Case Study Description

This analysis examines sales and customer data to enhance marketing and inventory strategies. Key findings include identifying top cities for marketing, segmenting customers by order frequency, pinpointing high-revenue products, and evaluating sales trends. Recommendations focus on targeted marketing, optimizing inventory, and planning for peak sales periods.

Overview: As a data analyst at our dynamic e-commerce company, you're tasked with leveraging our extensive databases to extract insights that drive our business strategies forward. Your analysis will inform various departments, from marketing to supply chain, providing them with actionable data to optimize our operations, enhance customer satisfaction, and boost our sales performance. This case study simulates real-world tasks you will encounter and requires you to apply your SQL skills to solve practical business problems.

Business Context:
Your work will directly impact the following business verticals:

- **Customer Insights:** Understanding our customer base to tailor marketing strategies.
- **Product Analysis:** Evaluating product performance to inform stock and sales strategies.
- **Sales Optimization:** Analyzing sales data to identify trends, opportunities, and areas for improvement.
- **Inventory Management:** Managing stock levels to ensure product availability while minimizing excess inventory.

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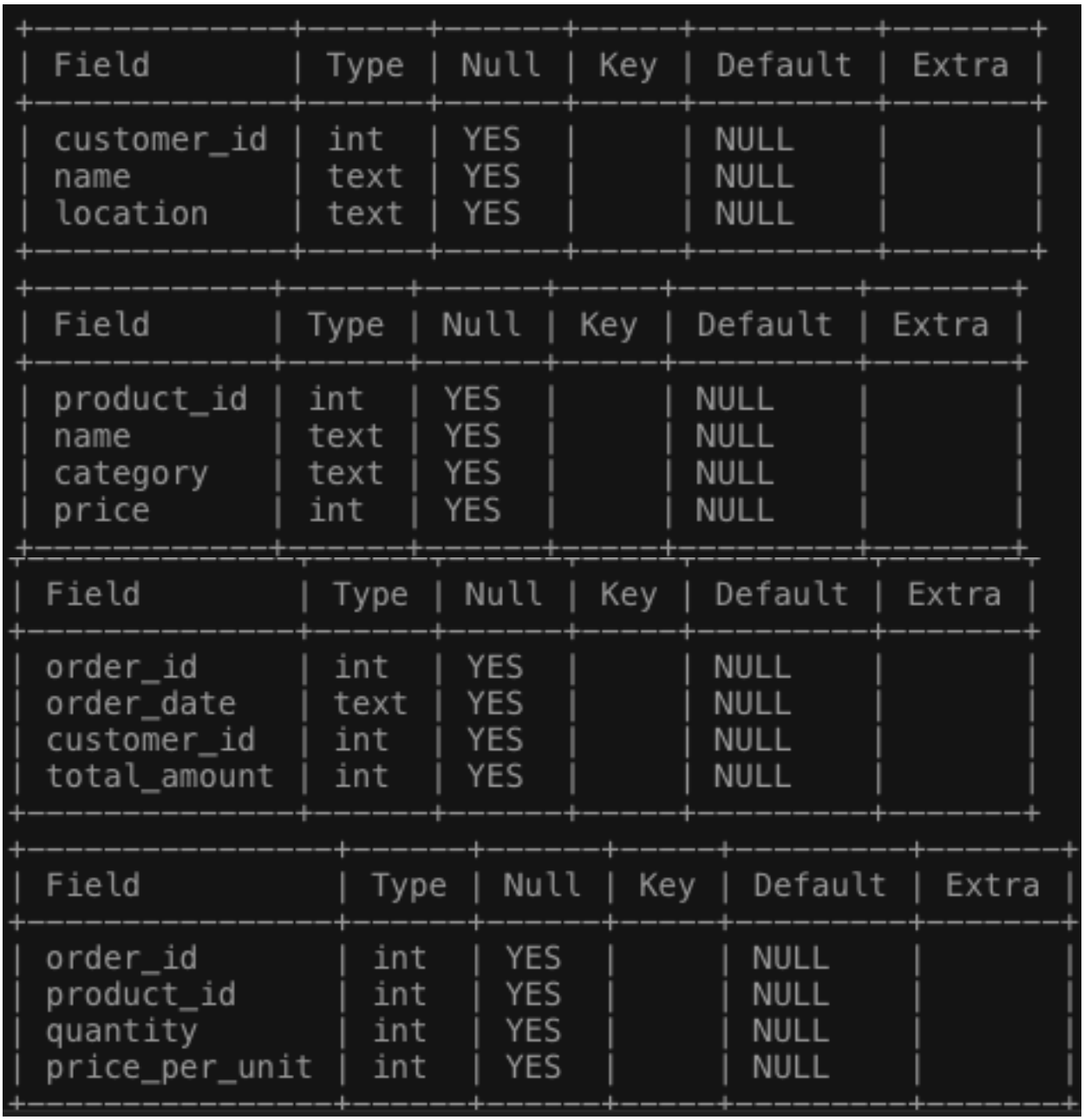
Analyse the data

