

# **Sri Lanka Institute of Information Technology**

Data Warehousing and Business Intelligence(IT3021)

Assignment 2 – 2025, Semester 1



BY

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# Data source

The data Source used for this project is the Supermarket\_DW databases which is taken from the previous assignment 1. This Data source contains dimensional and fact tables as mention below :

- Dim\_Customers
- Dim\_Products
- Dim\_Date
- Fact\_Transactions.

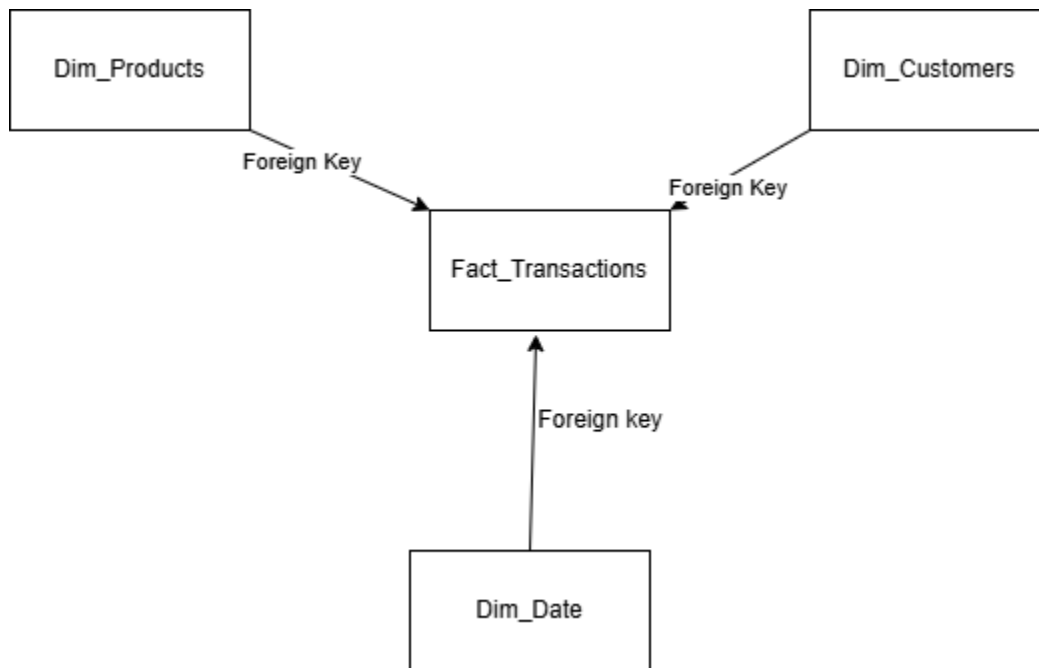
These tables are based on a **Star Schema design** and include with 1 year simulated retail transaction data, prepared for OLAP analysis.

The screenshot displays the SQL Server Enterprise Manager interface. The Object Explorer on the left shows the SupermarketDW database structure, including tables like Dim\_Customers, Dim\_Date, Dim\_Products, and Fact\_Transactions. The main window shows a query window with the following SQL code:

```
use SupermarketDW;
SELECT TOP 10 * FROM Fact_Transactions;
```

The Results pane at the bottom shows the output of the query, displaying 10 rows of transaction data. The status bar at the bottom indicates the query was executed successfully.

TransactionID	CustomerKey	ProductKey	DateKey	Quantity	acorn_txn_create_time	acorn_txn_complete_time	txn_process_time_hours
1	31	11	20240905	7	2025-04-18 16:28:12.910	2024-01-01 11:33:00.000	-11357
2	62	14	20240131	7	2025-04-18 16:28:12.910	2024-01-01 09:00:00.000	-11359
3	22	25	20240718	1	2025-04-18 16:28:12.910	2024-01-01 10:12:00.000	-11358
4	34	30	20240804	5	2025-04-18 16:28:12.910	2024-01-01 10:45:00.000	-11358
5	90	47	20241204	9	2025-04-18 16:28:12.910	2024-01-01 09:38:00.000	-11359
6	92	32	20240407	3	2025-04-18 16:28:12.910	2024-01-01 09:30:00.000	-11359
7	38	14	20241023	1	2025-04-18 16:28:12.910	2024-01-01 10:25:00.000	-11358
8	95	35	20240609	1	2025-04-18 16:28:12.910	2024-01-01 13:07:00.000	-11355
9	8	4	20240901	10	2025-04-18 16:28:12.910	2024-01-01 13:15:00.000	-11355
10	65	34	20240130	3	2025-04-18 16:28:12.910	2024-01-01 13:02:00.000	-11355



