation	Default Value	Policy Tags	Description
□	customer_id	STRING	NULLABLE				
□	customer_unique_id	STRING	NULLABLE				
□	customer_zip_code_prefix	INTEGER	NULLABLE				
□	customer_city	STRING	NULLABLE				
□	customer_state	STRING	NULLABLE				



□	Field name	Type	Mode	Collation	Default Value	Policy Tags	Description
□	order_id	STRING	NULLABLE				
□	customer_id	STRING	NULLABLE				
□	order_status	STRING	NULLABLE				
□	order_purchase_timestamp	TIMESTAMP	NULLABLE				
□	order_approved_at	TIMESTAMP	NULLABLE				
□	order_delivered_carrier_date	TIMESTAMP	NULLABLE				
□	order_delivered_customer_date	TIMESTAMP	NULLABLE				
□	order_estimated_delivery_date	TIMESTAMP	NULLABLE				

1.2 Time period for which the data is given.

Assumption: order_purchase_timestamp column is used to find the first order and the last order as it more granular and updated more frequently.



```
SELECT
  MIN(order_purchase_timestamp) AS Start_date,
  MAX(order_purchase_timestamp) AS End_date
FROM
 `Target_SQL_Business_Case.orders`;
```

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

Query:

```
SELECT
 MIN(order_purchase_timestamp) AS Start_date,
 MAX(order_purchase_timestamp) AS End_date
FROM
 `Target_SQL_Business_Case.orders`;
```

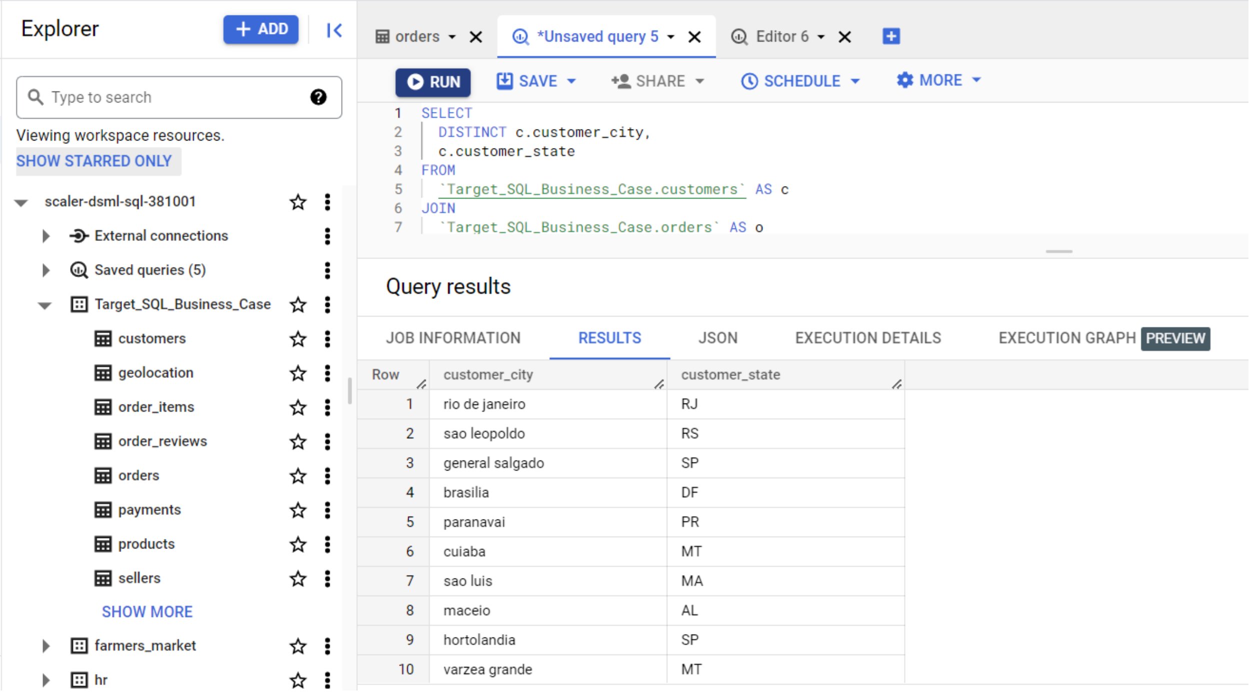
Insight: The earliest order timestamp from the given data is captured by the query as 2016-09-04 21:15:19 UTC and the last order timestamp is captured by the query as 2018-10-17 17:30:18 UTC.

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

Assumption: Customer city and state can be found using the customer table and by joining the customer table with orders table we can get the data for customers who placed orders during the given period.

Query:

```
SELECT
 DISTINCT c.customer_city,
 c.customer_state
FROM
 `Target_SQL_Business_Case.customers` AS c
JOIN
 `Target_SQL_Business_Case.orders` AS o
ON
 c.customer_id=o.customer_id;
```



```
SELECT
  DISTINCT c.customer_city,
  c.customer_state
FROM
  `Target_SQL_Business_Case.customers` AS c
JOIN
  `Target_SQL_Business_Case.orders` AS o
```

Row	customer_city	customer_state
1	rio de janeiro	RJ
2	sao leopoldo	RS
3	general salgado	SP
4	brasilia	DF
5	paranavai	PR
6	cuiaba	MT
7	sao luis	MA
8	maceio	AL
9	hortolandia	SP
10	varzea grande	MT

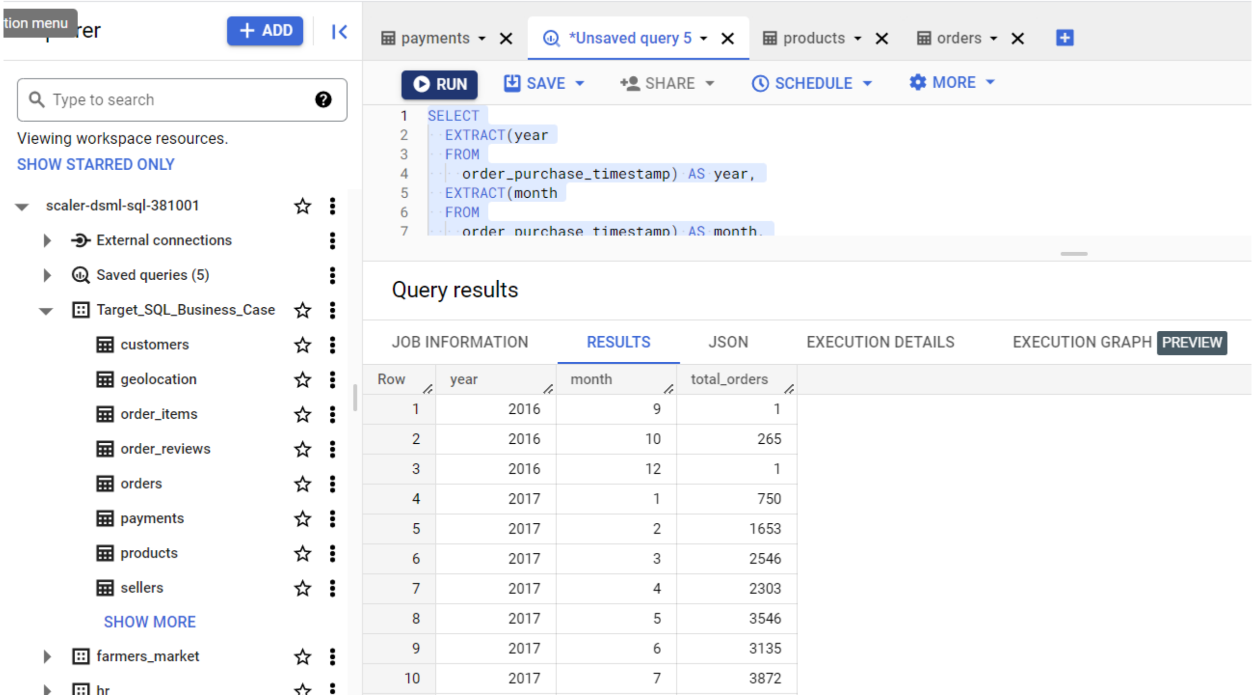
2. In-depth Exploration:

2.1 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?

Assumption: Number of orders placed or number of products purchased from orders table is analyzed find out about the growing trend on e-commerce in Brazil. To extract this information order_purchase_timestamp column is used to extract individual time attributes such as year, month, day etc.

