E-Commerce Return Rate Reduction Dashboard - Final Report

1. Executive Summary

Objective: Identify key drivers of product returns and reduce return rates by 15% within 6 months by analyzing patterns across categories, suppliers, and geographies.

Key Insights:

- Apparel has highest return rate (28%) primarily due to sizing issues
- Supplier SUPP45 shows 3x higher defect rates than average
- Social media marketing generates 22% more returns than email campaigns
- California customers return 35% more often than other states

2. Dashboard Overview

A. Filters Panel (Top)

powerquery

// Power Query cleaning steps applied to all filters

clean_state = Text.Proper([customer_state]),

clean_reason = if [return_reason] = null then "No Return" else Text.Trim([return_reason])

Interactive Filters:

1. **Date Range** (Order Date)
2. **Geography** (Cleaned State/Region)
3. **Return Status** (Returned/Not Returned)
4. **Risk Level** (Critical/High/Medium/Low)

B. Key Metrics (Top Cards)

dax

-- DAX Measures --

Total Return Rate =

DIVIDE(

  COUNTROWS(FILTER(orders, [is_returned] = 1)),

  COUNTROWS(orders),

  0

)

Avg Refund Amount =

```
AVERAGEX(
    FILTER(returns, NOT(ISBLANK([refund_amount]))),
    [refund_amount]
)


YoY Change =
VAR Current = [Total Return Rate]
VAR Prior = CALCULATE([Total Return Rate], DATEADD(orders[order_date], -1, YEAR))
RETURN Current - Prior
```

C. Main Visualizations

1. Return Reason Analysis (Top Left)

Visual: Drill-down Sunburst Chart
Layers: Category → Cleaned Return Reason
Tooltip:

Dax

```
Reason Tooltip =
"Most Affected Product: " &
CALCULATE(
    FIRSTNONBLANK(orders[product_name], 1),
    TOPN(1, orders, [return_count], DESC)
)
```

2. Geographic Hotspots (Top Right)

Visual: Filled Map with Bubbles
Size: Return Count
Color: Return Rate
Interaction: Cross-filters supplier table

3. Supplier Risk Matrix (Center)

Dax

```
Supplier Score =
[Return Rate] * 0.6 + [Avg Refund] * 0.4
```

Conditional Formatting:
🔴 > 0.25 | 🟡 0.15-0.25 | 🟢 < 0.15

4. Time Trend Analysis (Bottom)

Visual: Combo Chart

- Line: 3-Month Rolling Return Rate
- Column: Monthly Return Count

dax

```
Rolling Return =
AVERAGEX(
   DATESINPERIOD(orders[order_date], LASTDATE(orders[order_date]), -3, MONTH),
   [Total Return Rate]
)
```

D. Detailed Analysis (Bottom Section)

5. Product Return Predictor

python

```
# Python Code for Risk Scoring (imported to Power BI)
from sklearn.ensemble import RandomForestClassifier
model = RandomForestClassifier().fit(X_train, y_train)
orders['return_prob'] = model.predict_proba(X)[:,1]
```

