Sales Analysis

Sales and Profitability Analysis

1. Total Sales and Profit Margin Analysis

The Python code snippet for calculating the total_sales,average_profit_per_order and profit_margin for each category after merging the List of Orders and Order Details datasets on basis of Order ID.

The output below displays the total sales, average profit per order, and profit margin for each category after merging the List of Orders and Order Details datasets on basis of Order ID.

```
--- Final Results Table ---
      Category  Total_Sales  Total_Profit  Total_Orders  Avg_Profit_per_Order  \
0     Clothing       139054         11163           393             28.404580
1  Electronics       165267         10494           204             51.441176
2    Furniture       127181          2298           186             12.354839

   Profit_Margin_%
0         8.027817
1         6.349725
2         1.806874
```

The **Total Sales** for **Clothing** is **₹1,39,054**, for **Electronics** is **₹1,65,267**, and for **Furniture** is **₹1,27,181**.

When evaluating profitability, the **Electronics** category leads with an **Average Profit per Order** of **51.44**, while the **Clothing** category has the **highest Profit Margin** at **8.03%**.

2. Top-performing and under performing categories.

The designation of **Electronics** as the **top-performing category** is based on its **average profit per order of ₹51.44**. In contrast, the **underperformer** is Furniture which is identified using the **profit margin** metric 1.81%.

The output below displays the Performance Analysis Summary

```
--- Performance Analysis Summary ---
 Top Performer (by Avg. Profit per Order): Electronics
   - Avg Profit per Order: ₹51.44

 Underperformer (by Profit Margin): Furniture
   - Profit Margin: 1.81%
```


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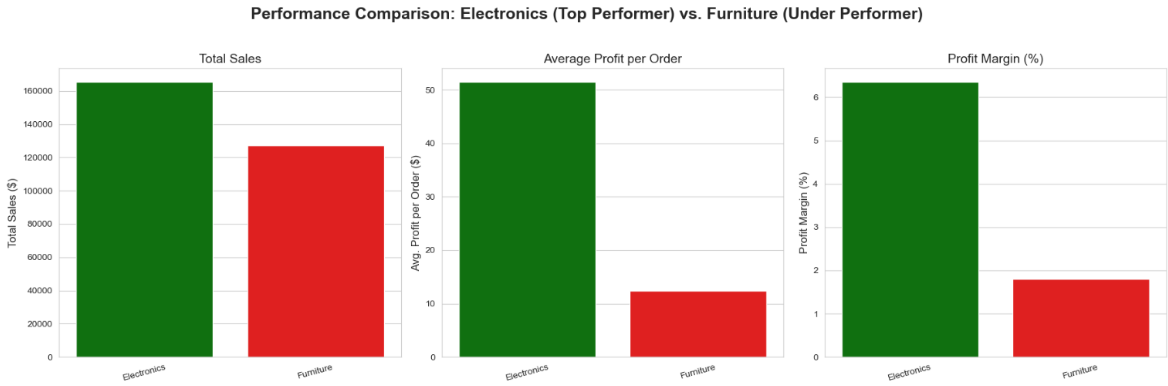

Performance Comparison:Electronics Vs Furniture

Reasons for their performance differences.

The stark contrast between the **Top Performer** and the **Underperformer** is explained by disparities in **market strategy (pricing power)** and **unit economics (cost structure)**.

Category Feature	Top Performer	Underperformer
Product Type	**Specialized/Premium Goods** (e.g., custom, technology, luxury).	**Commoditized/Generic Goods** (e.g., simple accessories, basic office supplies).
Pricing Power	**High.** Customers are willing to pay a premium because the products solve a specialized problem or offer high perceived value. This insulates them from competitor price wars.	**Low.** Customers are highly price-sensitive and can easily find the product elsewhere. This forces the category into aggressive discounting.
Profit Margin (%)	**High.** Maintained by superior **value-based pricing** and **effective Cost of Goods Sold(COGS)**.	**Low.** Eroded by competition and required markdowns, leaving little room for operational cost absorption.
Avg. Profit per Order	**High.** Driven by large transaction size (high Average Order Value, AOV) and **low Cost-to-Serve (CTS)** relative to revenue.	**Low.** Fixed operational costs (picking, packing, shipping) consume a disproportionately large share of the small profit, making each transactin **operational streamlining** before further scaling.

Top Performer: Reasons for Success (Superior Unit Economics)

The Top Performer excels due to a combination of high revenue per order and high efficiency.

