

# Google Colab Link

[Cleaned Dataset](#)

## Analysis

### A. Overall Sales Performance

- Total historical sales: ~10.01K
- Forecasted sales (AI -  $\hat{y}$ ): ~3.09M
- This large gap indicates:
  - Either forecast is long-term (multi-year)
  - Or model is extrapolating aggressive growth

→ Business interpretation: Strong projected growth, but risk of over-forecasting if not validated.

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### B. Past Sales Trend (2014-2017)

- Sales decline sharply around 2016
- Recovery in 2017, but not stable
- Indicates:
  - Demand volatility
  - Possible market disruption or operational inefficiency

→ Business interpretation: Historical sales are unstable; forecasting must be used cautiously.

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## C. Future Sales Forecast (2014-2018)

- Forecast shows **steady upward trend**
- No seasonal dips visible
- Indicates:
  - Model assumes **consistent demand growth**
  - Seasonality may not be fully captured

→ Business interpretation: **Optimistic forecast, but lacks seasonal realism.**

## D. Forecast vs Actual Sales (By Order Date)

- **Actual sales ≈ 0** compared to forecast line
- This is a **data alignment issue**, not business reality

Root cause (very important):

- Actual sales aggregated at **daily level**
- Forecast aggregated at **monthly / yearly level**
- Hence actual values appear as zero

→ Business interpretation:

**Dashboard logic issue — not a sales failure.**

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## E. Category Contribution (Quantity Share)

Category	Quantity Share
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Office Supplies	~58%
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Furniture	~21.8%
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Technology	~20%
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Key insight:

- Office Supplies = **high volume, low margin**
- Technology & Furniture = **lower volume, higher margin**

→ Business interpretation:

Revenue growth should **not depend only on Office Supplies**.

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## F. Geographic (State Filter)

- Multiple states available → potential for:
  - Regional performance comparison
  - Targeted state-level strategy

→ Business interpretation:

Geography can be used for **localized marketing & inventory planning**.

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## 2. Key Problems Identified (Critical)

1 Forecast vs Actual chart is misleading

- Actual sales plotted incorrectly
- Makes it look like **actual sales are zero**

2 Forecast growth seems inflated

- Forecast value (3.09M) far exceeds historical scale
- Risk of:
  - Overstocking
  - Cash flow misallocation

### ③ Category risk concentration

- Heavy dependency on Office Supplies quantity
  - Profitability risk if margins shrink
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## 3. Clear Business Recommendations (Actionable)

### Recommendation 1: Fix Data Granularity (Highest Priority)

Business impact: High

- Align:
  - Actual Sales → Monthly aggregation
  - Forecast Sales → Monthly aggregation
- This will:
  - Show true performance gap
  - Improve executive trust in dashboard

📌 Without this fix, decisions based on this dashboard are **unsafe**.

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### Recommendation 2: Validate Forecast Before Scaling Operations

Business impact: High

Actions:

- Compare:
  - Last 12 months actual vs forecast

- Apply:
  - Confidence intervals
  - Conservative scenario planning

Decision rule:

Do not increase inventory or hiring solely based on current forecasts.

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## Recommendation 3: Shift Growth Strategy Toward High-Margin Categories

Business impact: Medium-High

- Maintain Office Supplies for cash flow
- Increase focus on:
  - Technology
  - Furniture bundles
- Use:
  - Cross-selling (Office + Tech)
  - Promotional pricing in low-volume states.

## Recommendation 4: State-Level Targeting

Business impact: Medium

- Identify:
  - Top 20% states by sales
- Actions:
  - Higher inventory allocation
  - Faster delivery SLAs
- Reduce spend in low-performing states

## **Recommendation 5: Add 3 KPIs to Strengthen Decision Making**

For next dashboard version:

1. Forecast Accuracy (MAPE)
  2. Sales Growth % (YoY)
  3. Category-wise Revenue (not just quantity)
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## **4. How to Explain This in Interview / Viva (Short)**

"The dashboard shows unstable historical sales but an optimistic AI forecast. Office Supplies dominate quantity, but higher-margin categories like Technology and Furniture offer better growth opportunities. Before acting on the forecast, data granularity issues must be fixed to ensure forecast accuracy and avoid operational risk."