Data-Driven Strategies for Inventory Optimisation at T.T Inc.

BY Sylvanus
January 2025

Table of Contents

Business Overview:

T.T. Inc. is a prominent player in the consumer electronics sector, renowned for its high-quality and innovative products. The company serves a global market and has earned its place as a key industry leader by emphasizing operational efficiency, leveraging technological, and maintaining a customer-centric approach. Given the fluctuating nature of demand in the consumer electronics space; driven by seasonal trends and dynamic market conditions, data-driven inventory management is crucial for sustaining growth and maintaining market competitiveness.

Business Challenges and Key Analysis Objective

❑ Business Challenges:

- **Overstock and Understock**: Imbalanced inventory causing excess costs or missed sales.
- **Seasonal Demand**: Lack of precise understanding of seasonal sales trends, affecting demand forecasting.
- **Product Availability**: Challenges in ensuring products are consistently available, leading to customer dissatisfaction.

❑ Analysis Goals:

- **Optimize inventory levels:** Minimize overstock and understock to reduce costs and prevent lost sales.
- **Understand sales demand:** Analyse historical data to forecast demand accurately.
- **Improve customer satisfaction:** Ensure product availability to enhance the customer experience and loyalty.
- **Enhance operational efficiency:** Streamline supply chain processes and reduce costs.
- **Support data-driven decision making:** Provide actionable insights for strategic inventory.

Total Units Sold Per Product SKU:

Dashboard × Properties × SQL × Statistics × Dependencies × De

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
1  -- (#1) Total Units Sold per SKU?
2
3  select productid, sum(inventoryquantity)
4  as total_unit_sold
5  from sales
6  group by productid
7  order by total_unit_sold DESC
8
```

Data Output | Messages | Notifications

SQL

	productid numeric	total_unit_sold bigint
1	9806	210
2	3381	201
3	8486	188
4	8106	186
5	3993	182
6	9605	178
7	9237	176

- **Insights:** Certain product SKUs consistently demonstrated high sales volumes, indicating strong market demand or effective product positioning strategies. Other product SKUs exhibited very low sales, potentially due to weak demand, limited market visibility, or operational challenges affecting their performance.

- **Recommendation:** Leverage Success Factors from top performers such as seasonal trends, customer preferences, or promotional strategies. For bottom performers that show potential, increase marketing efforts and improve visibility in the market to spark consumer interest.

Top-performing Product Category: Last Month

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
-- (#2) Top-Selling Product Category -Last Month
select p.productcategory, SUM(s.inventoryquantity)
As sales_volume from sales s
join product p
on p.PRODUCTID = s.PRODUCTID
where s.sales_year = '2021' and s.sales_month =
'11' group by p.productcategory
order by sales_volume DESC
```

Data Output | Messages | Notifications

	productcategory text	sales_volume bigint
1	Electronics	678
2	Laptops	481
3	SmartPhones	384
4	Home_Appliances	182

- **Insights:** Electronics topped sales at $44,935, followed by Home Appliances ($42,203), Smartphones ($41,601), and Laptops ($40,439), showing stable demand in November. The rise in Electronics and Home Appliances sales is likely driven by early holiday shopping for December.

- **Recommendation:** Optimise Inventory Levels: Ensure adequate stock availability to meet the anticipated surge in demand during the December holiday season. Enhance Marketing Efforts: Strengthen promotional campaigns to capitalise on the increased consumer interest and drive sales during this peak period.