Pricing Power & Brand Value:

Low Price Elasticity: Sells premium, specialized, or unique products (e.g., high-end electronics). Customers are less price-sensitive, allowing for high markups and a high Profit Margin.

Strong Brand Equity: Commands premium prices, directly increasing revenue and profit.

Cost and Operational Efficiency (Low COGS):

Effective Sourcing: Efficient supply chains lead to a relatively low Cost of Goods Sold (COGS), which is the primary driver of the high Profit Margin.

High Unit Value: Fixed costs (like fulfillment) are a small percentage of the total revenue, maximizing the dollars retained as profit per order.

Underperformer: Reasons for Struggle (Poor Scalability)

The Underperformer struggles due to low profitability, driven by intense market pressure and operational inefficiency.

Market Competition and Commoditization:

High Price Elasticity: Products are often commoditized, forcing the company into price wars and heavy discounting. This directly leads to a low Profit Margin.

Thin Margins: Intense competition prevents significant markup.

Logistical and Fulfillment Costs:

High Cost-to-Serve: Products might be bulky or fragile, leading to high shipping and packaging costs that severely reduce profit.

Low Transaction Value: Orders often contain many small, cheap items. The total profit may barely cover the fixed cost of processing, resulting in a very low Avg. Profit per Order.

Conclusion: Scalability

Top Performer (Scalable Asset): High Avg. Profit per Order allows the company to afford a higher Customer Acquisition Cost (CAC). This is the ideal category for scaling investment and growth.

Underperformer (Operational Drain): Low profit realization makes scaling difficult. This segment requires aggressive operational streamlining before further growth.

Target Achievement Analysis

1. Percentage change in target sales for the Furniture category month-over-month.

Key Observations:

- Initial Growth: Target Sales started at 11,500 in January and showed positive MoM growth through March, peaking at 11,800 in March (a 1.72% increase).
- Significant Decline in Q2: The most notable fluctuation occurred between March and April, where the target dropped sharply from 11,800 to 10,400, resulting in a substantial negative MoM change of-11.86%.
- Stable Recovery and Growth: Following the Q2 dip, Target Sales figures maintained a steady, though low, positive MoM growth (ranging from 0.92% to 1.89%) from May through the end of the year.
- Year-End Target: The analysis concludes with a year-end Target Sales figure of 11,400 for December, which is slightly below the starting target for January (11,500).

```
--- Furniture Target Month over Month Analysis ---
                     Target Sales  Target Change MoM (%)
Month of Order Date
2025-01                     11500                    NaN
2025-02                     11600                   0.87
2025-03                     11800                   1.72
2025-04                     10400                 -11.86
2025-05                     10500                   0.96
2025-06                     10600                   0.95
2025-07                     10800                   1.89
2025-08                     10900                   0.93
2025-09                     11000                   0.92
2025-10                     11100                   0.91
2025-11                     11300                   1.80
2025-12                     11400                   0.88
```

The provided output displays a Month-over-Month (MoM) Analysis of the Target Sales for the Furniture category throughout the year 2025.

2. Analyzing Target Fluctuations

Fluctuation Type	Interpretation
High Positive Spike	Indicates an expectation of **high seasonal demand** or a major **planned initiative** (e.g., product launch).
High Negative Drop	Indicates an expectation of a **market slowdown** or **planned inventory reduction** (e.g., post-holiday dip).
Low/Stable Change	Suggests a **linear target-setting process** that likely ignores actual seasonal trends, creating a gap between expectation and market reality.

Strategic Alignment: Targets vs. Performance Trends

A. Data-Driven Target Setting

- **Implement Seasonality:** Base targets on **last year's actual sales for the same month**, adjusting with a specific growth factor. This ensures high targets align with historical peak seasons.
- **Base on Actuals:** Target formulas should use the **prior month's *actual sales*** as the baseline, not the prior month's target. This immediately corrects expectations based on demonstrated market performance.

B. Resource and Alignment Strategy

- **Cross-Functional Review:** All significant target fluctuations must be reviewed through a **Sales & Operations Planning (S&OP)** process

This confirms that Finance (profitability), Marketing (budget), and Operations (inventory) can support the target.

- **Tiered Goals:** Introduce a **Base Target** (realistic) and a **Stretch Target** (aspirational, tied to specific marketing/sales investments). This provides clarity and motivation while keeping the core business plan grounded.

