# Understanding Datasets in Tableau Desktop

Tableau is a Business Intelligence tool utilized for data visualization, analysis, and storytelling across various data types. In Tableau, data is represented graphically using charts, maps, tables, and graphs to produce informative dashboards that enable businesses to monitor their performance.

## Data Import and Connectivity

Tableau allows users to import data from diverse file sources (Text files, JSON files, Microsoft Access, PDF files, Spatial files, Statistical files, etc.) and database sources (Microsoft SQL Server, MySQL, Oracle, Amazon Redshift, MongoDB, etc.). Our datasets were cleaned and exported as separate tables on an Excel sheet before importing into Tableau.

## Data Preparation and Analysis

Upon importing, Tableau offers additional data cleaning options to prepare the data for analysis. However, Tableau may struggle with large datasets, taking considerable time to load and limiting the number of rows per view. To mitigate this, Tableau enables metadata extraction, allowing users to select specific data for analysis. Caution is required when selecting data, as important rows may be excluded.

## Data Querying and Analysis

To ensure comprehensive data selection, Tableau allows users to run queries. Since our focus is on the tool's capabilities rather than the data itself, we will work with a limited number of rows to evaluate Tableau's performance in presenting business insights.

## Advanced Visualizations with Tableau

This section explores the creation of sophisticated visuals in Tableau using diverse charts, parameters, and calculated fields.

## Data Preparation

Although Tableau provides data cleaning options, thorough investigation and cleaning of datasets are crucial to prevent analysis errors. Following setup of Power BI and Tableau Desktop, I imported the data into Tableau Desktop.

## Descriptive Analysis

This analysis examines how Tableau's advanced features facilitate the creation of intricate visuals:

1. Calculated Fields: enabling data transformation and customization
2. Parameters: enhancing dashboard interactivity and flexibility
3. Diverse Charts: visualizing complex data relationships and trends

By leveraging these features, Tableau empowers users to uncover valuable insights and present data in a compelling, intuitive manner.

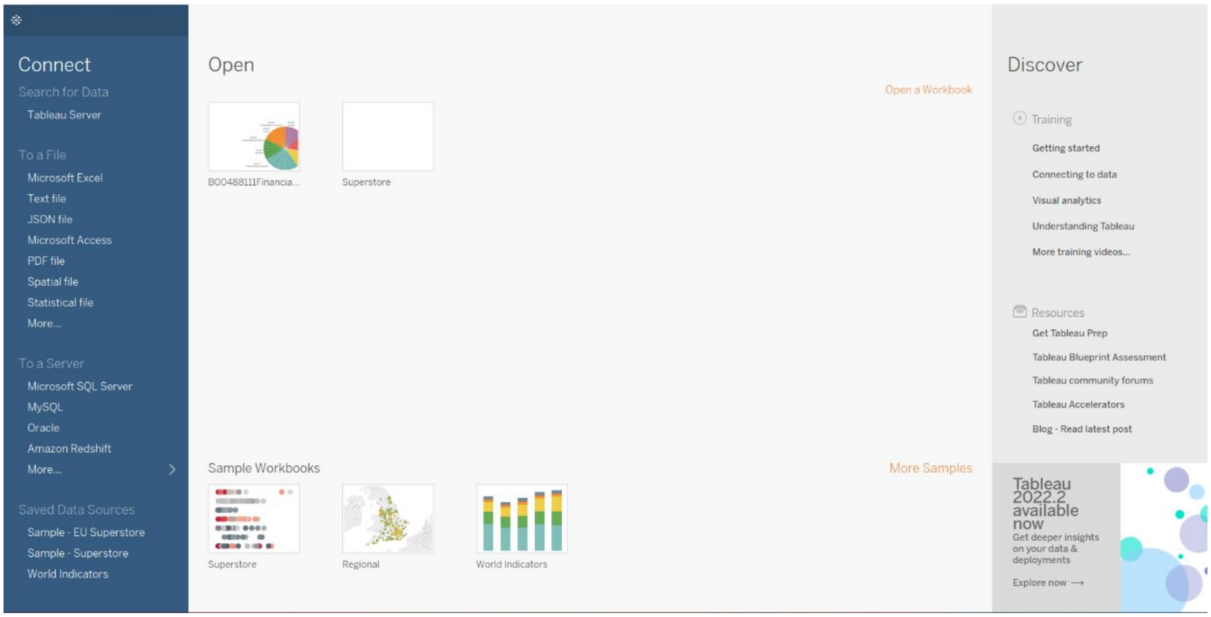


***Figure 1:*** *Tableau Data Sources*

## Task 1: Importing Superstore Dataset into Tableau Desktop

In this task, I imported the extracted Superstore dataset from the DataMart, saved as an Excel file on my desktop.

### Import Process

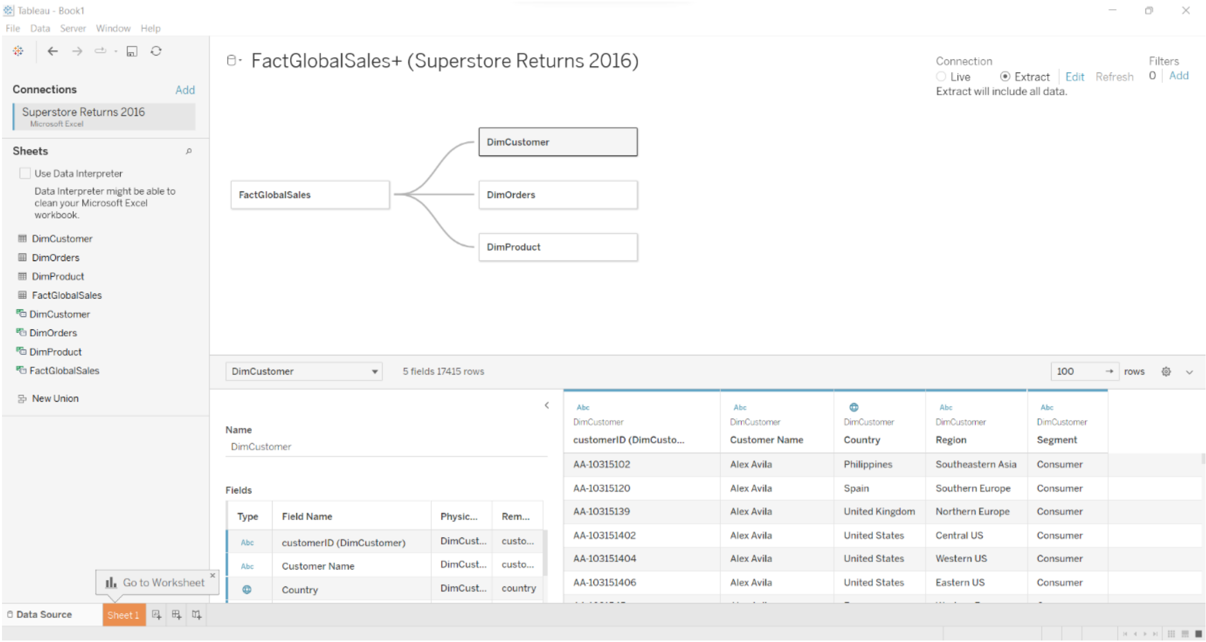
1. Opened Tableau Desktop and selected the Excel file import option.
2. Navigated to the folder containing the extracted file and chose the relevant sheet.
3. Clicked "Open" to load the file into Tableau.
4. Selected the table format import option, as opposed to text format.
5. Dragged the tables into the working area and created joins between them.
6. Extracted the data and verified for errors; none were detected (see screenshot).

### Tableau's Automated Relationship Building

Tableau automatically established relationships between tables based on unique keys, streamlining the data preparation process.

## Next Steps

With the data successfully imported and error-free, I proceeded to create sheets and build visuals.



FactGlobalSales+ (Superstore Returns 2016)

Connection ○ Live ● Extract Edit Refresh
Extract will include all data.

Filters 0 Add

Superstore Returns 2016
Microsoft Excel

□ Use Data Interpreter
Data Interpreter might be able to clean your Microsoft Excel workbook.

DimCustomer
DimOrders
DimProduct
FactGlobalSales
DimCustomer
DimOrders
DimProduct
FactGlobalSales

DimCustomer — 5 fields 17415 rows — 100 rows

Name
DimCustomer

Fields

| Type | Field Name | Physic... | Rem... |
|---|---|---|---|
| Abc | customerID (DimCustomer) | DimCust... | custo... |
| Abc | Customer Name | DimCust... | custo... |
| 🌐 | Country | DimCust... | country |

| Abc<br>DimCustomer<br>customerID (DimCusto... | Abc<br>DimCustomer<br>Customer Name | 🌐<br>DimCustomer<br>Country | Abc<br>DimCustomer<br>Region | Abc<br>DimCustomer<br>Segment |
|---|---|---|---|---|
| AA-10315102 | Alex Avila | Philippines | Southeastern Asia | Consumer |
| AA-10315120 | Alex Avila | Spain | Southern Europe | Consumer |
| AA-10315139 | Alex Avila | United Kingdom | Northern Europe | Consumer |
| AA-103151402 | Alex Avila | United States | Central US | Consumer |
| AA-103151404 | Alex Avila | United States | Western US | Consumer |
| AA-103151406 | Alex Avila | United States | Eastern US | Consumer |

***Figure 2:** Tables Extracted and Relationships created.*

This figure created above illustrates the successful extraction of tables from the Superstore dataset and the automated relationship building process in Tableau. The image shows:

- Five extracted tables: Orders, Customers, Products, Returns, and Sales

- Established relationships between tables based on unique keys

- Tableau's automatic join functionality enables seamless data integration and analysis

## Task 2: Editing Data in Tableau

### 1. Introduction to Tableau's data editing capabilities

Tableau, a visualization tool, leverages dimensions and measures to create custom charts.

### 2. Challenges with large datasets

Handling large datasets can be challenging, particularly when presenting multiple entries on a single sheet.

### 3. Tableau's filter options

However, Tableau's robust filter options simplify data management, allowing users to fetch specific information. These filters are accessible during data import and sheet creation.

### Task 3: Creating Powerful Columns, Parameters, and Measures in Tableau Desktop

Unlike Power BI, Tableau builds views on separate sheets. To analyze the Superstore dataset, we created distinct views.

### Creating Columns, Parameters, and Measures

Tableau automatically divided our dataset into dimensions and measures. We defined parameters and crafted simple formulas using calculated fields to create columns.

### Parameter Creation

Parameters enable users to customize views. Tableau uses parameters to filter dates, numbers, and strings, replacing constant values. Users can create parameters in four steps.

### Use Cases

### Parameters offer numerous benefits, including:

- Customizable views
- Dynamic charts and visualizations
- Actionable dashboards

### Formulas for Parameter Creation

Tableau supports various formulas using dates, integers, and string values. For this experiment, we utilized two formulas to create sales and profit views.

## Task 4: Creating Visuals for Dashboard Analysis using Charts in Tableau Desktop

Although creating graphics in Tableau seems straightforward, working with large datasets requires technical expertise. To provide comprehensive insights, we created multiple charts displaying the same data from various dimensions.

### Objective:

Create dynamic comparisons of Superstore dataset's sales and profit analyses for the marketing team.

### Methodology:

1. Created a parameter: "Sum of Profit or Sum of Sales" to allow viewers to choose between sales and profit views.

2. Developed a calculated field: "Choose Profit or Sales" using a case statement to reference the parameter.

## Calculated Field Formula:

*CASE [Sum or Profit or Sum of Sale]*

*WHEN 1 THEN SUM([Profit])*

*WHEN 2 THEN SUM([Sales])*

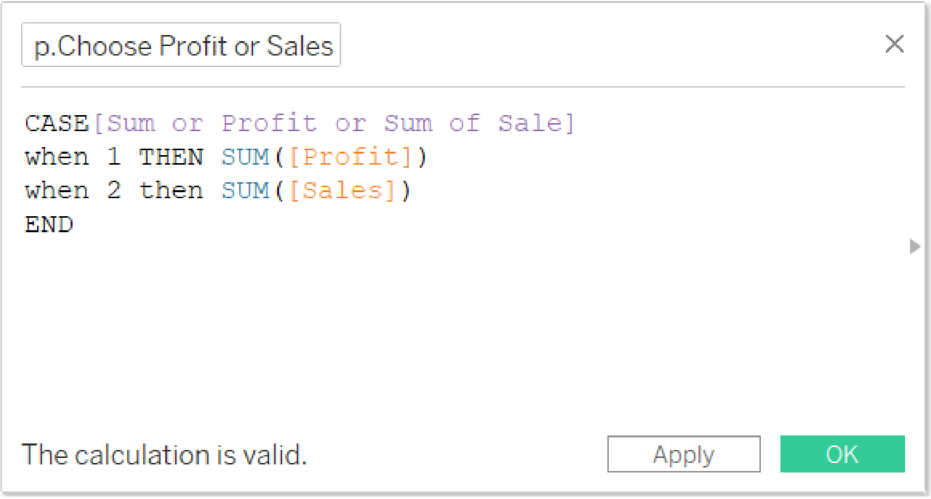
*END*

1. Dragged and dropped tables into columns and rows to create visualizations.

## Results:

The created parameter enables users to toggle between sales and profit views in the parameter panel.

