T. T Inc. Inventory Optimization: From Challenges to Solutions

SQL Capstone Project by Ifeoluwa Akinyelure

```
5  --Q1 What is the total number of units sold per product SKU?
6  Select productid, sum(inventoryquantity) as total_units_sold
7  From sales
8  Group by (productid)
9  Order by  total_units_sold DESC;
```

Data Output | Messages | Notifications

	productid numeric	total_units_sold bigint
	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

Total rows: 1000 of 1375 Query complete 00:00:00.179 Ln 11, Col 37

```sql
--Q2 Which product category had the highest sales volume last month?
Select p.productcategory, sum(s.inventoryquantity) as sales_volume
From product p
Join sales s on p.productid=s.productid
where s.salesdate between '2022-11-01' and '2022-11-30'
Group by p.productcategory
Order by sales_volume DESC
Limit 1;
```

Data Output | Messages | Notifications

	productcategory text	sales_volume bigint
	Home_Appliances	551

```sql
-- Q3 How does the inflation rate correlate with sales volume for a specific month?
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 s.salesdate=f.salesdate
Group by s.sales_year, s.sales_month
Order by s.sales_year DESC, s.sales_month ASC;
```

Data Output | Messages | Notifications

	sales_month integer	sales_year integer	avg_inflation numeric	sales_volume bigint
1	1	2022	3.33	2284
2	2	2022	3.36	2644
3	3	2022	2.76	962
4	4	2022	3.09	3683
5	5	2022	2.81	1565
6	6	2022	2.82	3020
7	7	2022	2.56	2589
8	8	2022	3.61	1619
9	9	2022	3.04	4219
10	10	2022	2.89	3649
11	11	2022	3.06	1603
12	12	2022	3.00	2539
13	1	2021	2.65	1449
14	2	2021	3.09	2357

Total rows: 60 of 60 Query complete 00:00:00.117 Ln 21, Col 1

```sql
-- Q4 What is the correlation between the inflation rate and sales quantity for all products combined on a monthly basis over the
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 s.salesdate=f.salesdate
where s.salesdate >= (CURRENT_DATE - INTERVAL '1 Year')
Group by s.sales_year, s.sales_month
Order by s.sales_year DESC, s.sales_month ASC;
```

Data Output | Messages | Notifications

	sales_month integer	sales_year integer	avg_inflation numeric	sales_volume bigint

```sql
--Q5 Did promotions significantly impact the sales quantity of products?
Select p.productcategory, p.promotions, round(avg(s.inventoryquantity), 2) as avg_sales
From product p
Join sales s on p.productid=s.productid
Group by p.productcategory, p.promotions;
```

Data Output | Messages | Notifications

	productcategory text	promotions text	avg_sales numeric
1	Laptops	Yes	49.64
2	Electronics	No	53.63
3	Home_Appliances	No	50.10
4	Laptops	No	51.08
5	SmartPhones	Yes	49.26
6	Electronics	Yes	52.35
7	Home_Appliances	Yes	54.13
8	SmartPhones	No	52.70

```sql
--OR
Select p.productcategory, round(avg(s.inventoryquantity)) as avg_sales, p.promotions
From product p
Join sales s on p.productid=s.productid
Where p.promotions = 'No'
Group by p.productcategory, p.promotions

Union All

Select p.productcategory, round(avg(s.inventoryquantity)) as avg_sales, p.promotions
From product p
Join sales s on p.productid=s.productid
Where p.promotions = 'Yes'
Group by p.productcategory, p.promotions;
```

Data Output | Messages | Notifications

	productcategory text	avg_sales numeric	promotions text
1	Home_Appliances	50	No
2	Electronics	54	No
3	SmartPhones	53	No
4	Laptops	51	No
5	Home_Appliances	54	Yes
6	Electronics	52	Yes
7	SmartPhones	49	Yes
8	Laptops	50	Yes

Total rows: 8 of 8 Query complete 00:00:00.100 Ln 42, Col 1

```sql
--Q6 What is the average sales quantity per product category?
Select p.productcategory, round(avg(s.inventoryquantity)) as Avg_sales_quantity
from product p
join sales s on p.productid=s.productid
Group by p.productcategory
Order by avg_sales_quantity DESC;
```

Data Output | Messages | Notifications

	productcategory text	avg_sales_quantity numeric
1	Electronics	53
2	Home_Appliances	52
3	SmartPhones	51
4	Laptops	50

```sql
--Q7 How does the GDP affect the total sales volume?
Select s.sales_year, round(sum(f.gdp),2) as Total_GDP, sum(s.inventoryquantity) as sales_volume
From sales s
Join factors f on s.salesdate=f.salesdate
Group by s.sales_year
Order by sales_volume DESC;
```

Data Output | Messages | Notifications

	sales_year integer	total_gdp numeric	sales_volume bigint
1	2022	11784921.53	30376
2	2020	10809156.99	29068
3	2018	11720114.38	28494
4	2019	10959585.47	27529
5	2021	10437239.33	27349

```sql
--Q8 What are the top 10 best-selling product SKUs?
Select productid, sum(inventoryquantity) as Sales_volume
from sales
Group by productid
order by sales_volume DESC
limit 10;
```

