Optimizing Inventory for Growth: Data-Driven Insights for T.T Inc.

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Business Overview

T.T Inc. is a leading company known for its innovative consumer electronics. They make a wide range of products, from home appliances, electronics to laptops. As T.T Inc. grows, it's really important to manage their inventory well to stay profitable and keep customers happy. This presentation looks at key data insights from T.T Inc.'s sales and inventory records. These insights will help create a strong inventory plan for the next year.

Business Problems

- **Too Much or Too Little Stock:** T.T Inc. sometimes has too much inventory (which costs money to store) or not enough inventory (which means missed sales and unhappy customers).

- **Predicting What Customers Want:** It's hard for T.T Inc. to know exactly what customers will buy, especially because of seasonal trends and the economy. This makes it difficult to plan inventory.

- **Efficient Operations:** T.T Inc. wants to make its inventory processes smoother and more efficient to save money and resources.

Objectives of this Analysis

- **Find the Right Amount of Inventory:** Develop data-driven ways to avoid having too much or too little stock.

- **Understand Sales Trends:** Figure out seasonal patterns and what's popular for different products to better predict demand.

- **Make Sure Products Are Available:** Keep enough stock on hand so customers can always find what they need.

- **Improve Inventory Management:** Make inventory processes more efficient to cut costs and use resources wisely.

- Use these data insights to help T.T Inc. create a better supply chain strategy for next year.

Data Analysis & Findings : SQL
Queries, Insights &
Recommendations

Question 1: What is the total number of units sold per product SKU?

```sql
-- 1) What is the total number of units sold per product SKU?
select productid, sum(inventoryquantity) as total_units_sold
from sales
group by productid
order by total_units_sold desc;
```

Data Output   Messages   Notifications

	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

Total rows: 1000 of 1375   Query complete 00:00:00.219   Ln 5, Col 32

- **Insights:** (i) **Big Sales Differences:** Some products sell a lot, others barely at all. This indicates that some products are incredibly popular while some are not doing well at all(ii) **Many Low Sellers:** Lots of products have very low sales.

- **Recommendations:** (i) **Review Products:** Look at the low sellers and consider stopping some. (ii) **Group Inventory:** Use A, B, C groups to manage inventory. (iii) **Check Stock:** Make sure there's enough of the top sellers.

Top 20 Products - Total Sales

Least 20 Products - Total Sales

Question 2: Which product category had the highest sales volume last month?

- **Insights:** Electronics are the top seller in November, likely due to seasonal shopping events such as black Friday, cyber monday. This category is a key revenue driver for T.T Inc.

- **Recommendations:** (i) Ensure sufficient electronics inventory to meet peak November demand. (ii) Run targeted promotions for electronics during November. (iii) Analyse top-selling electronics subcategories for focused efforts. (iv) Investigate performance of other categories in November. (v) Compare November sales to past data for trend analysis.

```sql
8   -- 2) Which product category had the highest sales volume last month?
9 ∨ select p.productcategory, sum(s.inventoryquantity) as sales_volume
10   from sales s
11   inner join product p on s.productid = p.productid
12   where s.sales_year = '2021' and s.sales_month = '11'
13   group by p.productcategory
14   order by sales_volume desc
15   limit 1;
16
```
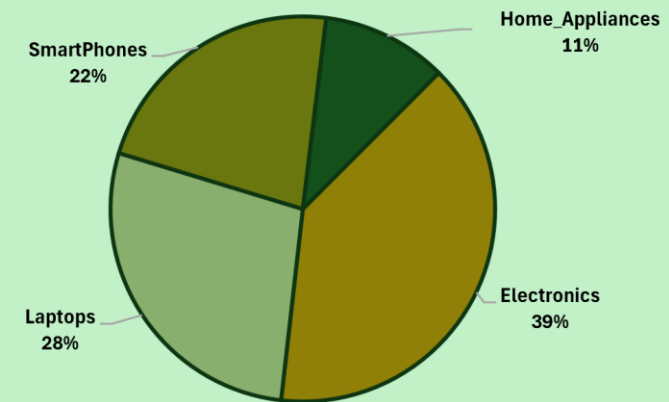
Data Output Messages Notifications