Star Schema

The database was created and popularized using SSIS ETL pipelines and present in Microsoft SQL Server and used as sources for both SQL Server Analysis Services (SSAS) and Power BI.

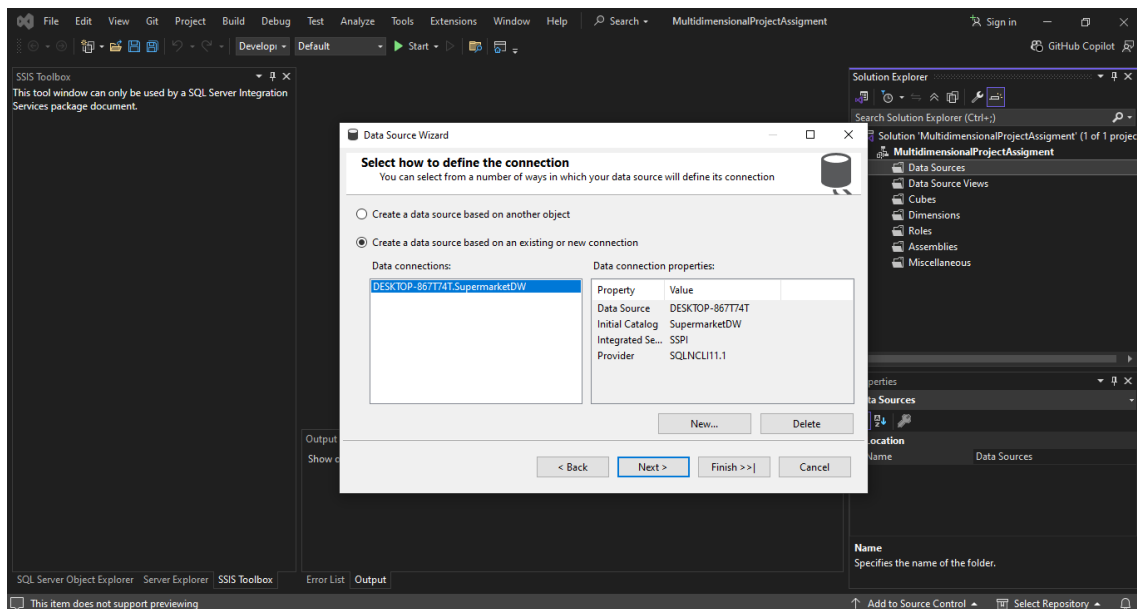
## SSAS Cube Implementation

The cube called **SupermarketDWCube** was created in SQL Server Analysis Services and developed using SQL Server Data tools and the following dimensions