You can analyze all the tables by describing their contents.

Task: Describe the Tables:

1. Customers
2. Products
3. Orders
4. OrderDetails



```
+-------------+------+------+-----+---------+-------+
| Field       | Type | Null | Key | Default | Extra |
+-------------+------+------+-----+---------+-------+
| customer_id | int  | YES  |     | NULL    |       |
| name        | text | YES  |     | NULL    |       |
| location    | text | YES  |     | NULL    |       |
+-------------+------+------+-----+---------+-------+

+------------+------+------+-----+---------+-------+
| Field      | Type | Null | Key | Default | Extra |
+------------+------+------+-----+---------+-------+
| product_id | int  | YES  |     | NULL    |       |
| name       | text | YES  |     | NULL    |       |
| category   | text | YES  |     | NULL    |       |
| price      | int  | YES  |     | NULL    |       |
+------------+------+------+-----+---------+-------+

+--------------+------+------+-----+---------+-------+
| Field        | Type | Null | Key | Default | Extra |
+--------------+------+------+-----+---------+-------+
| order_id     | int  | YES  |     | NULL    |       |
| order_date   | text | YES  |     | NULL    |       |
| customer_id  | int  | YES  |     | NULL    |       |
| total_amount | int  | YES  |     | NULL    |       |
+--------------+------+------+-----+---------+-------+

+----------------+------+------+-----+---------+-------+
| Field          | Type | Null | Key | Default | Extra |
+----------------+------+------+-----+---------+-------+
| order_id       | int  | YES  |     | NULL    |       |
| product_id     | int  | YES  |     | NULL    |       |
| quantity       | int  | YES  |     | NULL    |       |
| price_per_unit | int  | YES  |     | NULL    |       |
+----------------+------+------+-----+---------+-------+
```

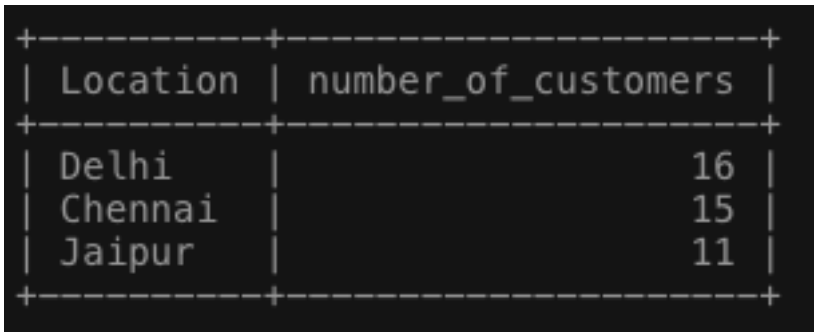
Market segmentation Analysis

Identify the top 3 cities with the highest number of customers to determine key markets for targeted marketing and logistic optimization.

Hint:

Use the "Customers" Table.
Return the result table limited to top 3 locations in descending order

```
select Location , count(*) as number_of_customers
from Customers
group by 1
order by 2 desc
limit 3 ;
```



Location	number_of_customers
Delhi	16
Chennai	15
Jaipur	11

- Delhi , Chennai and Jaipur should be focused for the marketing campaign

Engagement Depth Analysis

Determine the distribution of customers by the number of orders placed. This insight will help in segmenting customers into one-time buyers, occasional shoppers, and regular customers for tailored marketing strategies.

Hint:

Use the "Orders" table.
Return the result table which helps you to segment customers on the basis of the number of orders in ascending order.

```
select distinct Cs_segment as NumberOfOrders , Count(customer_id) CustomerCount
from
(select customer_id ,
count(order_id) Cs_segment
from Orders
group by 1 ) a
group by 1
order by 1 ;
```

NumberOfOrders	CustomerCount
1	26
2	26
3	18
4	6
5	6
6	1
8	1

As per the Engagement Depth Analysis question, What is the trend of the number of customers v/s number of orders?

