E-Commerce Business Performance Analysis Using SQL

Project Objective

This report analyzes an e-commerce database using SQL to evaluate business performance, identify revenue drivers, understand customer behavior, analyze product performance, and provide actionable, data-driven business insights.

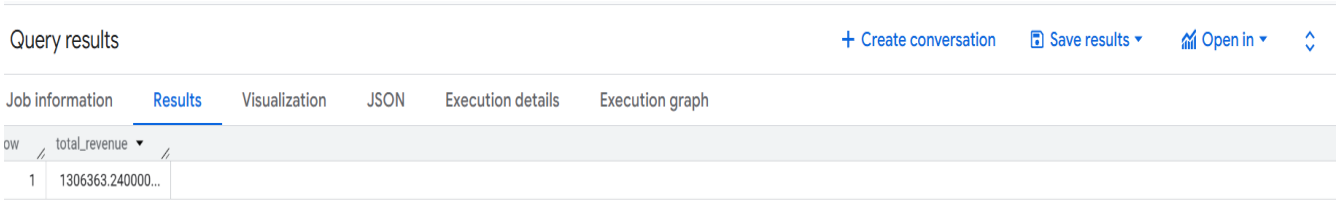
Dataset Overview

The analysis is based on the following tables: Customers, Orders, Order_Items, Products, Categories, and Payments. These tables collectively represent customer demographics, transactional data, inventory details, and payment information.

1. Total Revenue Analysis

Analyzes total revenue generated from successful (non-cancelled) orders. This represents actual business earnings and serves as a primary financial performance metric.']

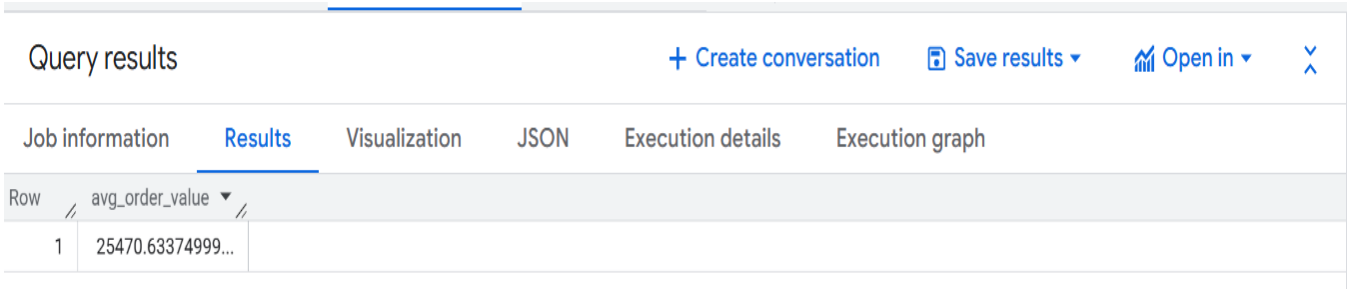
```
SELECT SUM(total_amount) as total_revenue
FROM ecommerce-analytics-482417.Ecommerce_db.order
WHERE status != 'Cancelled';
```



2. Average Order Value (AOV)

Calculates the average amount spent per order. AOV helps evaluate customer purchasing power and pricing effectiveness.

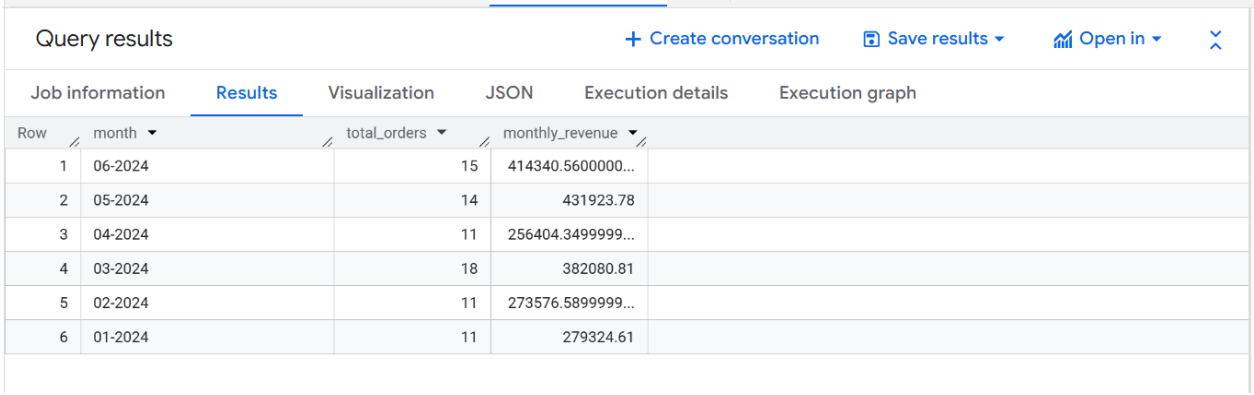
```
SELECT SUM(total_amount) as total_revenue
FROM ecommerce-analytics-482417.Ecommerce_db.order
WHERE status != 'Cancelled';
```



