Power BI Final Exam

Buisness Intelligence 2025

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Problem Statement

Akbar, a Procurement Manager at a growing mid-sized manufacturing company, needs a way to monitor and optimize inventory levels across warehouses because manual reports fail to highlight critical stock issues, leading to unexpected shortages and overstocking.

Fulfilling this need will help the organization make faster, data-driven procurement decisions, reduce stockouts, and free up working capital.
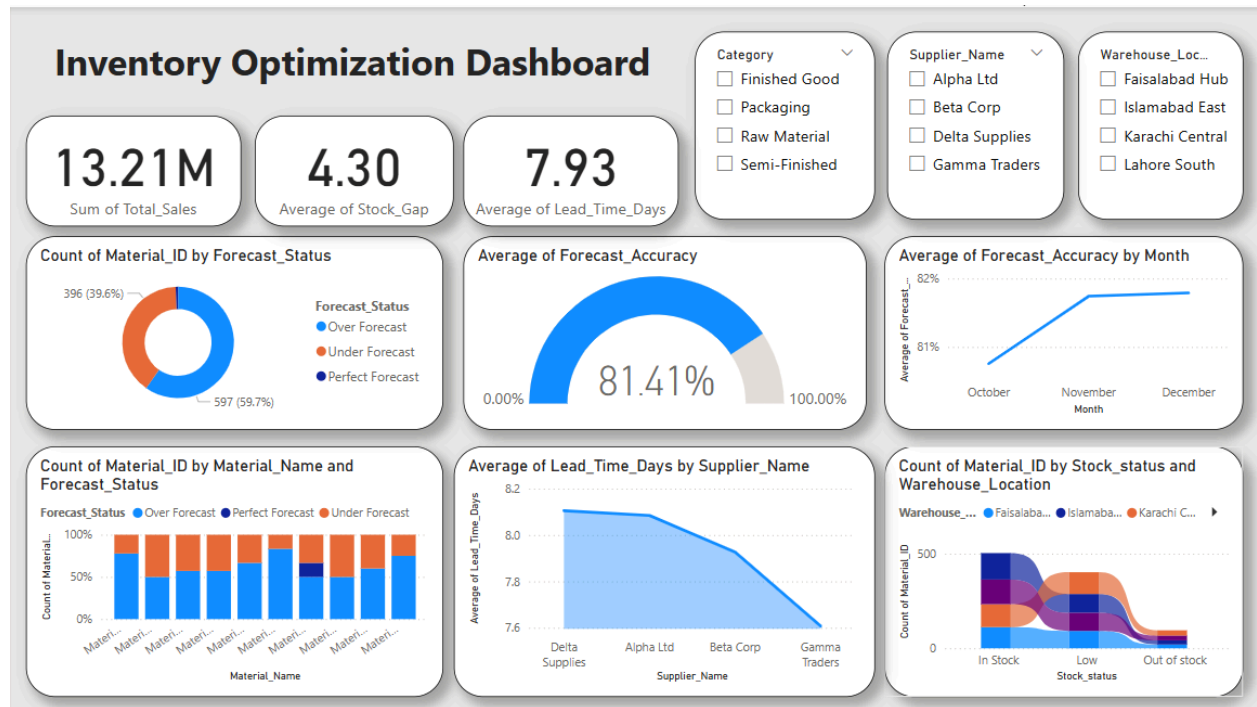
Key Points:

- Real pain point as Akbar's team can't act quickly despite having data
- Inventory tracking is essential as stockouts and overstocking directly affect operations and revenue. Data contains fields like Current_Stock, Reorder_Level, Forecasted_Demand, and Actual_Consumption to enable accurate tracking.
- Balancing stock prevents both lost sales (from shortages) and cash lock-in (from overstocking).

