وزارة الاتصالات
وتكنولوجيا المعلومات

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Clarity in Every Chain

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YOUth

Capstone Project

Data Preprocessing Notebook

Date of Submission: 1/3/2025

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Contents

Objectives of Data Cleaning

The primary objective of this data cleaning process is to ensure the accuracy, consistency, and reliability of the Supplier Quality Dataset. By addressing common data quality issues, this process aims to enhance the validity of subsequent analysis and reporting. The specific goals of data cleaning include:

- Handling Missing Data: Identifying and addressing any missing values in key columns to prevent gaps in analysis.
- Correcting Inconsistencies: Standardizing naming conventions, data formats, and measurement units to ensure uniformity across records.
- Removing Duplicates: Eliminating redundant records to avoid double counting and biased results.
- Resolving Errors: Identifying and correcting incorrect values, such as negative defect counts or unrealistic downtime durations.
- Ensuring Data Integrity: Verifying relationships between different columns, such as supplier IDs matching the correct supplier names.

By conducting a thorough data cleaning process, the dataset will be optimized for accurate supplier quality analysis, ensuring meaningful insights for decision-making.

Data Sources

The dataset used in this analysis originates from supply chain management systems and consists of records related to lead times, stock levels, shipping details, and supplier performance.
The dataset is provided in CSV format (Supply chain.csv) for seamless import into data analysis tools, structured into multiple fields capturing essential supply chain metrics needed for evaluation and optimization.

Cleaning steps

The steps will be in this template for each table:

Table name:

Notes:

Changes made:

Data type changes:

The flat file “supply_chain_dataset” was transformed to the Power Query.

Our approach was to normalize the given dataset for better overall performance and data integrity. This was done by dividing the flat files into 1-fact table and 4-dimension tables. The fact table is the Report Table, and the dimension tables are Products Table, Supplier Table, Customer Table, and Transportation table.

To normalize the dataset, we followed these steps:

1. Make a copy of the Report Table as Duplicate.
2. Choose the columns needed for the table and remove the others.
3. Remove the duplicates as needed to make a unique dimension table.
4. Add an indexed column if needed.
5. Change the Data types if needed.
6. Go back to the Report Table and merge the new table with the intended column if needed. Choose the ID column.
7. Remove the normalized column from the Report Table leaving just the ID column

Example:

Product Table

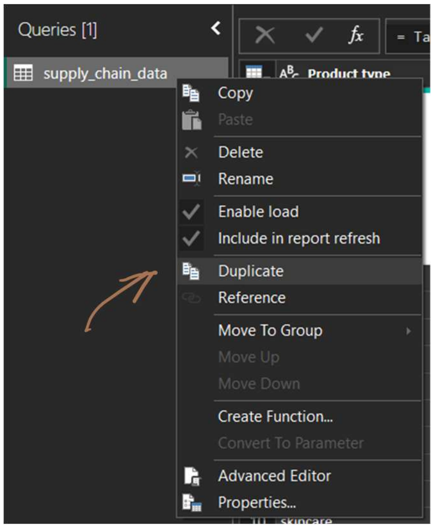


Figure 1: Duplicate Report Table

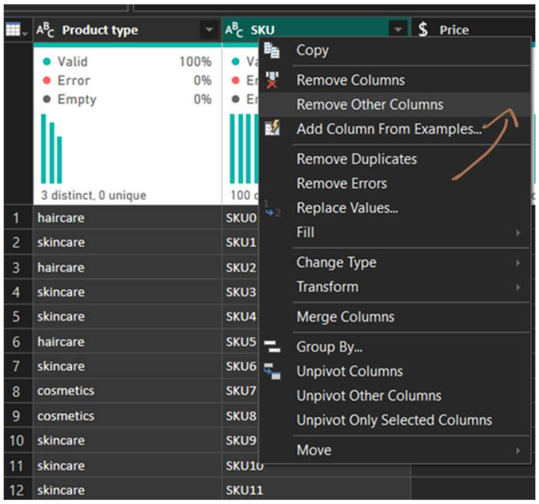


Figure 2: Removing other columns

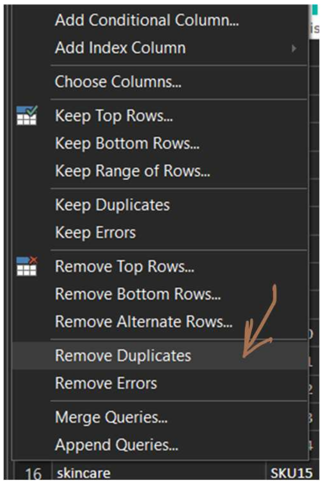


Figure 3: Removing Duplicates

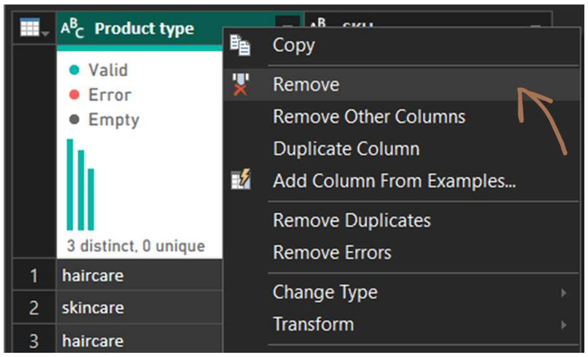


Figure 4: Remove Product Type from Report Table

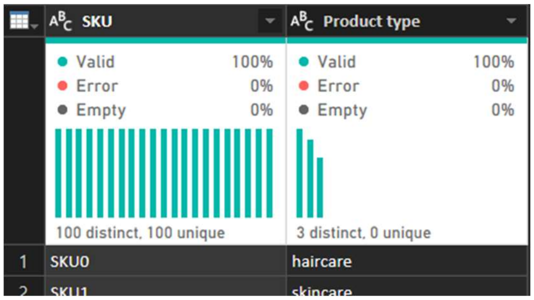
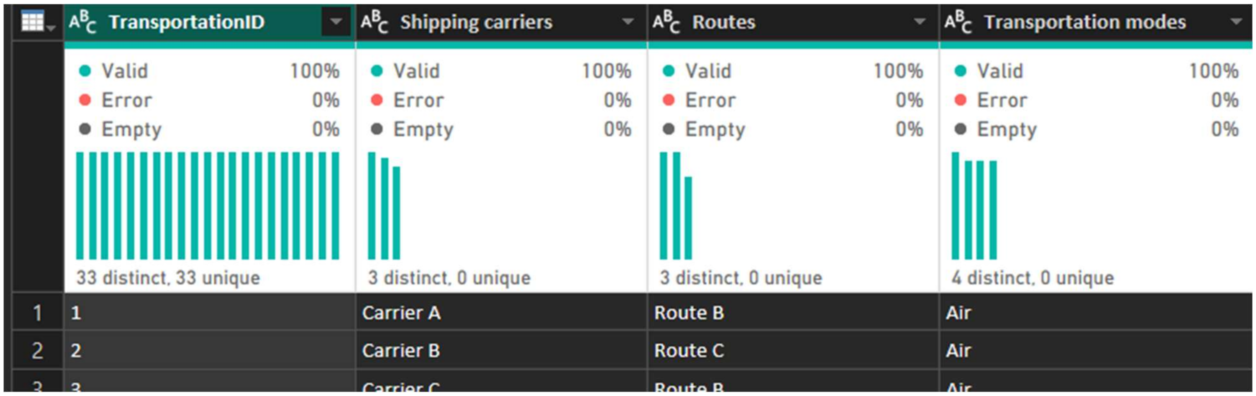


Figure 5: Final Product Table

Instead of creating an indexed column, SKU is used.

There is not any missing data or inconsistency

Transportation Table



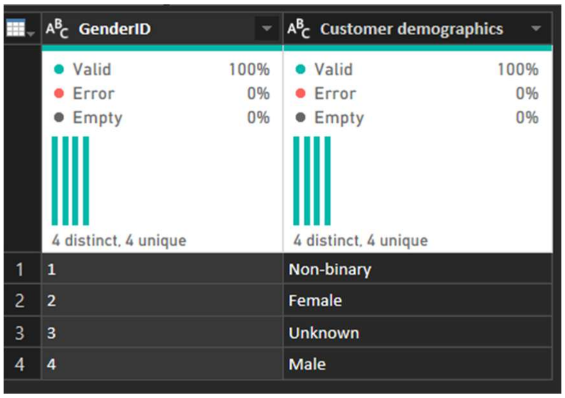
	TransportationID	Shipping carriers	Routes	Transportation modes
	● Valid 100% ● Error 0% ● Empty 0% 33 distinct, 33 unique	● Valid 100% ● Error 0% ● Empty 0% 3 distinct, 0 unique	● Valid 100% ● Error 0% ● Empty 0% 3 distinct, 0 unique	● Valid 100% ● Error 0% ● Empty 0% 4 distinct, 0 unique
1	1	Carrier A	Route B	Air
2	2	Carrier B	Route C	Air
3	3	Carrier C	Route B	Air

There is no missing data or inconsistency.