## Visualizations:

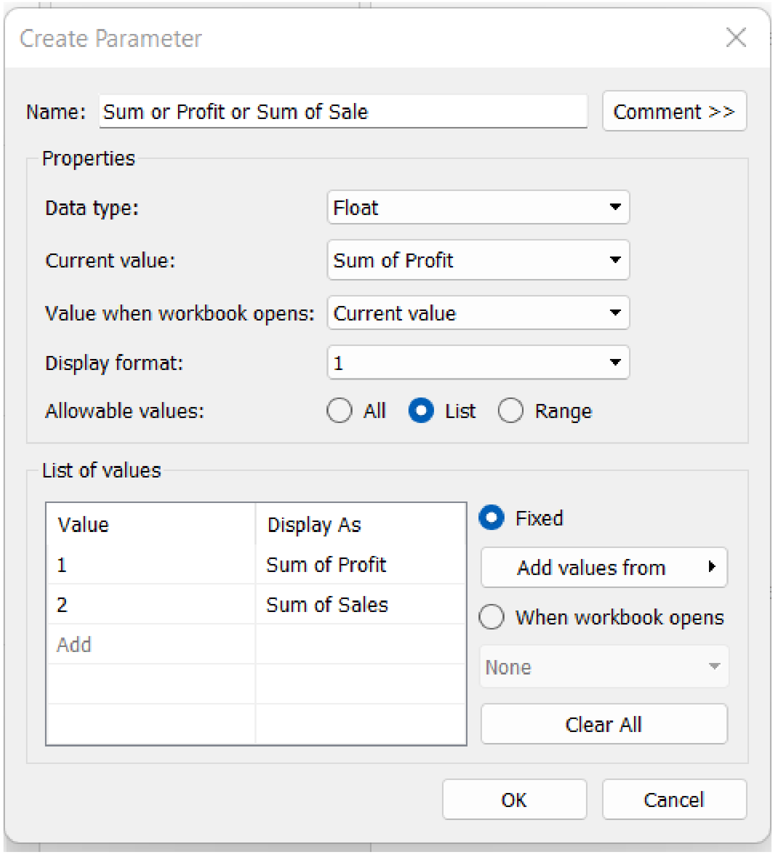


```
CASE[Sum or Profit or Sum of Sale]
when 1 THEN SUM([Profit])
when 2 then SUM([Sales])
END
```

The calculation is valid.

***Figure 3:*** *Calculated field to sum either sale of profit*

## *Sheet1*



Name: Sum or Profit or Sum of Sale

Properties

Data type: Float

Current value: Sum of Profit

Value when workbook opens: Current value

Display format: 1

Allowable values: ○ All ● List ○ Range

List of values

| Value | Display As |
|---|---|
| 1 | Sum of Profit |
| 2 | Sum of Sales |
| Add | |

● Fixed

○ When workbook opens

None

To the Parameter in Tableau as displayed above we used: Sum of Profit or Sum of Sales

To do so we used the following steps:

1. we clicked and went to "Dimensions" in the Data pane.

2. Right-clicked and selected the "Create" > "Parameter".

3. We named the parameter: "Sum or Profit or Sum of Sale".

4. Set the Data Type to: Float.

5. Set Current Value: sum of profit.

6. Finally, we clicked "OK".

**Parameters are used to:**

- Create a calculated field referencing this parameter.
- Used to create parameters in charts and visualizations.
- Helps users to toggle between sum of profit and sum of sales in visualizations.

## Tableau's intuitive features facilitate the creation of self-explanatory dashboards.

### Chart Description:

This scattered chart visualizes the relationship between Sum of Sales and Profit.

Configuration:

- X-axis: Sum of Sales
- Y-axis: Profit
- Marks: Circle (or other desired shape)
- Color: (optional, e.g., by region or category)
- Size: (optional, e.g., by quantity)

### Example Screenshot:

### Scattered Chart in Tableau: Sum of Sales vs. Profit

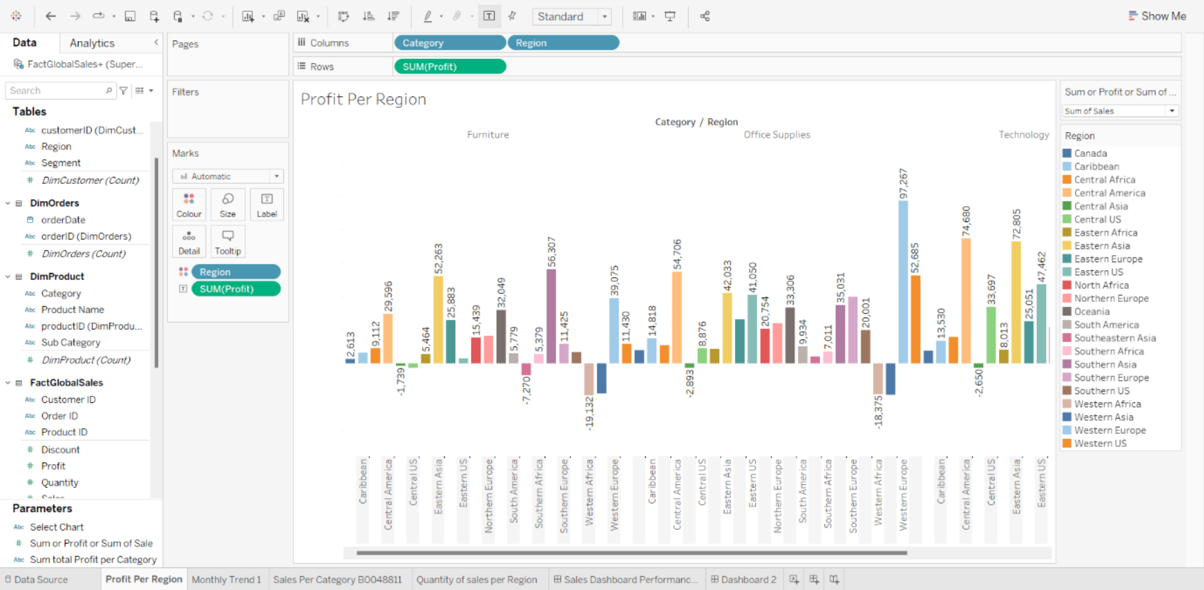


***Chart 1:*** *Scattered chart Tableau showing sum of sales and Profit.*

## Sheet 2

## Continuous line Chart

## Line Chart: Business Trends

### Chart Description:

This line chart illustrates the business trends over time, showcasing the fluctuations in sales and profit.

### Configuration:

- X-axis: Date (Continuous)

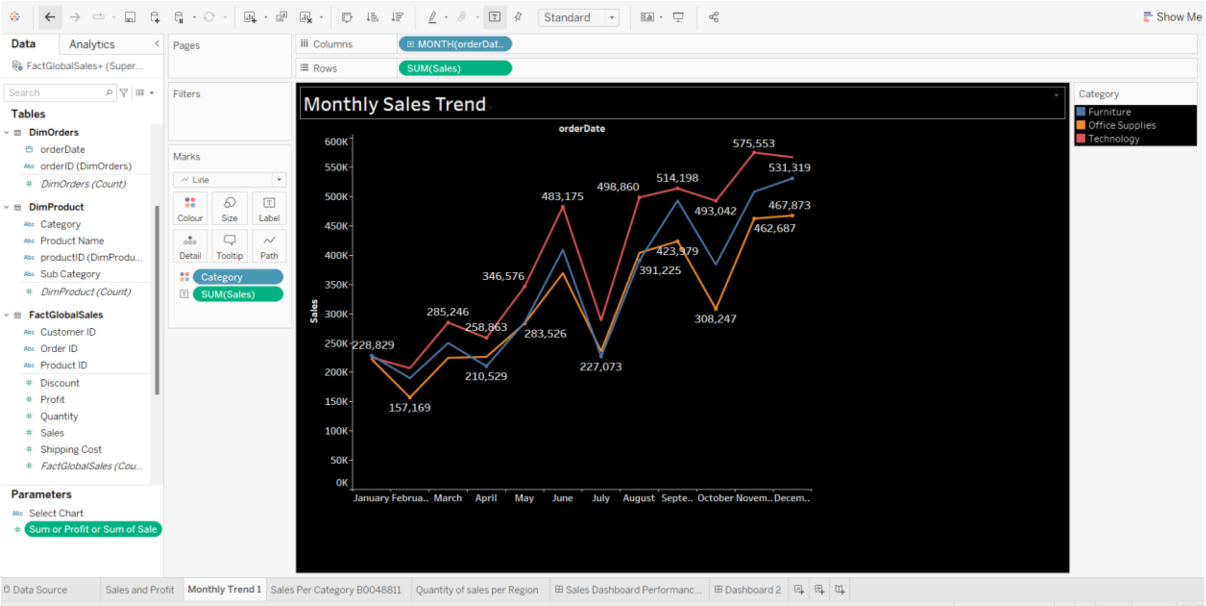
- Y-axis: Sum of Sales and Profit

- Lines: Sales and Profit

- Color: Sales (e.g., blue) and Profit (e.g., green)

- Legend: Sales and Profit

## Example Screenshot:



Columns: MONTH(orderDat..

Rows: SUM(Sales)

Marks: Line

Category

SUM(Sales)

***Chart 2**: Line chart showing business Trends.*

## Chart 3

## Circle chart.

Circle Chart (Pie Chart): Sum of Products per Category

## Chart Description:

This circle chart displays the distribution of products across different categories.

## Configuration:

- Dimension: Category
- Measure: Sum of Products
- Color: Category
- Size: Sum of Products

## Example Screenshot:

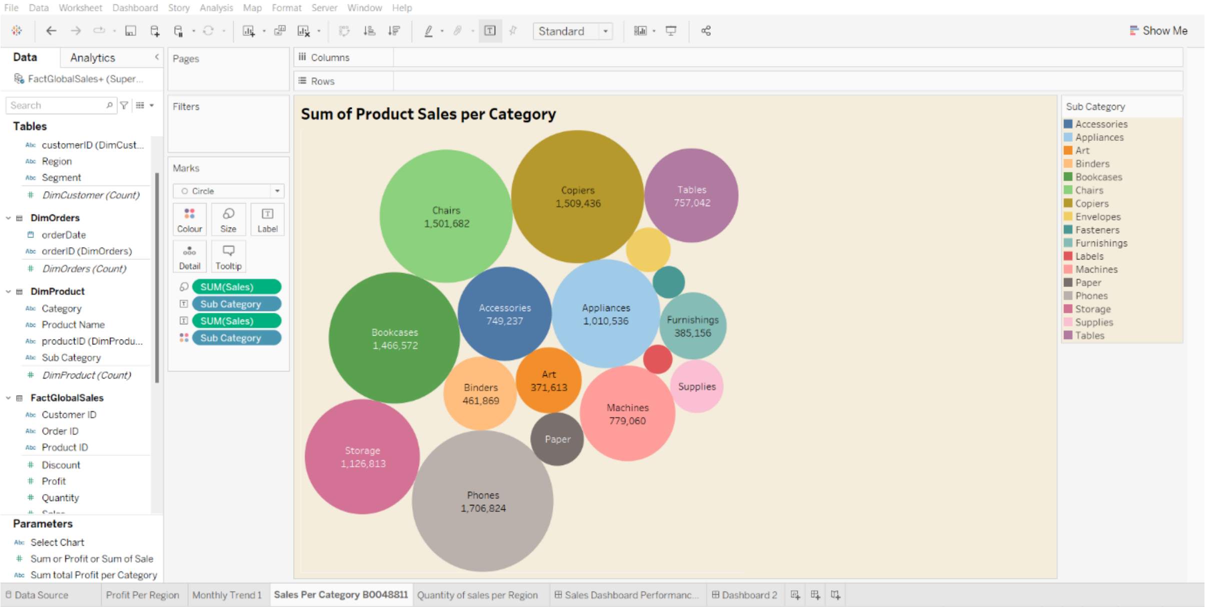


**Chart 3:** Circle chart depicting the sum of Products per Category

## Chart 4: Regional Sales Fluctuation Box Chart

This box chart visualizes the fluctuations in sales data across different regions. The box chart reveals variations in sales performance across regions, enabling identification of:

- Regions with highest/lowest sales
- Sales distribution and outliers
- Potential areas for improvement

## Box Chart: Quantity of Sales per Region

### *Chart 4: Regional Sales Fluctuation Box Chart*

This box chart visualizes the fluctuations in sales data across different regions.

### Configuration:

- Dimension: Region (Columns)
- Measure: Quantity (Rows)
- Detail: Customer Information (unchecked)

### Chart Description:

This box chart compares the distribution of sales quantities across different regions.

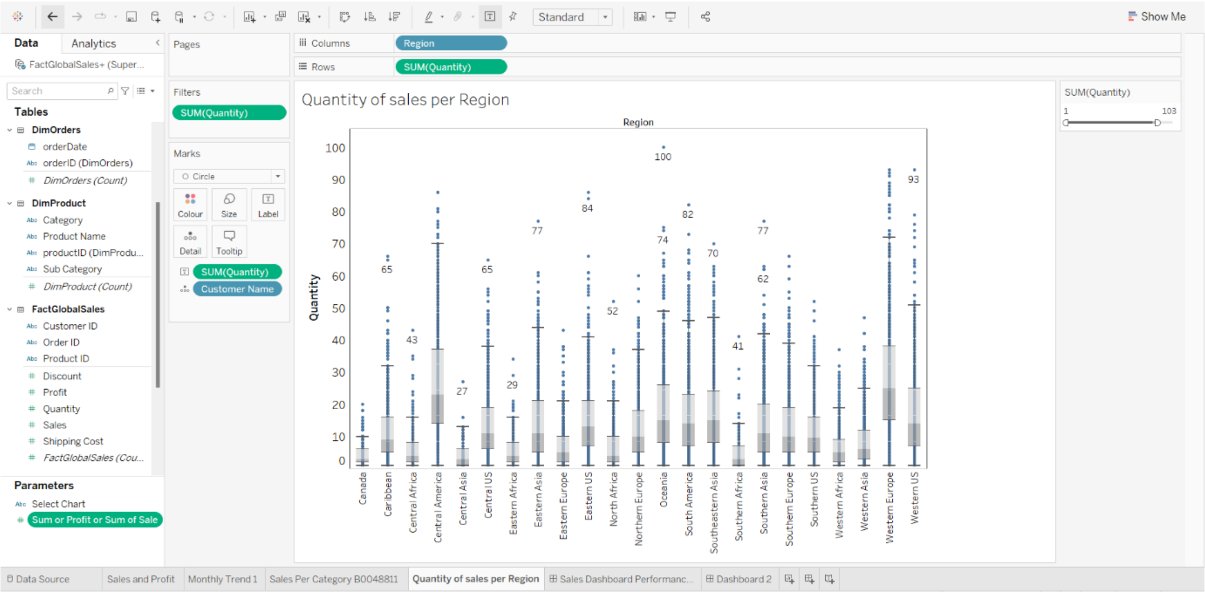
### Configuration:

- Dimension: Region
- Measure: Quantity of Sales

- Color: Region

This chart reveals:

- Regional sales performance
- Sales distribution and variability
- Outliers (exceptionally high/low sales)
- Regions requiring improvement



Columns: Region

Rows: SUM(Quantity)

Filters: SUM(Quantity)

Marks: Circle

SUM(Quantity)

Customer Name

Quantity of sales per Region

***Chart 4:*** *Box chart Analysing quantity of Sales per Region*

## Circle Chart (Pie Chart): Sum of Sales by Product Category

### Chart Description:

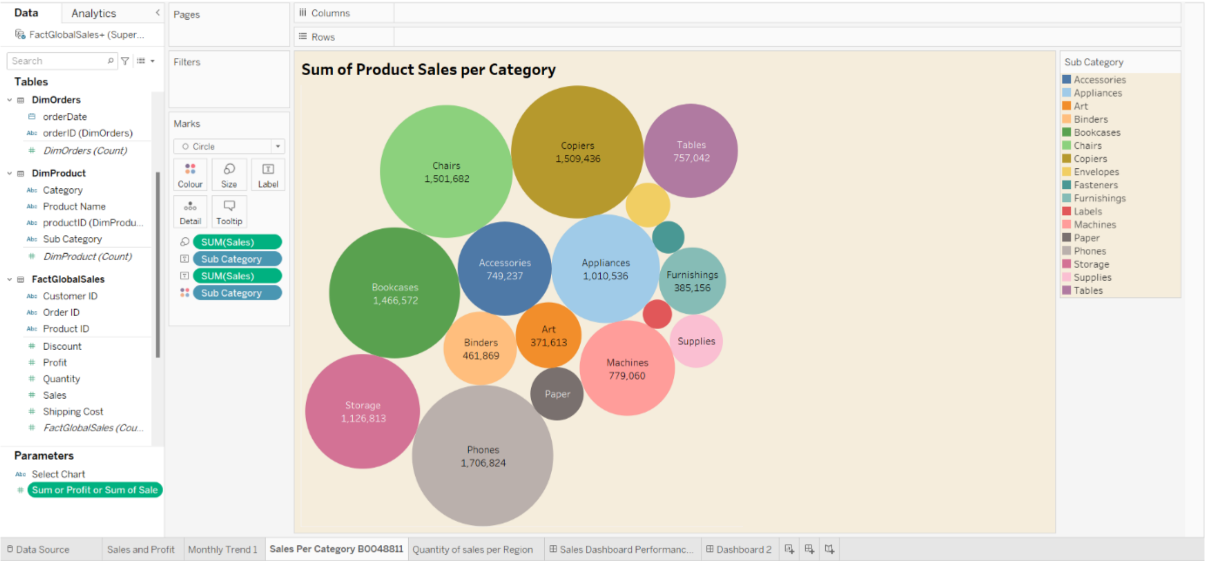
This circle chart displays the distribution of total sales across different product categories.

## Configuration:

- Dimension: Product Category
- Measure: Sum of Sales
- Color: Product Category

## This chart helps identify:

- Top-selling product categories
- Underperforming categories
- Sales distribution across categories
- Opportunities for product development



Marks: ○ Circle

- SUM(Sales)
- Sub Category
- SUM(Sales)
- Sub Category

***Chart 5**: Sum of Sales pe Product Category*

Task 5: Dashboard Performance using Tableau

## Dashboard Overview:

The sales performance dashboard provides an interactive view of the company's monthly sales, categorized by product. The dashboard offers additional insights into sales and profits, with parameter-driven views allowing users to toggle between different perspectives.

## Key Features:

1. Monthly Sales by Product Category
2. Sales and Profit Analysis
3. Parameter-driven views for dynamic analysis
4. Interactive filtering and drilling capabilities

## Dashboard Components:

1. Sales by Product Category Chart
2. Sales and Profit Metrics
3. Parameter Control (e.g., Sum of Sales, Sum of Profit)
4. Date Filter (e.g., Month, Quarter, Year)

## Insights and Benefits:

1. Identify top-selling product categories
2. Analyze sales trends and seasonality
3. Evaluate profit margins and sales performance
4. Make data-driven decisions with interactive filtering

## Uses in Tableau:

1. Use dashboards to combine multiple views
2. Leverage parameters for dynamic analysis
3. Implement interactive filters for user engagement

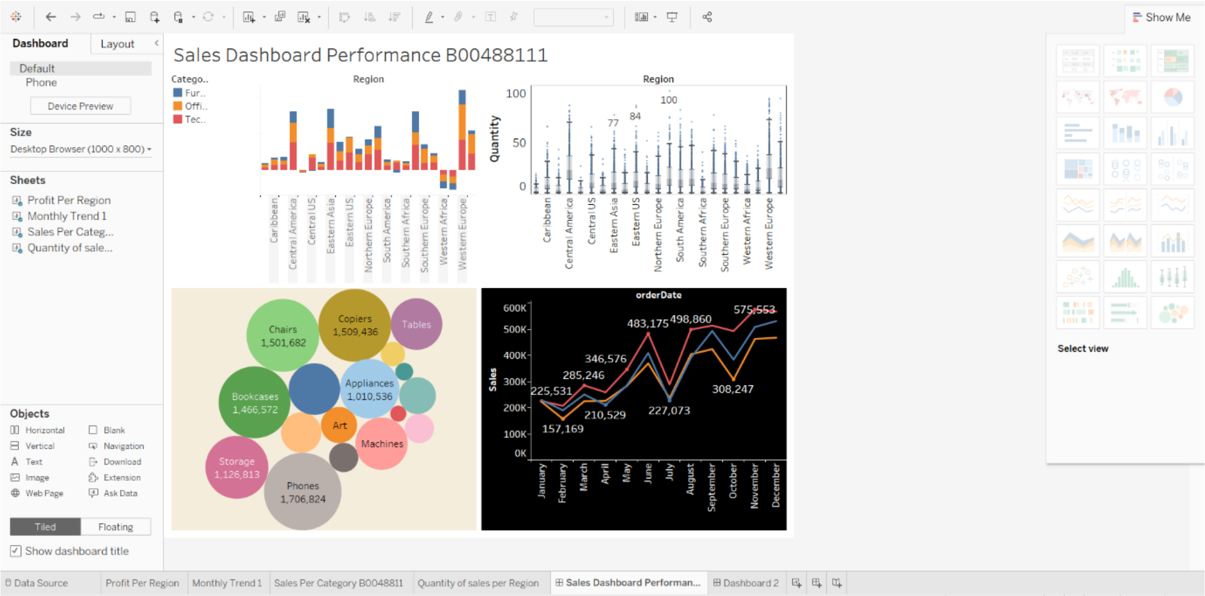


*__Chart 6:__ Dashboard 1 toggle action showing only two sheets at a time.*

## Dashboard 2

## Dashboard 2 Toggle Action

Description:

This dashboard presents a toggle action that switches between three sheets, providing a dynamic view of sales and profit data.

## Insights:

### This dashboard allows users to:

1. Analyze sales by region
2. Examine sales by product category
3. Evaluate profit trends by quarter
4. Seamlessly switch between views using the toggle action

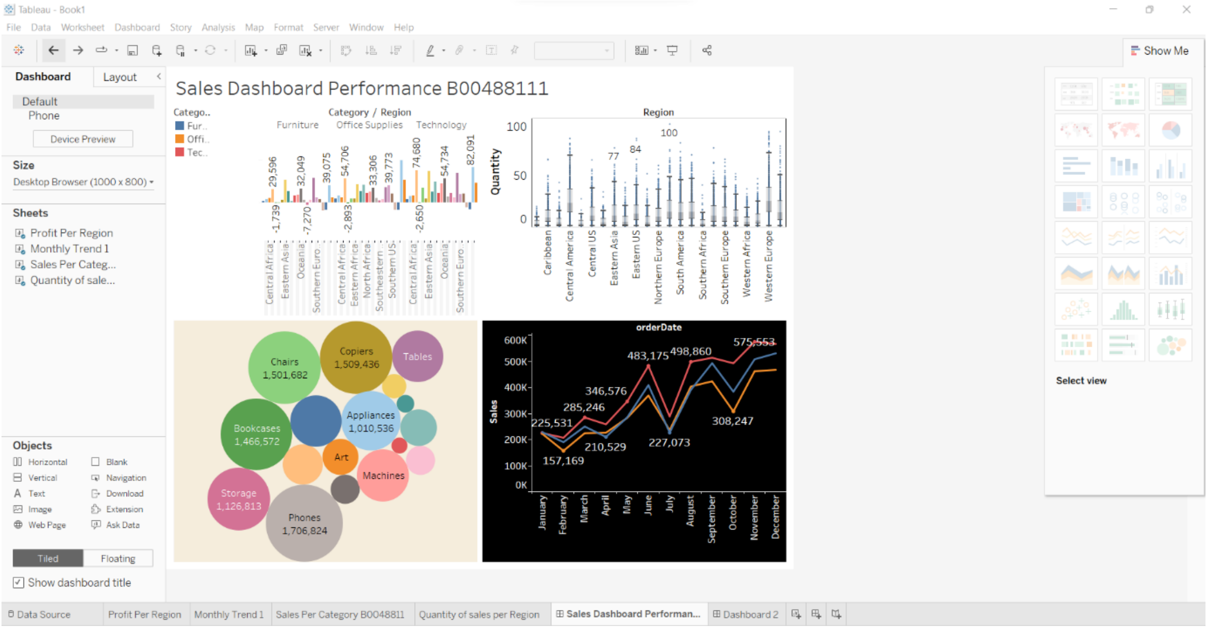


*Chart 7:* *Dashboard 2 toggle action presenting three sheets.*

## Understanding Datasets in Power BI Desktop

### Building Powerful Dashboards for Business Analysis

Power BI Desktop's intuitive graphical user interface enables users to upload data from various sources, including relational and non-relational databases, file formats, and Excel sheets. Users can refine and edit datasets using Power Query Editor and column/row editing.

### Five-Step Process for Building Powerful Visuals in Power BI

Our dataset consists of a single Excel sheet containing four-dimension tables, cleaned using ETL processes. The dataset comprises four tables:

1. Dim Order
2. Dim Product
3. Dim Customer
4. Facts Global Sales

## Task 1: Importing Datasets into Power BI

Power BI supports data import from various sources:

### File-based sources:

1. Excel workbook
2. Text/CSV
3. XML
4. JSON
5. FOLDER
6. PDF
7. SharePoint folder

### Database sources:

1. Access database
2. SQL Server database

3. Analysis Services databases

4. Server Analysis Services database

5. Oracle database

6. IBM Db2 Database

7. IBM Informix database (Beta)

8. IBM Netezza

9. MySQL database

10. PostgreSQL database

These databases store data in different formats, use various queries and codes, and perform ETL (Extract, Transform, Load) tasks.

**Database types:**

1. Relational databases (e.g., SQL Server, Oracle)

2. NoSQL databases (e.g., MongoDB, Cassandra)

**For this demonstration:**

We're using an Excel sheet containing:

1. Three-dimension tables

2. One fact table

**Power BI Import Channels:**

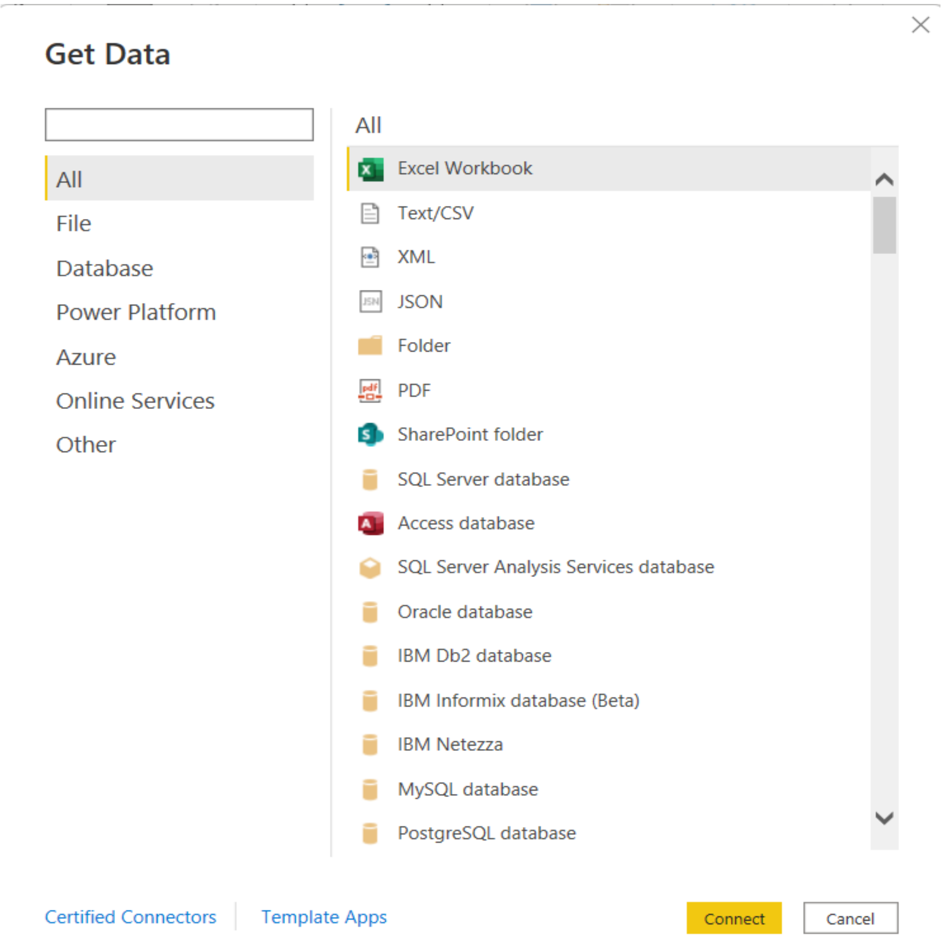


**Figure 4**: Power BI Import Data Options

**Next Steps**:

1. Connect to the Excel file
2. Select the tables to import
3. Transform and clean the data using Power Query Editor

## Task 2: Editing Data using Power Query Editor

Power BI's Query Editor, also known as Get and Transform, utilizes the 'M' programming language to edit and transform data.