Inflation Vs. Sales Volume Correlation: Monthly

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
17
18  -- (#3) Inflation Rate vs. Sales Volume Correlation
19
20  select s.sales_month, s.sales_year, round
21  (Avg(f.inflationrate),2) as  Avg_inflation,
22  Sum(s.inventoryquantity) as sales_volume
23  from sales  s join factors  f
24  on f.salesdate = s.salesdate
25  group by sales_year, sales_month;
```

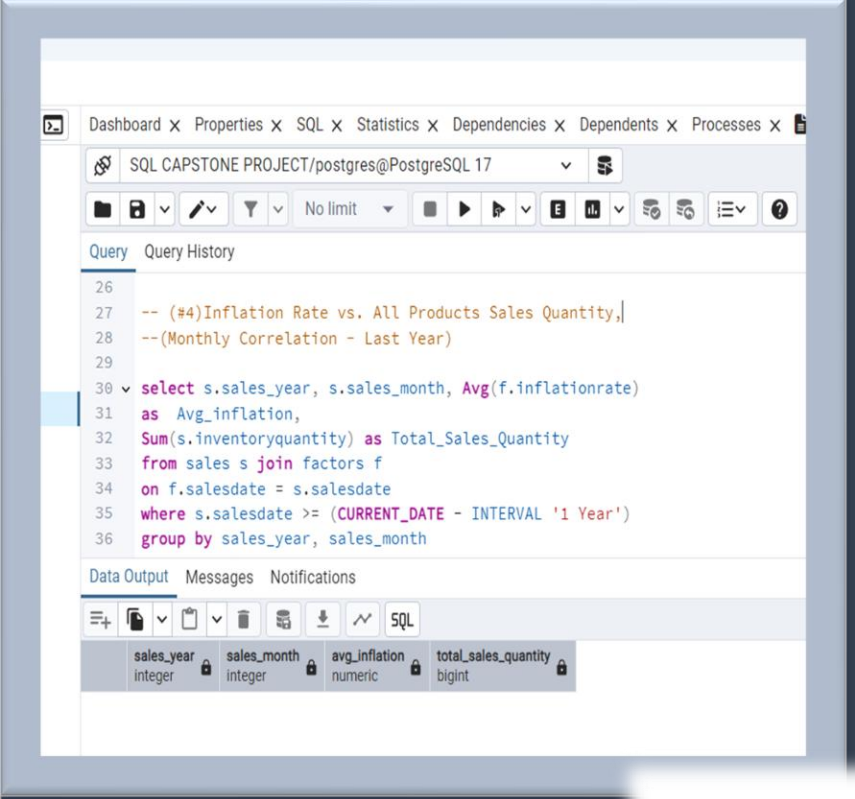
Data Output | Messages | Notifications

	sales_month integer	sales_year integer	avg_inflation numeric	sales_volume bigint
1	6	2022	2.82	3020
2	8	2018	2.39	2131
3	7	2022	2.56	2589
4	11	2018	3.41	1743
5	2	2020	3.24	3432
6	12	2021	2.97	2562
7	7	2019	3.27	1874
8	10	2019	3.25	1879
9	10	2022	2.89	3649

- **Insights:** Sales volume shows minimal correlation with inflation, indicating that factors like seasonality, promotions, and consumer trends have a stronger impact on consumer spending, which remains stable despite inflationary changes.

- **Recommendation:** Since inflation has little direct impact on sales, focus on leveraging seasonality, targeted promotions, and understanding consumer trends to drive sales. Monitoring product availability and ensuring a seamless customer experience will also help maintain stable consumer spending.

Inflation Vs. Sales Volume Correlation: Monthly Basis Last year



- **Insights:** Despite fluctuations in inflation, consumer spending remains stable, indicating that inflation has a minimal impact on sales month-on-month last year 2023. Sales trends do not align with inflation changes, suggesting that other factors such as seasonal demand, promotional activities, and new product launches have a stronger influence on consumer purchasing decisions.

Impact of Promotions on Sales Quantity:

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
--(#5)Impact of Promotions on Sales Quantity

select p.productcategory, round (Avg(s.inventoryquantity))
as Avg_Sales_Without_Promotion, p.promotions
from sales  s join product p
on p.productid = s.productid
where promotions = 'No'
group by p.productcategory, p.promotions
union all
select p.productcategory, round (Avg(s.inventoryquantity))
as Avg_Sales_With_Promotion, p.promotions
from sales  s join product p
on p.productid = s.productid
where promotions = 'Yes'
group by p.productcategory, p.promotions
```

Data Output | Messages | Notifications

	productcategory text	avg_sales_without_promotion 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

- **Insights:** Promotions helped increase sales of Home Appliances by +4, but did not have much of an effect on Electronics, Smartphones, or Laptops. This suggests that consumers are more responsive to promotions for Home Appliances, while other factors might be at play in the other categories.

- **Recommendation:**

Focus promotions on Home Appliances, where they have proven effective in boosting sales. For Electronics, Smartphones, and Laptops, consider exploring other strategies such as seasonal campaigns, bundling offers, or emphasising product features to drive consumer interest and increase revenue.

Average Sales Quantity per Product Category

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
55  --(#6) Average Sales Quantity by Product Category
56  select p.productcategory, round (avg (s.inventoryquantity)) As Avg_Sales
57  from sales s
58  join product p
59  on p.productid = s.productid
60  group by productcategory
61  order by avg_sales desc
```

Data Output | Messages | Notifications

	productcategory text	avg_sales numeric
	Electronics	53
	Home_Appliances	52
	SmartPhones	51
	Laptops	50

- **Insights:** Electronics lead in sales with the highest average of 53 units, indicating strong consumer demand. Home Appliances follow closely at 52 units, suggesting they are also in high demand, particularly with promotions. However, Smartphones (51 units) and Laptops (50 units) have slightly lower sales, which could be attributed to market saturation or high competition.

- **Recommendation:** Focus promotions on Home Appliances to maximize sales and maintain stock for Electronics to capitalise on high demand. For Smartphones and Laptops, explore bundling, highligh new features, or target upgrades to boost sales amid market saturation and competition.

Impact of GDP on Total Sales Volume:

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
63  --(#7) GDP Impact on Total Sales Volume
64  select s.sales_year, Sum(f.GDP) as total_GDP,
65  SUM(s.inventoryquantity) as total_sales
66  from sales s
67  join factors f
68  on f.salesdate = s.salesdate
69  group by s.sales_year
70  order by total_sales desc
71
```

Data Output | Messages | Notifications

SQL

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

- **Insights:** There is a minimal relationship between GDP and total sales, meaning higher GDP generally aligns with higher sales. However, despite GDP being lowest in 2021 ($10.43M) with sales at their lowest (27,349 units), sales grew significantly in 2020 with a slight increase in GDP ($10.8M). This suggests that other factors, also play a significant role in driving sales growth.

