**E-commerce Return Rate Reduction Analysis**

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📅 Date: 25/10/2025**

**Project Report: E-commerce Return Rate Reduction Analysis**

**1. Project Title:**   
**E-commerce Return Rate Reduction Analysis**

**2. Objective:  
The objective of this project is to analyze product return patterns in an e-commerce setting and uncover the underlying reasons and trends behind customer returns. The goal is to identify actionable insights that can help reduce the return rate, optimize operations, and improve customer satisfaction.**

**3. Dataset Overview:**

* **File Used: ecommerce\_returns\_synthetic\_data.csv**
* **Records: Contains details of customer orders including order date, product category, customer location, return flag, and reason for return.**
* **Key Columns:**
  + **Order\_Id**
  + **Order\_Date**
  + **Product\_Category**
  + **Customer\_Segment**
  + **Customer\_Location**
  + **Return\_Reason**
  + **Return\_Flag (engineered)**

**4. Data Preparation and Cleaning:**

* **Missing values in the column return\_reason were filled with "Not Returned".**
* **A new column return\_flag was created:**
  + **1 if a product was returned (return\_reason != "Not Returned")**
  + **0 if not returned**
* **An additional column Order\_Month was derived from order\_date for trend analysis.**

**5. Feature Engineering:**

* **Return\_Flag: Indicates whether a product was returned.**
* **Order\_Month: Formatted date (e.g., Jan 2025) for monthly trend analysis.**
* **Return Rate (%):**
  + **Calculated as (SUM of Return\_Flag / Total Orders) \* 100**

**6. Dashboard Visualizations:**

* **KPI Cards:**
  + **Total Orders**
  + **Total Returns**
  + **Return Rate (%)**
* **Clustered Bar Chart:**
  + **Returns by product\_category**
* **Pie Chart:**
  + **Distribution of return\_reason (excluding "Not Returned")**
* **Line Chart:**
  + **Monthly trend of return volumes (using Order\_Month)**
* **Map:**
  + **Returns by customer\_location**
* **Additional (Optional):**
  + **Stacked Bar Chart: Returns by product\_category and customer\_segment**

**7. Key Insights:**

* **Certain product categories contribute disproportionately to returns.**
* **A few return reasons (e.g., defective, wrong item) dominate the return causes.**
* **Return trends fluctuate seasonally or by month.**
* **Specific locations show higher return volumes.**

**8. Recommendations:**

* **Investigate quality issues in high-return categories.**
* **Re-evaluate packaging and fulfillment processes.**
* **Consider improving customer product education and sizing guides.**
* **Adjust return policies or provide incentives for keeping products in regions with high return rates.**

**9. Deliverables:**

* **Power BI file (.pbix): Final interactive dashboard**
* **This Report Document (Word)**
* **Dataset (CSV)**
* **Dashboard Screenshots**

**10. Conclusion:**

**This analysis highlights critical areas where the business can take targeted actions to reduce returns, thereby saving costs and enhancing customer experience.**