### Key Features:

1. Table and column editing
2. Importing additional tables
3. Data cleaning and transformation
4. Error-free data upload

### Power BI Graphical User Interface (GUI):

1. Pages for creating visuals (unlike Tableau's sheets)
2. Ribbon tabs: Home, Insert, Modelling, and View
3. Imported data displayed on the right-hand side
4. View Table option on the left for Report, Data, and Model

### Data Import and Transformation:

1. Supports various data types (e.g., text files, databases, Excel, HTML, online tables, XML Endpoint results)
2. 'M' programming language reads and processes table codes
3. Advanced query window for complex transformations

3. Advanced query window for complex transformations

4. Built-in data cleaning methods using 'M' functions

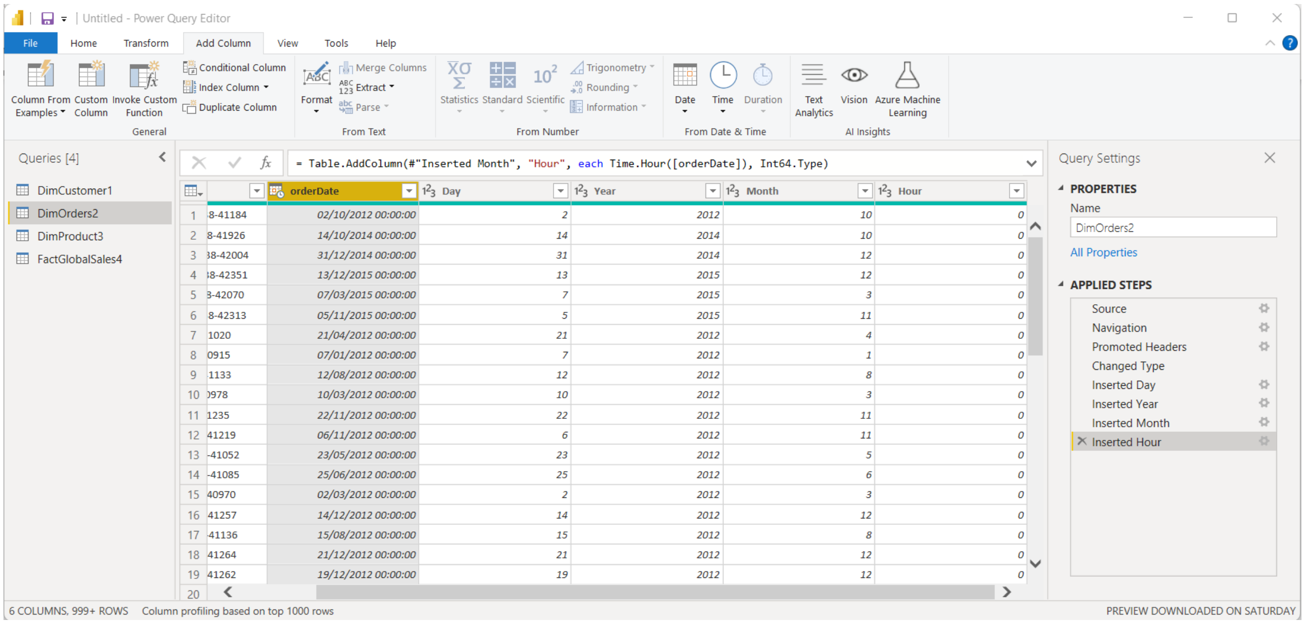
### Benefits:

1. Efficient data transformation and cleaning

2. Error-free data upload

3. Seamless integration with Power BI desktop

4. Robust data modeling and visualization capabilities



```
= Table.AddColumn(#"Inserted Month", "Hour", each Time.Hour([orderDate]), Int64.Type)
```

| | | orderDate | Day | Year | Month | Hour |
|---|---|---|---|---|---|---|
| 1 | 8-41184 | 02/10/2012 00:00:00 | 2 | 2012 | 10 | 0 |
| 2 | 8-41926 | 14/10/2014 00:00:00 | 14 | 2014 | 10 | 0 |
| 3 | 38-42004 | 31/12/2014 00:00:00 | 31 | 2014 | 12 | 0 |
| 4 | 38-42351 | 13/12/2015 00:00:00 | 13 | 2015 | 12 | 0 |
| 5 | 3-42070 | 07/03/2015 00:00:00 | 7 | 2015 | 3 | 0 |
| 6 | 8-42313 | 05/11/2015 00:00:00 | 5 | 2015 | 11 | 0 |
| 7 | 1020 | 21/04/2012 00:00:00 | 21 | 2012 | 4 | 0 |
| 8 | 0915 | 07/01/2012 00:00:00 | 7 | 2012 | 1 | 0 |
| 9 | 1133 | 12/08/2012 00:00:00 | 12 | 2012 | 8 | 0 |
| 10 | 0978 | 10/03/2012 00:00:00 | 10 | 2012 | 3 | 0 |
| 11 | 1235 | 22/11/2012 00:00:00 | 22 | 2012 | 11 | 0 |
| 12 | 41219 | 06/11/2012 00:00:00 | 6 | 2012 | 11 | 0 |
| 13 | -41052 | 23/05/2012 00:00:00 | 23 | 2012 | 5 | 0 |
| 14 | -41085 | 25/06/2012 00:00:00 | 25 | 2012 | 6 | 0 |
| 15 | 40970 | 02/03/2012 00:00:00 | 2 | 2012 | 3 | 0 |
| 16 | 41257 | 14/12/2012 00:00:00 | 14 | 2012 | 12 | 0 |
| 17 | 41136 | 15/08/2012 00:00:00 | 15 | 2012 | 8 | 0 |
| 18 | 41264 | 21/12/2012 00:00:00 | 21 | 2012 | 12 | 0 |
| 19 | 41262 | 19/12/2012 00:00:00 | 19 | 2012 | 12 | 0 |
| 20 | | | | | | |

Source
Navigation
Promoted Headers
Changed Type
Inserted Day
Inserted Year
Inserted Month
Inserted Hour

6 COLUMNS, 999+ ROWS    Column profiling based on top 1000 rows    PREVIEW DOWNLOADED ON SATURDAY

*Figure 5:* Screenshot of extracted columns on table Orders.

**Figure 28: Extracted Columns on Table Orders**

This screenshot displays the extracted columns on the Table Orders after applying transformations using Power BI's Query Editor.

## Query Editor Code:

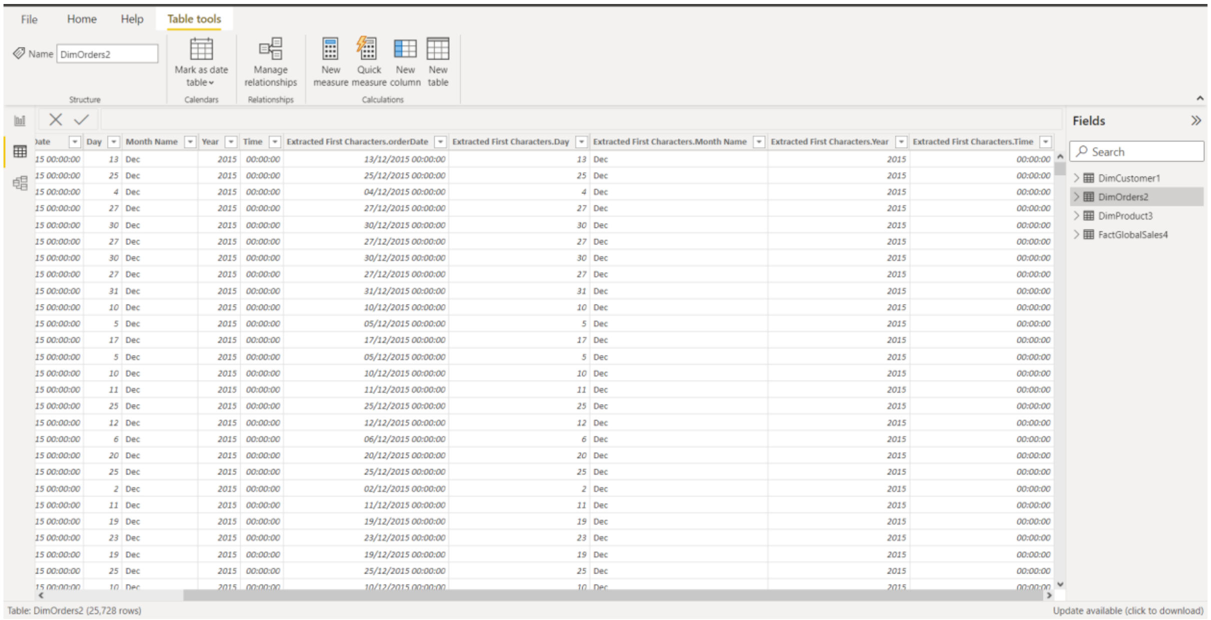
The code snippet below illustrates the transformations applied to the DimOrders table:

```
let
    Source = Excel.Workbook(File.Contents("C:\Users\ngong\Desktop\SQL Database\Superstore
Returns 2016.xlsx"), null, true),
    DimOrders_DefinedName = Source {[Item="DimOrders", Kind="DefinedName"]} [Data],
    #"Promoted Headers" = Table.PromoteHeaders(DimOrders_DefinedName,
[PromoteAllScalars=true]),
    #"Changed Type" = Table.TransformColumnTypes(#"Promoted Headers", {{"orderID", type
text}, {"orderDate", type datetime}}),
    #"Inserted Day" = Table.AddColumn(#"Changed Type", "Day", each Date.Day([orderDate]),
Int64.Type),
    #"Inserted Month Name" = Table.AddColumn(#"Inserted Day", "Month Name", each
Date.MonthName([orderDate]), type text),
    #"Inserted Year" =

Table.AddColumn(#"Inserted Month Name", "Year", each Date.Year([orderDate]), Int64.Type),
    #"Inserted Time" = Table.AddColumn(#"Inserted Year", "Time", each
DateTime.Time([orderDate]), type time),
    #"Extracted First Characters" = Table.TransformColumns(#"Inserted Time", {{"Month
Name", each Text.Start(_, 3), type text}}),
    #"Merged Queries" = Table.NestedJoin(#"Extracted First Characters", {"orderID"},
#"Extracted First Characters", {"orderID"}, "Extracted First Characters", JoinKind.LeftOuter),
    #"Expanded Extracted First Characters" = Table.ExpandTableColumn(#"Merged Queries",
"Extracted First Characters", {"orderDate", "Day", "Month Name", "Year", "Time"},
{"Extracted First Characters.orderDate", "Extracted First Characters.Day", "Extracted First
Characters.Month Name", "Extracted First Characters.Year", "Extracted First
Characters.Time"})
in
    #"Expanded Extracted First Characters"
```

## **Power BI Query Editor Features**:

1. Edit column options
2. Date and time group
3. Transform options
4. Merge queries
5. SQL query integration



| Date | Day | Month Name | Year | Time | Extracted First Characters.orderDate | Extracted First Characters.Day | Extracted First Characters.Month Name | Extracted First Characters.Year | Extracted First Characters.Time |
|---|---|---|---|---|---|---|---|---|---|
| 15 00:00:00 | 13 | Dec | 2015 | 00:00:00 | 13/12/2015 00:00:00 | 13 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 25 | Dec | 2015 | 00:00:00 | 25/12/2015 00:00:00 | 25 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 4 | Dec | 2015 | 00:00:00 | 04/12/2015 00:00:00 | 4 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 27 | Dec | 2015 | 00:00:00 | 27/12/2015 00:00:00 | 27 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 30 | Dec | 2015 | 00:00:00 | 30/12/2015 00:00:00 | 30 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 27 | Dec | 2015 | 00:00:00 | 27/12/2015 00:00:00 | 27 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 30 | Dec | 2015 | 00:00:00 | 30/12/2015 00:00:00 | 30 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 27 | Dec | 2015 | 00:00:00 | 27/12/2015 00:00:00 | 27 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 31 | Dec | 2015 | 00:00:00 | 31/12/2015 00:00:00 | 31 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 10 | Dec | 2015 | 00:00:00 | 10/12/2015 00:00:00 | 10 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 5 | Dec | 2015 | 00:00:00 | 05/12/2015 00:00:00 | 5 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 17 | Dec | 2015 | 00:00:00 | 17/12/2015 00:00:00 | 17 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 5 | Dec | 2015 | 00:00:00 | 05/12/2015 00:00:00 | 5 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 10 | Dec | 2015 | 00:00:00 | 10/12/2015 00:00:00 | 10 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 11 | Dec | 2015 | 00:00:00 | 11/12/2015 00:00:00 | 11 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 25 | Dec | 2015 | 00:00:00 | 25/12/2015 00:00:00 | 25 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 12 | Dec | 2015 | 00:00:00 | 12/12/2015 00:00:00 | 12 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 6 | Dec | 2015 | 00:00:00 | 06/12/2015 00:00:00 | 6 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 20 | Dec | 2015 | 00:00:00 | 20/12/2015 00:00:00 | 20 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 25 | Dec | 2015 | 00:00:00 | 25/12/2015 00:00:00 | 25 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 2 | Dec | 2015 | 00:00:00 | 02/12/2015 00:00:00 | 2 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 11 | Dec | 2015 | 00:00:00 | 11/12/2015 00:00:00 | 11 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 19 | Dec | 2015 | 00:00:00 | 19/12/2015 00:00:00 | 19 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 23 | Dec | 2015 | 00:00:00 | 23/12/2015 00:00:00 | 23 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 19 | Dec | 2015 | 00:00:00 | 19/12/2015 00:00:00 | 19 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 25 | Dec | 2015 | 00:00:00 | 25/12/2015 00:00:00 | 25 | Dec | 2015 | 00:00:00 |
| 15 00:00:00 | 10 | Dec | 2015 | 00:00:00 | 10/12/2015 00:00:00 | 10 | Dec | 2015 | 00:00:00 |

Table: DimOrders2 (25,728 rows)

Update available (click to download)

***Figure 6****: Results of Extraction Query*

Figure 29: Results of Extraction Query

This figure displays the results of the extraction query applied to the DimCustomer table.

