

# Data Analysis Project Report on 'Amazon Sales' Dataset

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## Executive Summary:

This report focuses on analysing the sales and revenue data from April to June 2022, with the objective of developing strategies to increase overall revenue by the end of Q3 2022. The analysis highlights the performance of various product categories, customer spending patterns, and the impact of promotions. Our primary goal is to increase revenue by at least 5% for the lowest-performing product among the top 3 revenue-generating categories, and to target specific states for promotions, with Western Dress identified as a key category for driving additional sales.

### Key Findings:

- 1 . Top 3 Products: The product categories "Set," "Kurta," and "Western Dress" generate the highest revenue. However, Western Dress contributes the least among these, making it a primary target for revenue growth through targeted promotions.
- 2 . State-wise Performance: Sales are concentrated in a few key states. The top 50% of states contribute significantly to overall revenue, particularly for Western Dress, making them ideal targets for promotions.
3. Promotion Strategy: To achieve the target of increasing revenue by 5% for the third-highest revenue-generating product, we propose implementing discounts, Buy 1 Get 1 Free offers, and free shipping in the top-performing states.
4. Customer Spending: Business customers tend to have a higher average order value compared to regular customers, providing an opportunity to target B2B customers with specialized promotions.

### Recommendations:

- ☐ Promote Western Dress and other underperforming categories in the top 50% of states based on revenue.
- ☐ Implement targeted promotions such as discounts and Buy 1 Get 1 Free offers to boost sales.
- ☐ Focus on Q3 2022 promotions and track performance to ensure the revenue target of a 5% increase is met by the end of Q3 2022.

This report provides a detailed analysis of current sales trends and a well-defined promotion strategy aimed at driving revenue growth across multiple categories by the end of Q3 2022.

## Introduction:

The purpose of this report is to analyse the sales and revenue data from April to June 2022 and develop strategies to drive revenue growth by the end of Q3 2022. The data includes a comprehensive review of product category performance, customer spending patterns, and state-wise sales, which are used to create targeted promotional strategies aimed at increasing overall revenue.

The analysis identifies key product categories, such as Set, Kurta, and Western Dress, which are the top revenue-generating categories during the analysis period. Among these, Western Dress presents a significant opportunity for growth as it currently ranks third in revenue generation, making it a prime target for promotional efforts.

Additionally, the report examines customer spending behavior, highlighting the differences between business customers and regular customers, and how these segments can be effectively targeted to maximize revenue. The state-wise sales analysis further emphasizes the importance of focusing promotions in the top-performing states that contribute significantly to overall sales.

The primary objective is to achieve a 5% increase in revenue for the third-highest revenue-generating product category by the end of Q3 2022 through well-planned promotions and customer engagement strategies. This report will outline the steps necessary to reach this goal, ensuring that both product category performance and revenue growth are optimized.

## Data Cleaning:

**1. Dropping irrelevant columns:** There are some columns present in the dataset which is irrelevant and have no use to be in the analysis. Example: Unnamed 22, fulfilled-by, Ship Country, Currency, Sales Channel.



```
dataset.drop('Unnamed: 22',axis=1,inplace=True)
dataset.drop('fulfilled-by',axis=1,inplace=True)
dataset.drop('ship-country',axis=1,inplace=True)
dataset.drop('currency',axis=1,inplace=True)
dataset.drop('Sales Channel ',axis=1,inplace=True)
```

**2 . Dropping duplicates:** Dataset contains few duplicate values which is being removed during analysis.

```
[ ]
dataset=dataset.drop_duplicates(subset=['Order ID','ASIN'])
```

**3. Filling missing values:** Dataset contains some missing values which can be fatal to the analysis so, it has been removed.

```
[ ]
fill_na_value={'Courier Status':'Unknown','promotion-ids':'No Promotion','Amount':0}
dataset=dataset.fillna(value=fill_na_value)
dataset
```

**4. Renaming columns:** In the provided dataset a column is present which is playing an important role but its name is not as accurate as it should be. So, it has been changed.

```
[ ]
column_rename_dict={'B2B':'Customer_type','Amount':'Order_Amount_($)'}
dataset=dataset.rename(columns=column_rename_dict)
dataset
```

**5 . Adding month column:** A new column named month is being added to the dataset in order to perform some useful analysis.

```
[ ] #ADD MONTH COLUMN
dataset['Month']=dataset['Date'].dt.month_name()
dataset
```

## 6 . Converting INR to USD:

```
[ ] # CHANGE AND CONVERTING INR ITNO $
exchange_rate=0.0120988
dataset['Order_Amount_($)']=(dataset['Order_Amount_($)'].apply(lambda x:x*exchange_rate)).round(2)
```

## Data Analysis:

The data from April to June 2022 was analysed to identify trends in product category performance, customer spending behaviour, cancellation/return patterns, and state-wise sales. The goal is to develop strategies to boost overall revenue and improve product category performance.