BI Queries

BI Query	Justification
1. Which materials have been consistently over-forecasted, under-forecasted, or perfectly forecasted?	Identifying forecast performance by material helps Akbar pinpoint where demand estimation needs improvement, reducing stockouts and overstocking risks.
2. What is the trend of forecast accuracy over the past 3 months?	Monitoring accuracy over time shows whether procurement decisions are becoming more data-driven or not, enabling continuous improvement in planning.
3. Which suppliers have the highest average lead times?	Understanding supplier reliability is critical to minimizing delays, adjusting safety stock levels, and ensuring timely procurement decisions.
4. How is inventory distributed across stock statuses (In Stock, Low, Out of Stock) by warehouse?	This identifies which warehouse locations are experiencing stock issues, helping Akbar optimize inventory allocation and inter-warehouse transfers.
5. What is the average stock gap and total sales value across the organization?	High-level KPIs provide a quick overview of performance and gaps, allowing executives and procurement teams to align on broad-level supply chain goals.

Dashboard

Inventory Optimization Dashboard

Category	Supplier_Name	Warehouse_Loc...
☐ Finished Good	☐ Alpha Ltd	☐ Faisalabad Hub
☐ Packaging	☐ Beta Corp	☐ Islamabad East
☐ Raw Material	☐ Delta Supplies	☐ Karachi Central
☐ Semi-Finished	☐ Gamma Traders	☐ Lahore South

13.21M
Sum of Total_Sales

4.30
Average of Stock_Gap

7.93
Average of Lead_Time_Days

Count of Material_ID by Forecast_Status

396 (39.6%)

597 (59.7%)

Forecast_Status
- Over Forecast
- Under Forecast
- Perfect Forecast

Average of Forecast_Accuracy

0.00%   81.41%   100.00%

Average of Forecast_Accuracy by Month

82%
81%

October   November   December
Month

Count of Material_ID by Material_Name and Forecast_Status

Forecast_Status ● Over Forecast ● Perfect Forecast ● Under Forecast

100%
50%
0%

Materi... Materi... Materi... Materi... Materi... Materi... Materi... Materi... Materi...
Material_Name

Average of Lead_Time_Days by Supplier_Name

8.2
8.0
7.8
7.6

Delta Supplies   Alpha Ltd   Beta Corp   Gamma Traders
Supplier_Name

Count of Material_ID by Stock_status and Warehouse_Location

Warehouse_... ● Faisalaba... ● Islamaba... ● Karachi C...

500
0

In Stock   Low   Out of stock
Stock_status

New Columns

1. Stock_status

```
Stock_status =
SWITCH(
    TRUE(),
    'BI_Final_dataset'[Current_Stock] = 0, "Out of stock",
    'BI_Final_dataset'[Reorder_Flag] = "Yes", "Low",
    'BI_Final_dataset'[Reorder_Flag] = "No", "In Stock"
)
```

Categorizes inventory into clear statuses ("In Stock", "Low", "Out of Stock") based on current stock and reorder flags. This helps stakeholders quickly identify materials needing urgent action, facilitating better procurement decisions and inventory monitoring.

2. Forecast_Accuracy

```
Forecast_Accuracy =
VAR Diff = ABS('BI_Final_dataset'[Forecasted_Demand] -
'BI_Final_dataset'[Actual_Consumption])
RETURN 1 - DIVIDE(Diff, 'BI_Final_dataset'[Forecasted_Demand])
```

Calculates how closely forecasted demand matches actual consumption, giving a measure of accuracy. Stakeholders can leverage this to evaluate forecasting methods and adjust predictions, reducing stockouts and excess inventory.

3. Stock_Gap

```
Stock_Gap = 'BI_Final_dataset'[Current_Stock] -
'BI_Final_dataset'[Reorder_Level]
```

Indicates the numerical gap between current stock levels and reorder thresholds. Highlighting this helps stakeholders easily identify materials approaching critical inventory points, guiding timely reordering actions.

