Final Report BI

Data Cleaning: Done on python notebook.

Data Transformation: New columns created as

- Stock_status: Stock Status =

SWITCH(TRUE(), BI_Final2_dataset_cleaned[Current_Stock] = 0, "Out of Stock", BI_Final2_dataset_cleaned[Current_Stock] <=BI_Final2_dataset_cleaned[Reorder_Level], "Low", BI_Final2_dataset_cleaned[Current_Stock] BI_Final2_dataset_cleaned[Reorder_Level], "In Stock")Overstock_Flag = IF([Current_Stock] > [Forecasted_Demand] + [Safety_Stock], "Yes", "No") -> column that explains if the particular product at a particular time is “In Stock”, “Low” or “Out of stock”.

- Urgency_level:

Urgency_Level =

SWITCH(

TRUE(),

[Current_Stock] = 0, "Critical",

[Current_Stock] <= [Safety_Stock], "High",

[Current_Stock] <= [Reorder_Level], "Medium",

"Low"

) → Can be used to compare to reorder flag to see if critical items have been reordered or not.

- Forcast_accuracy_flag: Forecast_Accuracy_Flag =

```
VAR Difference = [Forecasted_Demand] - [Actual_Consumption]
VAR AbsDifference = ABS(Difference)

RETURN
   SWITCH(
      TRUE(),
      Difference < 0, "Overconsumed",
      AbsDifference <= [Safety_Stock] * 0.25, "Low Difference",
```

```
    AbsDifference <= [Safety_Stock] * 0.75, "Medium Difference",
    AbsDifference > [Safety_Stock] * 0.75, "High Difference",
    "Check Data"
) ->to evaluate how accurate the forecast was compared to actual consumption, while factoring in safety stock to identify risk levels or inefficiencies.
```

Problem Statement:

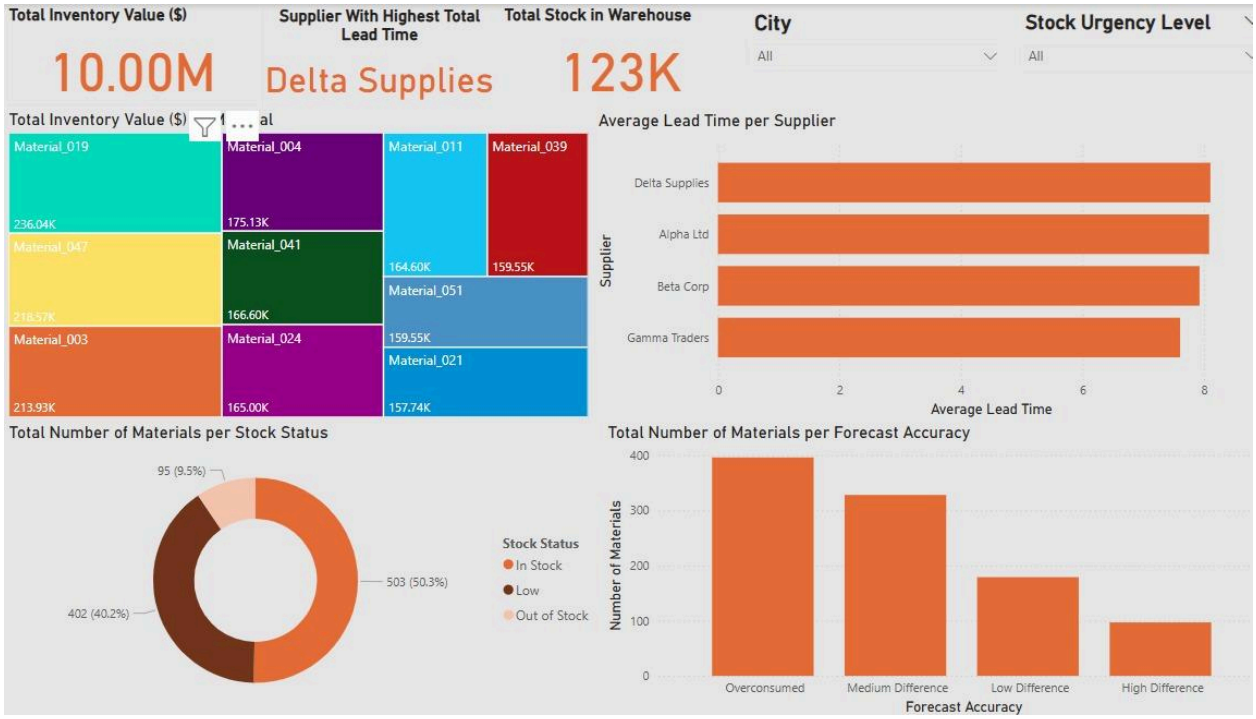
Akbar, a Procurement Manager from a mid-sized manufacturing company, needs a way to proactively balance inventory levels across Karachi, Lahore, Islamabad, and Faisalabad warehouses because unpredictable stockouts halt production while overstocking ties up capital, worsened by supplier delays and inaccurate forecasts. Fulfilling this need will help the organization optimize working capital, ensure production continuity, and reduce operational costs.