- As the number of orders Increases the Customer Count Decreases

As per the Engagement Depth Analysis question, Which customers category does the company experiences the most?

NumberOfOrders	Terms
1	One-time buyer.
2-4	Occasional Shoppers.
>4	Regular customers.

- One-time buyers and Occasional Shoppers .

Purchase His Value product

Identify products where the average purchase quantity per order is 2 but with a high total revenue, suggesting premium product trends.

Hint:

Use "OrderDetails".
Return the result table which includes average quantity and the total revenue in descending order.

```
select product_Id , avg(quantity) as AvgQuantity, sum(quantity*price_per_unit) as
TotalRevenue
from OrderDetails
group by 1
having  avg(quantity) = 2
order by 2 desc , 3 desc
;
```

```
+------------+-------------+--------------+
| product_Id | AvgQuantity | TotalRevenue |
+------------+-------------+--------------+
|          1 |      2.0000 |      1620000 |
|          8 |      2.0000 |       390000 |
+------------+-------------+--------------+
```

Among products with an average purchase quantity of two, which ones exhibit the highest total revenue?

- Product ID 1

Category-wise Customer Reach

For each product category, calculate the unique number of customers purchasing from it. This will help understand which categories have wider appeal across the customer base.

Hint:

Use the "Products", "OrderDetails" and "Orders" table.
Return the result table which will help you count the unique number of customers in descending order.

```
select p.category , count( distinct customer_id ) as unique_customers
from Products as p
join OrderDetails as od on p.Product_id = od.Product_id
 join Orders as o on o.order_id = od.order_id
group by 1
order by 2 desc ;
```

category	unique_customers
Electronics	79
Wearable Tech	61
Photography	45

Which product category needs more focus as it is in high demand among the customers?

- Electronics

Sales Trend Analysis

Analyze the month-on-month percentage change in total sales to identify growth trends.

Hint:

Use the "Orders" table.
*Return the result table which will help you get the month (YYYY-MM), Total Sales and Percent Change of the total amount (Present month value- Previous month value/ Previous month value)*100.*
The resulting change in percentage should be rounded to 2 decimal places.

```
select * ,
 round ((totalsales - lag(totalsales) over ( order by month ))
 / lag(totalsales) over ( order by month )*100 , 2)as PercentChange
 from
(select date_format(order_date,'%Y-%m') as Month , sum(total_amount) as
TotalSales
from Orders
group by 1) a
```

Month	TotalSales	PercentChange
2023-03	789000	NULL
2023-04	1704000	115.97
2023-05	1582000	-7.16
2023-06	1040000	-34.26
2023-07	2568000	146.92
2023-08	1800000	-29.91
2023-09	2927000	62.61
2023-10	1497000	-48.86
2023-11	1151000	-23.11
2023-12	2774000	141.01
2024-01	1555000	-43.94
2024-02	396000	-74.53

As per Sales Trend Analysis question, During which month did the sales experience the largest decline?

- FEB 2024

As per Sales Trend Analysis question, What could be inferred about the sales trend from March to August?

- Sales fluctuated with no clear trend

Average Order Value Fluctuation

Examine how the average order value changes month-on-month. Insights can guide pricing and promotional strategies to enhance order value.

Hint:

- *Use the "Orders" Table.*
- *Return the result table which will help you get the month (YYYY-MM), Average order value and Change in the average order value (Present month value- Previous month value).*
- *The resulting change in average order value should be rounded to 2 decimal places and should be ordered in descending order.*

```
select * , Round ( AvgOrderValue - lag(AvgOrderValue) over ( order by Month ) , 2)
as ChangeInValue
 from
(select date_format(order_date, '%Y-%m') as Month, Avg(total_amount) as
AvgOrderValue
from Orders
group by 1 ) a
order by 3 desc ;
```

Month	AvgOrderValue	ChangeInValue
2023-12	132095.2381	36178.57
2023-04	81142.8571	20450.55
2023-06	104000.0000	16111.11
2023-08	112500.0000	13730.77
2023-11	95916.6667	12750.00
2023-09	121958.3333	9458.33
2023-05	87888.8889	6746.03
2024-01	129583.3333	-2511.90
2023-07	98769.2308	-5230.77
2023-10	83166.6667	-38791.67
2024-02	44000.0000	-85583.33
2023-03	60692.3077	NULL

- As per last question, Which month has the highest change in the average order value?
- December has the highest change in average order value

Inventory refresh rate

Based on sales data, identify products with the fastest turnover rates, suggesting high demand and the need for frequent restocking.