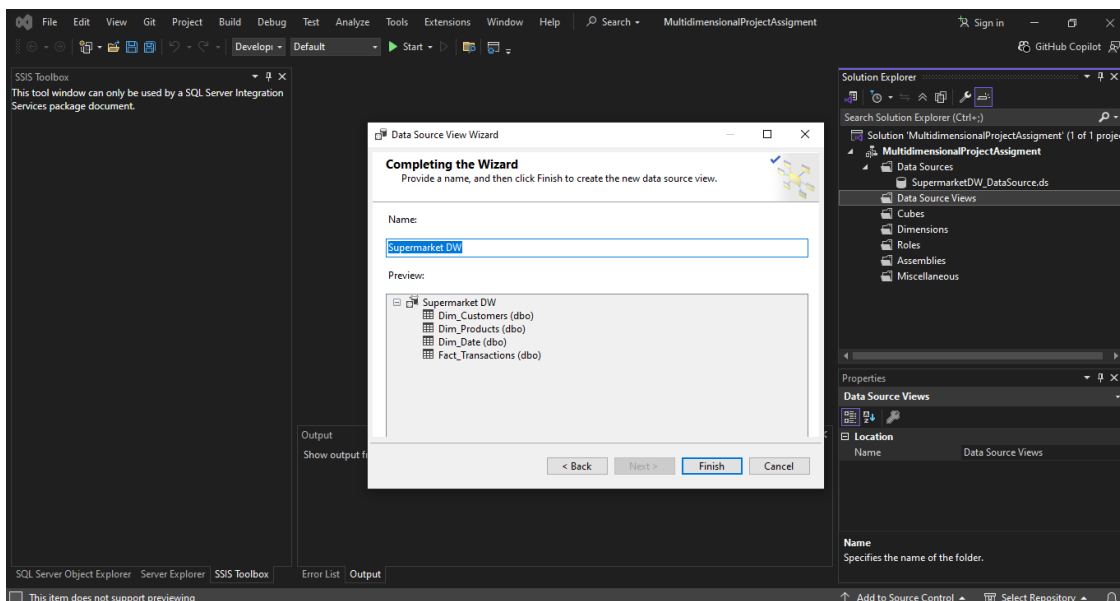
- Dim\_Customer
- Dim\_Product
- Dim\_Date

And the keys that used to include are

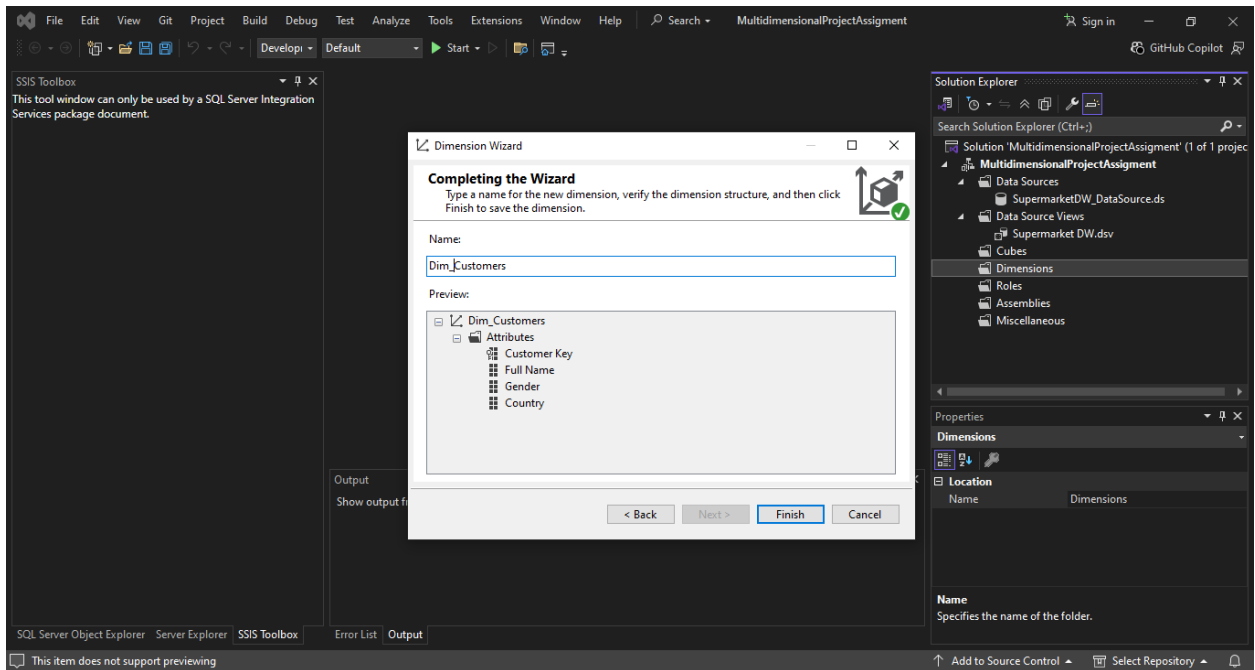
- Quantity in Dim\_product
- txn\_process\_time\_hours in dim\_date



