

E-COMMERCE ORDER & SALES ANALYSIS

A Data Analytics Project

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Tools used – Python, Pandas, Matplotlib, google Collab notebook

Date – December 2025

Objective: -

The objective of this project is to analyse E-commerce order data to understand sales performance, customer distribution, order fulfilment trend, and impact of promotional campaigns on revenue using python.

Data description: -

The dataset used in this project contains 128,975 e-commerce order records with 24 columns. It includes information related to order details, product category, shipment status, customer type (B2B/B2C), promotions, and sales amount.

- Rows: 128,975
- Columns: 24
- Source: Public e-commerce dataset

Tools used: -

Tools and Technologies

- Google colab - Python execution environment
- Python – data analysis
- Pandas – data cleaning & transformation
- Matplotlib – data visualization
- MS Word – documentation

1. DATA CLEANING & PREPARATION: -

The dataset was cleaned to ensure accuracy and consistency. The Date column was converted from object to datetime format. Missing values in the Courier Status column were labeled as “Not Available” to avoid incorrect assumptions. Irrelevant columns were removed, and a promotion flag was created to identify promotional orders.

- Date conversion code: -

```
df['Date'] = pd.to_datetime(df['Date'], errors='coerce')
```

- ✓ Filling courier status: -

```
df['Courier Status'] = df['Courier Status'].fillna('Not Available')
```

- ✓ Dropping columns: -

```
df.drop(columns=['index'], inplace=True)  
df.drop(columns=['Unnamed: 22'], inplace=True)
```

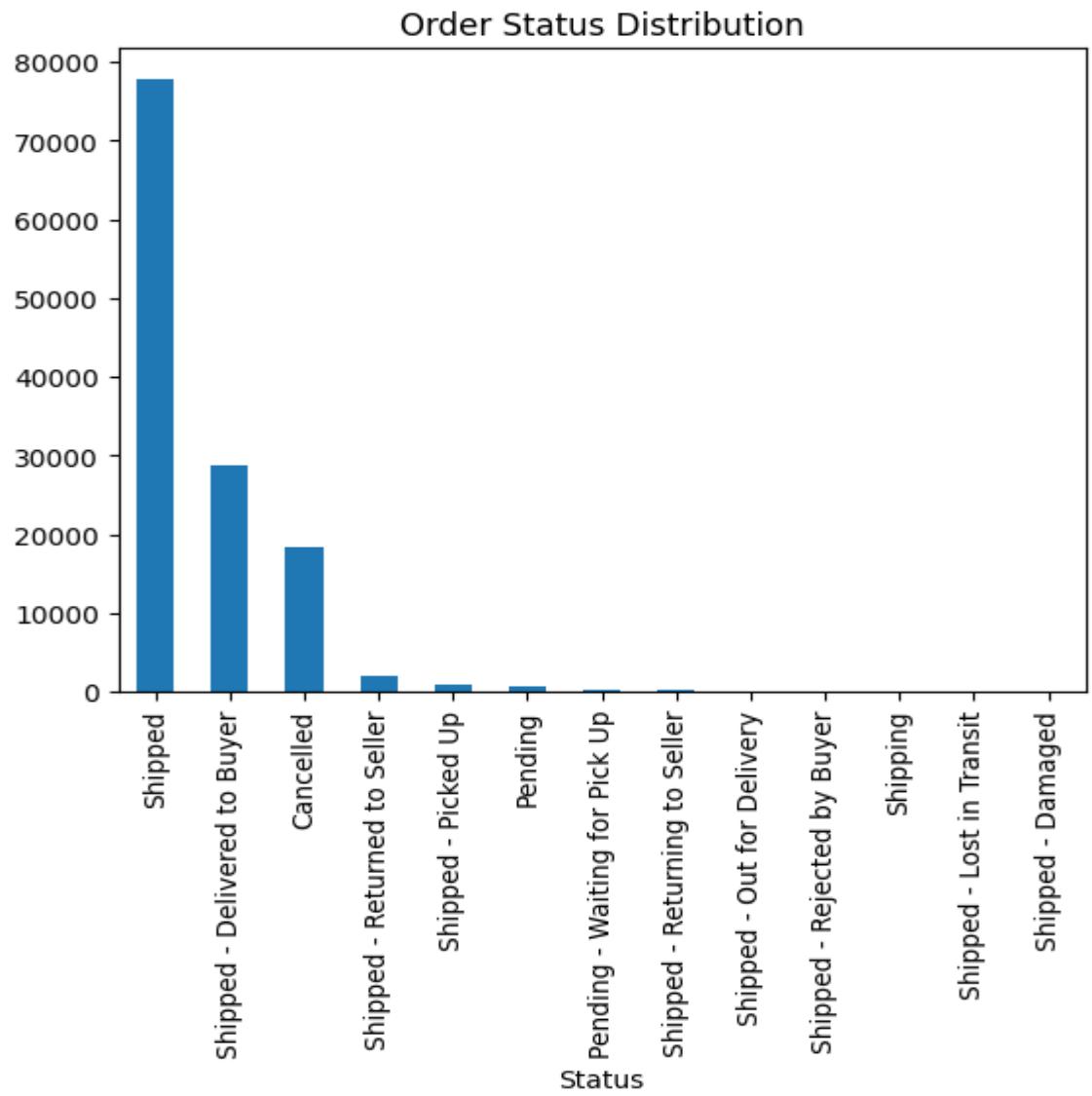
NOTE: - Data cleaning steps performed using Pandas