Query:

```
SELECT
 EXTRACT(year
 FROM
  order_purchase_timestamp) AS year,
 EXTRACT(month
 FROM
  order_purchase_timestamp) AS month,
 COUNT(DISTINCT order_id) AS total_orders,
FROM
 `Target_SQL_Business_Case.orders`
WHERE
 order_status = 'delivered'
GROUP BY
 year,  month
ORDER BY
 year,  month
```



```
SELECT
  EXTRACT(year
  FROM
    order_purchase_timestamp) AS year,
  EXTRACT(month
  FROM
    order_purchase_timestamp) AS month,
```

Row	year	month	total_orders
1	2016	9	1
2	2016	10	265
3	2016	12	1
4	2017	1	750
5	2017	2	1653
6	2017	3	2546
7	2017	4	2303
8	2017	5	3546
9	2017	6	3135
10	2017	7	3872

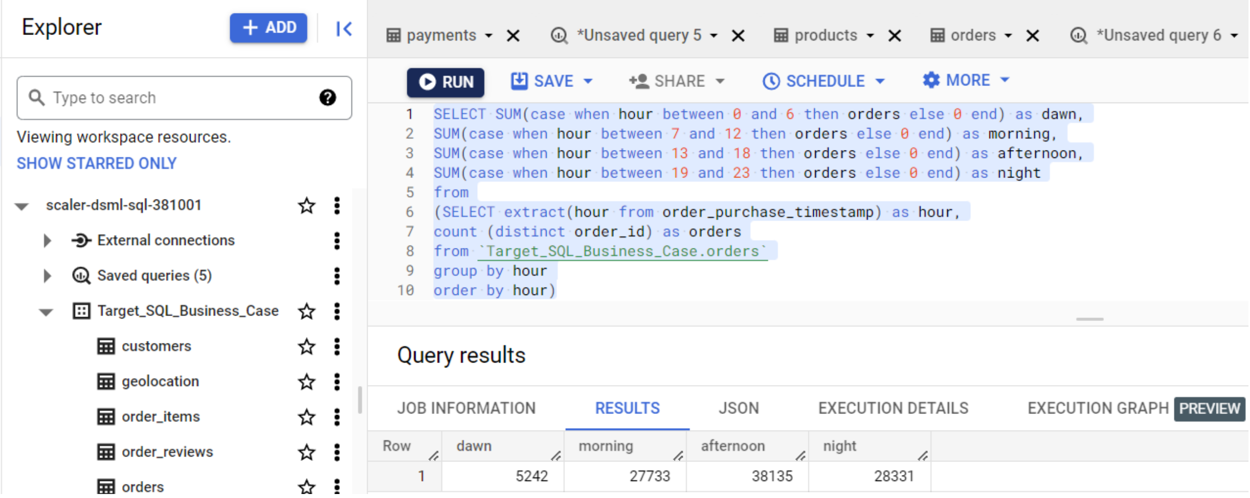
Insight: Yes, there is a growing trend on e-commerce in Brazil. This is understood by analyzing the result generated from the above query. During specific months there is a peak where customers have purchased more but in other months customers are inclined to purchase products online than before.

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

Assumption: Number of orders placed or number of products purchased from orders table is analyzed find out about the growing trend on e-commerce in Brazil. To extract this information order_purchase_timestamp column is used to extract individual time attributes such as year, month, hour etc. Dawn is assumed between 00:00H to 06:00H, Morning is assumed between 06:00H to 12:00H, Afternoon is assumed between 12:00H to 18:00H and the remaining period is considered as Night.

Query:

SELECT SUM(case when hour between 0 and 6 then orders else 0 end) as dawn,
SUM(case when hour between 7 and 12 then orders else 0 end) as morning,
SUM(case when hour between 13 and 18 then orders else 0 end) as afternoon,
SUM(case when hour between 19 and 23 then orders else 0 end) as night
from
(SELECT extract(hour from order_purchase_timestamp) as hour,
count (distinct order_id) as orders
from `Target_SQL_Business_Case.orders`
group by hour
order by hour)



```
SELECT SUM(case when hour between 0 and 6 then orders else 0 end) as dawn,
SUM(case when hour between 7 and 12 then orders else 0 end) as morning,
SUM(case when hour between 13 and 18 then orders else 0 end) as afternoon,
SUM(case when hour between 19 and 23 then orders else 0 end) as night
from
(SELECT extract(hour from order_purchase_timestamp) as hour,
count (distinct order_id) as orders
from `Target_SQL_Business_Case.orders`
group by hour
order by hour)
```

Row	dawn	morning	afternoon	night
1	5242	27733	38135	28331

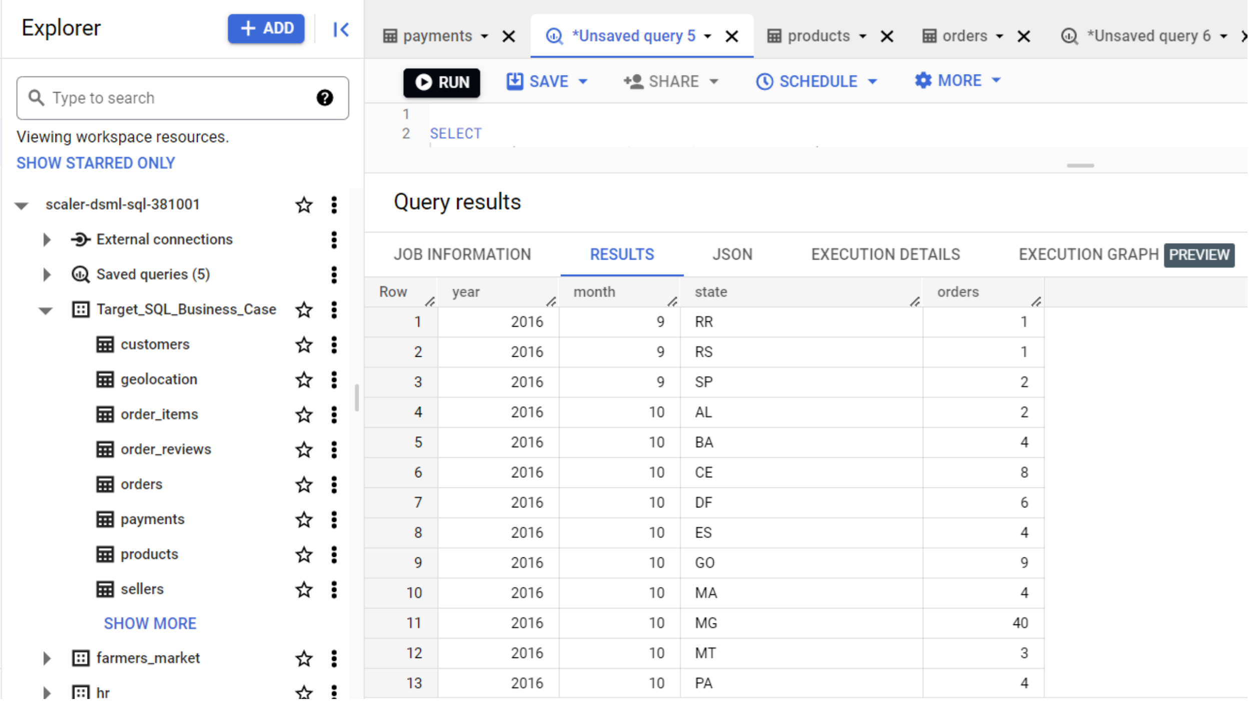
Insight: Brazilian customers tend to buy more during afternoons.

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

3.1 Get month on month orders by states

Query:

```
SELECT
 EXTRACT(Year FROM order_purchase_timestamp) AS year,
 EXTRACT(Month FROM order_purchase_timestamp)AS month,
 c.customer_state AS state,
 COUNT(distinct order_id) AS orders
FROM `Target_SQL_Business_Case.orders` AS o
JOIN `Target_SQL_Business_Case.customers` AS c
ON o.customer_id=c.customer_id
GROUP BY year, month, state
ORDER BY year, month, state;
```



```
SELECT
```