- Proactively balance inventory across Karachi, Lahore, Islamabad, and Faisalabad warehouses to avoid stockouts and overstocking.
- Challenges include supplier delays and inaccurate forecasts complicating inventory management.
- Solving this optimizes working capital, ensures continuous production, and reduces operational costs—critical for manufacturing efficiency and reliability.

BI Queries:

#	BI Query	Why It Matters
1	What are the top 10 materials with Highest Inventory value?	Identifies materials which are possibly tying up working capital.

2	How accurate is the forecast, and does the safety_stock cover it?	Highlighting via flags whether there needs to be some changes .
3	Which warehouse locations consistently have low stock or out of stock?	Identifies locations where suppliers are lacking in their fulfillment or forecasts are off
4	How does total inventory value compare across suppliers and urgency levels?	Helps prioritize high-value or urgent supplies for better cost and delivery focus.



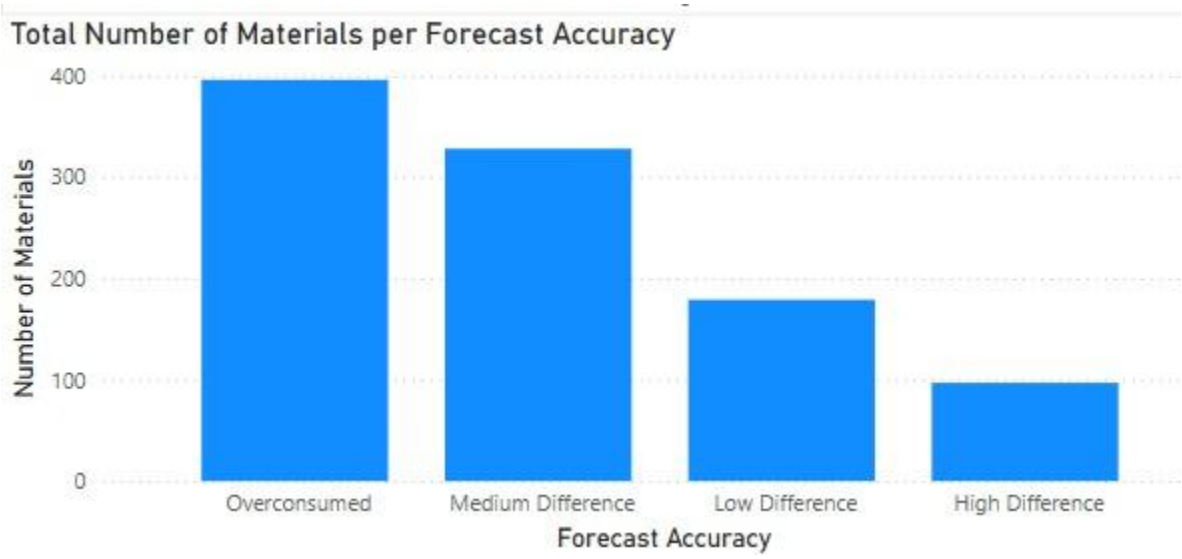
KPIs for instant visualization of key data points.

Slicers to Identify issue city-wise and by stock urgency level

Materials that are tying up the highest capital

Which supplier contributes to the highest lead time.

Donut chart to check stock level.



To give insights on how well/bad forecasted_demand accuracy is.

Final insights:

1)Supplier Performance Variability

- Delta Supplies has the highest average lead time, indicating a delay risk in restocking.
- Suppliers show different reliability levels, which could impact availability for critical materials.

2)Stock Status Distribution is Skewed

- 50.3% of materials are "In Stock", but 40.2% are already low, and 9.5% are out of stock.
- This imbalance suggests inventory management inefficiencies, especially for replenishment timing.

3)Forecast Accuracy is Inconsistent

- A large number of materials are overconsumed compared to forecast, showing a gap in demand forecasting.
- Materials with high differences are at risk of being either understocked or overstocked.

Recommendation for Akbar:

Improve Forecasting Models

- Refine demand forecasting using **historical trends**, seasonality, and machine learning if applicable.
- Flag high-variance items and adjust their **safety stock and reorder levels**.

Supplier Management

- Negotiate with suppliers like **Delta Supplies** to improve delivery times.

- Consider alternative suppliers for materials with consistent delivery issues.

Warehouse-Level Planning

- Use stock status and consumption rates to drive **auto-replenishment triggers** for warehouses.
- Consider **warehouse rebalancing** to avoid excess stock in one region and shortages in another.

References:

https://chatgpt.com/share/68381573-0e1c-800c-82b3-9b55ec81194f