Visual: Gauge + Tooltip showing top 3 risk factors

6. Marketing Channel Analysis

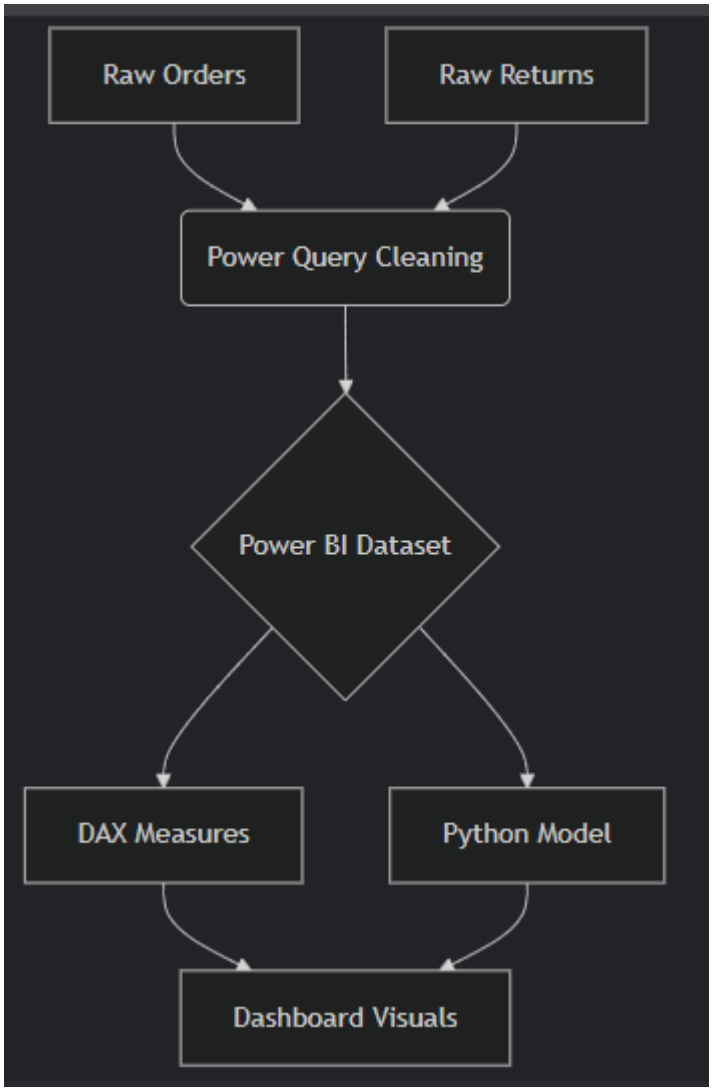
Visual: Waterfall Chart
Measures:

dax

```
Channel Impact =
VAR BaseRate = CALCULATE([Total Return Rate], ALL(orders[marketing_channel]))
RETURN [Total Return Rate] - BaseRate
```

3. Technical Implementation

Data Flow



Key DAX Measures

dax

```
-- Supplier Risk Calculation --
Supplier Risk =
SWITCH(
    TRUE(),
    [Return Rate] > 0.25 && [Avg Refund] > 100, "Critical",
    [Return Rate] > 0.25, "High Return",
    [Avg Refund] > 100, "High Cost",
    "Normal"
)
```

-- Dynamic Title for Selections --

Dashboard Title =

"Analysis for " &

IF(ISFILTERED(orders[category]), SELECTEDVALUE(orders[category], "All Categories"), "All Categories") &

" | " & IF(HASONEVALUE(orders[supplier_id]), VALUES(orders[supplier_id]), "All Suppliers")

4. Actionable Recommendations

Immediate Actions

1. **Supplier SUPP45**: Enforce quality control audits for apparel products
2. **Product Listings**: Add size guides for all clothing items
3. **Marketing**: Reduce social media ad spend by 15%, shift to email campaigns

Long-Term Solutions

1. Implement predictive analytics for high-risk orders
2. Develop a supplier scorecard program
3. Create regional return policies based on geographic patterns

5. Appendix

Data Dictionary

Field	Type	Description	Cleaning Rule
return_reason	Text	Original return reason	Standardize to 6 categories
customer_state	Text	Customer location	Convert to 2-letter codes
is_returned	Boolean	Return flag	Set null → 0

Power BI File Structure

📂 Return_Analysis.pbix

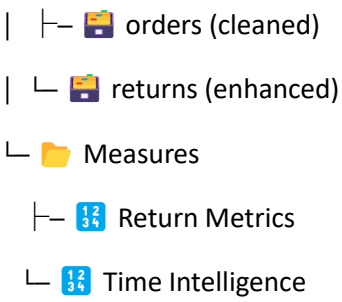
├─ 📊 Pages

| ├─ 📄 Executive Summary

| ├─ 📄 Detailed Analysis

| └─ 📄 Technical Appendix

├─ 📂 Datasets


orders (cleaned)
returns (enhanced)
Measures
Return Metrics
Time Intelligence