3. Monthly Revenue Trend

Aggregates orders and revenue on a monthly basis to identify seasonality, growth patterns, and potential revenue fluctuations.

```
SELECT FORMAT_TIMESTAMP('%m-%Y', order_date) as month,
COUNT(order_id) as total_orders,
SUM(total_amount) as monthly_revenue
FROM ecommerce-analytics-482417.Ecommerce_db.order
WHERE status != 'cancelled'
Group by month
ORDER BY month DESC;
```



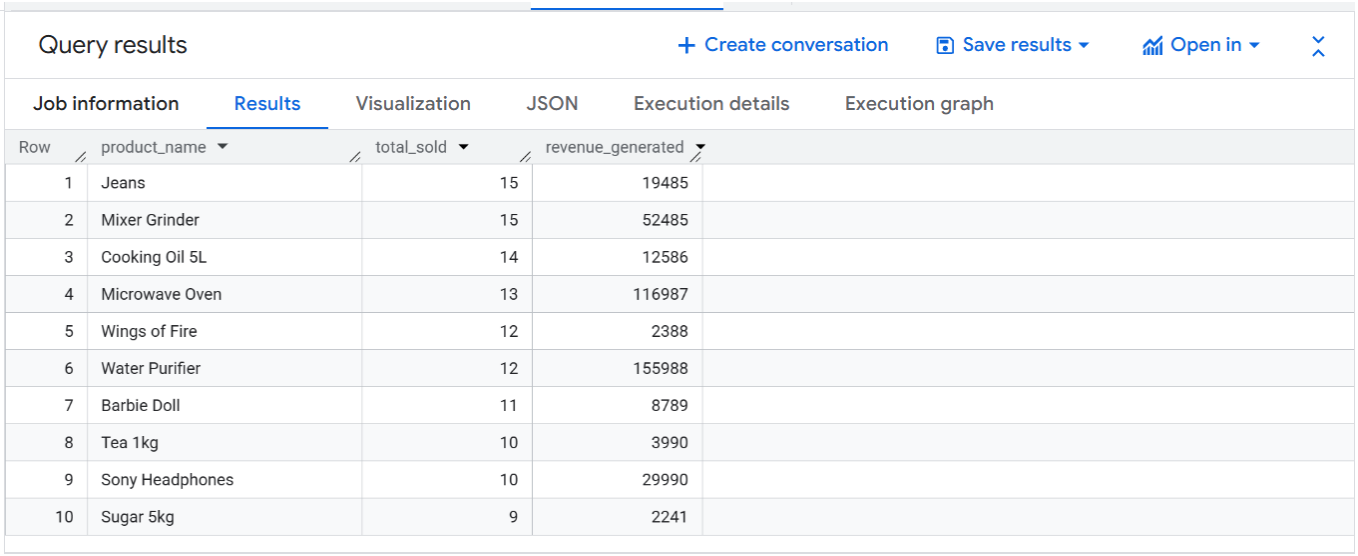
Row	month	total_orders	monthly_revenue
1	06-2024	15	414340.5600000...
2	05-2024	14	431923.78
3	04-2024	11	256404.3499999...
4	03-2024	18	382080.81
5	02-2024	11	273576.5899999...
6	01-2024	11	279324.61

4. Top 10 Selling Products

Identifies the top-selling products based on quantity sold and revenue generated. These products are key contributors to overall business performance.

```
SELECT p.product_name,
SUM(oi.quantity) as total_sold,
SUM(oi.quantity * oi.price) as revenue_generated
FROM ecommerce-analytics-482417.Ecommerce_db.order_items oi
```

```
LEFT JOIN ecommerce-analytics-482417.Ecommerce_db.products p ON
oi.product_id = p.product_id
GROUP BY p.product_name
ORDER BY total_sold DESC
LIMIT 10;
```