4. Forecast_Error

```
Forecast_Error = 'BI_Final_dataset'[Actual_Consumption] -
'BI_Final_dataset'[Forecasted_Demand]
```

Reflects the difference between actual and forecasted consumption. A positive value indicates under-forecasting, while negative indicates over-forecasting. Useful for stakeholders to assess forecast performance and rectify predictive processes.

5. Forecast_Status

```
Forecast_Status =
SWITCH(
    TRUE(),
    [Forecast_Error] > 0, "Under Forecast",
    [Forecast_Error] < 0, "Over Forecast",
    [Forecast_Error] = 0, "Perfect Forecast",
    "Unknown"
)
```

Clearly labels forecasting accuracy into intuitive categories (Under, Over, Perfect). Enables stakeholders to swiftly diagnose forecasting issues and take corrective measures for more reliable procurement planning.

6. Total_Sales

```
Total_Sales = 'BI_Final_dataset'[Unit_Cost] *
'BI_Final_dataset'[Actual_Consumption]
```

Computes total sales or cost consumption per material. This financial metric aids stakeholders in evaluating the monetary impact of consumption patterns, optimizing cost control and budget allocation.

7. Top_Selling_Material

```
Top_Selling_Material =
```

```
VAR MaxSales =
    MAXX(ALL('BI_Final_dataset'[Material_Name]),
CALCULATE(SUM('BI_Final_dataset'[Total_Sales])))
RETURN
    CALCULATE(
        SELECTEDVALUE('BI_Final_dataset'[Material_Name]),
        FILTER(
            'BI_Final_dataset',
            SUM('BI_Final_dataset'[Total_Sales]) = MaxSales
        )
    )
```

Identifies the material generating the highest sales. This insight directly informs stakeholders about key revenue-driving materials, guiding strategic inventory decisions and prioritizing procurement for high-demand products.
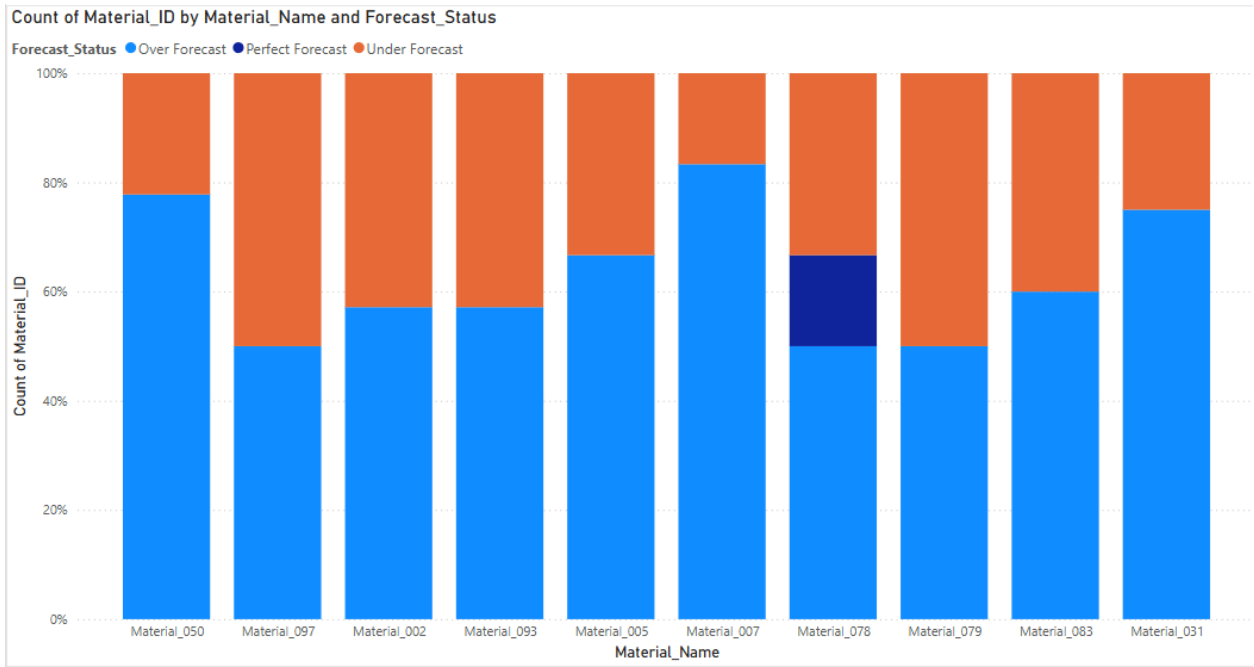
Score Cards