## **Query Editor Code:**

*let*

```
    Source = Excel.Workbook(File.Contents("C:\Users\ngong\Desktop\SQL Database\Superstore Returns 2016.xlsx"), null, true),
    DimCustomer_DefinedName = Source {[Item="DimCustomer", Kind="DefinedName"]}[Data],
    #"Changed Type" = Table.TransformColumnTypes(DimCustomer_DefinedName,
        {
            {"Column1", type text},
            {"Column2", type text},
            {"Column3", type text},
            {"Column4", type text},
            {"Column5", type text}
        })
        })
in
    #"Changed Type"
```

## Query Details:

- Source file: Superstore Returns 2016.xlsx
- Worksheet: DimCustomer
- Transformations:
    - Changed data types for columns 1-5 to text

## Power BI Query Editor Features Demonstrated:

- *Data type transformation*
- *Excel workbook import*
- *Defined name extraction*

## Task 3: Create Powerful Columns and Measures using Calculated Fields

In this section, we'll create new columns and measures to analyze sales data.

### Calculated Columns:

1. Total Buying Value: Calculates the total buying price of products.

Formula: Total Buying Value = FactGlobalSales4[Quantity] * FactGlobalSales4[Sales]

2. Total Selling Value: Calculates the total selling price of products, considering discounts.

Formula: Total Selling Value = FactGlobalSales4[Quantity] * FactGlobalSales4[Profit] * (1 - FactGlobalSales4[Discount])

### Calculated Measures:

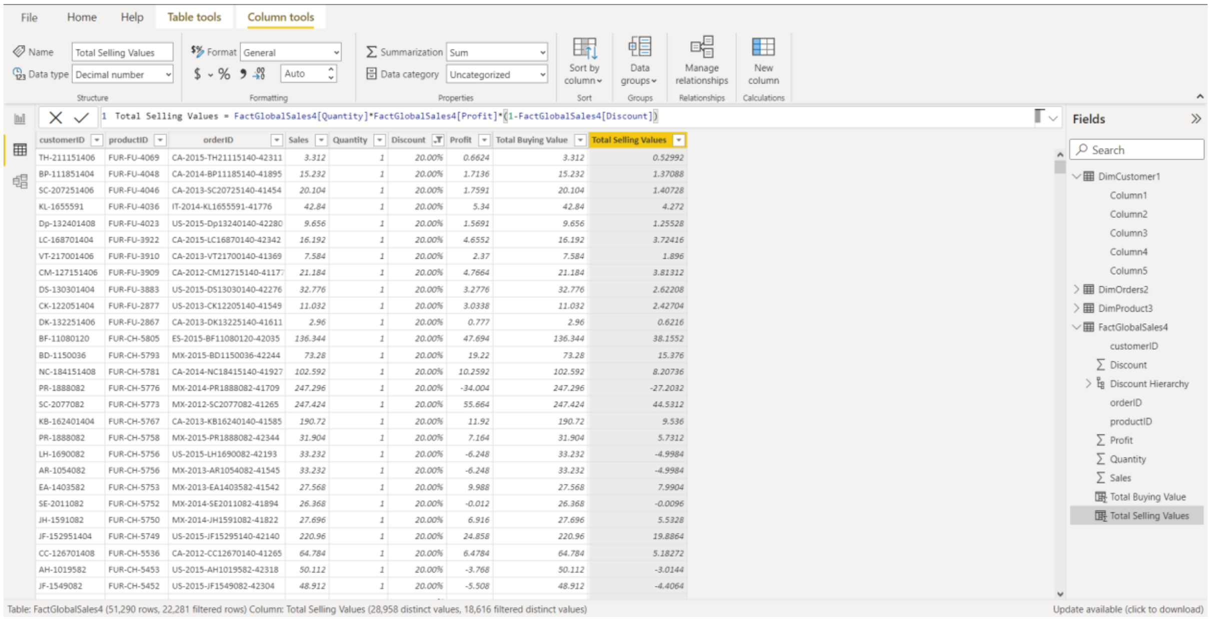
1. Profit: Calculates the profit for each product.

Formula: Profit = Total Selling Value - Total Buying Value

2. Profit Percentage: Calculates the profit percentage for each product.

Formula: Profit Percentage = (Profit / Total Selling Value) * 100

Figure 19: Screenshot of Calculated Columns



Name: Total Selling Values
Data type: Decimal number
Format: General
Summarization: Sum
Data category: Uncategorized

```
1  Total Selling Values = FactGlobalSales4[Quantity]*FactGlobalSales4[Profit]*(1-FactGlobalSales4[Discount])
```

| customerID | productID | orderID | Sales | Quantity | Discount | Profit | Total Buying Value | Total Selling Values |
|---|---|---|---|---|---|---|---|---|
| TH-211151406 | FUR-FU-4069 | CA-2015-TH21115140-42311 | 3.312 | 1 | 20.00% | 0.6624 | 3.312 | 0.52992 |
| BP-111851404 | FUR-FU-4048 | CA-2014-BP11185140-41895 | 15.232 | 1 | 20.00% | 1.7136 | 15.232 | 1.37088 |
| SC-207251406 | FUR-FU-4046 | CA-2013-SC20725140-41454 | 20.104 | 1 | 20.00% | 1.7591 | 20.104 | 1.40728 |
| KL-1655591 | FUR-FU-4036 | IT-2014-KL1655591-41776 | 42.84 | 1 | 20.00% | 5.34 | 42.84 | 4.272 |
| Dp-132401408 | FUR-FU-4023 | US-2015-Dp13240140-42280 | 9.656 | 1 | 20.00% | 1.5691 | 9.656 | 1.25528 |
| LC-168701404 | FUR-FU-3922 | CA-2015-LC16870140-42342 | 16.192 | 1 | 20.00% | 4.6552 | 16.192 | 3.72416 |
| VT-217001406 | FUR-FU-3910 | CA-2013-VT21700140-41369 | 7.584 | 1 | 20.00% | 2.37 | 7.584 | 1.896 |
| CM-127151406 | FUR-FU-3909 | CA-2012-CM12715140-4117 | 21.184 | 1 | 20.00% | 4.7664 | 21.184 | 3.81312 |
| DS-130301404 | FUR-FU-3883 | US-2015-DS13030140-42276 | 32.776 | 1 | 20.00% | 3.2776 | 32.776 | 2.62208 |
| CK-122051404 | FUR-FU-2877 | US-2013-CK12205140-41549 | 11.032 | 1 | 20.00% | 3.0338 | 11.032 | 2.42704 |
| DK-132251406 | FUR-FU-2867 | CA-2013-DK13225140-41611 | 2.96 | 1 | 20.00% | 0.777 | 2.96 | 0.6216 |
| BF-11080120 | FUR-CH-5805 | ES-2015-BF11080120-42035 | 136.344 | 1 | 20.00% | 47.694 | 136.344 | 38.1552 |
| BD-1150036 | FUR-CH-5793 | MX-2015-BD1150036-42244 | 73.28 | 1 | 20.00% | 19.22 | 73.28 | 15.376 |
| NC-184151408 | FUR-CH-5781 | CA-2014-NC18415140-41927 | 102.592 | 1 | 20.00% | 10.2592 | 102.592 | 8.20736 |
| PR-1888082 | FUR-CH-5776 | MX-2014-PR1888082-41709 | 247.296 | 1 | 20.00% | -34.004 | 247.296 | -27.2032 |
| SC-2077082 | FUR-CH-5773 | MX-2012-SC2077082-41265 | 247.424 | 1 | 20.00% | 55.664 | 247.424 | 44.5312 |
| KB-162401404 | FUR-CH-5767 | CA-2013-KB16240140-41585 | 190.72 | 1 | 20.00% | 11.92 | 190.72 | 9.536 |
| PR-1888082 | FUR-CH-5758 | MX-2015-PR1888082-42344 | 31.904 | 1 | 20.00% | 7.164 | 31.904 | 5.7312 |
| LH-1690082 | FUR-CH-5756 | US-2015-LH1690082-42193 | 33.232 | 1 | 20.00% | -6.248 | 33.232 | -4.9984 |
| AR-1054082 | FUR-CH-5756 | MX-2013-AR1054082-41545 | 33.232 | 1 | 20.00% | -6.248 | 33.232 | -4.9984 |
| EA-1403582 | FUR-CH-5753 | MX-2013-EA1403582-41542 | 27.568 | 1 | 20.00% | 9.988 | 27.568 | 7.9904 |
| SE-2011082 | FUR-CH-5752 | MX-2014-SE2011082-41894 | 26.368 | 1 | 20.00% | -0.012 | 26.368 | -0.0096 |
| JH-1591082 | FUR-CH-5750 | MX-2014-JH1591082-41822 | 27.696 | 1 | 20.00% | 6.916 | 27.696 | 5.5328 |
| JF-152951404 | FUR-CH-5749 | US-2015-JF15295140-42140 | 220.96 | 1 | 20.00% | 24.858 | 220.96 | 19.8864 |
| CC-126701408 | FUR-CH-5536 | CA-2012-CC12670140-41265 | 64.784 | 1 | 20.00% | 6.4784 | 64.784 | 5.18272 |
| AH-1019582 | FUR-CH-5453 | US-2015-AH1019582-42318 | 50.112 | 1 | 20.00% | -3.768 | 50.112 | -3.0144 |
| JF-1549082 | FUR-CH-5452 | US-2015-JF1549082-42304 | 48.912 | 1 | 20.00% | -5.508 | 48.912 | -4.4064 |

Table: FactGlobalSales4 (51,290 rows, 22,281 filtered rows) Column: Total Selling Values (28,958 distinct values, 18,616 filtered distinct values)

***Figure 7:*** *Measures used to create new columns in Power BI*

The screenshot displays the two new columns added to the FactGlobalSales4 table:

| Quantity | Total Buying Value | Total Selling Value | Profit \| | Profit Percentage |
|---|---|---|---|---|

Power BI automatically updates the results for each row.

## Key Takeaways:

1. Calculated columns and measures enable complex calculations.
2. Use formulas to create custom metrics.
3. Apply calculations to entire columns or subsets of data.

## Task: Creating New Measures for Profit Percentage

Step 1: Create Profit Measure

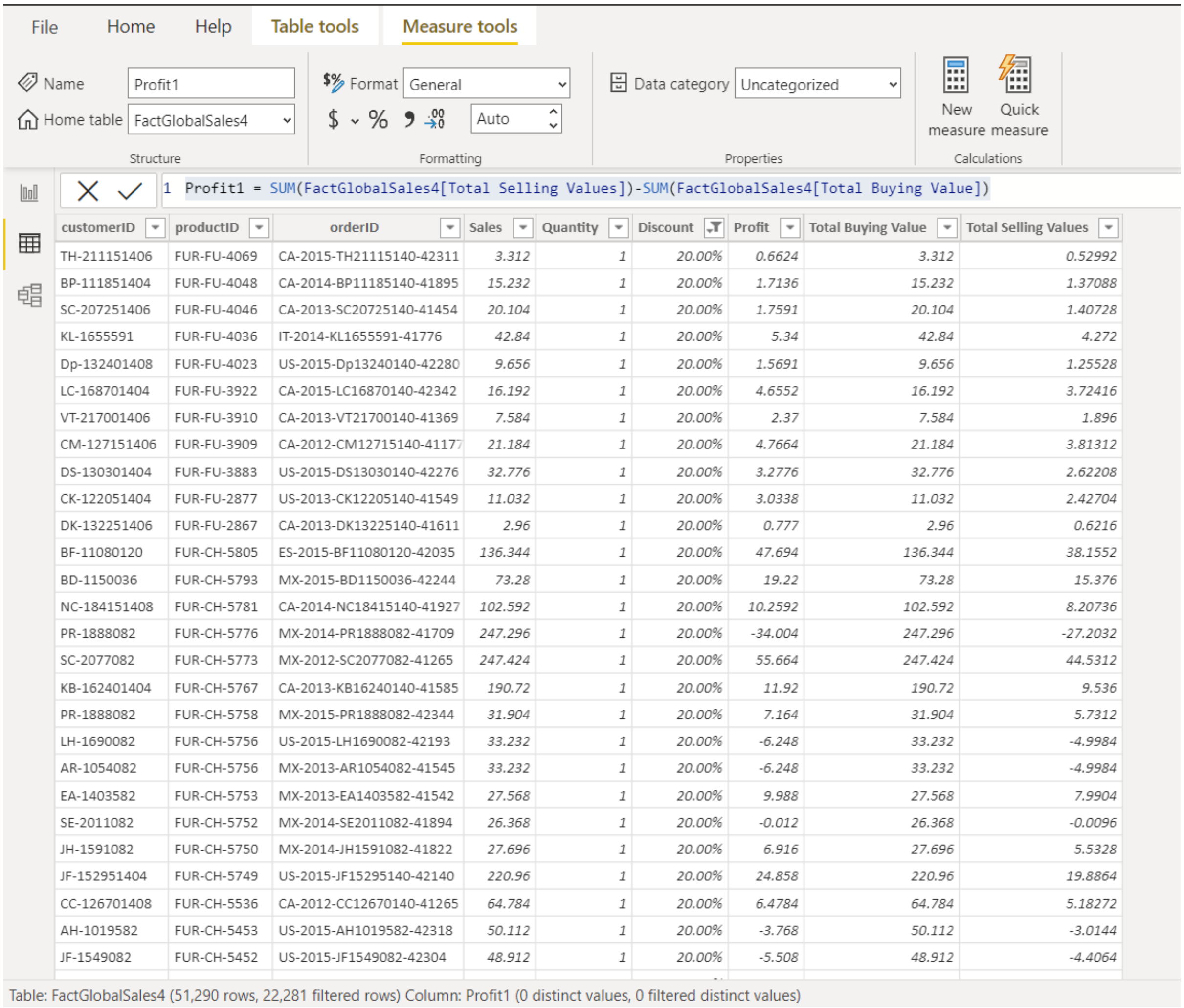
1. Click on the Calculation group on the home screen.
2. Select "New Measure" from the dropdown menu.
3. Name the measure "Profit1" (to avoid conflicts with existing field names).
4. Enter the formula: *Profit1 = SUM (FactGlobalSales4[Total Selling Values]) - SUM (FactGlobalSales4[Total Buying* Value])