2. EXPLORATORY DATA ANALYSIS: -

2.1 Order Status Distribution



Explanation: This analysis was conducted to understand the distribution of orders across different order statuses.



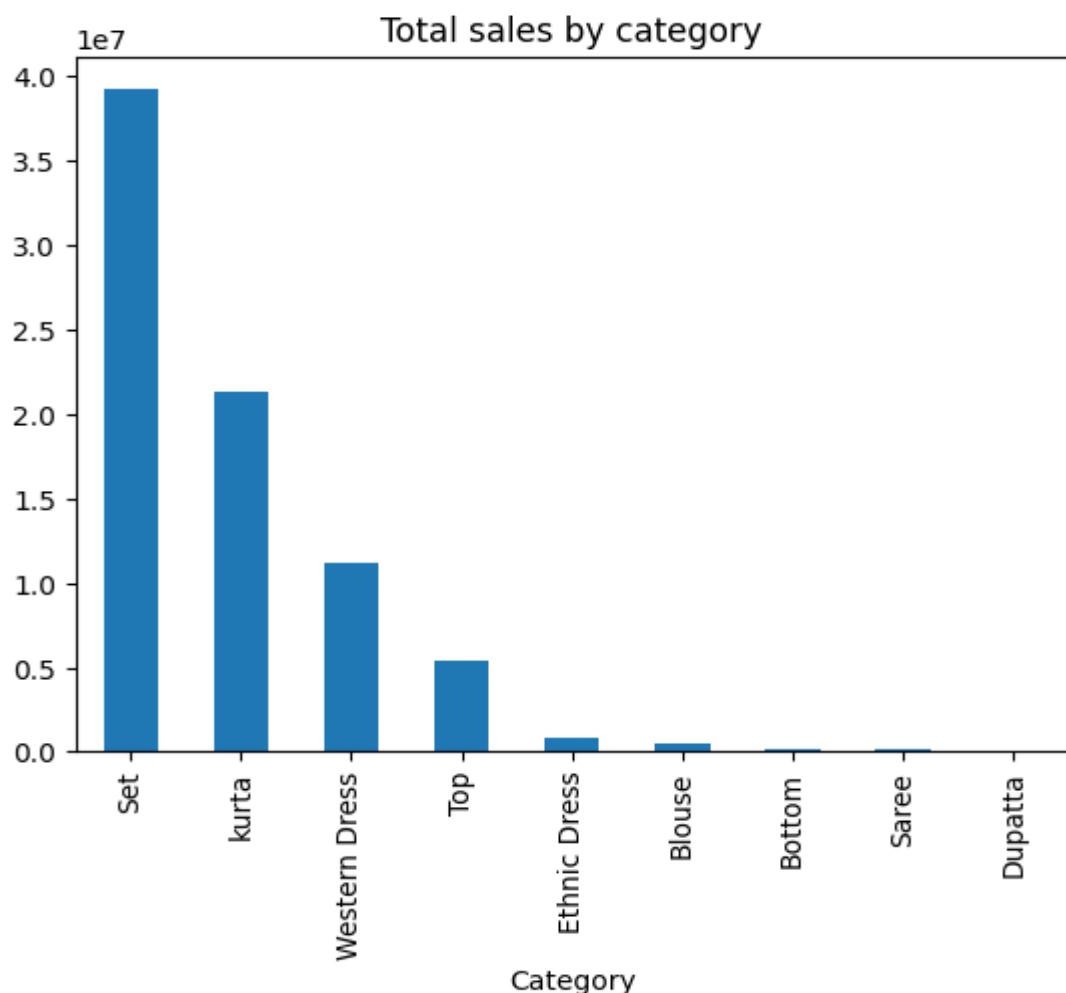
Insight:

The majority of orders are successfully delivered, indicating efficient order fulfillment.

2.2 Sales by Category

Explanation:

Sales were analysed across product categories to identify key revenue contributors.



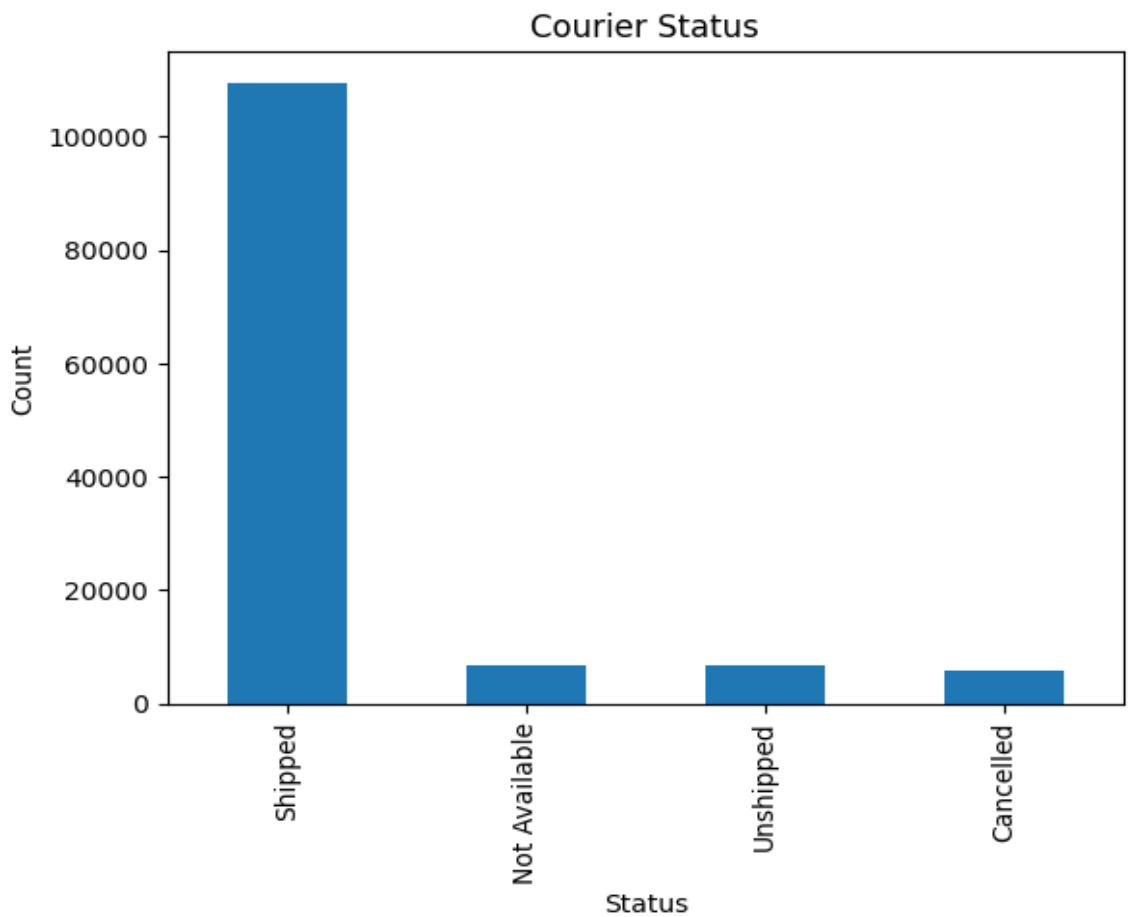
 **Insight:**

A small number of product categories contribute the majority of total sales.

