SQL Capstone Project

Case study: T.T Inc.,

By:

Abiodun Akinola

Data Analyst-10alytics

Case Overview

T.T Inc., is a leading company in the consumer electronics sector, it seeks to generate insights from data and optimization strategies for inventory management within the Supply Chain Management team.

▶ Objectives are to:

➤ Optimize inventory levels to minimize overstock and understock situations.

➤ Understand seasonal trend of sales for different products.

➤ Improve customer satisfaction by ensuring product availability.

Q. 1 What is the total number of units sold per product SKU?

productid numeric	total_units_sold bigint
1	9806	210
2	3381	201
3	8486	188
4	8106	186
5	3993	182
6	9605	178
7	9237	176
8	6364	176
9	3762	173
10	4450	171
11	7265	168
12	5485	164
13	8025	163
14	3906	162
15	3631	160
16	7131	160

```sql
SELECT productid, SUM(inventoryquantity)AS Total_Units_Sold
FROM sales
GROUP BY productid
ORDER BY Total_units_Sold DESC;
```

Q. 2 Which product category had the highest sales volume last month?

productcategory text	sales_volume bigint
Electronics	678

```sql
SELECT p.productcategory, SUM (s.inventoryquantity)
AS Sales_Volume
FROM PRODUCT p
JOIN sales s ON s.productid = p.productid
WHERE s.sales_year = '2021' AND sales_month = '11'
GROUP BY p.productcategory
ORDER BY Sales_Volume
DESC LIMIT 1;
```

Q. 3 How does the inflation rate correlate with sales volume for a specific month?

	sales_month integer	sales_year integer	avg_inflation numeric	sales_volume bigint
1	1	2020	3.66	1392
2	8	2022	3.61	1619
3	3	2018	3.43	1928
4	11	2018	3.41	1743
5	2	2022	3.36	2644
6	5	2018	3.34	2296
7	1	2022	3.33	2284
8	9	2019	3.33	2928
9	8	2019	3.32	3352
10	6	2018	3.32	1724
11	4	2019	3.28	2001
12	7	2019	3.27	1874
13	5	2021	3.25	2355
14	10	2019	3.25	1879
15	2	2020	3.24	3432

	sales_month integer	sales_year integer	avg_inflation numeric	sales_volume bigint
16	8	2021	3.22	2965
17	7	2018	3.21	4305
18	2	2019	3.21	1415
19	1	2019	3.17	4569
20	3	2019	3.16	2324
21	3	2020	3.15	2179
22	3	2021	3.14	3346
23	7	2021	3.11	1305
24	9	2021	3.09	1013
25	4	2022	3.09	3683
26	2	2021	3.09	2357
27	8	2020	3.08	4828
28	12	2020	3.07	2323
29	11	2022	3.06	1603
30	10	2021	3.04	3372

	sales_month integer	sales_year integer	avg_inflation numeric	sales_volume bigint
31	9	2022	3.04	4219
32	6	2021	3.03	3044
33	12	2019	3.03	2453
34	12	2022	3.00	2539
35	11	2020	2.98	1012
36	12	2021	2.97	2562
37	4	2020	2.95	1204
38	2	2018	2.94	1737
39	10	2022	2.89	3649
40	5	2019	2.89	1868
41	6	2019	2.89	1198
42	4	2021	2.88	1247
43	1	2018	2.87	3817
44	10	2018	2.86	2417
45	11	2021	2.86	2334
46	5	2020	2.82	2558

47	6	2022	2.82	3020
48	5	2022	2.81	1565
49	6	2020	2.81	1961
50	9	2020	2.77	2590
51	3	2022	2.76	962
52	9	2018	2.75	1693
53	7	2020	2.74	2170
54	1	2021	2.65	1449
55	10	2020	2.60	3419
56	12	2018	2.56	2099
57	7	2022	2.56	2589
58	4	2018	2.50	2604
59	11	2019	2.49	1668
60	8	2018	2.39	2131

```sql
SELECT s.sales_month, s.sales_year,
ROUND (AVG(f.inflationrate), 2) AS Avg_Inflation,
SUM (s.inventoryquantity) AS sales_Volume
FROM sales s
JOIN factors f ON f.salesdate = s.salesdate
GROUP BY sales_year, sales_month
ORDER BY Avg_inflation
DESC;
```

Correlation of the inflation rate with sales volume for January across the years under review

- **2020 (3.66)** → 1392
- **2022 (3.61)** → 1619
- **2018 (3.41)** → 1743
- **2019 (3.17)** → 4569
- **2021 (3.14)** → 1305

- Insight:
- In 2019, a relatively lower inflation (3.17) led to the highest sales volume (4569).
- In 2020, the highest inflation rate (3.66) coincided with a low sales volume (1,392).
- This suggests a negative correlation: as inflation increases, sales volume decreases.

Conclusion: We cannot say that inflation caused the change in sales volume.
There appears to be a negative correlation between average inflation rate and sales volume for January across the years analysed. While this suggests that higher inflation may be associated with lower sales, further analysis would be needed to determine if inflation directly caused the change in sales volume.

Q. 4 What is the correlation between the inflation rate and sales quantity for all products combined on a monthly basis over the last year?

```sql
SELECT s.sales_month, s.sales_year,
ROUND (AVG(f.inflationrate), 2)AS Avg_Inflation,
    SUM (s.inventoryquantity) AS Total_Sales_quantity
FROM sales s
    JOIN factors f ON f.salesdate = s.salesdate
    WHERE s.salesdate >= (CURRENT_DATE - INTERVAL '1 Year'
GROUP BY sales_year, sales_month
ORDER BY sales_year, sales_month;
```

► Insight: No correlation

► The inflation rate does not affect the sales quantity for all products combined monthly over the last year.