### Step 2: Create Profit Percentage Measure

1. Click on the Calculation group on the home screen.
2. Select "New Measure" from the dropdown menu.
3. Name the measure "Profit %".
4. Enter the formula: Profit % = [Profit1] / SUM (FSactGlobalSales4[Total Buying Value])

## Results:

Figure 30 shows the results after creating the separate measures:



Name: Profit1
Home table: FactGlobalSales4
Format: General
Auto
Data category: Uncategorized

```
Profit1 = SUM(FactGlobalSales4[Total Selling Values])-SUM(FactGlobalSales4[Total Buying Value])
```

| customerID | productID | orderID | Sales | Quantity | Discount | Profit | Total Buying Value | Total Selling Values |
|---|---|---|---|---|---|---|---|---|
| TH-211151406 | FUR-FU-4069 | CA-2015-TH21115140-42311 | 3.312 | 1 | 20.00% | 0.6624 | 3.312 | 0.52992 |
| BP-111851404 | FUR-FU-4048 | CA-2014-BP11185140-41895 | 15.232 | 1 | 20.00% | 1.7136 | 15.232 | 1.37088 |
| SC-207251406 | FUR-FU-4046 | CA-2013-SC20725140-41454 | 20.104 | 1 | 20.00% | 1.7591 | 20.104 | 1.40728 |
| KL-1655591 | FUR-FU-4036 | IT-2014-KL1655591-41776 | 42.84 | 1 | 20.00% | 5.34 | 42.84 | 4.272 |
| Dp-132401408 | FUR-FU-4023 | US-2015-Dp13240140-42280 | 9.656 | 1 | 20.00% | 1.5691 | 9.656 | 1.25528 |
| LC-168701404 | FUR-FU-3922 | CA-2015-LC16870140-42342 | 16.192 | 1 | 20.00% | 4.6552 | 16.192 | 3.72416 |
| VT-217001406 | FUR-FU-3910 | CA-2013-VT21700140-41369 | 7.584 | 1 | 20.00% | 2.37 | 7.584 | 1.896 |
| CM-127151406 | FUR-FU-3909 | CA-2012-CM12715140-41177 | 21.184 | 1 | 20.00% | 4.7664 | 21.184 | 3.81312 |
| DS-130301404 | FUR-FU-3883 | US-2015-DS13030140-42276 | 32.776 | 1 | 20.00% | 3.2776 | 32.776 | 2.62208 |
| CK-122051404 | FUR-FU-2877 | US-2013-CK12205140-41549 | 11.032 | 1 | 20.00% | 3.0338 | 11.032 | 2.42704 |
| DK-132251406 | FUR-FU-2867 | CA-2013-DK13225140-41611 | 2.96 | 1 | 20.00% | 0.777 | 2.96 | 0.6216 |
| BF-11080120 | FUR-CH-5805 | ES-2015-BF11080120-42035 | 136.344 | 1 | 20.00% | 47.694 | 136.344 | 38.1552 |
| BD-1150036 | FUR-CH-5793 | MX-2015-BD1150036-42244 | 73.28 | 1 | 20.00% | 19.22 | 73.28 | 15.376 |
| NC-184151408 | FUR-CH-5781 | CA-2014-NC18415140-41927 | 102.592 | 1 | 20.00% | 10.2592 | 102.592 | 8.20736 |
| PR-1888082 | FUR-CH-5776 | MX-2014-PR1888082-41709 | 247.296 | 1 | 20.00% | -34.004 | 247.296 | -27.2032 |
| SC-2077082 | FUR-CH-5773 | MX-2012-SC2077082-41265 | 247.424 | 1 | 20.00% | 55.664 | 247.424 | 44.5312 |
| KB-162401404 | FUR-CH-5767 | CA-2013-KB16240140-41585 | 190.72 | 1 | 20.00% | 11.92 | 190.72 | 9.536 |
| PR-1888082 | FUR-CH-5758 | MX-2015-PR1888082-42344 | 31.904 | 1 | 20.00% | 7.164 | 31.904 | 5.7312 |
| LH-1690082 | FUR-CH-5756 | US-2015-LH1690082-42193 | 33.232 | 1 | 20.00% | -6.248 | 33.232 | -4.9984 |
| AR-1054082 | FUR-CH-5756 | MX-2013-AR1054082-41545 | 33.232 | 1 | 20.00% | -6.248 | 33.232 | -4.9984 |
| EA-1403582 | FUR-CH-5753 | MX-2013-EA1403582-41542 | 27.568 | 1 | 20.00% | 9.988 | 27.568 | 7.9904 |
| SE-2011082 | FUR-CH-5752 | MX-2014-SE2011082-41894 | 26.368 | 1 | 20.00% | -0.012 | 26.368 | -0.0096 |
| JH-1591082 | FUR-CH-5750 | MX-2014-JH1591082-41822 | 27.696 | 1 | 20.00% | 6.916 | 27.696 | 5.5328 |
| JF-152951404 | FUR-CH-5749 | US-2015-JF15295140-42140 | 220.96 | 1 | 20.00% | 24.858 | 220.96 | 19.8864 |
| CC-126701408 | FUR-CH-5536 | CA-2012-CC12670140-41265 | 64.784 | 1 | 20.00% | 6.4784 | 64.784 | 5.18272 |
| AH-1019582 | FUR-CH-5453 | US-2015-AH1019582-42318 | 50.112 | 1 | 20.00% | -3.768 | 50.112 | -3.0144 |
| JF-1549082 | FUR-CH-5452 | US-2015-JF1549082-42304 | 48.912 | 1 | 20.00% | -5.508 | 48.912 | -4.4064 |

Table: FactGlobalSales4 (51,290 rows, 22,281 filtered rows) Column: Profit1 (0 distinct values, 0 filtered distinct values)

***Figure 8:*** *Screen shot of Profit1 Measure and results.*

| Product | Total Selling Values | Total Buying Value | Profit1 | \| Profit % |
|---|---|---|---|---|

## Key Takeaways:

1. Created two measures: Profit1 and Profit %.

2. Used SUM and division operations in measure calculations.

3. Calculated profit percentage by dividing Profit1 by Total Buying Value.

Task 4: Creating Visuals for Dashboard Analysis in Power BI Desktop

Now that data preparation is complete, we'll create data visuals.

## Available Chart Types:

Power BI offers various chart types, including:

1. Line charts
2. Tree maps
3. Doughnut charts
4. Map-based charts
5. Scatter plots
6. Bar charts
7. Line and area charts
8. Tables
9. Pivot tables
10. Metric cards
11. Range indicator cards
12. 'R' Visuals (for advanced scripting)

## Creating Visuals:

## Step 1: Create Slices

1. Select the Slices option in the Charts section.

**2. Create slices for:**

- Year
- Month
- Sales

- Payment mode

- Day
- Month name

**Step 2: Add Card Visuals**

1. Use Card visuals for Total Selling Values.
2. Create additional slices using the Card option.
3. Add filters using the Visual Filter option.

**Visual Customization:**

1. Font label: DIN
2. Font size: 24
3. Edit each slice using Field boxes.
4. Adjust data linkage for each visual.

Stacked Column Chart: Monthly Sales Profit Percentage

This visual represents the total percentage of monthly sales profit percentage, displayed on a stacked column bar chart.

**Chart Details:**

- Total monthly sales
- Profit percentage values

- Tooltip displays detailed information

### Interactive Features:

- Hover over the bar chart to view changing values
- Click on each bar to display additional information

### Optimization Considerations:

- Carefully managed data processing to avoid space issues
- Addressed common challenges with multifaceted reports, such as:
  - Tables with left and right joins failing to load information properly

## Chart 8: Monthly Profit, Sales, and Profit Percentage Stacked Column Chart

This stacked column chart visualizes the monthly:

1. Profit
2. Sales
3. Profit Percentage

Key Insights:

- Comparative analysis of monthly sales and profit
- Profit percentage trends over time
- Identification of highest and lowest performing months

### Chart Features:

- Stacked columns for easy comparison
- Tooltip displays detailed values
- Interactive filtering options

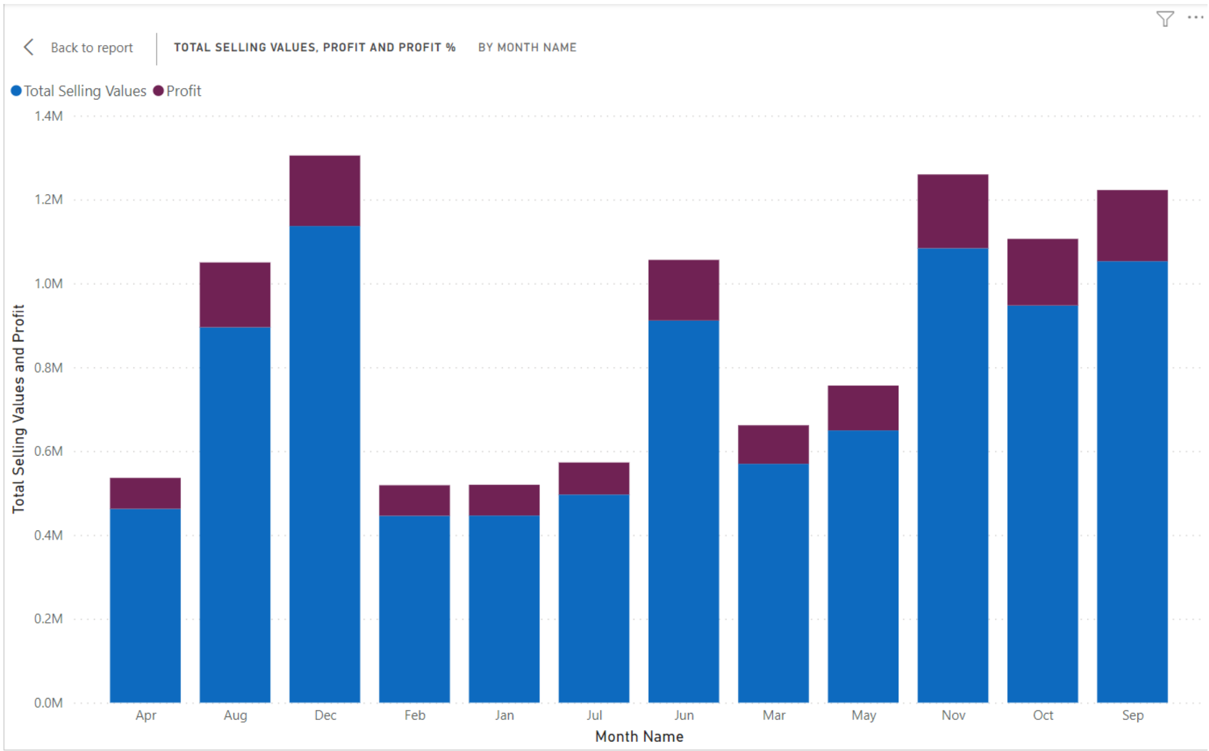


***Chart 8:*** *Profit, Sales, and Profit Percentage per Month on Stacked Column Chart*

### Area Chart: Daily Sales of Superstore

This area chart visualizes daily sales using:

- Date (day) on the x-axis
- Total Selling Value on the y-axis

### Reasoning:

To generate a continuous axis for temporal data, Power BI requires:

- Day or year datatype (numerical axis behavior)
- Month field requires a category field backup (categorical axis behavior)

### Key Insights:

- Daily sales trends
- Seasonal fluctuations
- Identification of peak sales days

### Chart Features:

- Continuous axis for daily sales
- Tooltip displays exact values
- Interactive filtering options

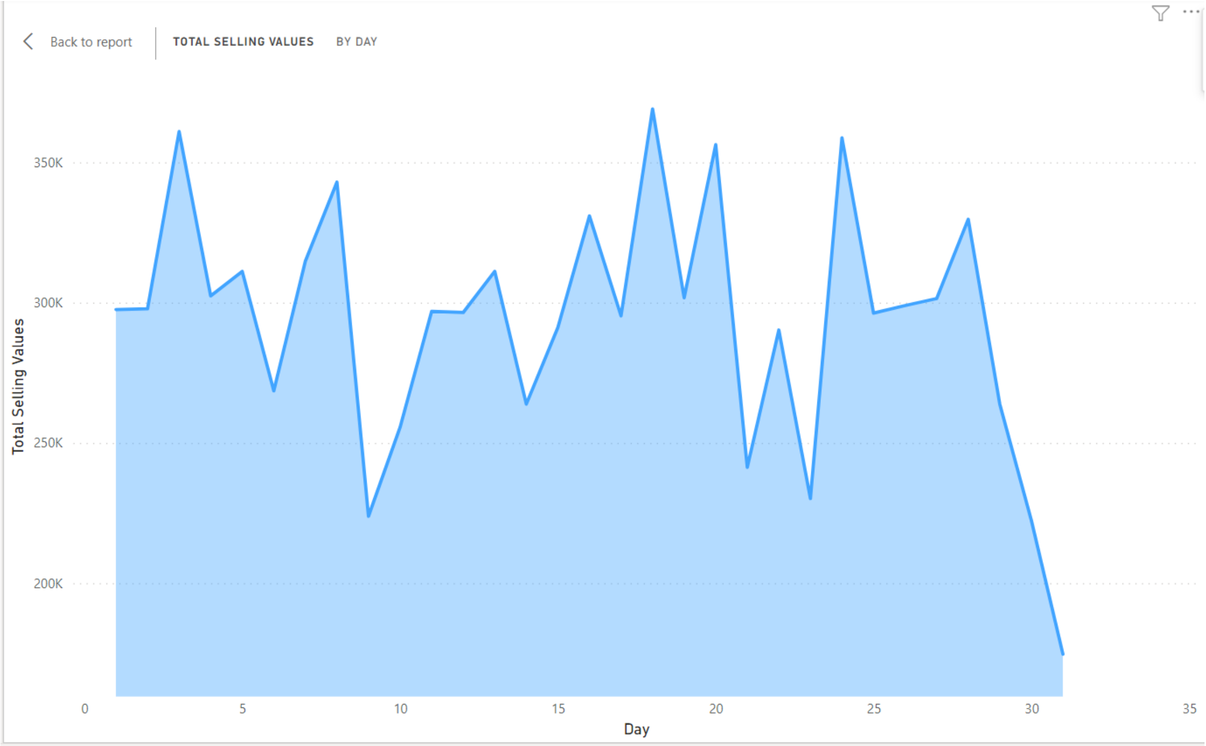


***Chart 9:*** *Daily Sales Values on Area Chart*

## Clustered Bar Chart: Yearly Profit of Superstore Global Sales

This chart displays the yearly profit of Superstore Global Sales using a vertical clustered bar chart.