Query results

+ Create conversation | Save results | Open in

Job information | Results | Visualization | JSON | Execution details | Execution graph

Row	product_name	total_sold	revenue_generated
1	Jeans	15	19485
2	Mixer Grinder	15	52485
3	Cooking Oil 5L	14	12586
4	Microwave Oven	13	116987
5	Wings of Fire	12	2388
6	Water Purifier	12	155988
7	Barbie Doll	11	8789
8	Tea 1kg	10	3990
9	Sony Headphones	10	29990
10	Sugar 5kg	9	2241

5. Category-wise Revenue Contribution

Evaluates revenue contribution at the category level to identify high-performing and underperforming product categories.

```
SELECT c.category_name,
SUM(oi.quantity) as total_sold,
SUM(oi.quantity * oi.price) as revenue_generated
FROM ecommerce-analytics-482417.Ecommerce_db.categories c
INNER JOIN ecommerce-analytics-482417.Ecommerce_db.products p ON
c.category_id = p.category_id
INNER JOIN ecommerce-analytics-482417.Ecommerce_db.order_items oi
ON oi.product_id = p.product_id
GROUP BY ROLLUP(category_name)
ORDER BY revenue_generated ;
```

Query results

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Row	category_name	total_sold	revenue_generated
1	Books	35	17169
2	Sports	18	17582
3	Automotive	20	21580
4	Grocery	39	22411
5	Beauty	20	24380
6	Toys	24	26776
7	Clothing	52	80248
8	Furniture	16	122484
9	Home & Kitchen	60	432140
10	Electronics	52	1597964
11	*null*	336	2362734

6. Top 5 High-Value Customers

Identifies customers with the highest total spending and order frequency. These customers represent high lifetime value and retention potential.

```
SELECT c.first_name, c.last_name,
COUNT(o.order_id) as total_order,
SUM(o.total_amount) as total_spent
FROM ecommerce-analytics-482417.Ecommerce_db.customers c
LEFT JOIN ecommerce-analytics-482417.Ecommerce_db.order o ON
o.customer_id=c.customer_id
GROUP BY c.first_name, c.last_name
ORDER BY total_spent DESC
LIMIT 5;
```

Query results

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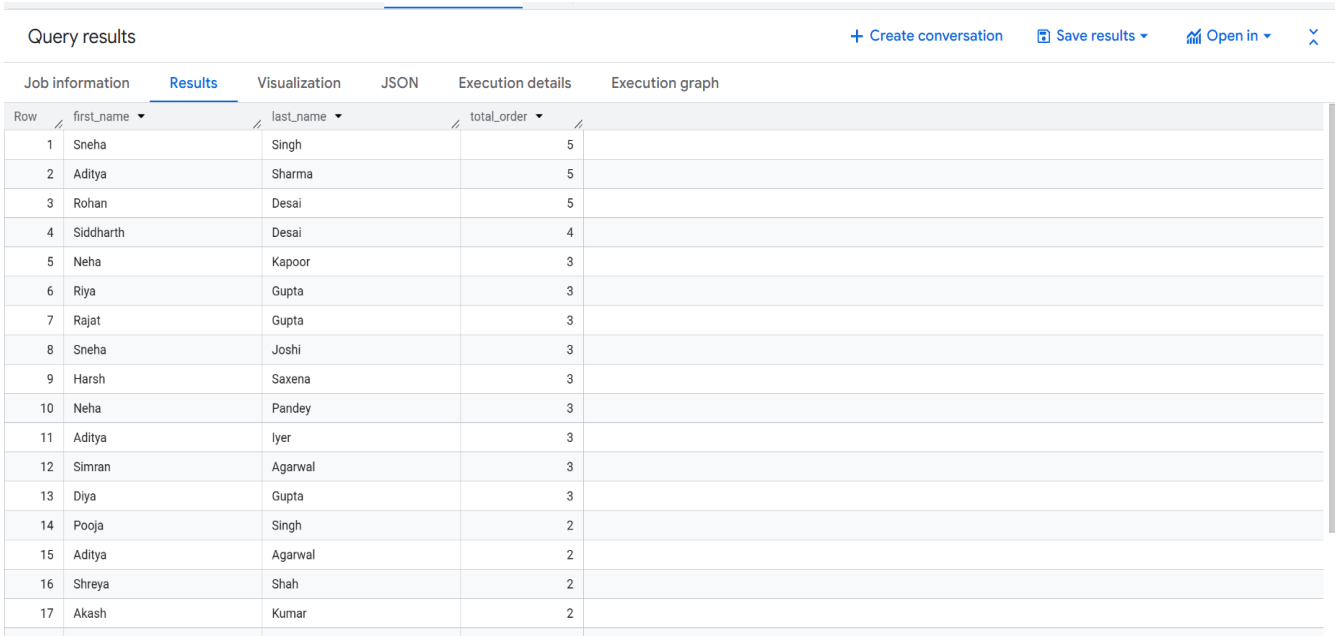
Row	first_name	last_name	total_order	total_spent
1	Siddharth	Desai	4	141790.7199999...
2	Harsh	Saxena	3	110842.6099999...
3	Neha	Pandey	3	109816.38
4	Sneha	Joshi	3	108434.99
5	Sneha	Singh	5	105510.5100000...