	productcategory text	sales_volume bigint
1	Electronics	678

Total rows: 1 of 1   Query complete 00:00:00.105   Ln 8, Col 7

Sales Volume by Product Category

- SmartPhones 22%
- Home_Appliances 11%
- Electronics 39%
- Laptops 28%

Question 3: How does the inflation rate correlate with sales volume for a specific month?

- **Insights:** (i) No clear, consistent correlation between inflation and sales volume is immediately apparent. (ii) Other factors likely influence sales, masking any direct inflation impact.

- **Recommendations:** The inflation-sales relationship requires further analysis to isolate its impact and inform accurate forecasting.
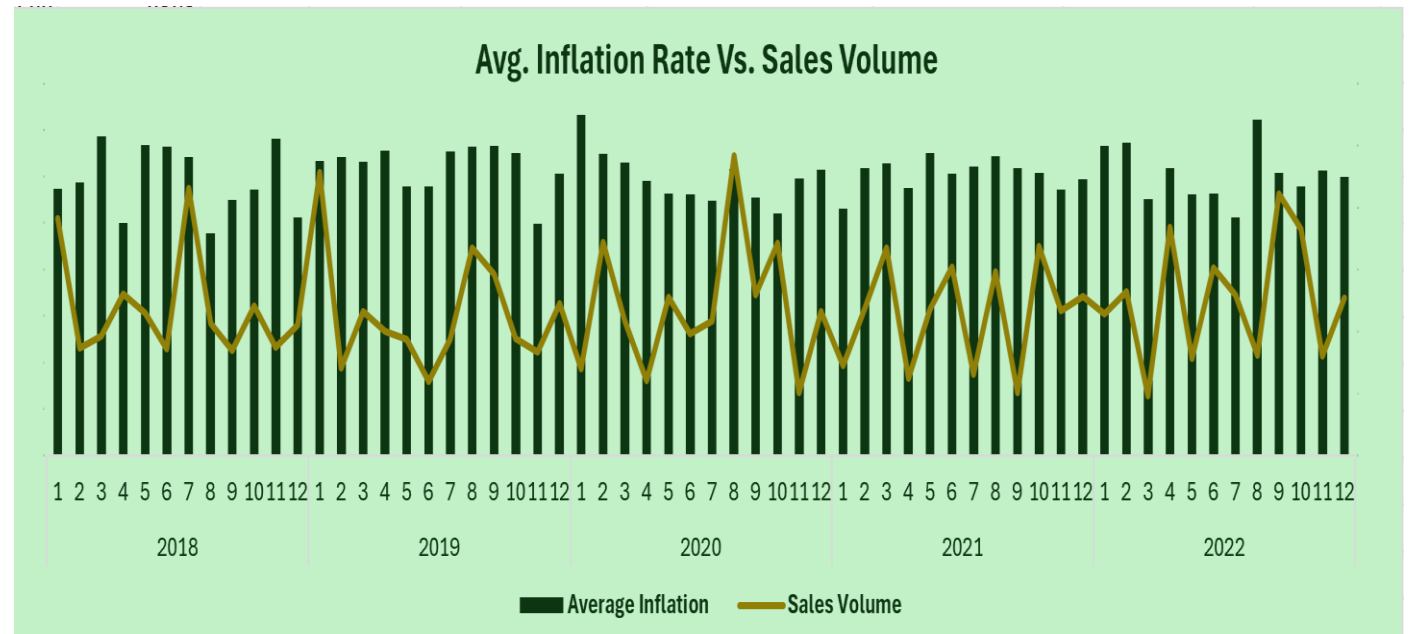
```
17   -- 3) How does the inflation rate correlate with sales volume for a specific month?
18 ∨ select s.sales_year, s.sales_month, round(avg(f.inflationrate),2) as avg_inflation,
19       sum(s.inventoryquantity) as sales_volume
20   from sales s
21   inner join factors f on s.salesdate = f.salesdate
22   group by s.sales_year, s.sales_month;
23
```