The analysis highlights the following key findings:

### 1. Top Products Analysis:

The top 3 revenue-generating product categories are Set, Kurta, and Western Dress:


- \* **Set:** Generates the highest revenue, accounting for 50% of the total sales.
- \* **Kurta:** Contributes 27% of the total revenue.
- \* **Western Dress:** Contributes 14%, and despite being third, it offers significant potential for growth through targeted promotions.

```
[ ] #TOP 3 CATEGORIES
top3_categories=grouped_dataset.nlargest(3)
print(top3_categories)
```




Category	Order_Amount_(\$)
Set	473634.23
kurta	257266.80
Western Dress	135605.96

Name: Order\_Amount\_(\$), dtype: float64



```
# CALCULATE THE TOTAL AMOUNT FROM THE GROUPED DATASET
Total_Amount=grouped_dataset.sum()

# Calculate the percentage for the top 3 categories
top3_categories_percentage=(top3_categories/Total_Amount)*100
print(top3_categories_percentage)
```

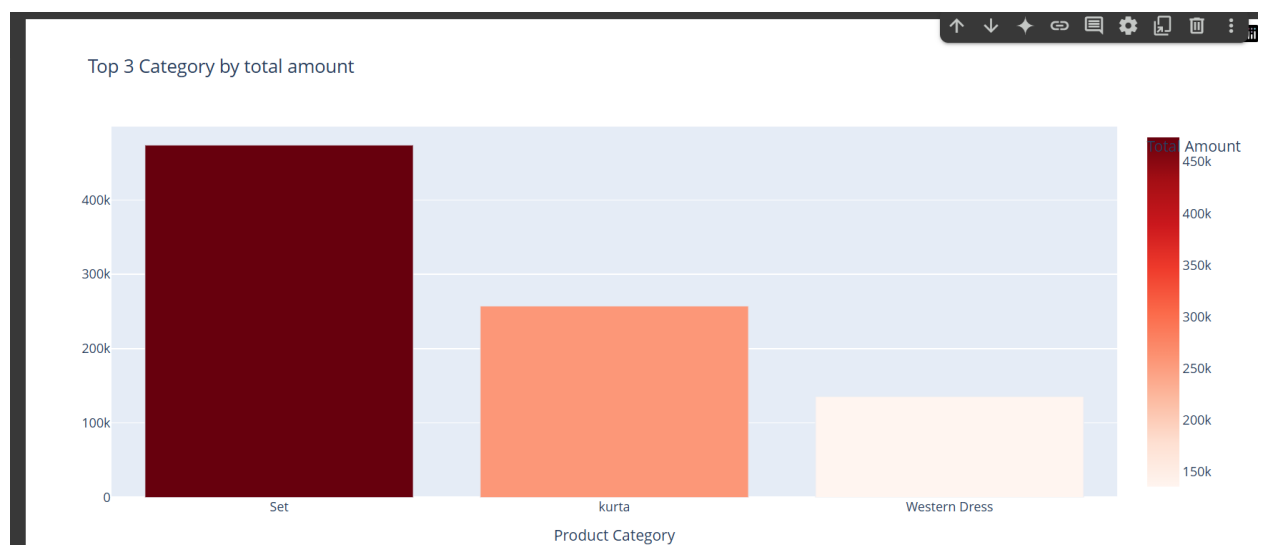


Category	Percentage
Set	49.878257
kurta	27.092678
Western Dress	14.280617

Name: Order\_Amount\_(\$), dtype: float64

```
#CREATING A BAR CHART FROM THE TOP THREE CATEGORIES
top3_categories=top3_categories.reset_index()
fig=px.bar(top3_categories,
           x='Category',
           y='Order_Amount_($)',
           title='Top 3 Category by total amount',
           labels={'Order_Amount_($)': 'Total Amount', 'Category': 'Product Category'},
           color='Order_Amount_($)',
           color_continuous_scale='reds')
fig.update_layout(xaxis_title='Product Category',yaxis_title='Total Amount')

fig.show()
```



**Insight:** Western Dress is identified as an underperforming category that can benefit from promotions to boost revenue.