2.3 Courier Status Distribution

 **Explanation:**

Courier status analysis helps evaluate the effectiveness of logistics operations.



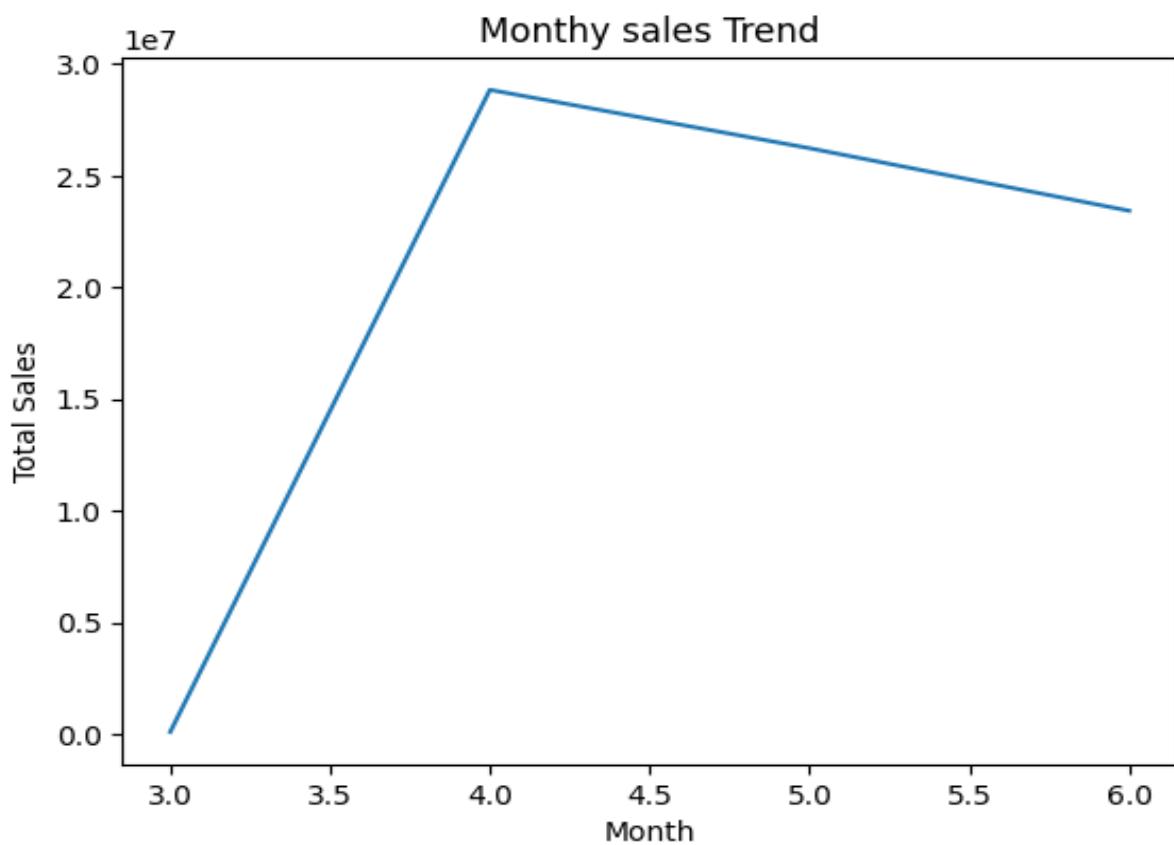
 **Insight:**

Most orders have valid courier tracking, while a small portion have missing courier information.