- **Recommendation:** Given that GDP alone does not fully explain sales growth, it's important to focus on leveraging other key drivers and align these strategies with economic trends and consumer behaviour.

Top 10 Best-Selling SKUs:

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
71
72  -- (#8) Top 10 Best-Selling Product SKUs
73  select productid, sum(inventoryquantity)
74  as unit_sold
75  from sales
76  group by productid
77  order by unit_sold desc
78  limit 10
```

Data Output | Messages | Notifications

SQL

	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

- **Insights:** The best-selling SKU, Product ID 9806, sold 210 units, and the top 10 products each sold over 170 units, highlighting strong consumer demand. The sales difference between the highest and lowest top-10 products is just 39 units (210 vs. 171), indicating that multiple products, rather than just a few bestsellers, contribute significantly to overall sales.

- **Recommendation:** Given the strong sales across multiple products, focus on maintaining a diverse product range and optimising inventory for high-demand SKUs. Analyse the key factors driving the success of the top performers - e.g., pricing, features, promotions and apply these insights to other products.

Seasonal Impact on Sales Quantities by Product Category:

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
80  -- (#9)Seasonal Impact on Sales by Category
81  select p.productcategory, round (avg (f.seasonalfactor)
82  ,3)
83  as average_seasonal_factor,
84  sum(s.inventoryquantity) as total_sales
85  from sales s
86  join product p
87  on p.productid =s.productid
88  join factors f
89  on f.salesdate = s.salesdate
90  group by productcategory
```

Data Output | Messages | Notifications

	productcategory text	average_seasonal_factor numeric	total_sales bigint
1	Electronics	0.998	44935
2	SmartPhones	1.003	416
3	Laptops	1.005	404
4	Home_Appliances	1.008	422

- **Insights:** Seasonality has a very slight effect on sales, with demand remaining relatively stable year-round. However, Home Appliances and Laptops show slight seasonal increases, likely due to factors like holiday promotions and back-to-school periods.

- **Recommendation:** Having minimal seasonal impact across most categories, focus on maintaining consistent stock levels and year-round marketing strategies for Smartphones and Electronics to cater to steady demand. For Home Appliances and Laptops, consider targeted promotions during key seasonal. periods.

Promotional Activity and Average Sales by Product Category

SQL CAPSTONE PROJECT/postgres@PostgreSQL 17

No limit

Query | Query History

```
93  -- (#10) Average Sales & Promotional Products per Category
94
95  select p.productcategory, round (avg (s.inventoryquantity))
96  as Avg_Sales_Qty,
97  count (case when p.promotions = 'Yes' then 1 end)
98  as promotion_count from sales s
99  join product p on s.productid = p.productid
100 group by p.productcategory
101 order by Avg_Sales_Qty
102
```

Data Output | Messages | Notifications

	productcategory text	avg_sales_qty numeric	promotion_count bigint
1	Laptops	50	219
2	SmartPhones	51	212
3	Home_Appliances	52	220
4	Electronics	53	212

Insights: All product categories show strong promotional activity, with Electronics leading in sales (53 units) followed by Smartphones (51 units). Home Appliances (52 units) and Laptops (50 units) have slightly lower sales, despite higher promotion counts, indicating efforts to drive demand in these areas due to market factors or seasonal trends.

Recommendation: Optimise promotions for Home Appliances and Laptops to drive sales, while continuing successful marketing strategies for Electronics and Smartphones and exploring additional targeted promotions during key periods.

Action Plan

Action	Product Category	Objective	Strategy
Enhance Promotions	Home Appliances & Laptops	Increase sales	Boost promotions and targeted marketing during seasonal trends (e.g., holiday promotions, back-to-school).
Optimise Inventory	All Categories	Ensure availability	Maintain optimal stock levels based on steady year-round demand for Electronics and Smartphones, and higher seasonal demand for Home Appliances & Laptops.
Leverage Consumer Demand	Electronics & Smartphones	Maintain strong sales	Continue successful marketing and product positioning; explore additional product bundles or seasonal promotions.
Analyse Promotion Effectiveness	Home Appliances & Laptops	Improve sales performance	Track the impact of increased promotions, adjust as needed to drive demand.
Expand Targeted Campaigns	All Categories	Maximise sales	Run campaigns focused on key consumer needs and seasonal trends, ensuring a balance between high-demand products and those with lower sales.

Conclusion

Sales remain strong for Electronics and Smartphones, while Home Appliances and Laptops have room to grow with better-targeted promotions. Since seasonality has little impact, strategic promotions—especially for Home Appliances—can help boost sales. By fine-tuning inventory management and aligning marketing efforts with consumer trends, T.T. Inc. can drive steady growth and improve overall performance.


THANK YOU