✅ **E-COMMERCE RETURN RATE ANALYSIS**

**Introduction**

This project aims to analyze the return rates of an e-commerce platform to understand product-wise and customer-wise return patterns, improve business strategies, and reduce unnecessary returns.

**Abstract**

The project uses an e-commerce dataset containing 2,539 return records. Key attributes analyzed include order details, product categories, return reasons, user demographics, and shipping methods. The goal is to visualize insights such as return counts, order quantities, days to return, and return patterns by category and user segment using Power BI.

**Tools Used**

* **Python (Pandas, NumPy, Matplotlib)** → Data cleaning and preparation
* **Power BI** → Dashboard creation and visualization
* **SQL** → Data analysis and grouping by user\_gender and product\_category

**Steps Involved in Building the Project**

1. **Data Cleaning with Python:**
   * Checked and confirmed no missing values.
   * Ensured correct data types (datetime for dates, float/int for numeric columns).
   * Filtered dataset to include only returned orders.
2. **Calculated Measures:**
   * Total Orders → COUNTROWS
   * Total Returns → CALCULATE(COUNTROWS, Return\_Status = "Returned")
   * Return Count by Product Category → Count of rows grouped by category
   * Days to Return → Summed and visualized across categories
3. **Power BI Dashboard:**  
   Created an interactive dashboard with:
   * Donut chart: Return count by Product Category
   * Card visuals: Total Orders, Total Returns
   * Treemap: Sum of Order Quantity by Product Category
   * Bar chart: Sum of Days to Return by Product Category
   * Line chart: Sum of Order Quantity by Year and Product Category
   * Filters: User Gender, Shipping Method

**Key Insights**

* Highest return count: Clothing (21.7%)
* Lowest return count: Books (18.9%)
* Total returns analyzed: 2,539 out of 7,670 orders
* Average Days to Return similar across categories
* Gender and shipping filters reveal useful customer patterns

**Conclusion**

The analysis helped identify categories with high return rates and customer segments contributing to returns. This insight can guide targeted improvements, such as better product descriptions or improved shipping methods, ultimately reducing the return rate and improving customer satisfaction.