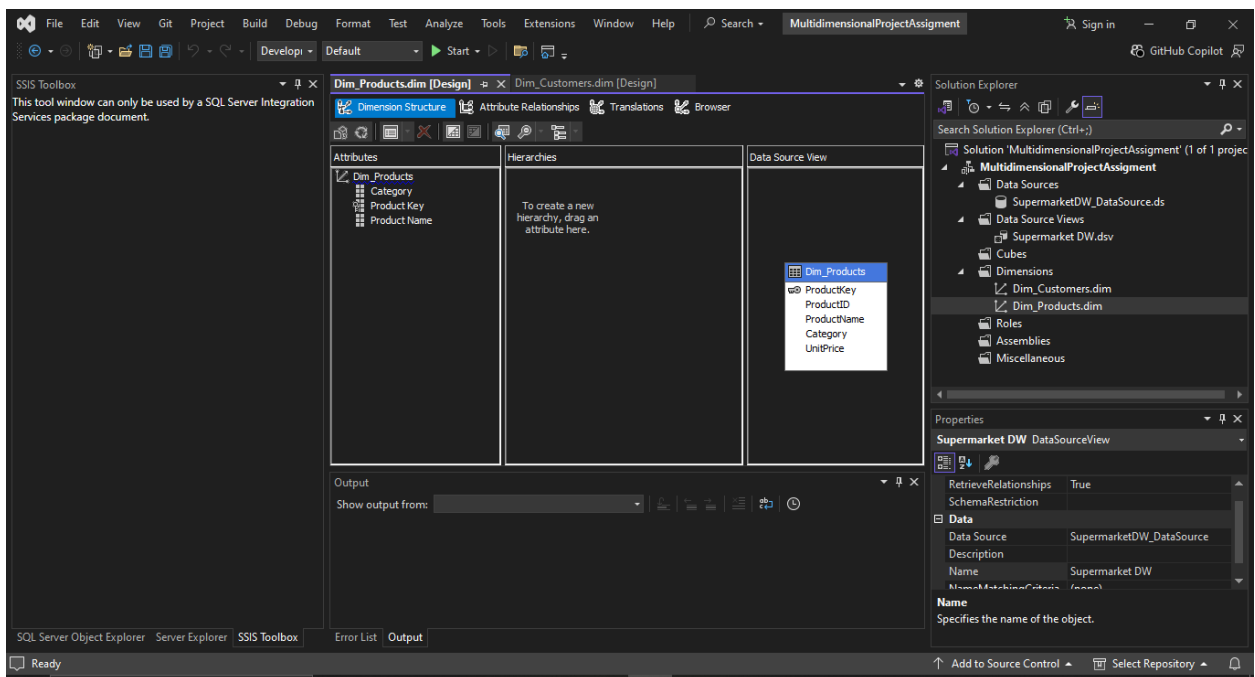
Data Source connection to SupermarketDW



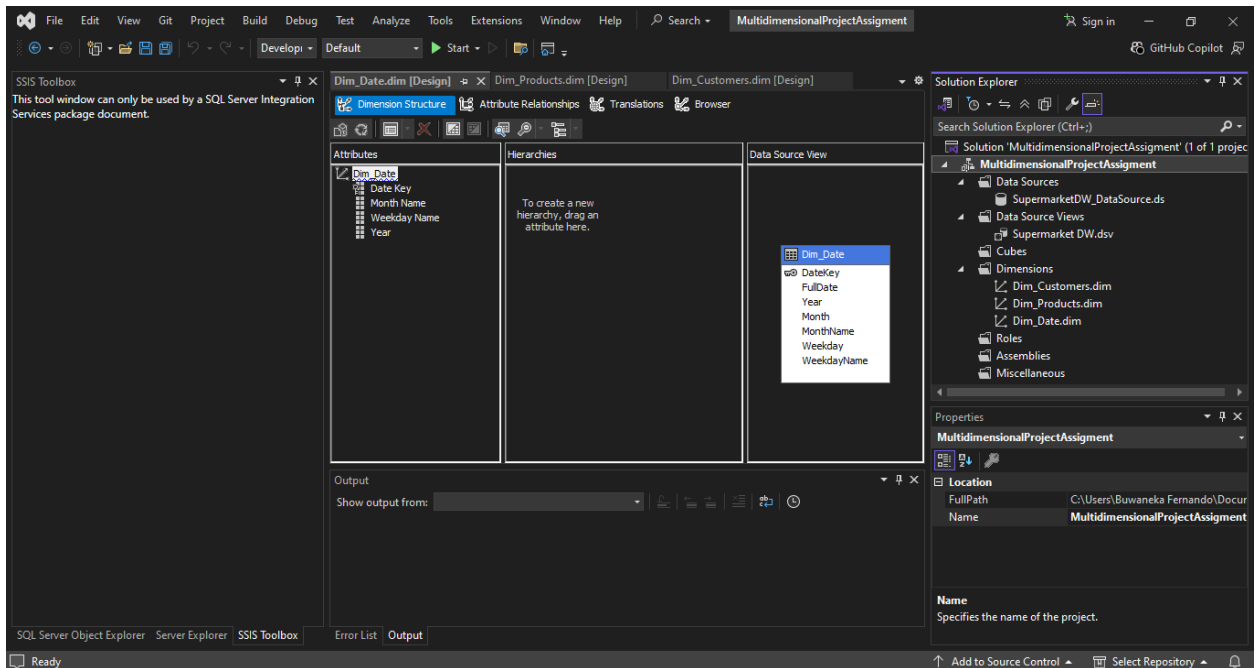
Data Source View (DSV)