7. Repeat Customers Analysis

Analyzes customers with multiple orders to measure repeat purchase behavior and customer retention.

```
SELECT c.first_name, c.last_name, COUNT(o.order_id) as total_order
FROM ecommerce-analytics-482417.Ecommerce_db.customers c
INNER JOIN ecommerce-analytics-482417.Ecommerce_db.order o on
o.customer_id=c.customer_id
GROUP BY c.first_name, c.last_name
HAVING total_order >= 2
ORDER BY total_order DESC;
```



Query results

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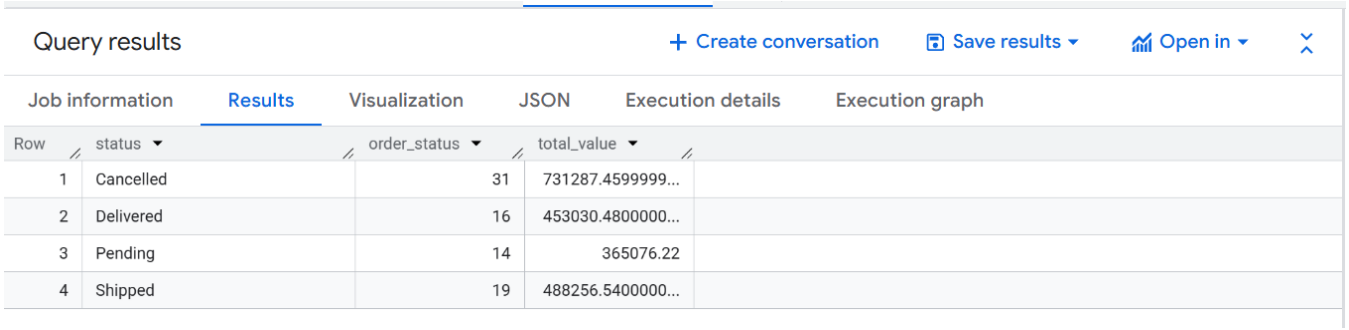
Row	first_name	last_name	total_order
1	Sneha	Singh	5
2	Aditya	Sharma	5
3	Rohan	Desai	5
4	Siddharth	Desai	4
5	Neha	Kapoor	3
6	Riya	Gupta	3
7	Rajat	Gupta	3
8	Sneha	Joshi	3
9	Harsh	Saxena	3
10	Neha	Pandey	3
11	Aditya	Iyer	3
12	Simran	Agarwal	3
13	Diya	Gupta	3
14	Pooja	Singh	2
15	Aditya	Agarwal	2
16	Shreya	Shah	2
17	Akash	Kumar	2

8. Order Status Distribution

Examines the distribution of order statuses such as Delivered, Cancelled, and Pending to identify operational bottlenecks or fulfillment issues.

```
SELECT status, COUNT(*) as order_status,
SUM(total_amount) as total_value
FROM ecommerce-analytics-482417.Ecommerce_db.order
GROUP BY status;
```