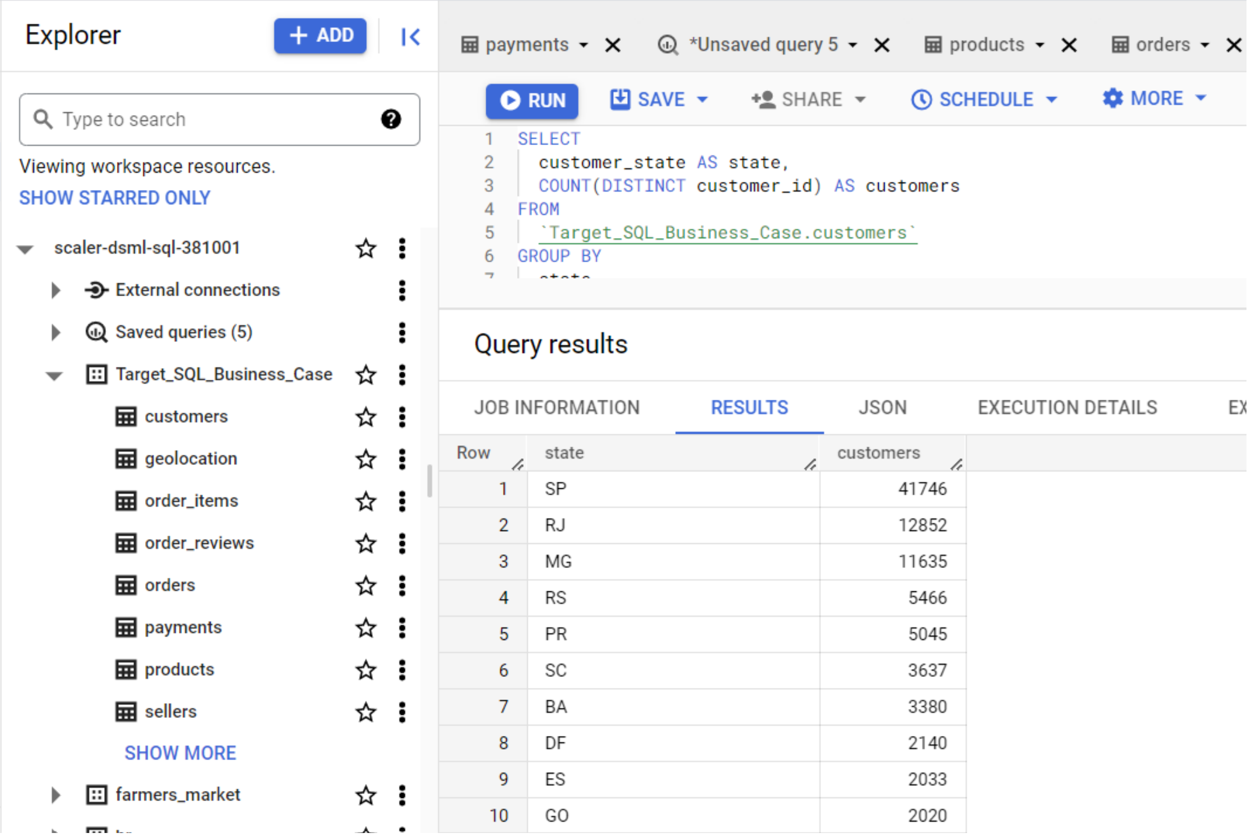
Row	year	month	state	orders
1	2016	9	RR	1
2	2016	9	RS	1
3	2016	9	SP	2
4	2016	10	AL	2
5	2016	10	BA	4
6	2016	10	CE	8
7	2016	10	DF	6
8	2016	10	ES	4
9	2016	10	GO	9
10	2016	10	MA	4
11	2016	10	MG	40
12	2016	10	MT	3
13	2016	10	PA	4

3.2 Distribution of customers across the states in Brazil

Query:

```
SELECT
 customer_state AS state,
 COUNT(DISTINCT customer_id) AS customers
FROM
 `Target_SQL_Business_Case.customers`
GROUP BY
 state
```

ORDER BY
 customers DESC;



```sql
SELECT
  customer_state AS state,
  COUNT(DISTINCT customer_id) AS customers
FROM
  `Target_SQL_Business_Case.customers`
GROUP BY
  state
```

Row	state	customers
1	SP	41746
2	RJ	12852
3	MG	11635
4	RS	5466
5	PR	5045
6	SC	3637
7	BA	3380
8	DF	2140
9	ES	2033
10	GO	2020

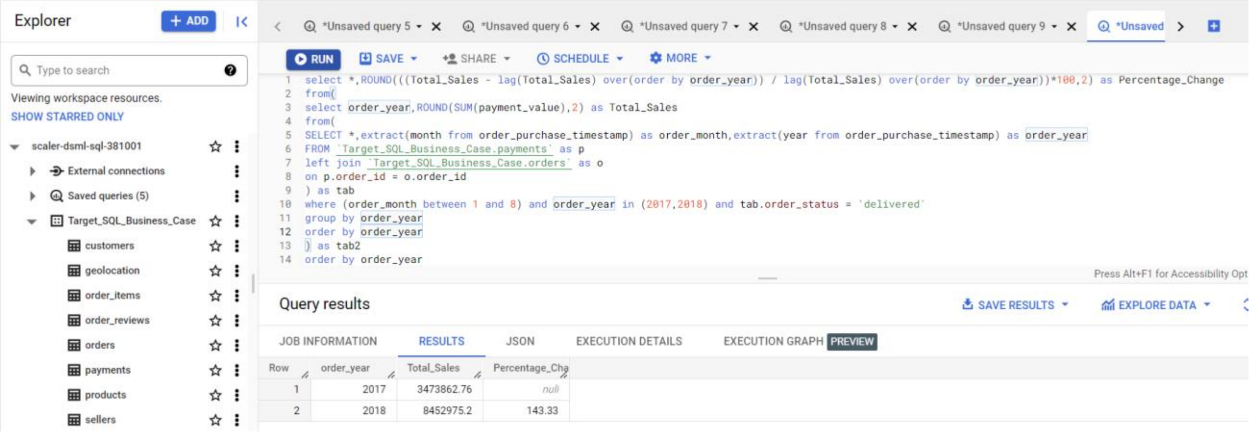
Insights:

The query gives the distribution of customers across states in Brazil. The highest number of customers are 41,746 in Sao Paulo, southeast state of Brazil and the least number of customers are 46 in Roraima, northern most state of Brazil.

4. Impact on Economy: Analyze the money movement by e-commerce by looking at order prices, freight, and others.
4.1 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.

Query:

```sql
select *,ROUND(((Total_Sales - lag(Total_Sales) over(order by order_year)) /
lag(Total_Sales) over(order by order_year))*100,2) as Percentage_Change
from(
select order_year,ROUND(SUM(payment_value),2) as Total_Sales
from(
SELECT *,extract(month from order_purchase_timestamp) as
order_month,extract(year from order_purchase_timestamp) as order_year
FROM `Target_SQL_Business_Case.payments` as p
left join `Target_SQL_Business_Case.orders` as o
on p.order_id = o.order_id
) as tab
where (order_month between 1 and 8) and order_year in (2017,2018) and
tab.order_status = 'delivered'
group by order_year
order by order_year
) as tab2
order by order_year
```



```
select *,ROUND(((Total_Sales - lag(Total_Sales) over(order by order_year)) / lag(Total_Sales) over(order by order_year))*100,2) as Percentage_Change
from(
select order_year,ROUND(SUM(payment_value),2) as Total_Sales
from(
SELECT *,extract(month from order_purchase_timestamp) as order_month,extract(year from order_purchase_timestamp) as order_year
FROM `Target_SQL_Business_Case.payments` as p
left join `Target_SQL_Business_Case.orders` as o
on p.order_id = o.order_id
) as tab
where (order_month between 1 and 8) and order_year in (2017,2018) and tab.order_status = 'delivered'
group by order_year
order by order_year
) as tab2
order by order_year
```

Row	order_year	Total_Sales	Percentage_Cha
1	2017	3473862.76	null
2	2018	8452975.2	143.33

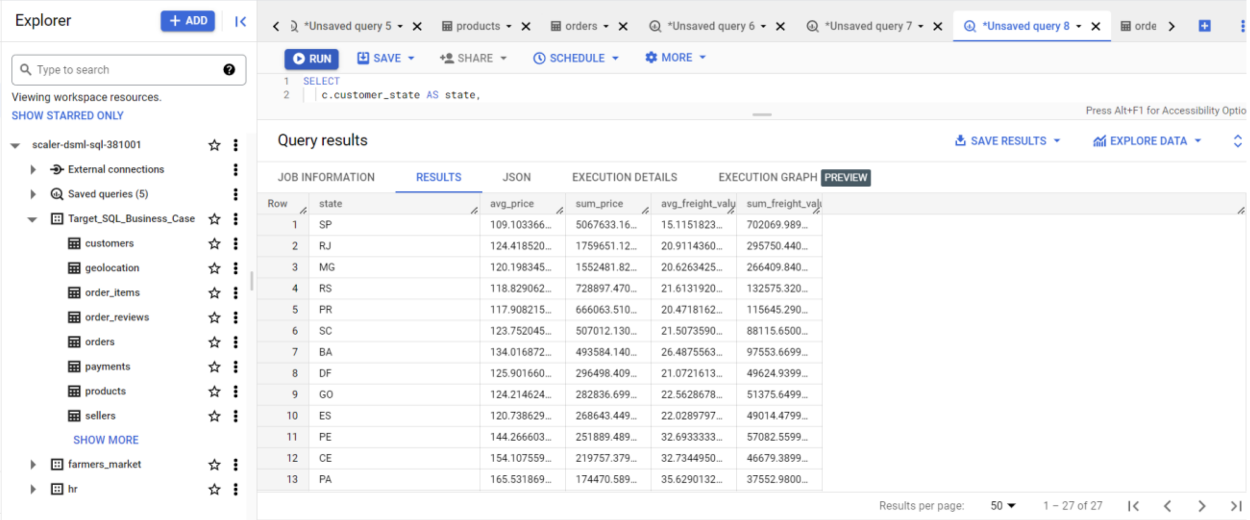
Insight: Total sales percentage increase of 143 is seen from 2017 to 2018.