Data Output   Messages   Notifications

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

Total rows: 60 of 60   Query complete 00:00:00.110   Ln 19, Col 2

Avg. Inflation Rate Vs. Sales Volume

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

```
25  /* 4) What is the correlation between the inflation rate and sales quantity for all products
26  combined on a monthly basis over the last year? */
27  select s.sales_year, s.sales_month, avg(inflationrate) as avg_inflation,
28      sum(inventoryquantity) as total_sales_quantity
29  from sales s
30  inner join factors f on s.salesdate = f.salesdate
31  where s.salesdate >= (current_date - interval '1 year')
32  group by s.sales_year, s.sales_month
33  order by s.sales_year, s.sales_month;
34
```

Data Output   Messages   Notifications

sales_year integer	sales_month integer	avg_inflation numeric	total_sales_quantity bigint

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- **Insights:** There is no correlation between inflation and sales volume for all products over the last year.

Question 5: Did promotions significantly impact the sales quantity of products?

- **Insights:** (i) Promotions significantly boosted Home Appliance sales, suggesting category-specific effectiveness. (ii) Other categories showed minimal or negative promotion impact.

- **Recommendations:** (i) Prioritize targeted Home Appliance promotions. (ii) Experiment with varied promotion types/timing for other categories. (iii) Develop category-specific promotion strategies.
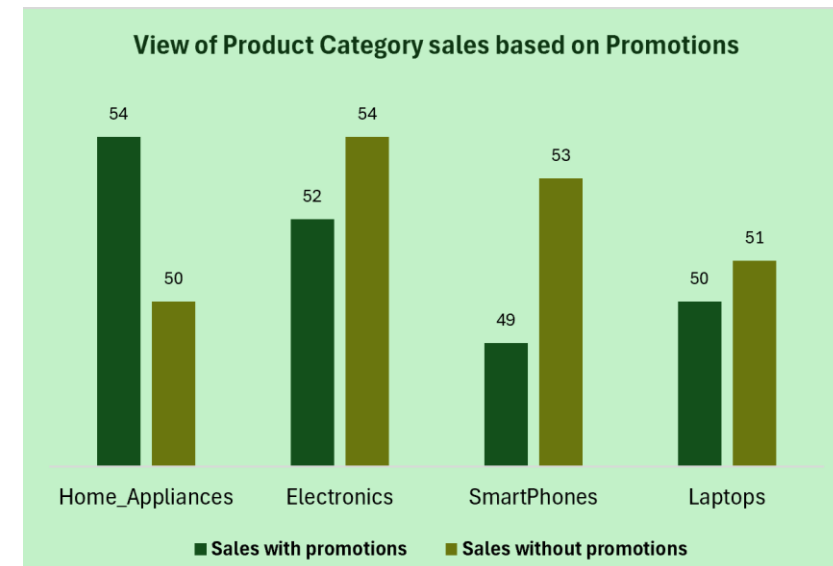
```
35   -- 5) Did promotions significantly impact the sales quantity of products?
36 v select p.productcategory, round(avg(s.inventoryquantity)) as avg_goods_sold, p.promotions
37   from product p
38   inner join sales s on p.productid = s.productid
39   where p.promotions = 'No'
40   group by p.productcategory, p.promotions
41
42   UNION ALL
43
44   select p.productcategory, round(avg(s.inventoryquantity)) as avg_goods_sold, p.promotions
45   from product p
46   inner join sales s on p.productid = s.productid
47   where p.promotions = 'Yes'
48   group by p.productcategory, p.promotions;
```