## 2. Customer Spending Analysis:

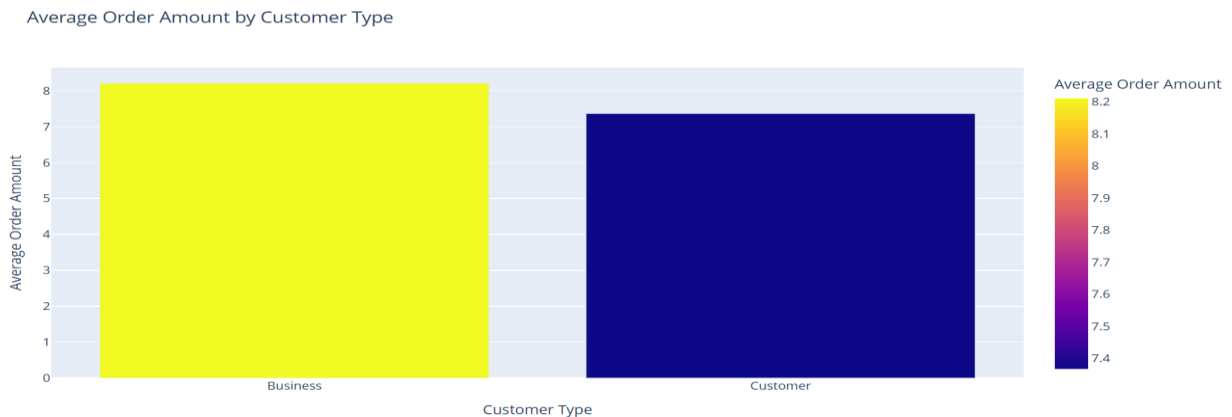
A detailed review of customer spending behaviour reveals:

- **Business Customers:** Higher average order value and larger order sizes, making them a crucial target for promotions.
- **Regular Customers:** Make more frequent but smaller purchases, and they can be engaged through targeted offers like discounts or loyalty programs.

```
[ ] # Group by 'customer_type' and calculate the average order amount
average_order_amount = dataset.groupby('Customer_type')['Order_Amount($)'].mean().reset_index()

# Create a bar chart using Plotly Express
fig = px.bar(average_order_amount, x='Customer_type', y='Order_Amount($)',
             title='Average Order Amount by Customer Type',
             labels={'Order_Amount($)': 'Average Order Amount', 'Customer_type': 'Customer Type'},
             color = 'Order_Amount($)')

fig.show()
```



**Insight:** Focusing on business customers with bulk offers and loyalty programs could drive additional revenue, while regular customers can be engaged with more frequent, smaller promotions



## 2 State-Wise Sales Analysis:

Sales data indicates that revenue is heavily concentrated in the top 50% of states:

These states account for the majority of sales for Western Dress and other top products.

States with lower sales present an opportunity for market expansion with targeted promotions.

```
[ ] # Sort the DataFrame by 'order_amount_($)' in descending order
statewise_sales_sorted = statewise_sales.sort_values(by='Order_Amount_($)', ascending=False)

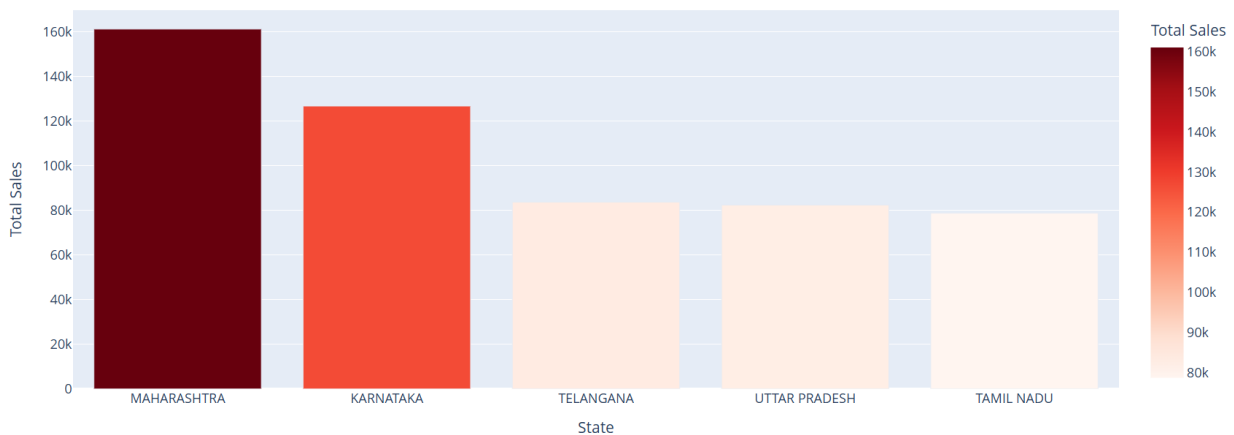
# Select the top 5 states
top5_states = statewise_sales_sorted.head(5)

# Create a bar graph using Plotly Express for the top 5 states
fig = px.bar(top5_states, x='ship-state', y='Order_Amount_($)',
             title='Top 5 State-wise Sales',
             labels={'Order_Amount_($)': 'Total Sales', 'ship-state': 'State'},
             color='Order_Amount_($)', color_continuous_scale='reds')

fig.update_layout(xaxis_title='State', yaxis_title='Total Sales')

fig.show()
```