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

Query:

```
SELECT
   c.customer_state AS state,
  AVG(o_i.price) AS avg_price,
  SUM(o_i.price) AS sum_price,
  AVG(o_i.freight_value) AS avg_freight_value,
  SUM(o_i.freight_value) AS sum_freight_value
FROM
   `Target_SQL_Business_Case.customers` as c
 inner JOIN
  `Target_SQL_Business_Case.orders` as o
ON
  c.customer_id = o.customer_id
  INNER JOIN
  `Target_SQL_Business_Case.order_items` as o_i
  ON o.order_id = o_i.order_id
WHERE
  o.order_status = 'delivered'
GROUP BY
```

```
  state
ORDER BY
  sum_price DESC;
```



```
SELECT
  c.customer_state AS state,
```

Query results

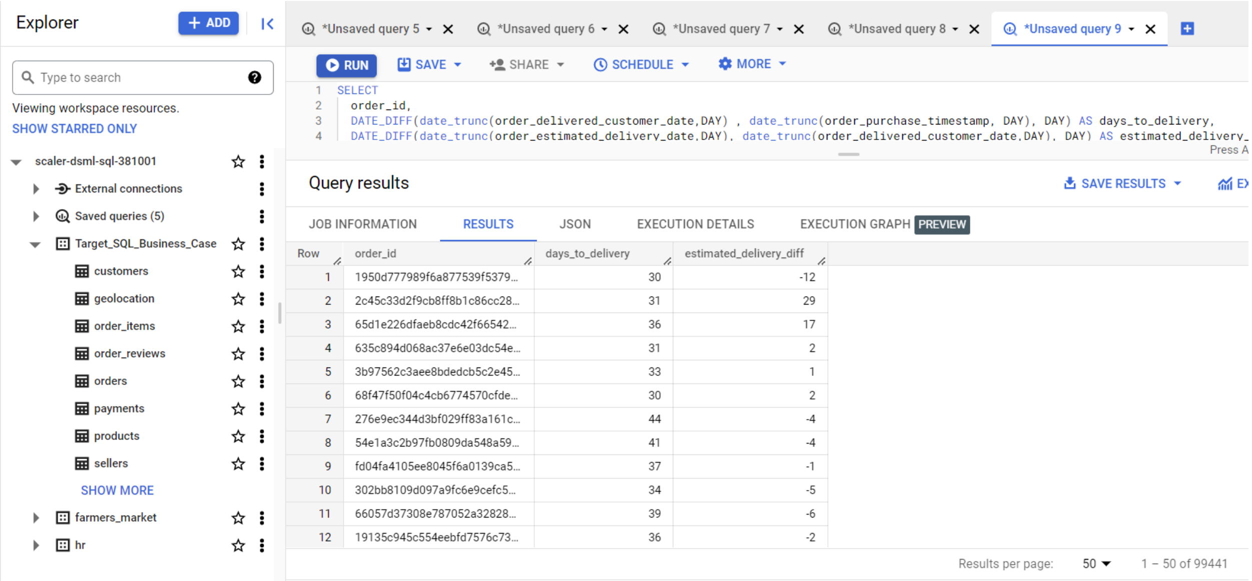
Row	state	avg_price	sum_price	avg_freight_valu	sum_freight_valu
1	SP	109.103366...	5067633.16...	15.1151823...	702069.989...
2	RJ	124.418520...	1759651.12...	20.9114360...	295750.440...
3	MG	120.198345...	1552481.82...	20.6263425...	266409.840...
4	RS	118.829062...	728897.470...	21.6131920...	132575.320...
5	PR	117.908215...	666063.510...	20.4718162...	115645.290...
6	SC	123.752045...	507012.130...	21.5073590...	88115.6500...
7	BA	134.016872...	493584.140...	26.4875563...	97553.6699...
8	DF	125.901660...	296498.409...	21.0721613...	49624.9399...
9	GO	124.214624...	282836.699...	22.5628678...	51375.6499...
10	ES	120.738629...	268643.449...	22.0289797...	49014.4799...
11	PE	144.266603...	251889.489...	32.6933333...	57082.5599...
12	CE	154.107559...	219757.379...	32.7344950...	46679.3899...
13	PA	165.531869...	174470.589...	35.6290132...	37552.9800...

Insight: Sao Paulo is the best performing state because of less freight value and price.

5. Analysis on sales, freight and delivery time
5.1 Calculate days between purchasing, delivering and estimated delivery.

<u>Query:</u>

```
SELECT
  order_id,
  DATE_DIFF(date_trunc(order_delivered_customer_date,DAY) ,
date_trunc(order_purchase_timestamp, DAY), DAY) AS days_to_delivery,
  DATE_DIFF(date_trunc(order_estimated_delivery_date,DAY),
date_trunc(order_delivered_customer_date,DAY), DAY) AS estimated_delivery_diff
FROM
  `Target_SQL_Business_Case.orders`;
```



```
SELECT
  order_id,
  DATE_DIFF(date_trunc(order_delivered_customer_date,DAY) , date_trunc(order_purchase_timestamp, DAY), DAY) AS days_to_delivery,
  DATE_DIFF(date_trunc(order_estimated_delivery_date,DAY), date_trunc(order_delivered_customer_date,DAY), DAY) AS estimated_delivery_
```

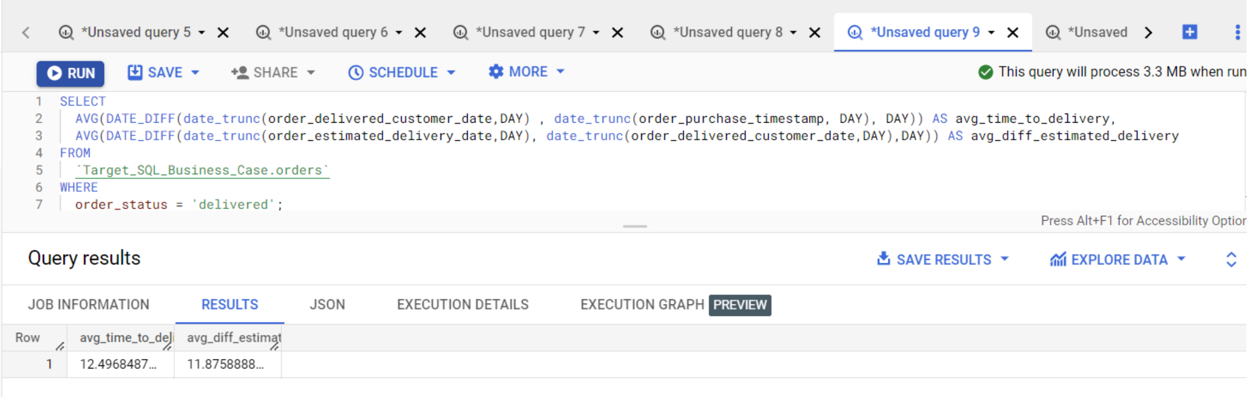
Row	order_id	days_to_delivery	estimated_delivery_diff
1	1950d777989f6a877539f5379...	30	-12
2	2c45c33d2f9cb8ff8b1c86cc28...	31	29
3	65d1e226dfaeb8cdc42f66542...	36	17
4	635c894d068ac37e6e03dc54e...	31	2
5	3b97562c3aee8bdedcb5c2e45...	33	1
6	68f47f50f04c4cb6774570cfde...	30	2
7	276e9ec344d3bf029ff83a161c...	44	-4
8	54e1a3c2b97fb0809da548a59...	41	-4
9	fd04fa4105ee8045f6a0139ca5...	37	-1
10	302bb8109d097a9fc6e9cefc5...	34	-5
11	66057d37308e787052a32828...	39	-6
12	19135c945c554eebfd7576c73...	36	-2

Results per page: 50 1 – 50 of 99441

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

<u>Query:</u>

```
SELECT
 AVG(DATE_DIFF(date_trunc(order_delivered_customer_date,DAY) ,
date_trunc(order_purchase_timestamp, DAY), DAY)) AS avg_time_to_delivery,
 AVG(DATE_DIFF(date_trunc(order_estimated_delivery_date,DAY),
date_trunc(order_delivered_customer_date,DAY),DAY)) AS
avg_diff_estimated_delivery
FROM
 `Target_SQL_Business_Case.orders`
WHERE
 order_status = 'delivered';
```



