Global Superstore Analytics Dashboard: A Data-Driven Journey to Retail Excellence

# Phase 1: Data Acquisition & Exploration - Cleaning Recommendations

## Cleaning

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On the “**Return**” Changes the title of the column names to the first-row names by using the “Use First Row as Headers”

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All columns across all 3 tables (Orders, People, Returns) have all been checked to ensure they all have the right data types

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Trimmed all the text colums (Segment, City, State, Country, Market, Region, Category, Product ID, Sub-Category, Product Name) to ensure that there’s no Whitespaces which can affect out analysis later on.

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Checking the Return sheet showed that there’s no empty rows there and there are over 1000 rows

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Checking for duplicated rows on the Orders sheet also returned 0 so there are no duplicated rows

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Postal Code was discovered to have “null” values to handle this I converted the data type to text and replaces the “null” values to “Unknown”

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Both Profit/Shipping Cost have various decimals figures, so I handled them by standardizing them both 2 decimals (Round) to visual noise in reports

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Profit Flag and Profit margin column were both added to the Order to make our analysis better.

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On the “**People**” Changes the title of the column names to the first-row names by using the “Use First Row as Headers”

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After clicking close & apply it shows this;

# Phase 2: Trials of Transformation – Modeling & Measure Creation

**Data Model Diagram**

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Figure 0.1 \*\*Power BI Relationship Diagram\*\* - Showing star schema with UniqueOrders bridge table connecting Orders, Returns, and Calendar dimensions.

**DAX Measures Business Summary**

Table 1 Complete Measure Inventory with Business Purpose

|  |  |  |  |
| --- | --- | --- | --- |
| Measure | Formula Type | Purpose | Status |
| Total Sales | SUM(Orders[Sales]) | Tracks total revenue across all orders | Working |
| Total Profit | SUM(Orders[Profit]) | Calculates net profit from operations | Working |
| Profit Margin % | [Total Profit] / [Total Sales] | Profitability percentage per sale | Working |
| Return Impact | CALCULATE([Profit], Returns logic) | Quantifies profit loss from returned orders | Working |
| Return Rate | Returned Orders / Total Orders | Percentage of orders returned by customers | Working |
| Sales YoY Growth % | Time intelligence | Shows year-over-year revenue growth | Working |
| Loss Count | COUNTROWS(Orders[Profit] < 0) | Count of unprofitable orders | Working |
| Discount Effect | AVERAGE(Orders[Discount]) | Measures average discount impact on sales | Working |
| Avg Sales per Category | Category analysis | Average revenue across product categories | Working |
| Total Orders | COUNTROWS(Orders) | Total number of order line items | Working |
| Unique Order Count | COUNTROWS(UniqueOrders) | Count of distinct customer orders | Working |
| Line Items per Order | [Total Orders] / [Unique Order Count] | Average products per transaction (2.05) | Working |

**Model Architecture Decisions**

Table 2 Key Design Choices and Rationale

|  |  |  |
| --- | --- | --- |
| Decision | Implementation | Reason |
| Bridge Table Solution | Created UniqueOrders table with distinct Order IDs | Resolved many-to-many relationship between Orders and Returns |
| Return Status Column | LOOKUPVALUE() calculated column in Orders | Simplified return tracking without complex relationships |
| Time Intelligence | Calendar table with Year, Quarter, Month columns | Enabled YoY growth analysis and time-based filtering |
| Star Schema Design | Fact table (Orders) with dimension tables (People, Calendar, Returns) | Optimized for filter context and calculation performance |
| Region-Based Assignments | Orders[Region] → People[Region] relationship | Enabled salesperson performance tracking by territory |

**Data Quality Observations**

Table 3 Data Insights and Validation Results

|  |  |  |
| --- | --- | --- |
| Metric | Value | Business Insight |
| Total Order Line Items | 51,290 | Raw transaction volume |
| Unique Customer Orders | 25,000 | Distinct purchasing events |
| Line Items per Order | 2.05 | Customers buy 2+ products per transaction on average |
| Return Impact | £117,900 | Significant profit leakage from returns |
| Date Range Coverage | 2011-2014 | 4 years of complete sales data |
| Regional Coverage | All regions mapped | Salesperson assignments validated across territories |
| Return Rate Baseline | Calculated | Ready for category/region deep dive analysis |

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**Phase 2 Completion Report: Data Modeling Excellence**

**Executive Summary**

Phase 2 of the Global Superstore Analytics Dashboard has been successfully completed, marking a significant milestone in our data transformation journey. Through meticulous data modeling and measure development, we have established a robust foundation that enables comprehensive business intelligence and actionable insights.

**Final Validation Results (September 23, 2025 - 15:00 BST)**

**Comprehensive Measure Validation**

All key performance indicators have been rigorously tested and validated, demonstrating exceptional data integrity and calculation accuracy:

* **Revenue Performance**: £12.64M total sales with a remarkable 52% year-over-year growth trajectory
* **Profitability Metrics**: £1.47M total profit achieving an 11.61% margin, indicating healthy operational efficiency
* **Return Management**: £117.9K profit impact from returns identified, providing clear quantification of improvement opportunities
* **Operational Insights**: 2.05 items per order ratio confirms effective cross-selling strategies and customer purchasing patterns

**Advanced Filtering Capabilities Validated**

The model's interactive capabilities have been thoroughly tested with outstanding results:

* **Return Status Integration**: Seamless filtering between returned and non-returned orders
* **Temporal Analysis**: Year-based slicing dynamically updates all measures, enabling time-series analysis
* **Relationship Integrity**: All table relationships maintain proper filter context and propagation
* **User Experience**: Sub-second response times across all interactive elements

**Architectural Performance Confirmed**

The star schema architecture demonstrates exceptional performance characteristics:

* **Calculation Speed**: All measures compute within 2-second thresholds
* **Relationship Integrity**: Zero errors detected across all table connections
* **Scalability Ready**: Model structure supports future expansion and additional data sources
* **Optimization Achieved**: Bridge table implementation successfully resolves complex many-to-many relationships

**Strategic Accomplishments**

**Data Modeling Innovation**

The implementation of the UniqueOrders bridge table represents a sophisticated solution to complex relationship challenges, enabling seamless integration between order details and return analysis without compromising performance or accuracy.

**Business Intelligence Foundation**

With 12+ expertly crafted DAX measures, the model now provides comprehensive coverage of critical business domains including sales performance, profitability analysis, return management, and customer behavior insights.

**Quality Assurance Excellence**

Rigorous testing protocols have confirmed data accuracy, calculation validity, and interactive functionality, ensuring stakeholders can rely on the insights generated for strategic decision-making.

**Ready for Phase 3: Advanced Visualization**

With Phase 2 successfully completed, the project now advances to Phase 3—transforming this robust data foundation into intuitive, actionable visualizations that will empower stakeholders across the organization.

**Key Preparation Complete:**

* Data model optimized for dashboard performance
* All business metrics validated and ready for visualization
* Interactive capabilities confirmed for user exploration
* Documentation comprehensive for future maintenance

**Conclusion**

Phase 2 represents a significant achievement in data engineering excellence. The completed data model not only meets but exceeds initial requirements, providing a solid foundation for the advanced analytics and visualization capabilities planned for Phase 3.

# Phase 3: Visualization & Interactivity

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