Average of Forecast_Accuracy

81.41%

0.00% 100.00%
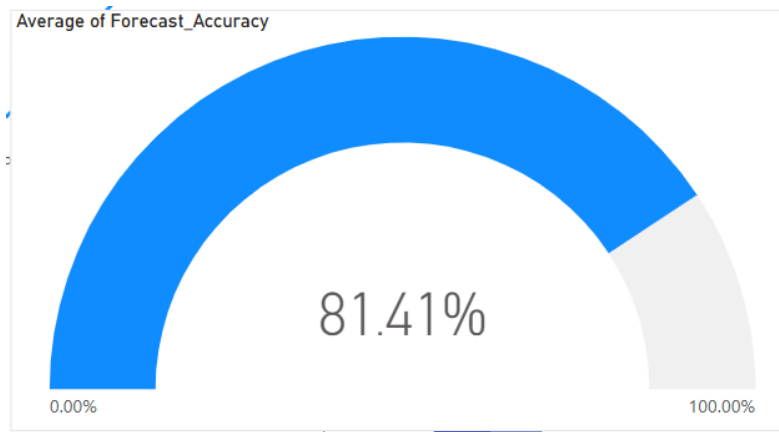
This chart shows the overall average forecast accuracy across all materials and warehouses.

The forecast accuracy of 81.41% reflects a relatively strong performance but leaves room for improvement, especially for high-impact materials where even small errors can lead to costly over- or understocking.
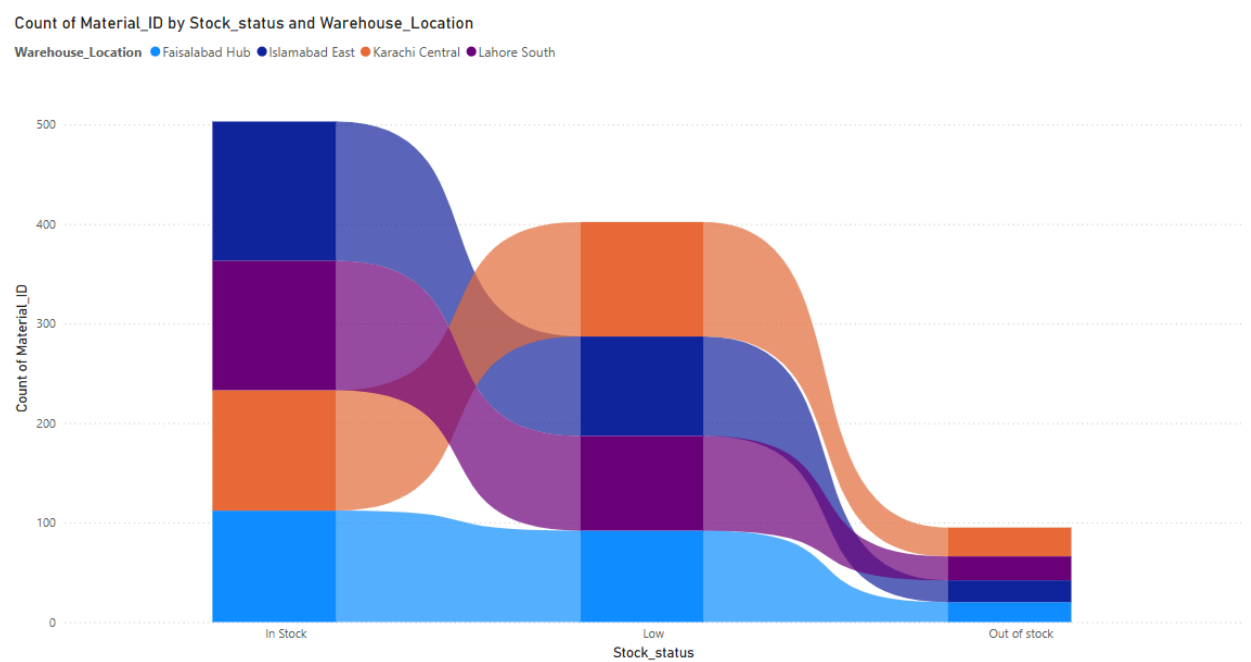
LEAST SOLD MATERIALS AND THEIR FORECASTING STATUS