This query will process 3.3 MB when run

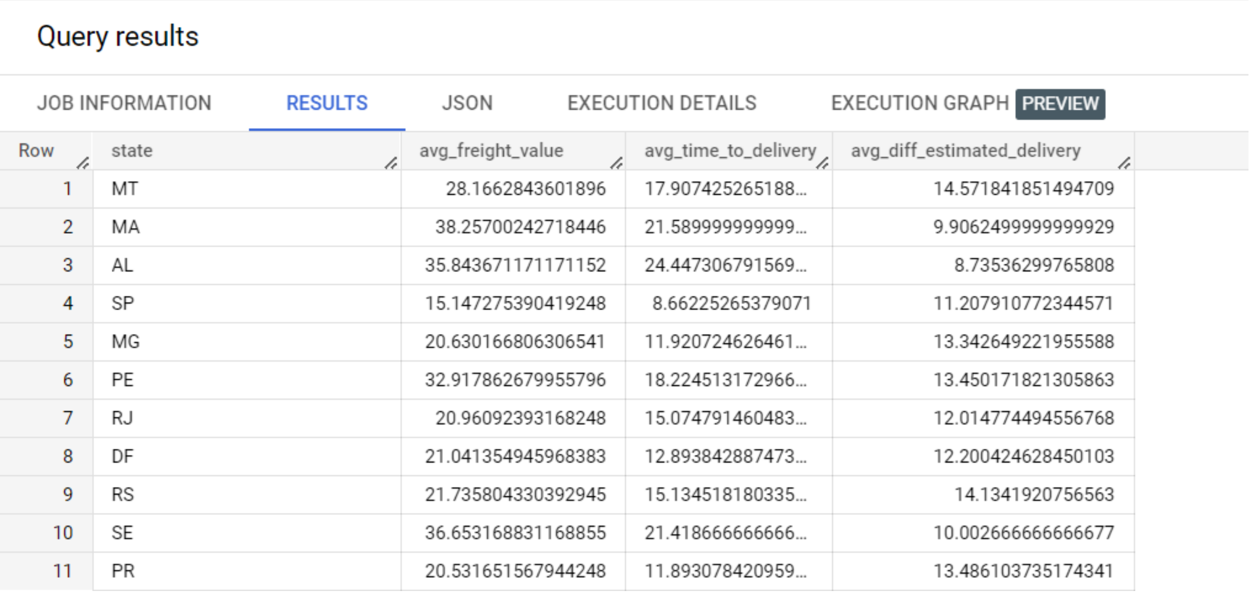
```
SELECT
  AVG(DATE_DIFF(date_trunc(order_delivered_customer_date,DAY) , date_trunc(order_purchase_timestamp, DAY), DAY)) AS avg_time_to_delivery,
  AVG(DATE_DIFF(date_trunc(order_estimated_delivery_date,DAY), date_trunc(order_delivered_customer_date,DAY),DAY)) AS avg_diff_estimated_delivery
FROM
  `Target_SQL_Business_Case.orders`
WHERE
  order_status = 'delivered';
```

Row	avg_time_to_deli	avg_diff_estimat
1	12.4968487...	11.8758888...

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

Query:

```
SELECT
 c.customer_state as state,
  AVG(o_i.freight_value) AS avg_freight_value,
 AVG(DATE_DIFF(date_trunc(o.order_delivered_customer_date,DAY) ,
date_trunc(o.order_purchase_timestamp, DAY), DAY)) AS avg_time_to_delivery,
  AVG(DATE_DIFF(date_trunc(o.order_estimated_delivery_date,DAY),
date_trunc(o.order_delivered_customer_date,DAY),DAY)) AS
avg_diff_estimated_delivery
FROM
`Target_SQL_Business_Case.order_items` as o_i
  join
  `Target_SQL_Business_Case.orders` as o
  on o.order_id=o_i.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state;
```



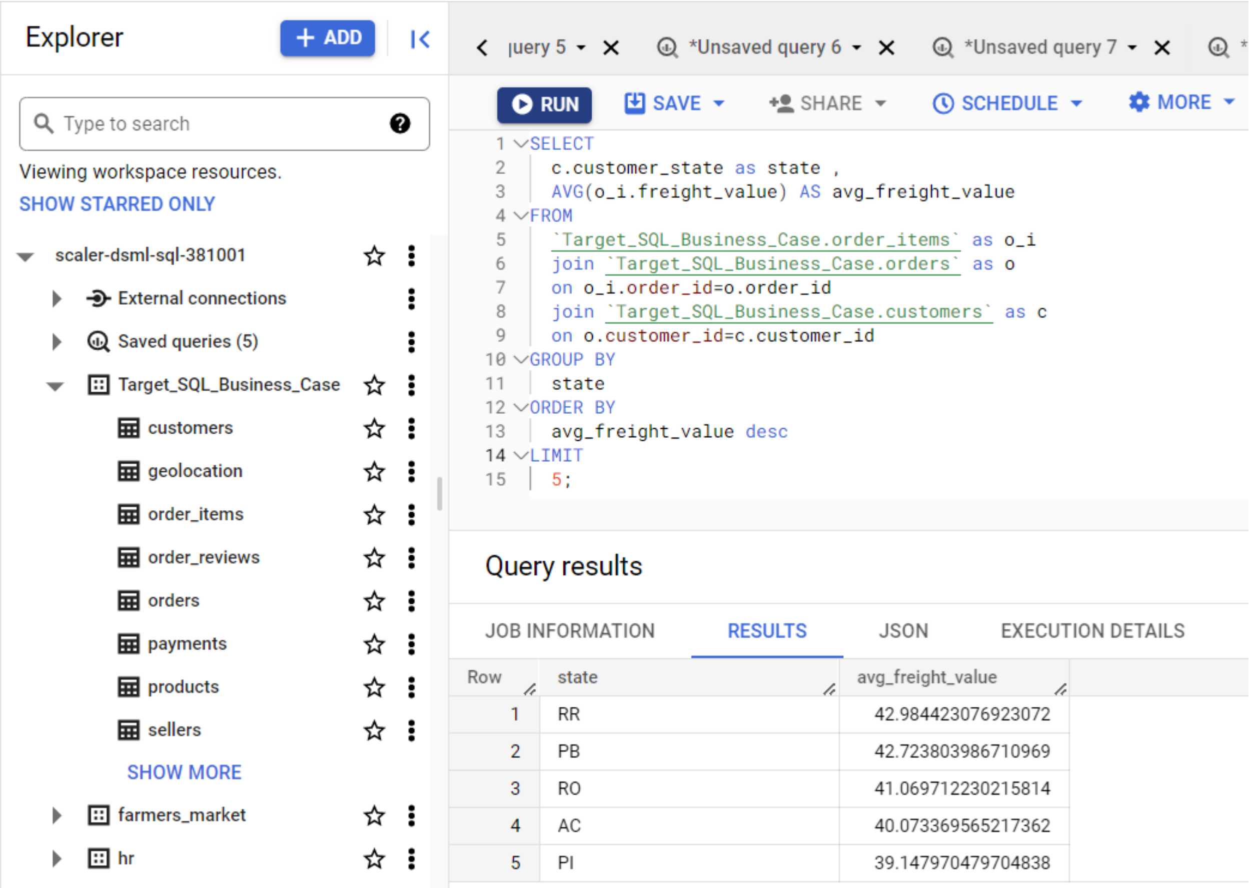
Row	state	avg_freight_value	avg_time_to_delivery	avg_diff_estimated_delivery
1	MT	28.1662843601896	17.907425265188...	14.571841851494709
2	MA	38.25700242718446	21.589999999999...	9.9062499999999929
3	AL	35.843671171171152	24.447306791569...	8.73536299765808
4	SP	15.147275390419248	8.66225265379071	11.207910772344571
5	MG	20.630166806306541	11.920724626461...	13.342649221955588
6	PE	32.917862679955796	18.224513172966...	13.450171821305863
7	RJ	20.96092393168248	15.074791460483...	12.014774494556768
8	DF	21.041354945968383	12.893842887473...	12.200424628450103
9	RS	21.735804330392945	15.134518180335...	14.1341920756563
10	SE	36.653168831168855	21.418666666666...	10.002666666666677
11	PR	20.531651567944248	11.893078420959...	13.486103735174341

Insights: Roraima has the highest freight payment cost.

Recommendations: Freight value can be reduced for customers to purchase more online.