2.4 Monthly Sales Trend

 **Explanation:**

Monthly sales trends were analysed to identify seasonal patterns.



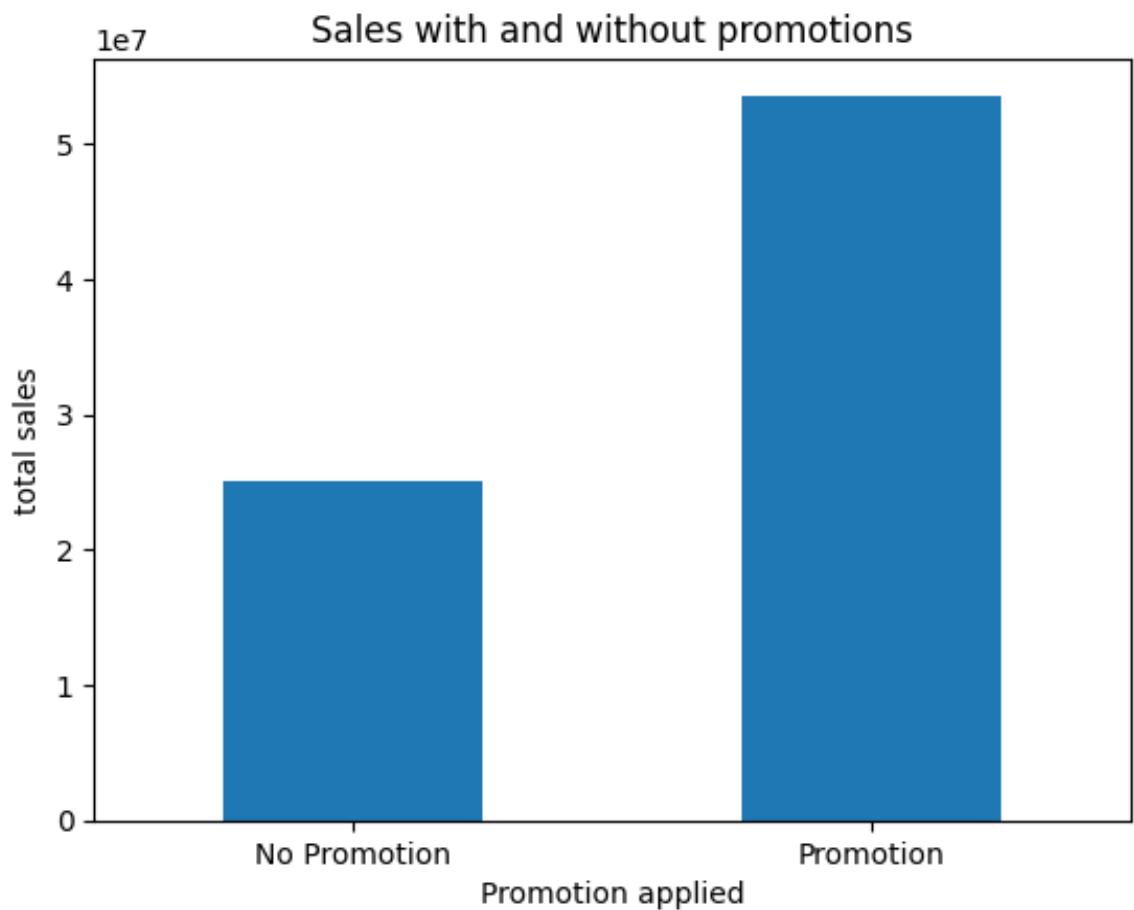
 **Insight:**

Sales show seasonal variation with higher demand during April month.

2.5 Promotion Impact on Sales

 **Explanation:**

Sales performance was compared between promotional and non-promotional orders.