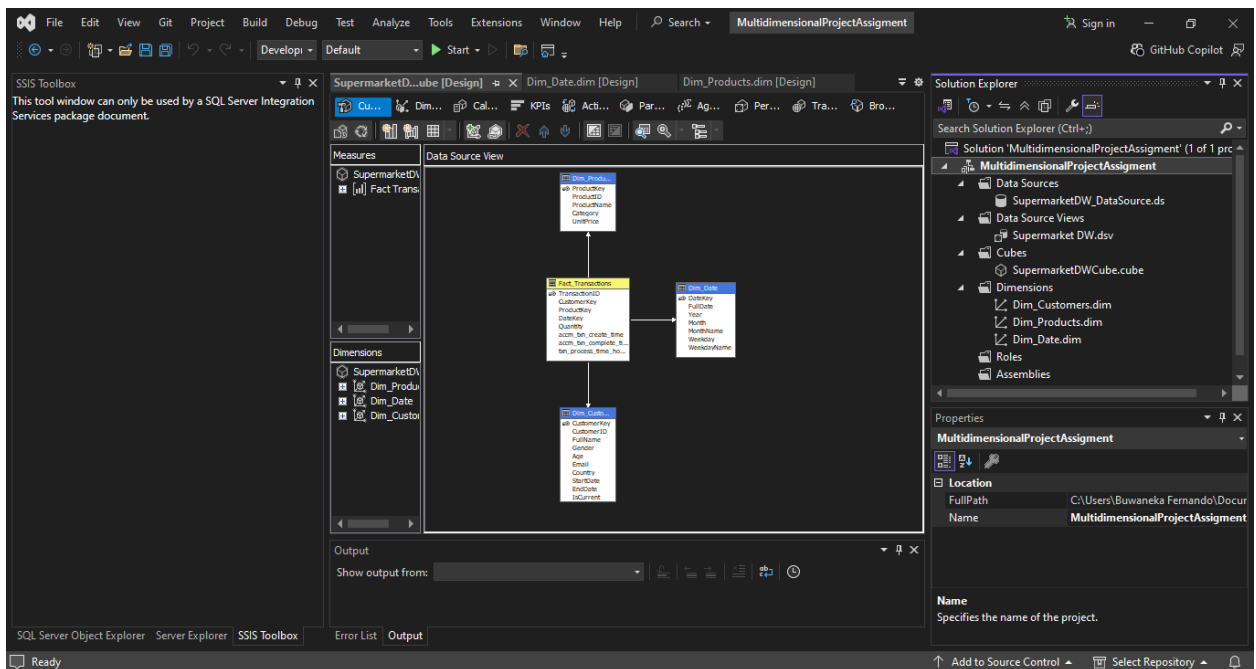
Customer Dimension attribute selection



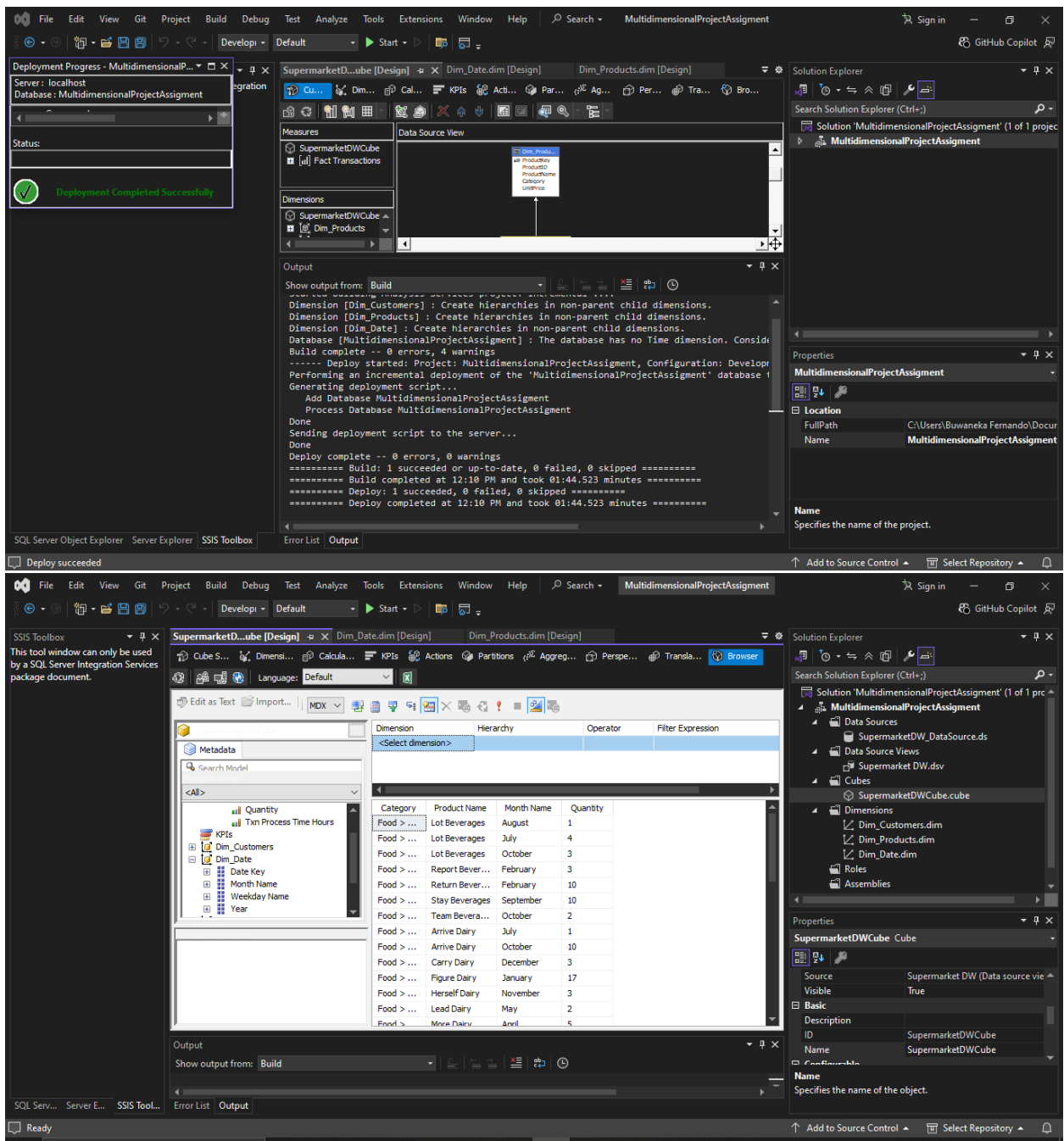
Product Dimension attribute selection



Date Dimension attribute selection



Cube Structure with dimensions and measures



## Cube Browser

# OLAP Operations in Excel

Excel was connected to the SSAS cube using the Analysis Services connector. In Excel Sheet, PivotTable was created to analyze the quantity sold by product category across months.