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

```
SELECT
  c.customer_state as state ,
  AVG(o_i.freight_value) AS avg_freight_value
FROM
  `Target_SQL_Business_Case.order_items` as o_i
  join `Target_SQL_Business_Case.orders` as o
  on o_i.order_id=o.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state
ORDER BY
  avg_freight_value desc
LIMIT
  5;
```



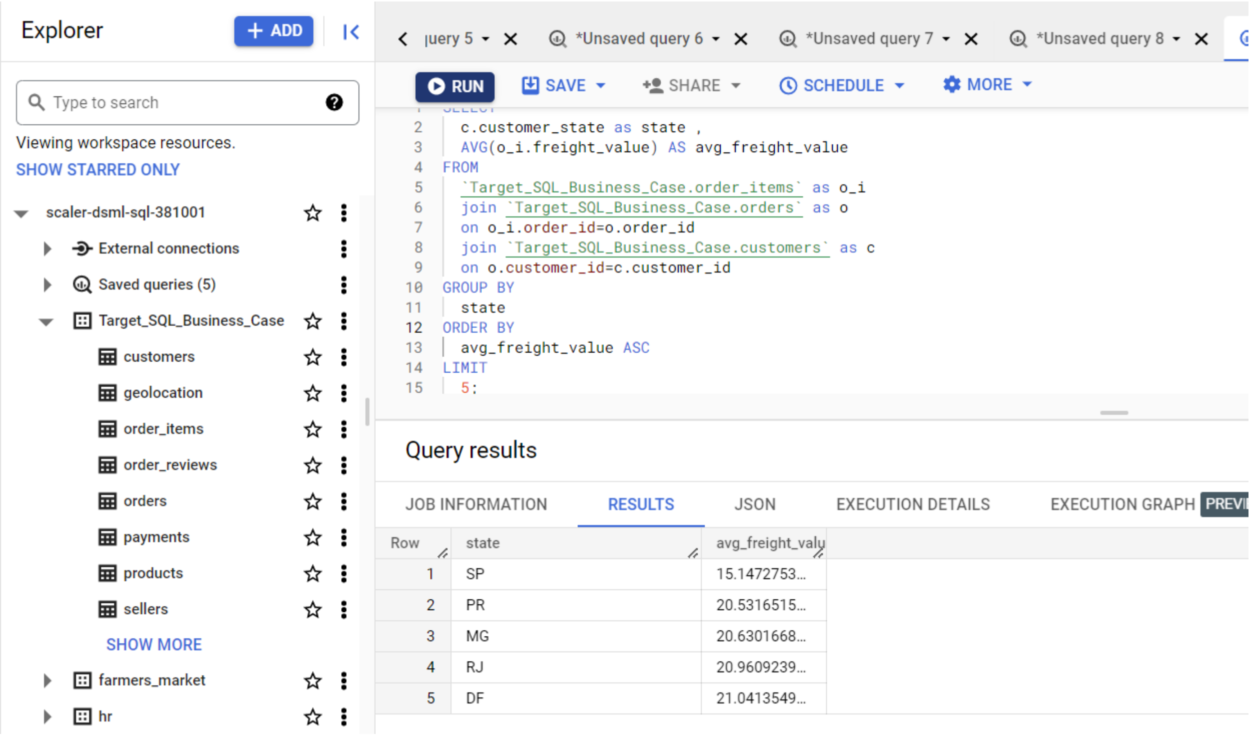
```sql
SELECT
  c.customer_state as state ,
  AVG(o_i.freight_value) AS avg_freight_value
FROM
  `Target_SQL_Business_Case.order_items` as o_i
  join `Target_SQL_Business_Case.orders` as o
  on o_i.order_id=o.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state
ORDER BY
  avg_freight_value desc
LIMIT
  5;
```

Row	state	avg_freight_value
1	RR	42.984423076923072
2	PB	42.723803986710969
3	RO	41.069712230215814
4	AC	40.073369565217362
5	PI	39.147970479704838

Recommendations: Freight value of RR and PB can be reduced for customers to purchase more online.

Query:

```sql
SELECT
 c.customer_state as state ,
 AVG(o_i.freight_value) AS avg_freight_value
FROM
 `Target_SQL_Business_Case.order_items` as o_i
 join `Target_SQL_Business_Case.orders` as o
 on o_i.order_id=o.order_id
 join `Target_SQL_Business_Case.customers` as c
 on o.customer_id=c.customer_id
GROUP BY
 state
ORDER BY
 avg_freight_value ASC
LIMIT
 5;
```



```
  c.customer_state as state ,
  AVG(o_i.freight_value) AS avg_freight_value
FROM
  `Target_SQL_Business_Case.order_items` as o_i
  join `Target_SQL_Business_Case.orders` as o
  on o_i.order_id=o.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state
ORDER BY
  avg_freight_value ASC
LIMIT
  5;
```

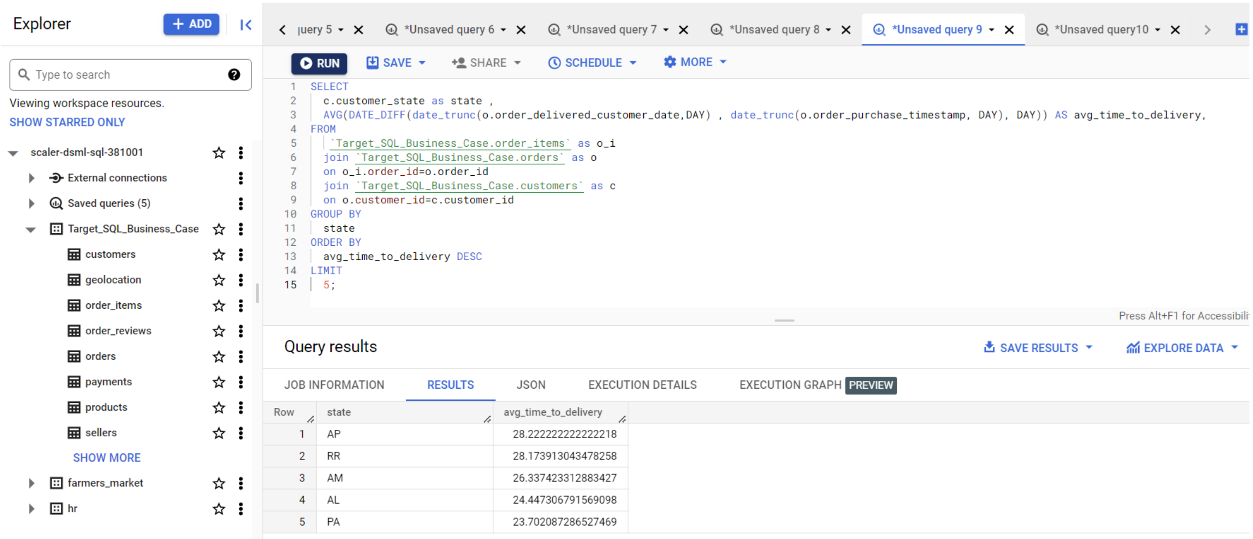
Row	state	avg_freight_valu
1	SP	15.1472753...
2	PR	20.5316515...
3	MG	20.6301668...
4	RJ	20.9609239...
5	DF	21.0413549...

Insights: State codes of SP and PR are best states to do online shopping since they less freight value.

5.5 Top 5 states with highest/lowest average time to delivery

Query:

```
SELECT
 c.customer_state as state ,
 AVG(DATE_DIFF(date_trunc(o.order_delivered_customer_date,DAY) ,
date_trunc(o.order_purchase_timestamp, DAY), DAY)) AS avg_time_to_delivery,
FROM
  `Target_SQL_Business_Case.order_items` as o_i
 join `Target_SQL_Business_Case.orders` as o
 on o_i.order_id=o.order_id
 join `Target_SQL_Business_Case.customers` as c
 on o.customer_id=c.customer_id
GROUP BY
 state
ORDER BY
 avg_time_to_delivery DESC
LIMIT
 5;
```