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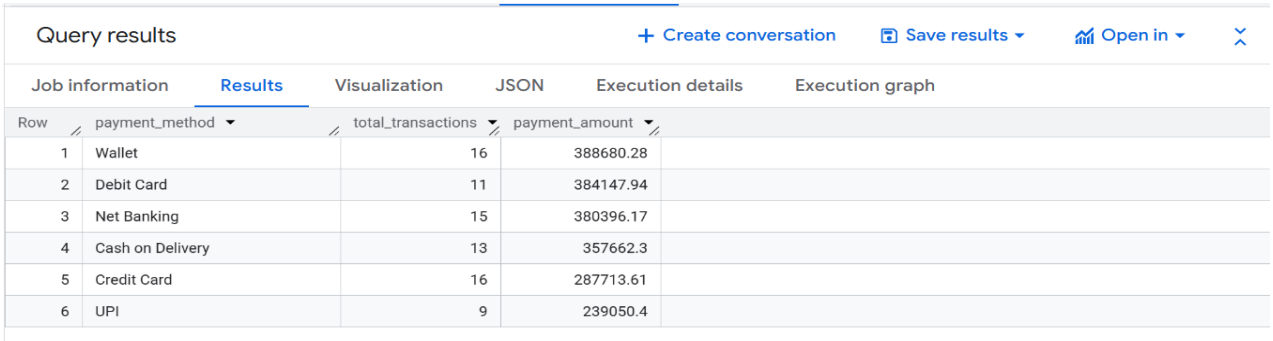
Row	status	order_status	total_value
1	Cancelled	31	731287.4599999...
2	Delivered	16	453030.4800000...
3	Pending	14	365076.22
4	Shipped	19	488256.5400000...

9. Payment Method Preference Analysis

Analyzes customer payment preferences by payment method. This insight helps optimize checkout experience and payment partnerships.

```
SELECT payment_method, count(*) as total_transactions,
ROUND(sum(amount), 2) as payment_amount
FROM ecommerce-analytics-482417.Ecommerce_db.payments
GROUP BY payment_method
ORDER BY payment_amount DESC;
```



Query results

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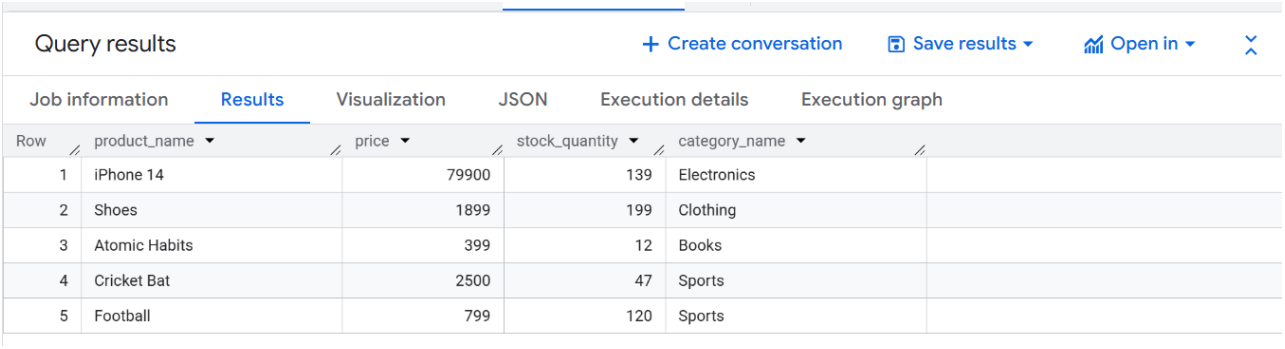
Row	payment_method	total_transactions	payment_amount
1	Wallet	16	388680.28
2	Debit Card	11	384147.94
3	Net Banking	15	380396.17
4	Cash on Delivery	13	357662.3
5	Credit Card	16	287713.61
6	UPI	9	239050.4

10. Products Never Ordered (Dead Inventory)

Identifies products that have never been ordered, highlighting dead inventory and potential cost optimization opportunities.

```
SELECT p.product_name, p.price, p.stock_quantity, c.category_name
FROM ecommerce-analytics-482417.Ecommerce_db.products p
INNER JOIN ecommerce-analytics-482417.Ecommerce_db.categories c ON
p.category_id = c.category_id
```

LEFT JOIN ecommerce-analytics-482417.Ecommerce_db.order_items oi ON p.product_id = oi.product_id
WHERE oi.product_id IS NULL;



Row	product_name	price	stock_quantity	category_name
1	iPhone 14	79900	139	Electronics
2	Shoes	1899	199	Clothing
3	Atomic Habits	399	12	Books
4	Cricket Bat	2500	47	Sports
5	Football	799	120	Sports

Conclusion

This SQL-based analysis demonstrates how structured queries can uncover meaningful insights related to revenue, customers, products, and operations. The findings support informed business decision-making and highlight opportunities for growth and optimization.