Data Type Changes:

Transportation ID column is changed from Whole number to Text.

Customer Table



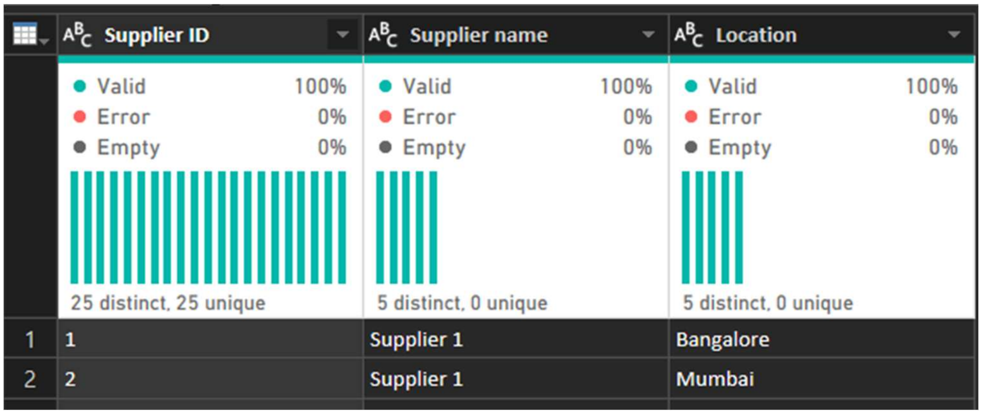
	GenderID	Customer demographics
	● Valid 100% ● Error 0% ● Empty 0% 4 distinct, 4 unique	● Valid 100% ● Error 0% ● Empty 0% 4 distinct, 4 unique
1	1	Non-binary
2	2	Female
3	3	Unknown
4	4	Male

There is no missing data or inconsistency.

Data Type Changes:

Gender ID column is changed from Whole number to Text.

Supplier Table



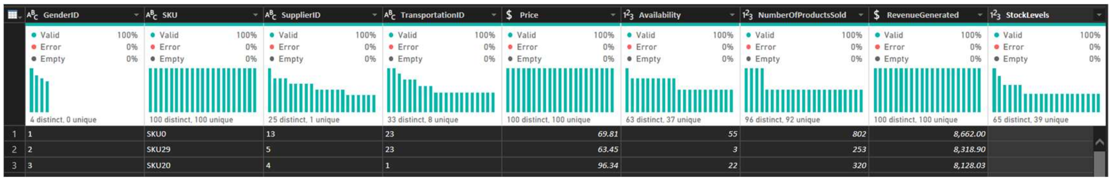
	Supplier ID	Supplier name	Location
	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%
	25 distinct, 25 unique	5 distinct, 0 unique	5 distinct, 0 unique
1	1	Supplier 1	Bangalore
2	2	Supplier 1	Mumbai

There is no missing data or inconsistency.

Data Type Changes:

Supplier ID column is changed from Whole number to Text.

Report Table



	GenderID	SKU	SupplierID	TransportationID	Price	Availability	NumberOfProductsSold	RevenueGenerated	StockLevels
	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%	● Valid 100% ● Error 0% ● Empty 0%
	4 distinct, 0 unique	100 distinct, 100 unique	25 distinct, 1 unique	33 distinct, 8 unique	100 distinct, 100 unique	63 distinct, 37 unique	96 distinct, 92 unique	100 distinct, 100 unique	65 distinct, 39 unique
1	1	SKU0	13	23	69.81	55	802	8,662.00	
2	2	SKU29	5	23	63.45	3	253	8,318.90	
3	3	SKU20	4	1	96.34	22	320	8,128.03	

The ID columns were added to the report and the normalized columns were removed.

There is no missing data, duplicates or inconsistency.

Data type Changes:

Price column is changed from Decimal number to fixed decimal number (currency).

RevenueGenerated column is changed from Decimal number to fixed decimal number (currency).

ShippingCost column is changed from Decimal number to fixed decimal number (currency).

ManufacturingCost column is changed from Decimal number to fixed decimal number (currency).

Costs column is changed from Decimal number to fixed decimal number (currency).