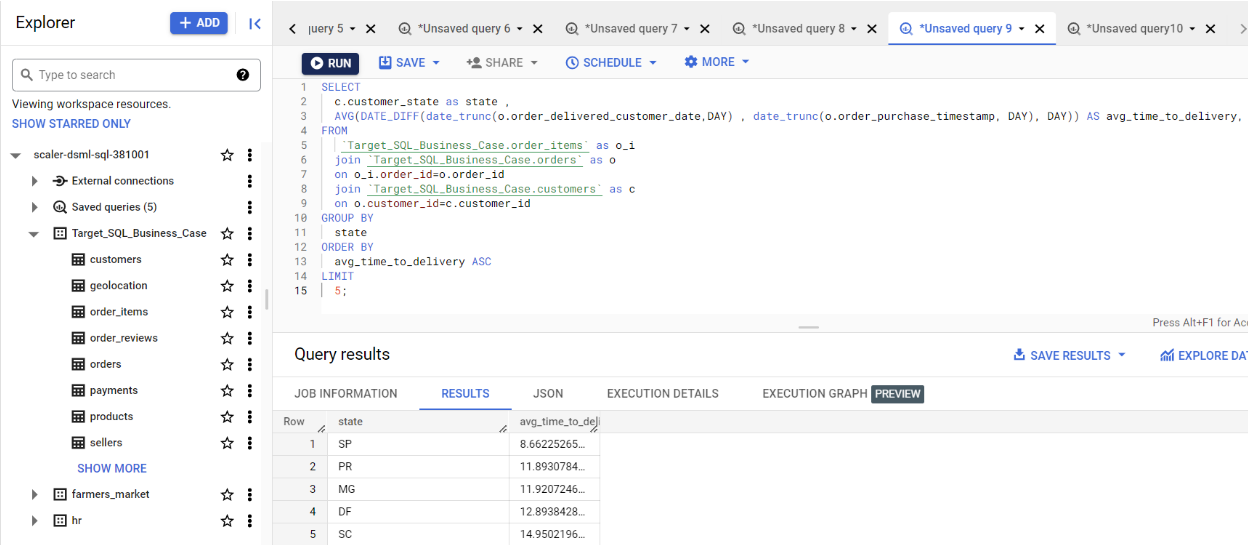
```
SELECT
  c.customer_state as state ,
  AVG(DATE_DIFF(date_trunc(o.order_delivered_customer_date,DAY) , date_trunc(o.order_purchase_timestamp, DAY), DAY)) AS avg_time_to_delivery,
FROM
   `Target_SQL_Business_Case.order_items` as o_i
  join `Target_SQL_Business_Case.orders` as o
  on o_i.order_id=o.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state
ORDER BY
  avg_time_to_delivery DESC
LIMIT
  5;
```

Row	state	avg_time_to_delivery
1	AP	28.222222222222218
2	RR	28.173913043478258
3	AM	26.337423312883427
4	AL	24.447306791569098
5	PA	23.702087286527469

Recommendations: Delivery time of AP and RR can be reduced for customers to purchase more online.

Query:

```
SELECT
 c.customer_state as state ,
 AVG(DATE_DIFF(date_trunc(o.order_delivered_customer_date,DAY) ,
date_trunc(o.order_purchase_timestamp, DAY), DAY)) AS avg_time_to_delivery,
FROM
  `Target_SQL_Business_Case.order_items` as o_i
 join `Target_SQL_Business_Case.orders` as o
 on o_i.order_id=o.order_id
 join `Target_SQL_Business_Case.customers` as c
 on o.customer_id=c.customer_id
GROUP BY
 state
ORDER BY
 avg_time_to_delivery ASC
LIMIT
 5;
```



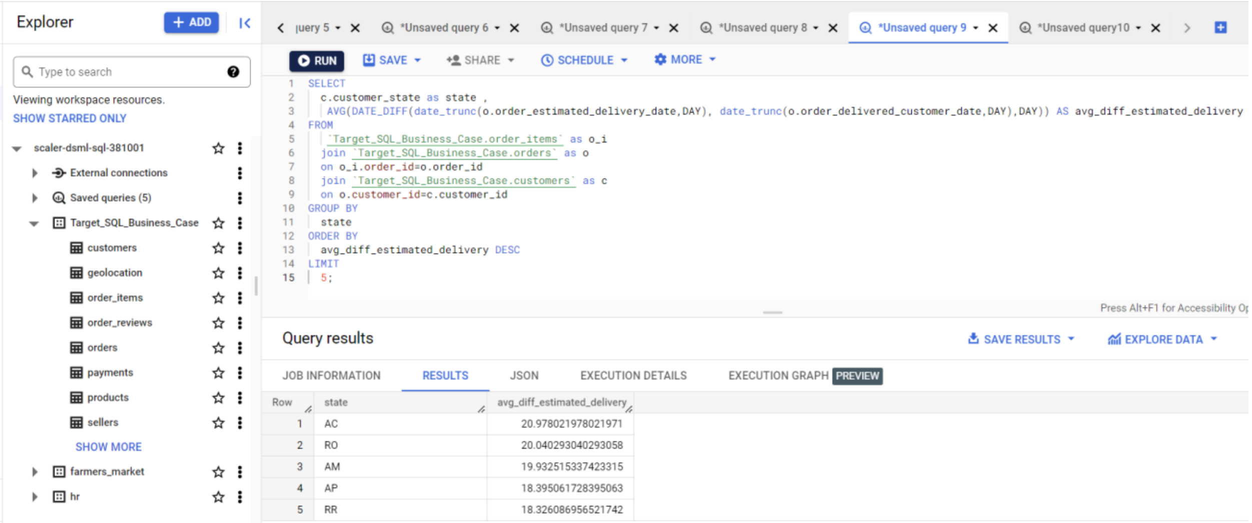
```
SELECT
  c.customer_state as state ,
  AVG(DATE_DIFF(date_trunc(o.order_delivered_customer_date,DAY) , date_trunc(o.order_purchase_timestamp, DAY), DAY)) AS avg_time_to_delivery,
FROM
  `Target_SQL_Business_Case.order_items` as o_i
  join `Target_SQL_Business_Case.orders` as o
  on o_i.order_id=o.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state
ORDER BY
  avg_time_to_delivery ASC
LIMIT
  5;
```

Row	state	avg_time_to_deli
1	SP	8.66225265...
2	PR	11.8930784...
3	MG	11.9207246...
4	DF	12.8938428...
5	SC	14.9502196...

Insights: State codes of SP and PR are best states to do online shopping since they less delivery time.

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

```
SELECT
 c.customer_state as state ,
  AVG(DATE_DIFF(date_trunc(o.order_estimated_delivery_date,DAY),
date_trunc(o.order_delivered_customer_date,DAY),DAY)) AS
avg_diff_estimated_delivery
FROM
  `Target_SQL_Business_Case.order_items` as o_i
 join `Target_SQL_Business_Case.orders` as o
 on o_i.order_id=o.order_id
 join `Target_SQL_Business_Case.customers` as c
 on o.customer_id=c.customer_id
GROUP BY
 state
ORDER BY
 avg_diff_estimated_delivery DESC
LIMIT
 5;
```

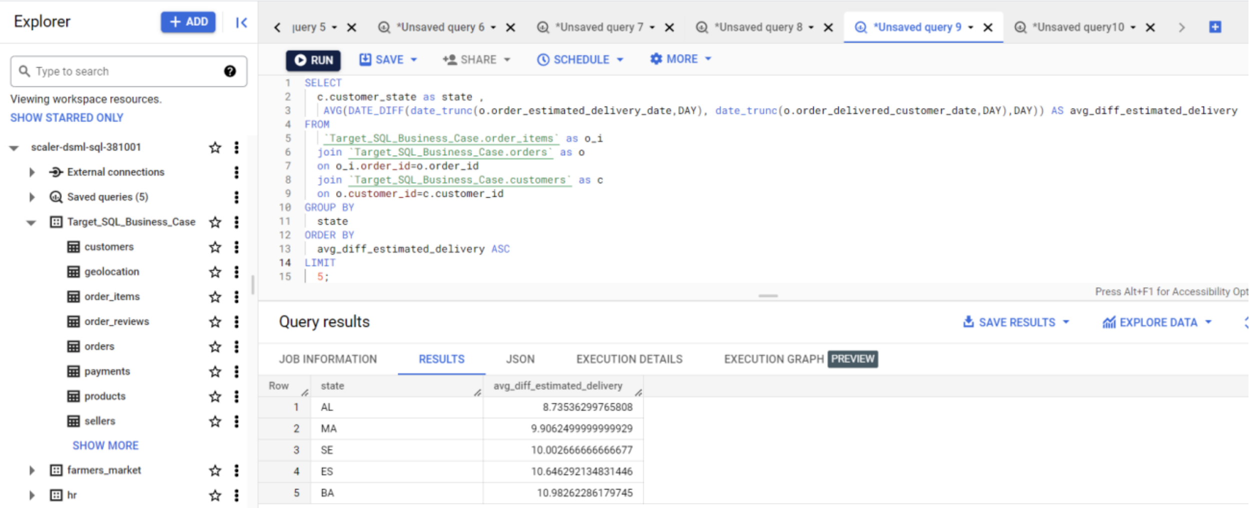


```sql
SELECT
  c.customer_state as state ,
  AVG(DATE_DIFF(date_trunc(o.order_estimated_delivery_date,DAY), date_trunc(o.order_delivered_customer_date,DAY),DAY)) AS avg_diff_estimated_delivery
FROM
   `Target_SQL_Business_Case.order_items` as o_i
  join `Target_SQL_Business_Case.orders` as o
  on o_i.order_id=o.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state
ORDER BY
  avg_diff_estimated_delivery DESC
LIMIT
  5;
```