 **Insight:**

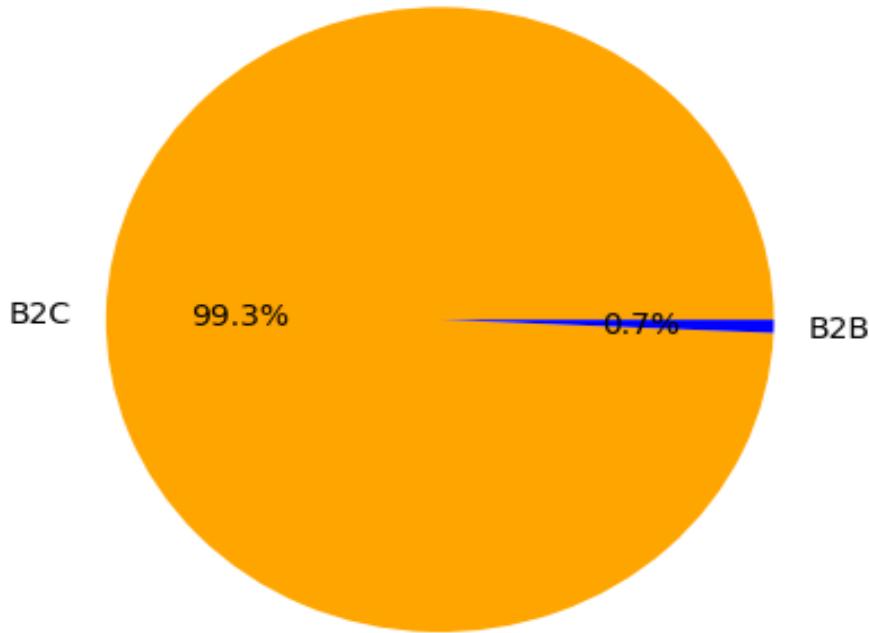
Promotional orders contribute a higher share of total sales, highlighting the effectiveness of promotions.

2.6 B2B vs B2C Orders

 **Explanation:**

This analysis compares the proportion of business-to-business and business-to-consumer orders.

B2B vs B2C Orders



💡 Insight:

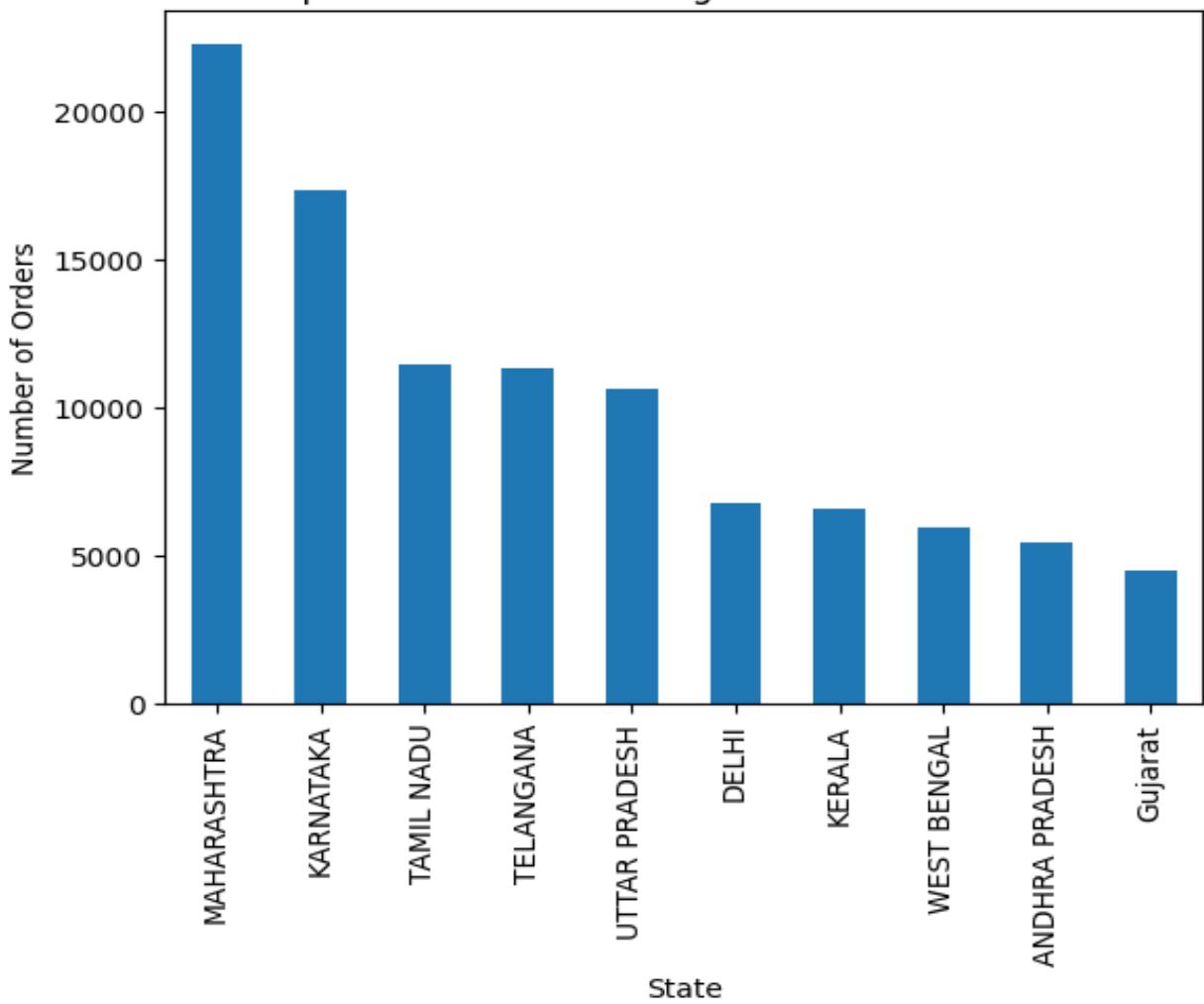
The majority of orders are B2C, while B2B orders form a smaller but important segment.