Data Output   Messages   Notifications

	productcategory text	avg_goods_sold numeric	promotions text
1	Home_Appliances	50	No
2	Electronics	54	No
3	SmartPhones	53	No

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Total rows: 8 of 8   Query complete 00:00:00.086   Ln 48, Col 42

View of Product Category sales based on Promotions

Category	Sales with promotions	Sales without promotions
Home_Appliances	54	50
Electronics	52	54
SmartPhones	49	53
Laptops	50	51

■ Sales with promotions   ■ Sales without promotions

# Question 6: What is the average sales quantity per product category?

```
50  -- 6) What is the average sales quantity per product category?
51  select p.productcategory, round(avg(s.inventoryquantity)) as avg_goods_sold
52  from product p
53  inner join sales s on p.productid = s.productid
54  group by p.productcategory
55  order by avg_goods_sold desc;
56
```

Data Output   Messages   Notifications

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

Total rows: 4 of 4   Query complete 00:00:00.119   Ln 64, Col 45

- **Insights:** (i) Average sales quantity were very similar across all categories with electronics slightly leading. (ii) This suggests there is a stable demand for products in all product categories.

- **Recommendations:** (i) Ensure balanced inventory levels across all categories to meet consistent demand and avoid stockouts. (ii) Conduct deeper analysis within each category to identify top-selling products and potential areas for improvement.

Product Category by Quantity Sold
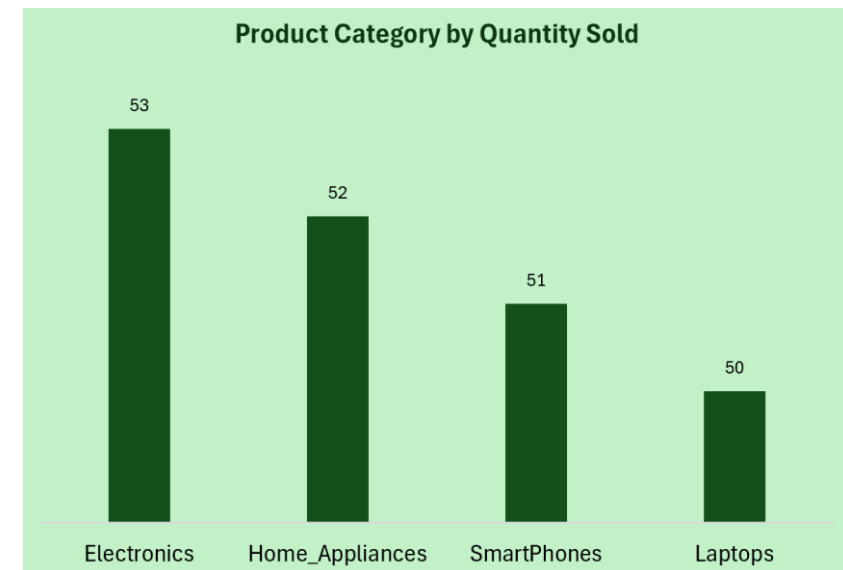
Question 7: How does the GDP affect the total sales volume?

```
58    -- 7) How does the GDP affect the total sales volume?
59 ∨  select s.sales_year, sum(f.gdp) as totalgdp, sum(s.inventoryquantity) as total_sales
60    from factors f
61    inner join sales s on f.salesdate = s.salesdate
62    group by s.sales_year
63    order by s.sales_year asc;
64
```
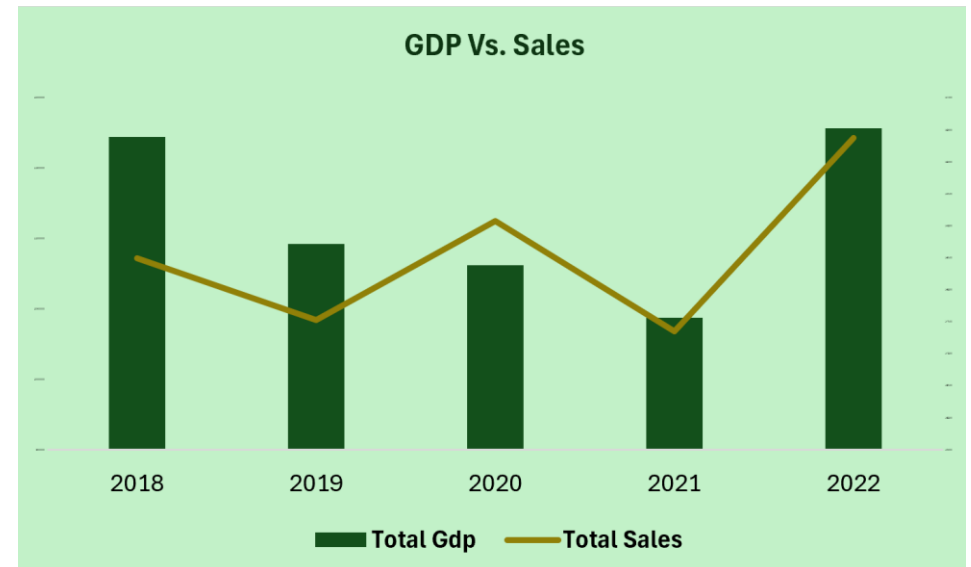
Data Output   Messages   Notifications