### Chart Characteristics

1. Vertical representation of profit
2. Numerical values on both x (Year) and y (Profit) axes
3. Product and profit measures from each segment

### Data Insights

1. Yearly profit trends
2. Comparison of profit across different years
3. Identification of highest and lowest profit years

## Chart Features

1. Vertical bars for easy comparison
2. Tooltip displays exact values
3. Interactive filtering options

## Design Overview

This chart effectively visualizes the Superstore's yearly profit, enabling analysis and insights into sales performance.

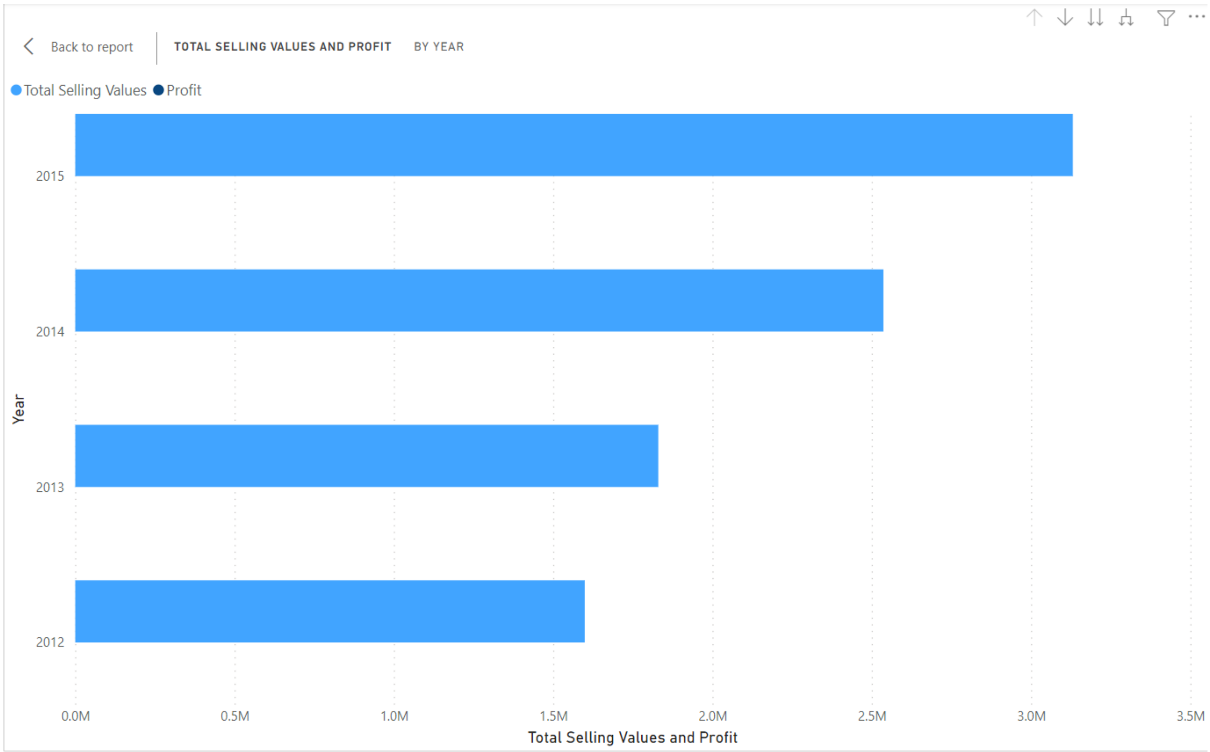


***Chart 10:*** *Yearly Profit using Profit measure on Clustered bar chart*

## Tree Map Chart: Product Category Analysis

This tree map chart visualizes the category of products based on the Total Selling Value parameter in the discount hierarchy group.

### Chart Characteristics

1. Drill-down capability: Expands to lower-level logic for detailed analysis
2. Category breakdown: Displays product categories and calculated fields
3. Aggregated values: Sums up quantity and profit for each product category

### Interactive Features

1. Hover-over functionality: Displays sales values and product category details on hover
2. Segment-level analysis: Enables examination of individual product categories

### Data Insights

1. Product category performance: Identifies top-performing product categories
2. Sales and profit analysis: Analyzes sales and profit trends for each category
3. Category comparison: Compares performance across different product categories

This tree map chart provides a comprehensive view of product category performance, enabling informed business decisions.

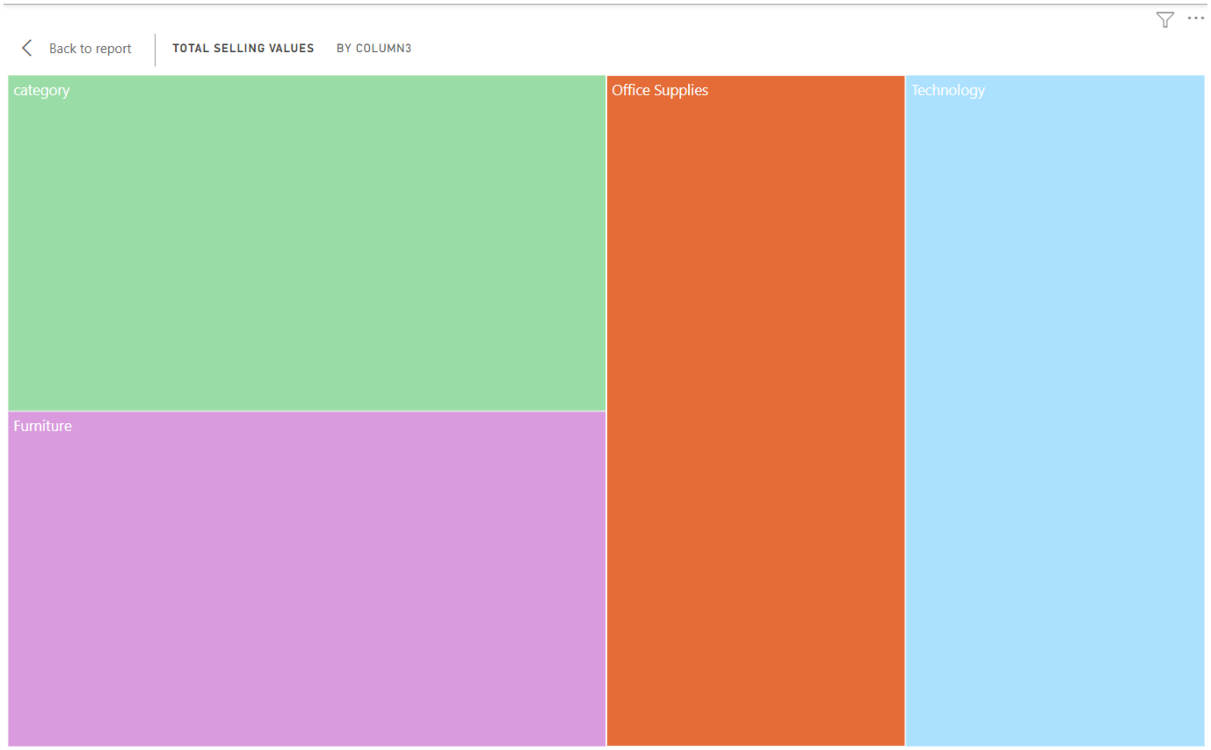


***Chart 11:*** *Sales Values per Category on Tree map Chart.*

### Show Tables Option

Located at the top right corner of the visualization, the "Show Tables" option allows you to view the underlying data in a tabular format. Selecting this option will display the values and product categories used in the formula.

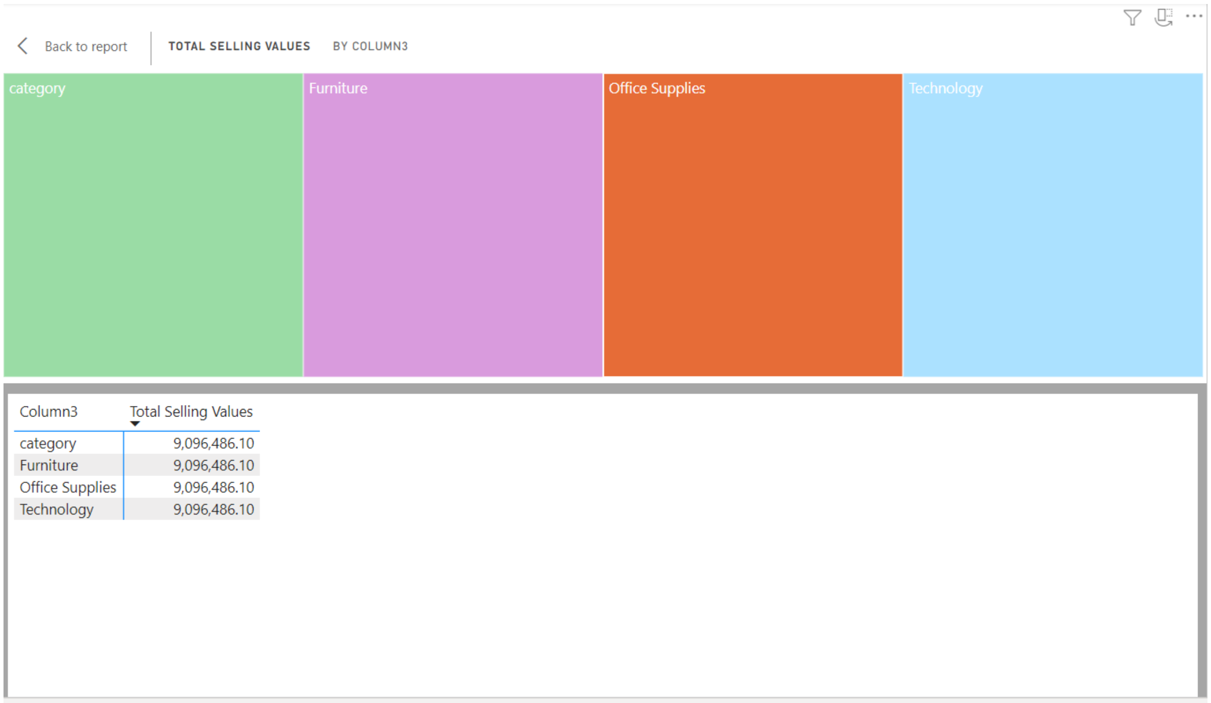
### Extracted Data

The chart screenshot below illustrates the extracted data based on the sales value measures. This advanced visual enables the extraction of important information to:

1. Uncover significant issues: Identify potential problems or trends that may not be immediately apparent.

2. Draw attention to anomalies: Highlight unusual patterns or outliers that require further investigation.

By using this feature, you can gain a deeper understanding of the data and make more informed decisions.



| Column3 | Total Selling Values |
|---|---|
| category | 9,096,486.10 |
| Furniture | 9,096,486.10 |
| Office Supplies | 9,096,486.10 |
| Technology | 9,096,486.10 |

***Chart 12:** Sales value of each category on a Tree Map Chart.*

## Doughnut Chart 1: Sales Value Distribution

This doughnut chart represents the divisions in the sales value parameter, with each segment reflecting the size of each portion.

## Key Features

1. Percentage labels: Displayed on each segment to show the proportion of sales value.
2. Segment size: Reflects the total sales value from each transaction.
3. Whole numbers and percentages: Used to display sales information.
4. Color-coded segments: Managed using the color panel to ensure clear visual distinction.
5. Bars on the side: Displayed to highlight the differences between segments.

## Benefits

1. Easy to understand: The doughnut chart provides a clear visual representation of sales value distribution.
2. Quick comparison: Enables rapid comparison of sales values across different segments.
3. Customizable: Colors can be edited using the color panel to suit the desired visual representation.

By using the built-in doughnut chart option in Power BI, we can effectively visualize and communicate sales value distribution to viewers.