Hint:

Use the "OrderDetails" table.
Return the result table limited to top 5 product according to the SalesFrequency column in descending order.

```
select Product_id , count(*) as SalesFrequency
from OrderDetails
Group by 1
order by 2 desc
limit 5;
```

Product_id	SalesFrequency
7	78
3	68
4	68
2	67
8	65

- Which product_id has the highest turnover rates and needs to be restocked frequently?
- Product ID 7

Low engagement Products

List products purchased by less than 40% of the customer base, indicating potential mismatches between inventory and customer interest.

Hint:

Use the "Products", "Orders", "OrderDetails" and "Customers" table.
Return the result table which will help you get the product names along with the count of unique customers who belong to the lower 40% of the customer pool.

```
 with s AS
( SELECT
    p.product_id,
    p.Name AS Name,
    COUNT(DISTINCT c.customer_id) AS UniqueCustomerCount
  FROM
    Products p
  JOIN
    OrderDetails od ON p.product_id = od.product_id
  JOIN
    Orders o ON od.order_id = o.order_id
  JOIN
    Customers c ON o.customer_id = c.customer_id
  GROUP BY
    1,2)

select product_id as Product_id , Name , UniqueCustomerCount
from
    (select * , ntile(10) over (order by UniqueCustomerCount) as percentile
    from s) a
where percentile < 4
 limit 2 ;
```

Product_id	Name	UniqueCustomerCount
1	Smartphone 6"	36
8	Wireless Earbuds	38

Why might certain products have purchase rates below 40% of the total customer base?

- Poor visibility on the platform

After running an analysis to identify products purchased by less than 40% of the customer base, it was found that a few products have lower purchase rates than expected.

What could be a strategic action to improve the sales of these underperforming products?

- Implement targeted marketing campaigns to raise awareness and interest

Customer Accusation trends

Evaluate the month-on-month growth rate in the customer base to understand the effectiveness of marketing campaigns and market expansion efforts.

Hint:

Use the "Orders" table.
Return the result table which will help you get the count of the number of customers who made the first purchase on monthly basis.
The resulting table should be ascendingly ordered according to the month.

```
select date_format(order_date, '%Y-%m') as FirstPurchaseMonth ,
count(customer_id ) as TotalNewCustomers
from
(select customer_id , min(order_date) as order_date
from Orders
group by 1) a
group by 1
order by 1;
```

FirstPurchaseMonth	TotalNewCustomers
2023-03	11
2023-04	18
2023-05	11
2023-06	8
2023-07	11
2023-08	9
2023-09	5
2023-10	3
2023-11	1
2023-12	4
2024-01	2
2024-02	1

As per last question, What can be inferred about the growth trend in the customer base from the result table?

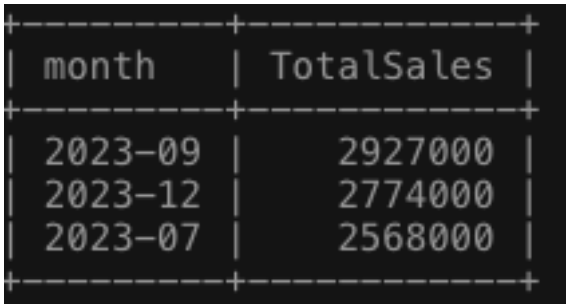
- its a downward trend which implies that the marketing campaigns are not as effective

Peak sales Period Indication

Identify the months with the highest sales volume, aiding in planning for stock levels, marketing efforts, and staffing in anticipation of peak demand periods.

Hint:
Use the "Orders" table.
Return the result table which will help you get the month (YYYY-MM) and the Total sales made by the company limiting to top 3 months.
The resulting table should be in descending order suggesting the highest sales month.

```
select date_format(order_date, '%Y-%m') as month , sum(total_amount) as TotalSales
from orders
group by 1
order by 2 desc
limit 3  ;
```



month	TotalSales
2023-09	2927000
2023-12	2774000
2023-07	2568000

Which months will require major restocking of product and increased staffs?

- September and December