Data Output | Messages | Notifications

	productid numeric	sales_volume 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

Total rows: 10 of 10 Query complete 00:00:00.109 Ln 71, Col 1

```sql
--Q9 How do seasonal factors influence sales quantities for different product categories?
Select p.productcategory, round(avg(f.seasonalfactor), 4) as avg_seasonalfactor, sum(s.inventoryquantity) as total_quantity
From sales s
Join factors f on s.salesdate=f.salesdate
Join product p on p.productid=s.productid
Group by p.productcategory
Order by avg_seasonalfactor;
```

Data Output | Messages | Notifications

	productcategory text	avg_seasonalfactor numeric	total_quantity bigint
1	Electronics	0.9983	44935
2	SmartPhones	1.0032	41601
3	Laptops	1.0048	40439
4	Home_Appliances	1.0076	42203

```sql
--Q10 What is the average sales quantity per product category, and how many products within each category were part of a promotion
Select p.productcategory, round(avg(s.inventoryquantity)) as Avg_Quantity,
count(Case When p.promotions = 'Yes' Then 1 End) as No_of_Promotions
from product p
join sales s on p.productid=s.productid
Group by p.productcategory
Order by Avg_Quantity
```

Data Output | Messages | Notifications

	productcategory text	avg_quantity numeric	no_of_promotions bigint
	Laptops	50	219
2	SmartPhones	51	212
3	Home_Appliances	52	220
4	Electronics	53	212

Total rows: 4 of 4 Query complete 00:00:00.139 Ln 86, Col 1

```sql
--Average sales and variance for each product to optimize stock levels
SELECT
    productid,
    AVG(inventoryquantity) AS Avg_Sales,
    STDDEV(inventoryquantity) AS Sales_Variance,
    MIN(salesdate) AS First_Sale_Date,
    MAX(salesdate) AS Last_Sale_Date
FROM sales
GROUP BY Productid;
```

Data Output | Messages | Notifications

	productid numeric	avg_sales numeric	sales_variance numeric	first_sale_date date	last_sale_date date
1	4773	43.0000000000000000	[null]	2020-04-29	2020-04-29
2	5067	51.0000000000000000	[null]	2019-07-15	2019-07-15
3	9515	64.0000000000000000	[null]	2018-10-06	2018-10-06
4	8756	45.0000000000000000	53.7401153701776119	2019-03-14	2022-03-16
5	9736	32.0000000000000000	[null]	2020-11-03	2020-11-03
6	3480	79.0000000000000000	[null]	2020-04-23	2020-04-23
7	9376	32.0000000000000000	[null]	2019-01-18	2019-01-18
8	2621	21.0000000000000000	[null]	2021-11-15	2021-11-15

Total rows: 1000 of 1375 Query complete 00:00:00.137 Ln 102, Col 71

```sql
--Monthly Sales Trends
SELECT Productid, sales_year, sales_month, SUM(inventoryquantity) AS Total_Sales
FROM Sales
GROUP BY Productid, sales_year, sales_month
ORDER BY Productid, Sales_Year, Sales_Month;
```

Data Output | Messages | Notifications

	productid numeric	sales_year integer	sales_month integer	total_sales bigint
1	1002	2022	8	12
2	1003	2022	3	19
3	1006	2019	9	37
4	1011	2019	9	61
5	1013	2021	12	72
6	1019	2019	4	4
7	1019	2022	5	87
8	1029	2021	12	74

Total rows: 1000 of 1497 Query complete 00:00:00.126 Ln 112, Col 23

```sql
--Confirm stockout
SELECT
    s.Productid,
    f.Salesdate,
    f.SeasonalFactor,
    COALESCE(SUM(s.InventoryQuantity), 0) AS Total_Sales
FROM Factors f
LEFT JOIN sales s ON s.Salesdate = f.Salesdate
GROUP BY s.Productid,f.Salesdate, f.SeasonalFactor
HAVING COALESCE(SUM(s.InventoryQuantity), 0) = 0;
```

Data Output | Messages | Notifications

productid numeric	salesdate date	seasonalfactor numeric	total_sales bigint

Total rows: 0 of 0 Query complete 00:00:00.075 Ln 128, Col 19

```sql
--Inventory Turnover Rate
SELECT Productid, Div(SUM(Inventoryquantity), Avg(InventoryQuantity)) as Inventory_Turnover
from Sales
Group by Productid
Order by Inventory_Turnover DESC;

```

Data Output | Messages | Notifications

	productid numeric	inventory_turnover numeric
1	3906	3
2	3406	3
3	3381	3
4	9605	3
5	9806	3
6	3200	3
7	3875	2
8	1019	2

Total rows: 1000 of 1375 Query complete 00:00:00.121 Ln 143, Col 34