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

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Total rows: 5 of 5   Query complete 00:00:00.100   Ln 57, Col 1

- **Insights:** There is a potential positive correlation between GDP and sales, but with inconsistencies. Other factors likely influence sales volume alongside GDP.

- **Recommendations:** GDP may influence sales, but the relationship is complex. Further analysis considering additional economic indicators and time lags is crucial for understanding the true impact.
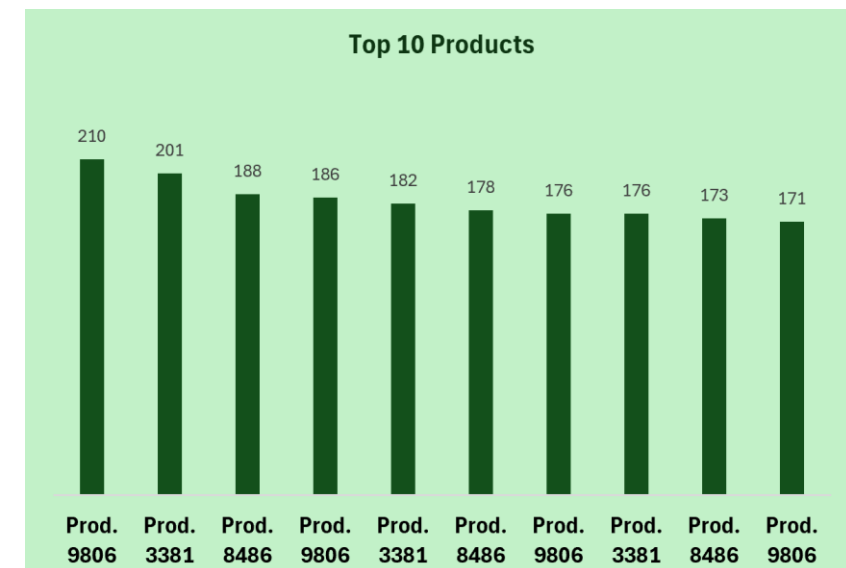

GDP Vs. Sales
2018 2019 2020 2021 2022
■ Total Gdp   — Total Sales

Question 8: What are the top 10 best-selling product SKUs?

- **Insights:** (i) The top 10 products drive significant sales volume. (ii) Demand is concentrated among these key products.