Row	state	avg_diff_estimated_delivery
1	AC	20.978021978021971
2	RO	20.040293040293058
3	AM	19.932515337423315
4	AP	18.395061728395063
5	RR	18.326086956521742

Query:

```sql
SELECT
 c.customer_state as state ,
  AVG(DATE_DIFF(date_trunc(o.order_estimated_delivery_date,DAY),
date_trunc(o.order_delivered_customer_date,DAY),DAY)) AS
avg_diff_estimated_delivery
FROM
  `Target_SQL_Business_Case.order_items` as o_i
 join `Target_SQL_Business_Case.orders` as o
 on o_i.order_id=o.order_id
 join `Target_SQL_Business_Case.customers` as c
 on o.customer_id=c.customer_id
GROUP BY
 state
ORDER BY
 avg_diff_estimated_delivery ASC
LIMIT
 5;
```



```
SELECT
  c.customer_state as state ,
   AVG(DATE_DIFF(date_trunc(o.order_estimated_delivery_date,DAY), date_trunc(o.order_delivered_customer_date,DAY),DAY)) AS avg_diff_estimated_delivery
FROM
   `Target_SQL_Business_Case.order_items` as o_i
  join `Target_SQL_Business_Case.orders` as o
  on o_i.order_id=o.order_id
  join `Target_SQL_Business_Case.customers` as c
  on o.customer_id=c.customer_id
GROUP BY
  state
ORDER BY
  avg_diff_estimated_delivery ASC
LIMIT
  5;
```

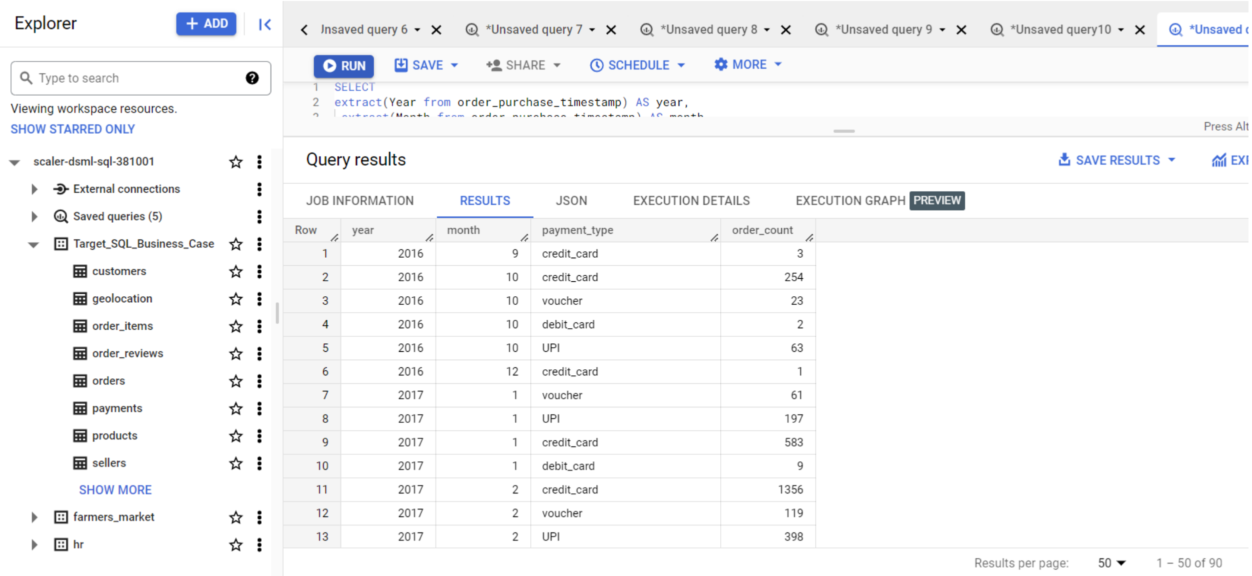
Row	state	avg_diff_estimated_delivery
1	AL	8.73536299765808
2	MA	9.9062499999999929
3	SE	10.002666666666677
4	ES	10.646292134831446
5	BA	10.98262286179745

6. Payment type analysis:

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

Query:

```
SELECT
extract(Year from order_purchase_timestamp) AS year,
 extract(Month from order_purchase_timestamp) AS month,
  p.payment_type,
  COUNT(o.order_id) AS order_count
FROM
  `Target_SQL_Business_Case.orders` as o
  join
  `Target_SQL_Business_Case.payments` as p
  on o.order_id=p.order_id
GROUP BY
year,
  month, payment_type
ORDER BY
 year, month ASC;
```



```
SELECT
extract(Year from order_purchase_timestamp) AS year,
extract(Month from order_purchase_timestamp) AS month
```

Row	year	month	payment_type	order_count
1	2016	9	credit_card	3
2	2016	10	credit_card	254
3	2016	10	voucher	23
4	2016	10	debit_card	2
5	2016	10	UPI	63
6	2016	12	credit_card	1
7	2017	1	voucher	61
8	2017	1	UPI	197
9	2017	1	credit_card	583
10	2017	1	debit_card	9
11	2017	2	credit_card	1356
12	2017	2	voucher	119
13	2017	2	UPI	398

Results per page: 50 1 – 50 of 90

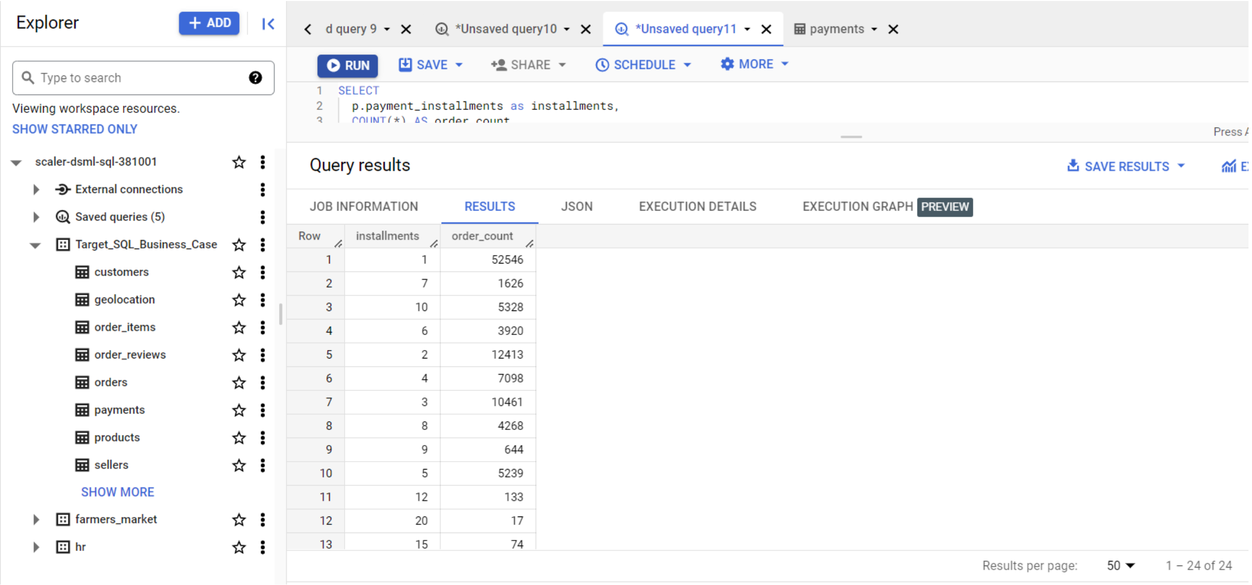
Insight: Payments made by credit cards take the first place but there is slight downfall in credit card payment from April 2018.

Recommendation: Debit card and UPI payments can be promoted to generate more sales by providing ease of payment for customers.

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

Query:

```
SELECT
 p.payment_installments as installments,
 COUNT(*) AS order_count
FROM
 `Target_SQL_Business_Case.orders` as o
 join
 `Target_SQL_Business_Case.payments` as p
 on o.order_id=p.order_id
GROUP BY
 installments;
```



```
SELECT
  p.payment_installments as installments,
  COUNT(*) AS order_count
```

Query results

Row	installments	order_count
1	1	52546
2	7	1626
3	10	5328
4	6	3920
5	2	12413
6	4	7098
7	3	10461
8	8	4268
9	9	644
10	5	5239
11	12	133
12	20	17
13	15	74

Insight: Instalments with single payment is popular among customers.