

# **Exploratory Data Analysis (EDA) and Business Insights**

## **Introduction**

The results of an exploratory data analysis (EDA) on three datasets—customers, products, and transactions—are presented in this study. To improve strategic decision-making, the goal was to extract valuable business insights. The study concentrated on product sales, customer profiles, and trends in transactions.

## **Key Findings and Business Insights:**

### **1. Customer Distribution and Regional Trends**

- The vast majority of clients are centred in particular areas, such Europe and North America.
- **Insight:** Marketing campaigns might be targeted by regional patterns. For example, goods that are well-liked in one area can be advertised in areas with comparable tastes.

### **2. High Revenue Products and Categories**

- The category "Electronics" generates the most revenue, with sales of certain products like "Smartphones" driving the market.
- **Insight:** Profitability can be increased by devoting more resources to stocking and promoting high-revenue categories.

### **3. Revenue Trends Over Time**

- Seasonal sales trends are shown by revenue peaks that occur during specific months.
- **Insight:** Sales can be increased by conducting promotional campaigns during months with high income and optimising inventory to prepare for seasonal demand increases.

### **4. Top Customers and Spending Patterns**

- The basic 80/20 Pareto Principle is demonstrated by the fact that a small percentage of customers account for a big portion of total revenue.
- **Insight:** Long-term revenue can be increased, and key clients can be retained by creating loyalty programs for high-spending customers.

### **5. Product Pricing and Profitability**

- While premium-priced items contribute disproportionately to revenue, mid-range products have the biggest sales volume.
- **Insight:** High sales volume and profitability are guaranteed when the product portfolio is balanced with mid-range and premium options.

## **EDA Methodology:**

- 1. Data Cleaning**
  - Values that were missing were found and dealt with properly.
  - for temporal analysis, columns such as "Transaction Date" were transformed into a datetime format.
- 2. Data Aggregation**
  - Total revenue, average spending per client, and product sales volume were calculated by combining transaction data.
- 3. Visualization**
  - For categorical distributions, pie charts and bar charts were employed.
  - Product preferences and expenditure trends were emphasised using scatter plots.
- 4. Statistical Analysis**
  - To summarise consumer spending and product pricing, key measures such as mean, median, and standard deviation were computed.
  - To comprehend the relationships between variables, correlation analysis was performed.

## **Recommendations**

- 1. Targeted Marketing**
  - Create campaigns tailored to a given region based on the preferences and demographics of your target audience.
- 2. Seasonal Promotions**
  - To register for advantage of seasonal demand, launch special deals during months with the highest revenue.
- 3. Customer Retention**
  - To improve engagement and retention, implement loyalty programs for high-spending clients.
- 4. Product Strategy**
  - Maintain a balanced portfolio by concentrating on promoting and supplying high-performing products.
- 5. Pricing Optimization**
  - To increase sales and profitability, adjust pricing tactics based on data-driven insights.

## **Conclusion:**

The EDA's insights yield practical suggestions for improving sales, inventory, and marketing tactics. The company can increase income, boost customer satisfaction, and achieve sustainable growth by utilising these results.