E-commerce Store Analysis

**1. Project Objective** The primary goal of this project is to perform a comprehensive business analysis of an online retail store and answer critical business-related questions. The specific objectives include:

* **Sales Performance Analysis**: Identify trends in sales and revenue growth over time, analyze product categories contributing the most to revenue.
* **Customer Behaviour Analysis**: Identify the most valuable customer segments, examine factors influencing purchase behaviour.
* **Profitability Insights**: Determine the most and least profitable products, analyze profit margins across different categories and regions.
* **Shipping & Operational Efficiency**: Assess the impact of shipping delays on customer satisfaction, identify inefficiencies in the supply chain.
* **Regional & Market Analysis**: Determine which regions/countries contribute the most to sales, understand customer demographics' role in purchasing patterns.

**2. Methodology: Steps Taken in the Project**

**Step 1: Data Loading & Cleaning**

* Loaded the dataset using pandas from a CSV file.
* Checked for missing values and data inconsistencies.
* Converted "Order Date" and "Ship Date" to datetime format for time-series analysis.
* Ensured data integrity by handling duplicate entries and missing values.

**Step 2: Exploratory Data Analysis (EDA)**

* **Summary Statistics**: Overview of sales, profit, and discount distributions.
* **Trend Analysis**: Yearly and monthly trends in sales.
* **Category-wise Performance**: Sales and profit margins by product categories.
* **Profitability Analysis**: Identified products with the highest and lowest profit margins.

**Step 3: Data Visualization**

* **Bar & Pie Charts**: Sales distribution across product categories.
* **Time-Series Analysis**: Revenue growth over time.
* **Customer Segmentation**: Visualized spending patterns based on location.
* **Shipping Efficiency**: Analyzed shipping delays' impact on sales.

**3. Tools & Technologies Used**

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| **Technology** | **Purpose** |
| pandas | Data manipulation and preprocessing |
| numpy | Numerical computations |
| plotly | Interactive data visualization |
| matplotlib & seaborn | Static visualizations |

**. Case Study: Business Context** The dataset represents a global e-commerce retail store selling products across various categories. The analysis focuses on:

* Identifying sales trends, customer behaviors, and operational inefficiencies.
* Understanding how shipping delays impact customer satisfaction.
* Evaluating profitability trends across categories.

**5. Business Questions Answered**

* What is the overall sales trend?
* Which months generate the highest revenue?
* How do discounts impact profitability?
* Which customer segments contribute the most to revenue?
* How long does it take for orders to be shipped?
* Does shipping time impact repeat purchases?

**6. Key Findings & Insights**

* Sales peak during specific months (e.g., holiday season).
* High-selling products sometimes have low profitability due to high discounts.
* Repeat customers contribute more revenue than one-time buyers.
* Longer shipping times negatively impact sales in some regions.

**7. Conclusion & Business Recommendations**

* **Optimize High-Discount Items**: Reduce discounts on high-selling but low-profit items to improve margins.
* **Improve Logistics & Delivery**: Focus on reducing shipping delays in underperforming regions.
* **Customer Engagement Strategies**: Invest in loyalty programs to retain high-value customers.
* **Inventory Management**: Stock more products in high-demand categories to avoid shortages.

By implementing these strategies, the business can increase revenue, enhance customer satisfaction, and improve overall profitability.