2.7 Orders by Region

📝 Explanation:

This analysis was conducted to identify regions with the highest number of orders and understand geographical demand distribution.

Top 10 states with the highest number of orders



💡 Insight:

The analysis shows that [Maharashtra, Karnataka] has the highest number of orders, indicating strong customer demand and market presence in these regions.

KEY INSIGHTS: -

- ✓ Customer demand is concentrated in a limited number of regions, indicating uneven geographical distribution.
- ✓ A small number of product categories (Set, Kurta, Western Dress) contribute the majority of total sales revenue.
- ✓ Promotional strategies play a major role in driving sales revenue.
- ✓ Order fulfillment performance is generally strong, with most orders successfully completed.
- ✓ Sales show noticeable seasonal fluctuations, suggesting demand varies across the year.
- ✓ The business is largely B2C-focused, with B2B contributing a smaller share.

Business Recommendations: -

1. Focus on high Demand Regions

- Increase inventory availability and targeted marketing efforts in high-performing regions to capitalize on strong customer demand and reduce order fulfillment delays.

2. Improve logistics data tracking

- Ensure courier status is properly recorded for all orders to improve shipment tracking and operational visibility.

3. Optimize promotional strategies

- Invest more in promotions that work well and evaluate weaker campaigns to use marketing budget more effectively.

4. Expand reach in underperforming regions

- Promote products more in low-performing regions to gradually increase customer orders.

5. Plan campaigns around seasonal demand

- Use identified seasonal sales trends to schedule promotions and stock planning during peak demand periods, improving sales performance and customer satisfaction.

6. Evaluate B2B growth opportunities

- Analyze B2B customers separately to identify opportunities to grow business and generate steady long-term revenue.

Conclusion:

This Project analyzed E-commerce order data to understand customer behaviour, sales performance and operational trends. Exploratory data analysis (EDA) revealed key patterns related to promotional impact, seasonal sales Trends, order fulfilments and regional demand. Based to these analysis, clear recommendations were provided help to improve sales, delivery efficiency and market efforts.

Limitations:

This analysis is based on historical data and may not reflect the current business conditions. External factors such as market competition, price change, and customer preferences were not be included in this dataset. Additionally, some records contained missing values, which may slightly affect the accuracy of the results.

Future Scope:

Future analysis study about customer behaviour in more detail to better understand buying patterns. Sales prediction model can be developed to estimate future demand. Adding data such as product prices, customer details, and competitor information can help provide deeper business insights.