- **Recommendations:** (i) Prioritize inventory for top sellers to prevent stockouts. (ii) Closely monitor performance and address any sales declines. (iii) Optimize pricing and promotions for these products. (iv) Analyze customer feedback and reviews.

```
65    -- 8) What are the top 10 best-selling product SKUs?
66  v select productid, sum(inventoryquantity) as quantity_ofunits_sold
67    from sales
68    group by productid
69    order by quantity_ofunits_sold desc
70    limit 10;
```

Data Output   Messages   Notifications

	productid numeric	quantity_ofunits_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

Total rows: 10 of 10   Query complete 00:00:00.146   Ln 71, Col 1

Top 10 Products

Value	Product
210	Prod. 9806
201	Prod. 3381
188	Prod. 8486
186	Prod. 9806
182	Prod. 3381
178	Prod. 8486
176	Prod. 9806
176	Prod. 3381
173	Prod. 8486
171	Prod. 9806

Question 9: How do seasonal factors influence sales quantities for different product categories?

- **Insights:** (i) Minimal seasonal impact on sales quantities across categories. (ii) Slightly different trends for Home Appliances, Laptops, Smart phones.

- **Recommendations:** (i) Investigate specific seasons linked to trends for targeted action. (ii) Consider combined seasonal/promotional effects.

```sql
72   -- 9) How do seasonal factors influence sales quantities for different product categories?
73 v select p.productcategory, round(avg(f.seasonalfactor), 4) as avg_seasonalfactor,
74      sum(s.inventoryquantity) as sales_quantity
75   from sales s
76   inner join product p on p.productid = s.productid
77   inner join factors f on f.salesdate = s.salesdate
78   group by p.productcategory
79   order by avg_seasonalfactor desc;
```
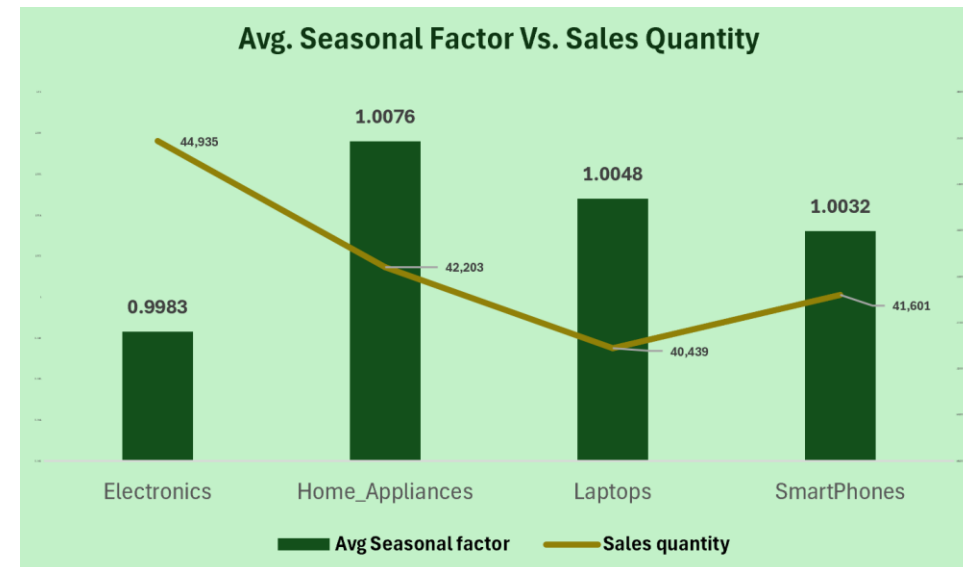
Data Output   Messages   Notifications

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

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Total rows: 4 of 4   Query complete 00:00:00.104   Ln 79, Col 34

Avg. Seasonal Factor Vs. Sales Quantity

Electronics: 0.9983, 44,935
Home_Appliances: 1.0076, 42,203
Laptops: 1.0048, 40,439
SmartPhones: 1.0032, 41,601

Legend: Avg Seasonal factor, Sales quantity

Question 10: What is the average sales quantity per product category, and how many products within each category were part of a promotion?

```
81 v   /* 10) What is the average sales quantity per product category, and how many products within each
82     category were part of a promotion? */
83 v   select p.productcategory,round(avg(s.inventoryquantity)) as avg_sales_qty,
84         count(case
85              when p.promotions = 'Yes' then 1
86         end) as promotion_count
87     from sales s
88     inner join product p on s.productid = p.productid
89     group by p.productcategory
90     order by avg_sales_qty;
91
```

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

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Total rows: 4 of 4   Query complete 00:00:00.131   Ln 91, Col 1

- **Insights:** (i) Electronics lead in average sales quantity. (ii) Promotion counts vary across categories. (iii) Home Appliances' higher sales may be linked to higher promotion count.