Q. 5 Did promotions significantly impact the sales quantity of products?

Implication

• Promotions helped increase sales for Home_Appliances.

• For other categories, promotions may have reduced profit margins
  or cannibalised existing sales without attracting new customers.

• Further analysis could explore the type of promotion

• and customer behavior to understand these trends better.

Insights:

• Home Appliances saw an increase in sales with promotions (from 50.10 to 54.13).

• Electronics, smartphones, and Laptops experienced a drop in average sales with promotions:

  • Electronics: 53.63 → 52.35

  • SmartPhones: 52.70 → 49.26

  • Laptops: 51.08 → 49.64

	productcategory text	promotions text	avg_sales_without_promotion numeric
1	Home_Appliances	No	50.10
2	Electronics	No	53.63
3	SmartPhones	No	52.70
4	Laptops	No	51.08

5	Yes	Home_Appliances	54.13
6	Yes	Electronics	52.35
7	Yes	SmartPhones	49.26
8	Yes	Laptops	49.64

Q. 6 What is the average sales quantity per product category?

```sql
SELECT  p.productcategory, ROUND (AVG (s.inventoryquantity), 2)
AS Avg_Sales_per_product_Category
FROM sales s
JOIN product p ON p.productid = s.productid
GROUP BY p.productcategory
ORDER BY Avg_Sales_per_product_Category
DESC;
```

	productcategory text	avg_sales_per_product_category numeric
1	Electronics	53.02
2	Home_Appliances	52.15
3	SmartPhones	51.08
4	Laptops	50.36

Q.7 How does the GDP affect the total sales volume?

```sql
SELECT s.sales_year, SUM (f.gdp) AS Total_GDP, ROUND (SUM (s.inventoryquantity), 2)
AS sales_volume
FROM factors f
JOIN sales s ON s. salesdate = f.salesdate
GROUP BY s.sales_year
ORDER BY sales_volume
DESC;
```

	sales_year integer	total_gdp numeric	sales_volume numeric
1	2022	11784921.53	30376.00
2	2020	10809156.99	29068.00
3	2018	11720114.38	28494.00
4	2019	10959585.47	27529.00
5	2021	10437239.33	27349.00

Insight

The data suggests a potential positive correlation between Total GDP and Total Sales Volume, where higher GDP tends to be associated with higher sales. However, with only five data points, I cannot definitively conclude a causal relationship or rule out the influence of other factors on sales.

Q.8 What are the top 10 best-selling product SKUs?

```
SELECT productid, SUM (inventoryquantity)
AS unit_sold
FROM sales
GROUP BY productid
ORDER BY unit_sold
DESC LIMIT 10;
```

	productid numeric	unit_sold bigint
1	9806	210
2	3381	201
3	8486	188
4	8106	186
5	3993	182
6	9605	178
7	9237	176
8	6364	176
9	3762	173
10	4450	171

Q. 9 How do seasonal factors influence sales quantities for different product categories?

```sql
SELECT ROUND(AVG(f.seasonalfactor), 2) AS Avg_seasonal_factor,
       p.productcategory,
       SUM(s.inventoryquantity) AS Sale_volume
FROM factors f
JOIN sales s ON s.salesdate = f.salesdate
JOIN product p ON p.productid = s.productid
GROUP BY p.productcategory
ORDER BY Avg_seasonal_factor
DESC;
```

Insight

•**For Electronics, Smartphones, and Laptops, seasonality does not appear to be a significant driver of overall sales.**

•The average seasonal factor for these categories is 1.00, meaning sales volumes are relatively consistent throughout the year.

•**Home Appliances show a very slight positive influence from seasonality.** The average seasonal factor is 1.01, indicating sales are marginally higher during peak periods.

	avg_seasonal_factor numeric	productcategory text	sale_volume bigint
1	1.01	Home_Appliances	42203
2	1.00	Electronics	44935
3	1.00	SmartPhones	41601
4	1.00	Laptops	40439

Conclusion:

While Home Appliances exhibit a minor seasonal effect, the data suggests that seasonal fluctuations do not strongly influence the overall sales volume for the product categories analysed.

Q.10. What is the average sales quantity per product category? And how many products within each category were part of a promotion?

```sql
SELECT  ROUND (AVG (s.inventoryquantity), 2) AS Avg_sales_qty,
        p.productcategory,
        COUNT (CASE WHEN p.promotions ='Yes'
                THEN 1
                END) AS promotion_count
FROM sales s
JOIN product p ON s.productid = p.productid
GROUP BY p.productcategory
ORDER BY Avg_sales_qty;
```

	avg_sales_qty numeric	productcategory text	promotion_count bigint
1	50.36	Laptops	219
2	51.08	SmartPhones	212
3	52.15	Home_Appliances	220
4	53.02	Electronics	212

Recommendations

➢ Focus marketing efforts for Electronics, Smartphones, and Laptops on non-seasonal drivers, such as product features or promotional events.

➢ Capitalise on the slight seasonal uplift for Home Appliances with targeted promotions during peak periods.

➢ Investigate the specific seasonal trends for Home Appliances to optimise inventory and marketing timing.

Recommendation Contd

➢ There's a need to gather more granular and comprehensive data to understand the relationship between GDP and sales volume

➢ There's a need to conduct a Time Series Analysis to explore the relationship between GDP and sales volume over time, and by extension, it will be beneficial to identify potential lags, and Forecast sales based on GDP.