Top 5 State-wise Sales



## Sales With Or Without Promotion

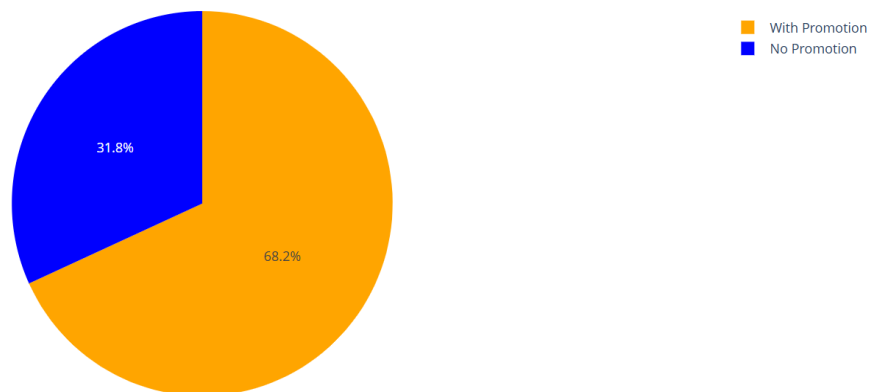
```
[ ] # Create a new column indicating whether there is a promotion
dataset['Promotion Status'] = dataset['promotion-ids'].apply(lambda x: 'No Promotion' if x == 'No Promotion' else 'With Promotion')

# Aggregate data for plotting
agg_data = dataset.groupby('Promotion Status')['Order_Amount_($)'].sum().reset_index()

# Create a pie chart using Plotly Express
fig = px.pie(agg_data, values='Order_Amount_($)', names='Promotion Status',
             title='Sales with and without Promotion',
             color='Promotion Status', color_discrete_map={'No Promotion': 'blue', 'With Promotion': 'orange'})

fig.show()
```

Sales with and without Promotion



### Insight-

When we do promotions sales is much higher than normal

## Summary of Analysis:

The top 3 product categories are key drivers of revenue, with Western Dress identified as a focus for future growth.

Business customers show higher spending potential, making them a critical segment for revenue growth through specialized promotions.

State-wise sales analysis indicates that focusing on the top-performing states will help maximize the effectiveness of promotional efforts.

Reducing the cancellation and returning rates can obviously lead to increase the revenue.

During the analysis of the dataset it was found that western dress is playing an important role here because we have been given that we have to increase the revenue of the bottom first product category from the top three revenue generating product category by 5% by the end of Q3 2022.

Also, it is given to us that we have to promote western dress which is a plus point here.

A future-based analysis shows that applying promotions on product categories and states can lead to the increment of revenue. As this analysis is hypothetical so the real analysis depends on the sales data of Q3 2022.

## Promotional Strategies for western dress:

Some promotional can be applied in order to increase the sales revenue are listed below:

### 1. Targeted Discounts and Offers

**Flash Sales:** Offer limited-time discounts on Western Dresses to create urgency and encourage quick purchases.

discounted rate to increase average order value.

**Buy and Get:** Offers like Buy 1 Get 1 free can be applied to the products in order to increase the order values and sales.

### 2. Seasonal Promotions

**Festive Sales:** Align promotions with upcoming festivals or holidays, showcasing Western Dresses as ideal choices for celebrations.

**End-of-Season Sales:** Clear out inventory with significant discounts on seasonal Western Dresses to make room for new styles.

### **3.Free Shipping Promotions**

**Threshold for Free Shipping:** Offer free shipping on orders above a certain amount, encouraging customers to purchase more items, including Western Dresses

### **4.In-Store Events**

**Try-On Events:** Host events where customers can try on Western Dresses, receive styling advice, and enjoy refreshments, creating a fun shopping experience.

### **5. Feedback and Improvement**

**Customer Surveys:** Gather feedback from customers who purchased Western Dresses to understand their preferences and improve future offerings.

Implementing a combination of these strategies will help increase awareness, engagement, and sales for Western Dresses. It's essential to monitor the performance of each strategy and adapt based on customer responses and sales data.

