

Report

 **Project Name: Exploratory Data Analysis on Diwali Sales Data**

 **Project Summary**

Diwali is one of the largest shopping festivals in India, where customers across demographics purchase products ranging from household items to electronics. Businesses often struggle to identify which customer segments, regions, and product categories contribute most to sales. Without data-driven insights, marketing campaigns and inventory planning may fail to capture the full potential of festive demand.

The goal of this project was to analyze Diwali festival sales data to uncover customer purchasing behaviour, identify high-value demographics, and highlight top-performing products and regions. The insights can help businesses optimize marketing strategies and inventory planning during festive seasons.

 **Problem Statement**

The challenge is to transform raw Diwali sales data into actionable insights by cleaning, analysing, and visualizing customer demographics, regional sales distribution, and product performance. The project must answer critical business questions:

- Which customer segments (gender, age group, marital status, occupation) contribute most to sales?
 - Which states and zones generate the highest revenue during Diwali?
 - What are the top product categories and products driving festive demand?
 - How do orders and spending patterns vary across different demographics and regions?
 - How can businesses use these insights to optimize marketing, inventory, and festive strategies?
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Objectives

- Identify **high-value customer segments** (gender, age group, marital status, occupation).
 - Highlight **top-performing states and zones** driving festive sales.
 - Evaluate **product categories and best-selling products**.
 - Understand the relationship between **orders and revenue**.
 - Provide **business recommendations** for marketing, inventory, and sales strategies.
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Dataset

- **Rows:** 11,243
 - **Columns:** 15 (after cleaning, 12 useful columns retained)
 - **Key Features:**
 - Customer demographics: Gender, Age Group, Marital_Status, Occupation
 - Geographic details: State, Zone
 - Product details: Product_ID, Product_Category
 - Transaction details: Orders, Amount
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Exploratory Data Analysis (EDA)

The project answers 15 key visualization questions, including:

1. Total sales by **Gender**
2. Spending by **Age Group**
3. Average spending by **Marital Status**
4. Revenue by **Occupation**
5. Orders vs. Age correlation
6. Top states and zones by sales
7. Product category performance
8. Top 10 products by revenue
9. Orders vs. Amount trends
10. Customer segment comparison (Gender × Age × Occupation)

Key Insights

- **Women** contributed higher overall sales than men.
- **Millennials (26–35)** are the biggest spenders.
- **Married professionals** spend more than unmarried customers.
- **Electronics and household items** dominate festive purchases.
- **Uttar Pradesh, Maharashtra, and Karnataka** lead in state-wise sales.
- Revenue is driven by both **frequent small orders** and **fewer large purchases**.

Recommendations & Solutions

Marketing

- Focus on women: Since female customers contributed the highest share of sales, campaigns should highlight products that resonate with them—fashion, household essentials, lifestyle bundles. Personalized offers (e.g., “Festive Home Makeover Kits”) can drive engagement.
- Millennials (26–35 age group): This group dominated spending. They are digital-savvy, so social media ads, influencer collaborations, and app-based promotions will maximize reach.
- Married professionals: Married customers spend more, especially in IT, Healthcare, and Business occupations. Position premium products (electronics, appliances) as family investments.
- Impact: Marketing becomes sharper, targeting the most profitable demographics instead of broad, unfocused campaigns.

Inventory

- Electronics: High average order value and revenue contribution. Stock premium electronics (smartphones, laptops, appliances) in advance.
- Household items: High order volume, moderate revenue. These are “fast-moving” festive essentials. Ensure bulk availability to avoid stockouts.
- High-demand states (UP, Maharashtra, Karnataka): Allocate more inventory to regional warehouses in these states. This reduces delivery delays and ensures supply meets demand.
- Impact: Inventory planning aligns with actual demand patterns, minimizing overstock in low-demand regions and shortages in high-demand ones.

Sales Strategy

- Geo-targeted ads: Use state-level insights (UP, Maharashtra, Karnataka) to run localized campaigns. Example: “Exclusive Diwali Deals for Maharashtra Customers.”
- Festive bundles: Combine high-volume household items with high-value electronics. Example: “Smartphone + Kitchen Essentials Combo.” This drives cross-selling.
- Financing schemes: Millennials and professionals are willing to spend more if flexible payment options exist. EMI, cashback, and festive credit cards can boost premium product sales.
- Impact: Sales campaigns become more persuasive, balancing affordability with aspirational purchases.

Customer Experience

- Mobile shopping optimization: Younger customers place more orders, often via mobile. Ensure app UX is smooth, with one-click checkout and personalized recommendations.
- Delivery speed: High order volumes in certain states require faster logistics. Partner with local couriers, expand last-mile delivery, and offer “Same-Day Festive Delivery” in metros.
- Post-purchase engagement: Send personalized thank-you messages, festive greetings, and loyalty points to encourage repeat purchases.
- Impact: Customers feel valued, enjoy seamless shopping, and are more likely to return for future festive seasons.

Conclusion

The Diwali Sales Data project successfully transformed raw transactional records into meaningful business insights.

Through systematic data cleaning, exploratory analysis, and visualization, the study revealed clear patterns in customer demographics, regional demand, and product performance.

- Customer Insights: Women, millennials (26–35), and married professionals emerged as the most profitable segments, highlighting the importance of targeted marketing.
- Regional Insights: Uttar Pradesh, Maharashtra, and Karnataka, particularly in the North Zone, contributed the highest revenue, underscoring the need for geo-focused campaigns and inventory allocation.
- Product Insights: Electronics and household items dominated festive purchases, with electronics driving high-value transactions and household items driving high-volume sales.

- **Behavioural Insights:** Revenue was generated both from frequent small orders and fewer large purchases, suggesting businesses should cater to both budget and premium buyers.

By connecting these findings to strategic recommendations—such as women-centric marketing, regional inventory prioritization, festive bundles, and mobile-optimized shopping—the project demonstrates how data can directly inform business decisions.

🔧 Tech Stack

- **Python:** Pandas, NumPy
- **Visualization:** Matplotlib, Seaborn
- **Data Cleaning & Analysis:** Pandas workflows