Count of Material_ID by Material_Name and Forecast_Status

Forecast_Status ● Over Forecast ● Perfect Forecast ● Under Forecast

This chart shows the forecast accuracy for different materials, (the 10 bottom most sold materials) categorized into Over Forecast, Perfect Forecast, and Under Forecast.

Most materials are frequently overforecasted, especially Material_097 and Material_005, which can result in excessive holding costs and capital lock-in. Material_078 also shows signs of underforecasting, increasing the risk of stockouts and production delays.

STOCK STATUS AND WAREHOUSE LOCATION

Count of Material_ID by Stock_status and Warehouse_Location

Warehouse_Location ● Faisalabad Hub ● Islamabad East ● Karachi Central ● Lahore South


This chart shows how stock levels (In Stock, Low, Out of Stock) are distributed across the four warehouse locations.

Karachi Central has a disproportionately high number of materials in the Low stock category, which may indicate high demand or insufficient replenishment. In contrast, Islamabad East and Faisalabad Hub have a larger share of In Stock materials, suggesting lower consumption or better inventory control.

AVERAGE FORECAST ACCURACY BY MONTH

**Average of Forecast_Accuracy by Month**
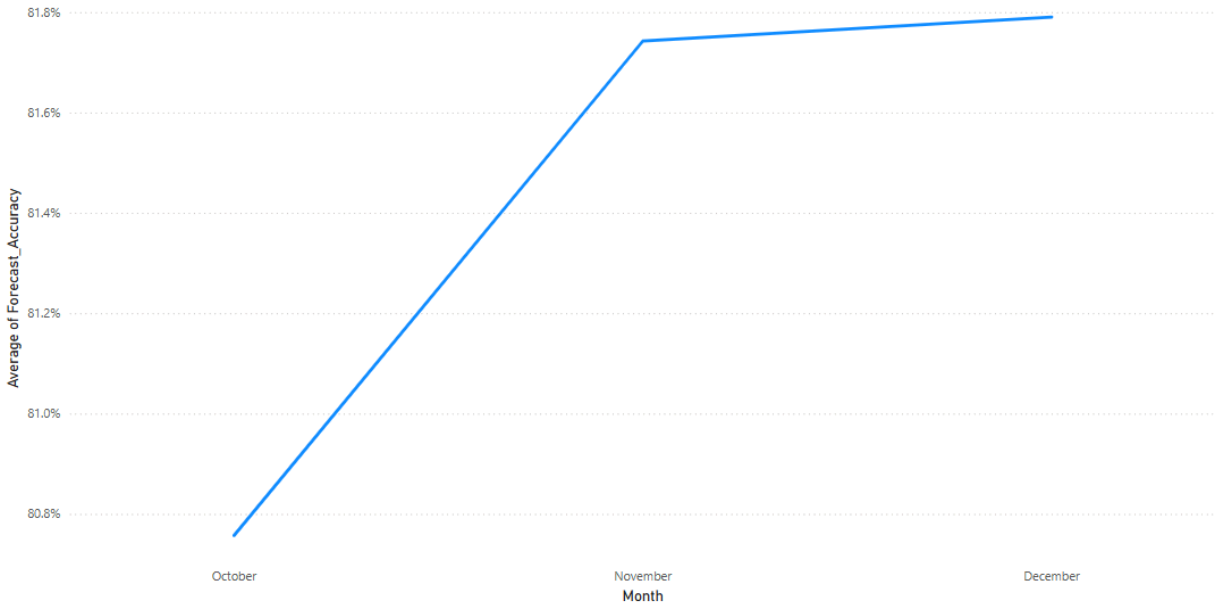
This chart shows the **Average of Forecast Accuracy by Month** over the months of October, November, and December. It uses a line graph to visualize how the forecast accuracy percentage changes month-over-month.