## **KPI and Revenue Growth:**

### **Key Performance Indicators (KPIs)**

**1.Revenue Growth Rate** Measures the percentage increase in revenue over a specific period.

**Target:** Aim for a 15% increase in revenue for the Western Dress category over the next quarter. Not only western dresses but other products can also be included for promotional purpose in order to gain revenue increase.

### **2. Customer Acquisition Cost (CAC)**

The total cost of acquiring a new customer, including marketing and advertising expenses.

**Target:** Keep CAC below \$30 per new customer acquired.

**3.Customer Retention Rate** The percentage of customers who continue to purchase over a specific period.

**Target:** Achieve a retention rate of 70% for customers purchasing Western Dresses.

### **4. Average Order Value (AOV)**

The average amount spent by customers in a single transaction.

**Target:** Increase the AOV by 10% through upselling and cross-selling strategies.

## 5. Conversion Rate

The percentage of website visitors who make a purchase

**Target:** Achieve a conversion rate of 3% on the product pages for Western Dresses.

## 6. Sales Volume

The total number of units sold within a specific timeframe.

**Target:** Increase sales volume of Western Dresses by 20% in the upcoming promotional campaign.

## 7. Customer Feedback and Satisfaction

Measure customer satisfaction through surveys and reviews.

**Target:** Maintain an average customer satisfaction score of 4.5/5 for Western Dresses.

## Revenue Growth Strategies:

1. **Increase Sales from Promotions:** Implement targeted promotions aimed at the Western Dress category to stimulate purchases and drive revenue growth.
  2. **Enhance Online Presence:** Optimize the website for better visibility, ensuring a smooth shopping experience to increase conversions and boost revenue.
  3. **Leverage Social Media Advertising:** Use targeted ads to reach potential customers who may be interested in Western Dresses, driving more traffic and sales.
  4. **Expand Product Range:** Introduce new styles or variations of Western Dresses based on market trends and customer feedback to attract more buyers.
  5. **Improve Customer Engagement:** Foster relationships with customers through personalized communication and engagement, encouraging repeat purchases.
  6. **Utilize Data Analytics:** Analyse sales data to identify high-performing products and customer preferences, allowing for informed decisions on inventory and promotions.
  7. **Implement Referral Programs:** Encourage satisfied customers to refer friends and family, offering discounts or incentives for successful referrals to drive new customer acquisition.
- By monitoring these KPIs and implementing effective revenue growth strategies, you can enhance the performance of the Western Dress category and drive overall business growth.

## Conclusions and Recommendations:

### Conclusions

1. **Revenue Performance:** The Western Dress category has shown potential for growth, contributing 14% to the overall revenue. Targeted promotions can significantly enhance its performance.

**2. Top Categories:** The top three revenue-generating categories—Set, Kurta, and Western Dress—highlight the importance of leveraging popular products to drive sales.**3. Promotional Impact:** Initial analyses indicate that promotions can lead to a considerable increase in sales volume and revenue, as seen in the post-promotion revenue strategies.

**4. Customer Engagement:** High customer retention rates and average order values suggest that customers are willing to spend more on appealing products, indicating effective marketing strategies.

## **Recommendations**

**1. Implement Targeted Promotions:** Utilize discounts, bundle offers, and seasonal promotions focused on the Western Dress category to stimulate sales and increase market share.

**2. Enhance Marketing Strategies:** Invest in social media marketing and influencer collaborations to reach a wider audience, showcasing the appeal and versatility of Western Dresses. Other underperforming categories can also benefit from similar promotional efforts.

**3. Expand Product Range:** Introduce new styles and variations of Western Dresses based on customer preferences and feedback, ensuring the product line remains fresh and appealing.

**4. Leverage Data Analytics:** Continuously analyse sales data and customer feedback to adjust marketing strategies and inventory management, ensuring alignment with market trends.

**5. Improve Customer Experience:** Enhance the online shopping experience with user-friendly navigation, detailed product descriptions, and high-quality images to boost conversion rates.

**6. Foster Customer Loyalty:** Develop loyalty programs and referral incentives to encourage repeat purchases and attract new customers through existing satisfied customers.

**7. Monitor and Adjust Strategies:** Regularly assess the effectiveness of promotional strategies through KPIs and adjust approaches based on data insights to optimize performance.

**8. Utilize Feedback for Improvement:** Collect customer feedback on Western Dresses to identify areas for improvement in product quality, pricing, and overall shopping experience. Hence, by implementing these recommendations, the business can capitalize on growth opportunities in the Western Dress category, enhance overall revenue performance, and build stronger customer relationships. Continuous monitoring and adaptation will be key to sustaining success in a competitive market.