- **Recommendations:** (i) Optimize promotion strategies based on category response. (ii) Implement targeted promotions for specific categories. (iii) Balance promotions with inventory levels.

Avg. Sales Qty. Vs Promotion Count
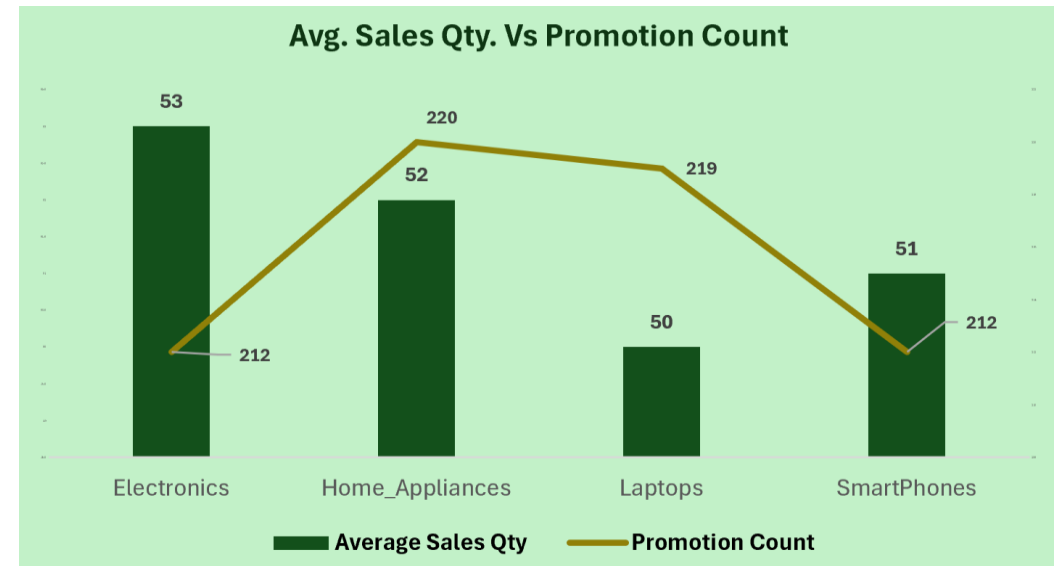
Action Plans

Inventory Optimization: (i) **Prioritize Top Sellers:** Focus inventory management on the best-selling SKUs. (ii) **Accurate Forecasting:** Improve demand forecasting using historical data, seasonality, and external factors. (iii) **Minimize Stockouts:** Establish safety stock levels for key products.

Targeted Sales & Marketing: (i) **Leverage Top Performers:** Boost marketing for top SKUs and categories (like Home Appliances). (ii) **Category-Specific Promotions:** Tailor promotions to each category's unique needs.

Operational Efficiency: (i) **Streamline Inventory:** Implement a warehouse management system. (ii) **Optimize Supply Chain:** Improve supplier relationships and delivery times.

Data-Driven Decisions: (i) **Regular Data Analysis:** Monitor key metrics and analyze sales trends. (ii) **Utilize Data Analytics Tools:** Leverage data to gain deeper insights and improve decision-making.

Conclusion

By prioritizing key products, optimizing inventory, and leveraging data-driven insights, TT Inc. can enhance operational efficiency, improve customer satisfaction, and achieve sustainable growth.

Thank you!!