Forecast accuracy **improved steadily from October (~80.75%) to November (~81.72%)**, showing a positive trend in the forecasting model's performance. The increase **slightly plateaued from November to December**, reaching about **81.76%**, suggesting a stabilization in accuracy improvements.

# AVERAGE DELAY BY SUPPLIER

Average of Lead_Time_Days by Supplier_Name
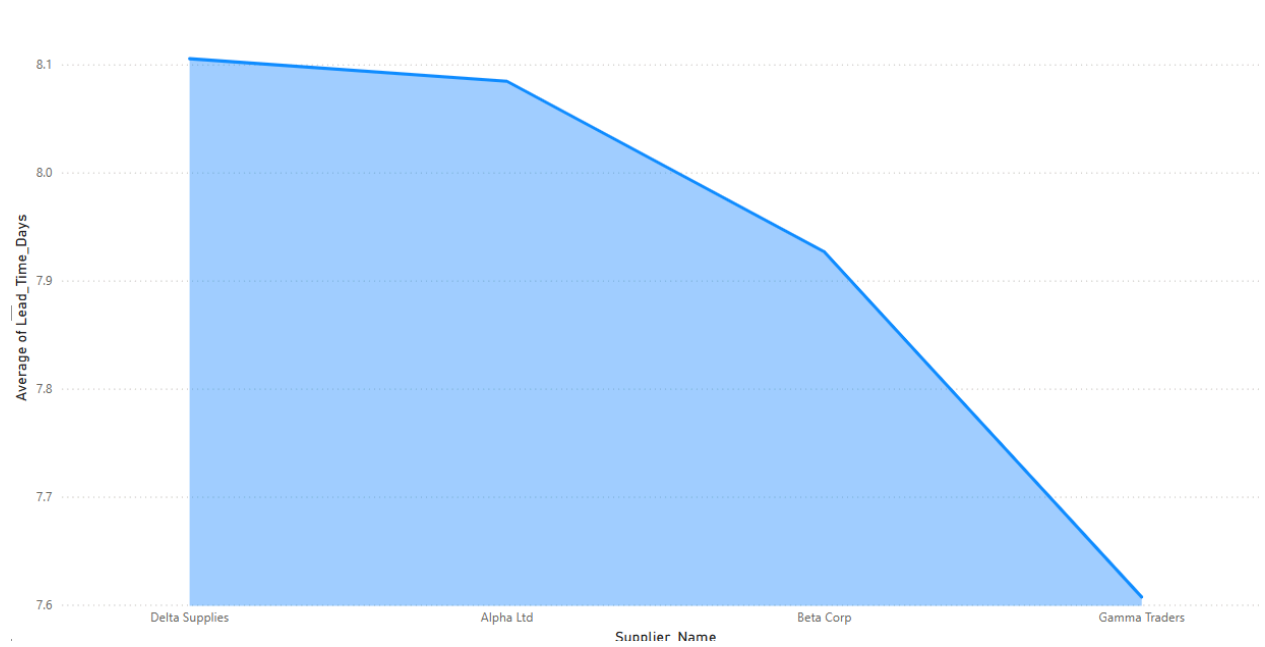
This graph shows the average delay by each supplier, we can see that the Delta supplier have the highest average delay of 8 days, and the lowest delay is of 7.6 days by Gamma Traders. We observe that there is a slight delay of less than a day between suppliers.