Regional Performance Insights

1. Top 5 states with the highest order count:

1. Madhya Pradesh
2. Maharashtra
3. Rajasthan
4. Gujarat
5. Punjab

```
--- Top 5 States: Total Sales and Average Profit ---
```

State	Total_Sales	Total_Profit	Order_Count	Average_Profit
Madhya Pradesh	₹105,140.00	5551	101	₹54.96
Maharashtra	₹95,348.00	6176	90	₹68.62
Rajasthan	₹21,149.00	1257	32	₹39.28
Gujarat	₹21,058.00	465	27	₹17.22
Punjab	₹16,786.00	-609	25	₹-24.36

Key Findings:

- **Sales Leadership: Madhya Pradesh** leads in Total Sales at **₹1,05,140.00**, followed closely by **Maharashtra** at **₹95,348.00**.
- **Profit Efficiency: Maharashtra** exhibits the highest **Average Profit** per order at **₹68.62**, despite having lower total sales and fewer orders (90) compared to Madhya Pradesh (101 orders, ₹54.96 Average Profit). This indicates greater efficiency in profit generation per transaction in Maharashtra.
- **Profit Loss/Outlier: Punjab** is the sole state reporting a **negative Total Profit** of **-₹609**, resulting in a negative **Average Profit** of **- ₹24.36**. This state requires immediate investigation into pricing, cost structure, or operational efficiency to address the losses.
- **Mid-Range Performance: Rajasthan** and **Gujarat** contribute significantly less to Total Sales compared to the top two states and show moderate Average Profit figures (₹39.28 and ₹17.22, respectively).

2. Regional Disparities

The key disparities are found when **sales volume (Order Count)** does not align with **profitability (Average Profit)**.

Identifying Disparities

Regional disparities are highlighted when states with similar order volume show significantly different Average Profit figures.

Disparity Scenario	Metric Pattern	Implied Business Insight
1.Critical Disparity (The Loss Leader)	**Punjab** has a **negative Total Profit (₹ 609)** and the lowest (₹24.36).	Every order in Punjab is costing the company money, signaling a catastrophic failure of unit economics.
2. Inefficient Powerhouse	**Madhya Pradesh** (Highest Sales/Volume) has a significantly lower (₹ 54.96) than Maharashtra (₹ 68.62).	MP's high volume is being produced less efficiently, likely due to excessive discounting or high logistics costs.
3. Missed Opportunity	**Maharashtra** has the **highest Average Profit (₹68.62)** and **Total Profit** (₹6,176).	This market is highly efficient and profitable, but the volume is lower than MP. We must maximize penetration here.
4. High-Risk States	**Gujarat** has the lowest positive (₹ 17.22).	This market operates on dangerously thin margins and is highly susceptible to flipping into a loss with minimal change in operational costs.

Regions or cities that should be prioritized for improvement.

Priority 1: Stop the Bleeding (Punjab)

- State: Punjab
- **Action:** Immediate and aggressive **Cost-to-Serve (CTS) Audit**.
  - **Eliminating Free Shipping:** Remove free shipping options entirely or enforce a significantly higher **Minimum Order Quantity (MOQ)**.
  - **De-listing:** Identify and cease selling specific products that are consistently sold at a loss in this region.
  - **Pricing:** Raise local prices to ensure .

Priority 2: Improve Efficiency (Madhya Pradesh & Gujarat)

- **States: Madhya Pradesh** (High Volume, Moderate Efficiency) and **Gujarat** (Low Volume, Low Efficiency).
- **Action:**
  - **MP:** Focus on **margin restoration**. Analyze discounting levels and shipping costs. Even a small increase in here will result in a huge gain in absolute profit due to its high volume.
  - **Gujarat:** Conduct a fast **Pricing Strategy Review**. The margin is too thin to sustain operations and needs to be addressed immediately to prevent it from becoming the next Punjab.

Priority 3: Scale Success (Maharashtra)

- State: Maharashtra
- **Action: Invest in Targeted Marketing and Logistics**. Since the high profitability is proven, this state should receive a disproportionate share of marketing spend and inventory allocation to further penetrate the market and maximize return on investment.

Prioritizing Cities

To make these actions highly effective, the next step is to analyze performance at the city level within the high-volume, low-profit states (like MP and Gujarat):

- **Action:** Identify the specific **cities** within these states that have the absolute lowest .
- **Focus:** Implement the corrective actions (pricing changes, shipping adjustments) **only in those specific underperforming cities** to minimize disruption to the entire state.