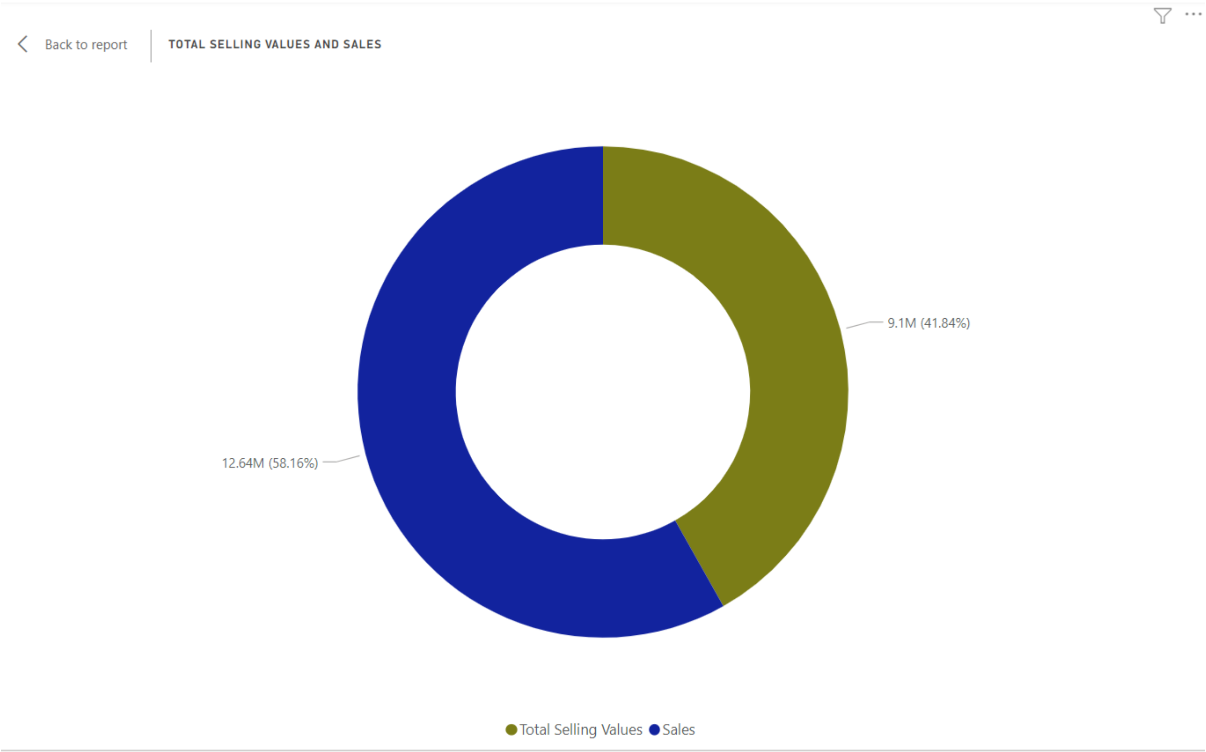


***Chart 13:*** *Doughnut Chart showing Total sales Values using Measures.*

## Doughnut Chart 2: Sales and Profit Analysis

This doughnut chart provides a detailed view of transaction differences, displaying sales and profits using calculated fields.

### Key Features

1. Calculated fields: Used to display sales and profit values.
2. Percentage values: Show the proportion of sales and profit per segment.
3. Interactive filtering: Clicking on the month panel updates the percentage values.
4. Dynamic updates: Continuously clicking on each month reveals new percentage information.

### Benefits

1. Clear visualization: The doughnut chart effectively communicates sales and profit differences.
2. Detailed analysis: Enables examination of sales and profit trends per segment.
3. Interactive exploration: Allows users to explore data by clicking on different months.

By using this doughnut chart, users can gain a deeper understanding of sales and profit trends, and how they vary by month. The interactive filtering feature enables users to easily explore the data and uncover new insights.

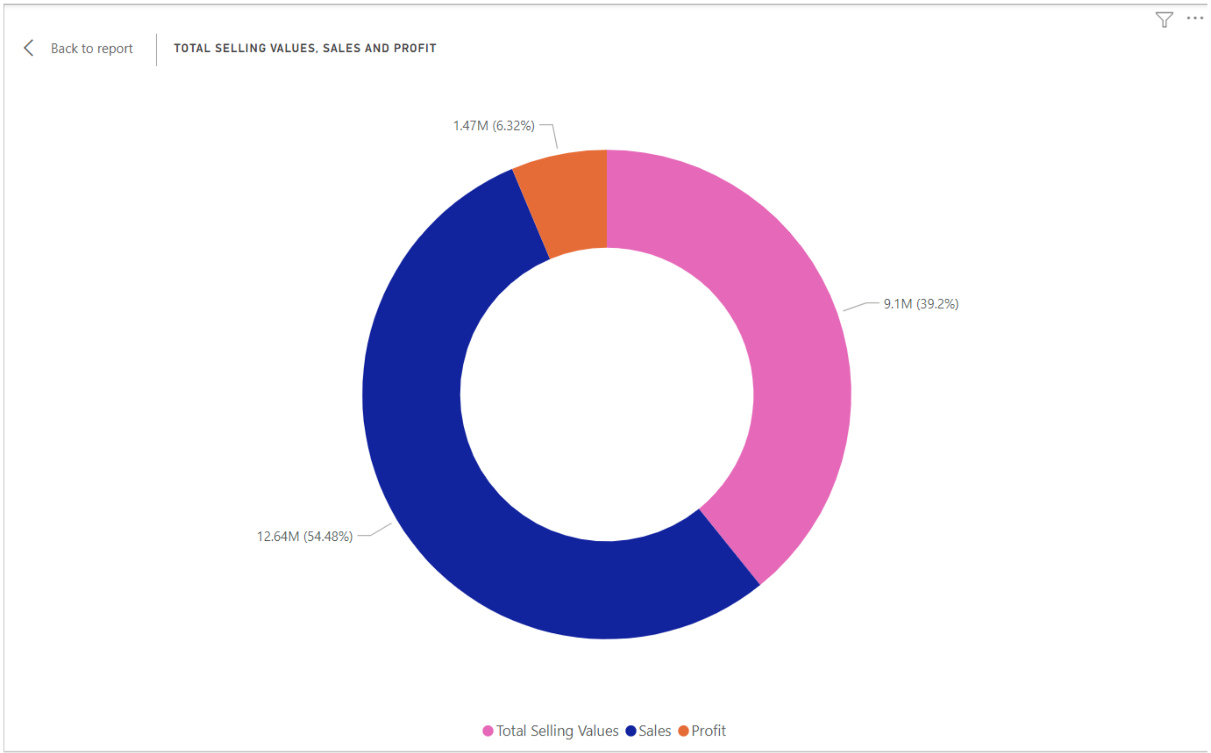


***Chart 14:*** *Total Sales and Profits using Total selling Values Measures*

Task 5: Dashboard Performance Using Power BI

In this section, I'll introduce the Power BI dashboard and outline the methods used to create this powerful visualization tool.

## Data Preparation

To create the dashboard, I started by cleaning the Super Store meta datasets. In Power BI Desktop, I:

1. Extracted data from the datasets
2. Transformed the date value into separate columns for easier analysis

## Dashboard Creation

Using Power BI's features and queries, I created a dashboard that captures key information about yearly sales and profits. The dashboard includes various charts, including:

1. Card charts displaying total values
2. Visuals linked to year and month thumbnails for easy filtering

## Dashboard Insights

The dashboard reveals valuable insights into sales and profit trends, including:

1. Yearly sales and profits
2. Monthly fluctuations in sales and profits
3. Total selling value and profit percentage

## Example Insights

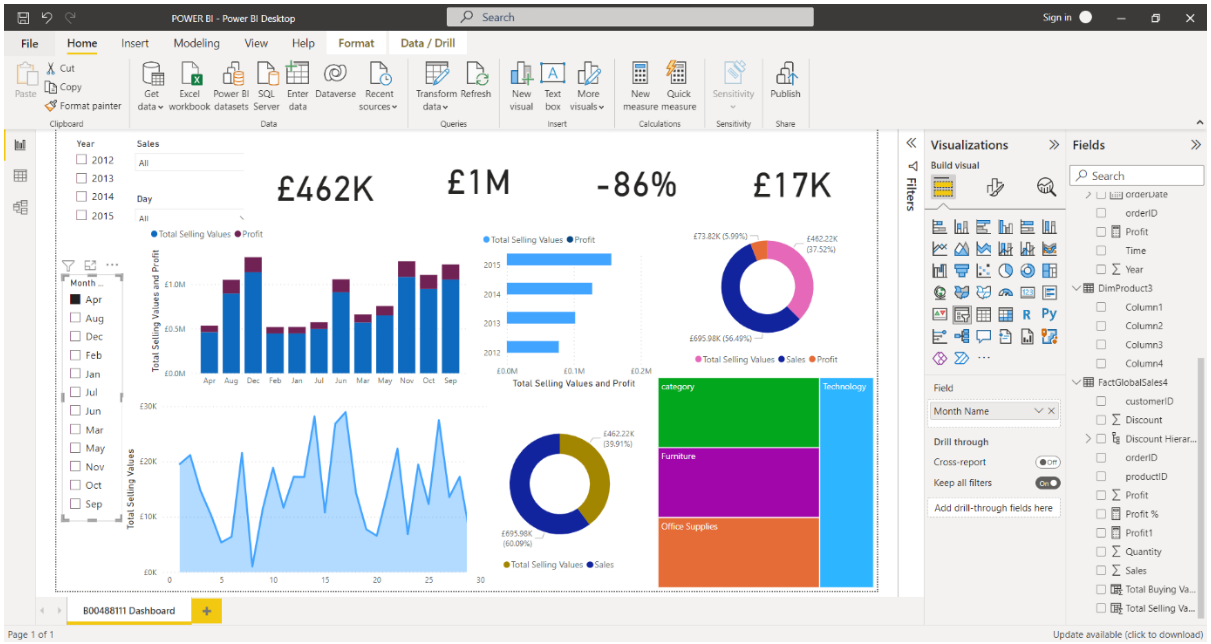
In April, the dashboard shows:

1. Sales reached £462 thousand
2. Profit was £1 million
3. Profit percentage was -86%
4. Total selling value was £17 thousand

### Business Implications

With this information, the sales department can develop targeted strategies to stay competitive and drive business growth.

By leveraging Power BI's capabilities, I created a dashboard that provides actionable insights into sales and profit trends, enabling data-driven decision-making.



***Dashboard 1:*** *Power BI Dashboard Visualisation depicting Sales and Profit Values in Aril*

## Key Insights from the Second Dashboard

In November 2015:

1. Sales were £389 thousand
2. Profit was £504 thousand
3. Percentage profit was -86%
4. Sales value was £15 thousand

## Comparative Analysis

**Comparing the sales and profit trends:**

1. April sales and profit were greater than those in November 2015
2. Significant changes are visible on the charts when filtering options are applied

**Power BI Features**

**Power BI offers:**

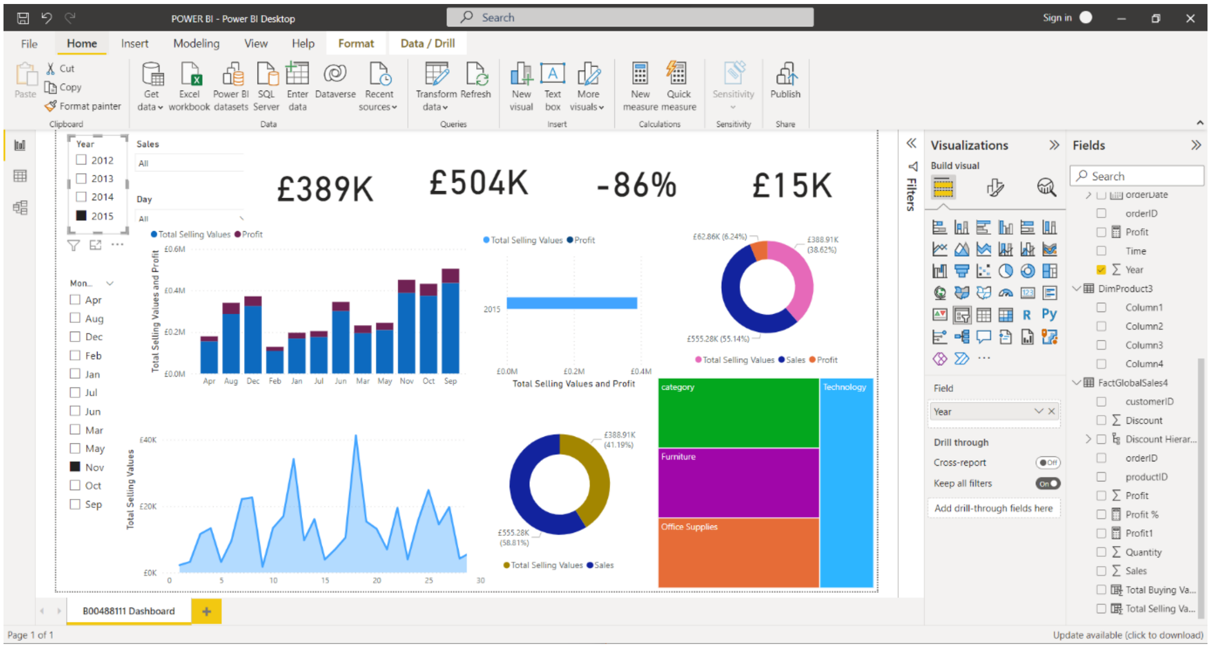
1. Currency conversion options
2. Separate visuals on a single page
3. Ability to open and edit visuals separately
4. Built-in doughnut charts (unlike Tableau)

**Power BI Advantages**

**Power BI's features enable users to:**

1. Easily analyze and compare sales and profit trends
2. Customize visuals to suit their needs
3. Make data-driven decisions with actionable insights

Overall, Power BI's capabilities provide a comprehensive and user-friendly platform for data analysis and visualization.



***Dashboard 2:*** *Values of Sales and Profit changes as Month and year change*

## Conclusion

## Comprehensive Dashboard Creation

Throughout this section, we have successfully created informative dashboards using Power BI, showcasing various sales and profit trends. We leveraged Power BI's features to:

1. Clean and transform data
2. Create interactive visuals (doughnut charts, card charts, etc.)
3. Analyze sales and profit trends
4. Compare data across different periods
5. Customize visuals for enhanced insights

## Key Takeaways

1. Effective data visualization enables data-driven decision-making
2. Power BI offers robust features for comprehensive data analysis
3. Interactive dashboards facilitate exploration and insight discovery

## Future Applications

1. Expand dashboard capabilities with additional data sources
2. Explore advanced Power BI features (DAX formulas, Power Query, etc.)
3. Apply dashboard creation skills to diverse business scenarios

By completing this section, we have demonstrated the power of Power BI in transforming data into actionable insights, empowering businesses to make informed decisions.