FORECAST STATUS

Count of Material_ID by Forecast_Status

7 (0.7%)

396 (39.6%)

597 (59.7%)

Forecast_Status
● Over Forecast
● Under Forecast
● Perfect Forecast
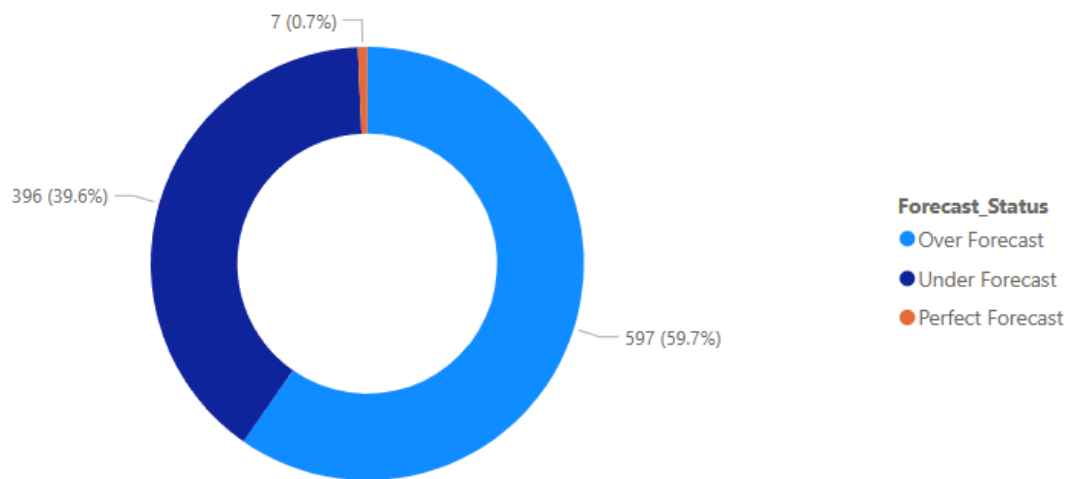
This donut chart shows the forecast status by materials, we can see that very less products are perfectly forecasted. Most are over forecasted and underforecasted.

SCORE CARDS

13.21M	4.30	7.93
Sum of Total_Sales	Average of Stock_Gap	Average of Lead_Time_Days

These show KPIs like total sales, average stock gap and average delay of supply.

Insights

Forecast Accuracy by Material

- Some materials are consistently over-forecasted or under-forecasted.

- Adjusting forecasting methods for these can reduce surplus and shortages.

Trend of Forecast Accuracy (Last 3 Months)

- Accuracy may be improving or declining over time.

- Shows if forecasting practices are becoming more reliable or need revision.

Supplier Lead Times

- Certain suppliers have higher average lead times.

- This affects planning buffers and safety stock decisions.

Inventory Status by Warehouse

- Some warehouses have more low or out-of-stock items.

- Enables better stock distribution or inter-warehouse transfers.

Stock Gaps & Total Sales Value

- Large gaps indicate missed sales opportunities.

- Helps align procurement with revenue impact and executive KPIs.

Recommendations

1. **Improve Forecasting Accuracy**

   - Focus on materials that are consistently misforecasted.

   - Use historical consumption trends to refine demand forecasting models.

2. **Optimize Supplier Management**

   ○ Re-evaluate contracts with suppliers who have long lead times.

   ○ Prioritize reliable suppliers or increase safety stock for high-delay vendors.

3. **Balance Inventory Across Warehouses**

   ○ Transfer excess stock from well-stocked warehouses to those facing shortages.

   ○ Set warehouse-specific reorder levels based on consumption patterns.

References:

ChatGPT