The screenshot shows the Microsoft Excel interface with a PivotTable and the PivotTable Fields task pane. The PivotTable is set to show 'Quantity' by 'Category' (Rows) and 'Month Name' (Columns). The data is summarized for the month of April.

Quantity	Column Labels	August	December	February	January	July	June	March	May	November	October	September	Grand Total
Food > Beverages	April	1			13		4				5	10	33
Food > Dairy	April	5	5	3		17	2			2	3	10	47
Food > Snacks	April		3		1	7		8	2	9	5	9	51
Home Care > Cleaning	April	3		1	2	3	1					4	14
Home Care > Laundry	April	6		9					6		5	10	41
Grand Total	April	14	9	13	16	27	6	9	2	17	13	38	186

The PivotTable Fields task pane on the right shows the following configuration:

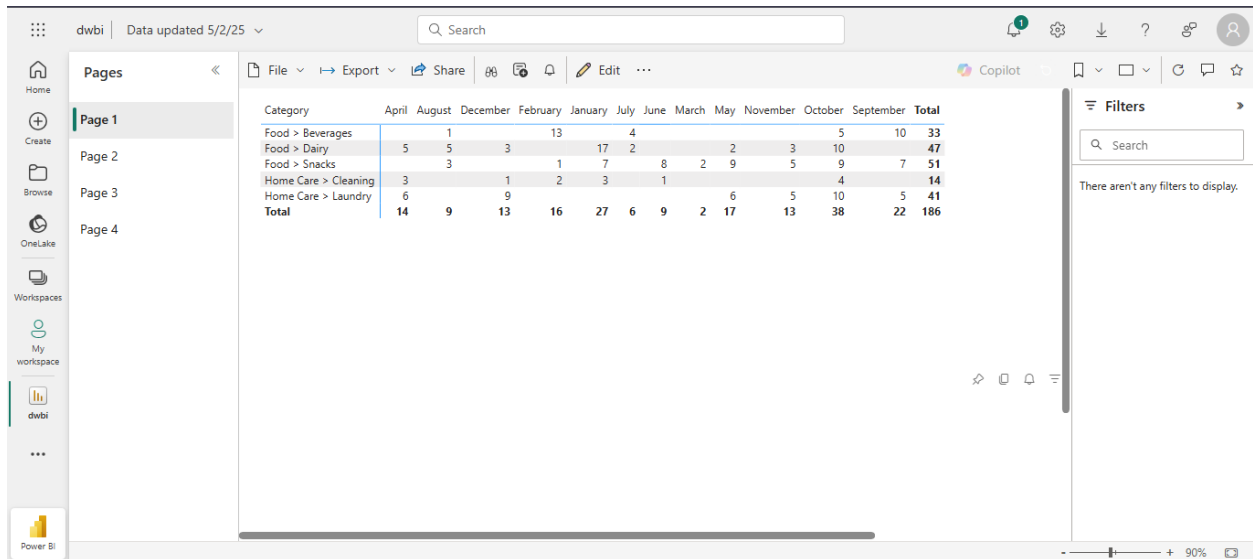
- Choose fields to add to report:** Dim\_Date (Month Name is checked).
- Filters:** (Empty)
- Columns:** Month Name
- Rows:** Category
- Values:** Quantity
- Defer Layout Update:** (Checked)

Excel PivotTable



# Power BI Reports

## Report 1: Matrix Visual



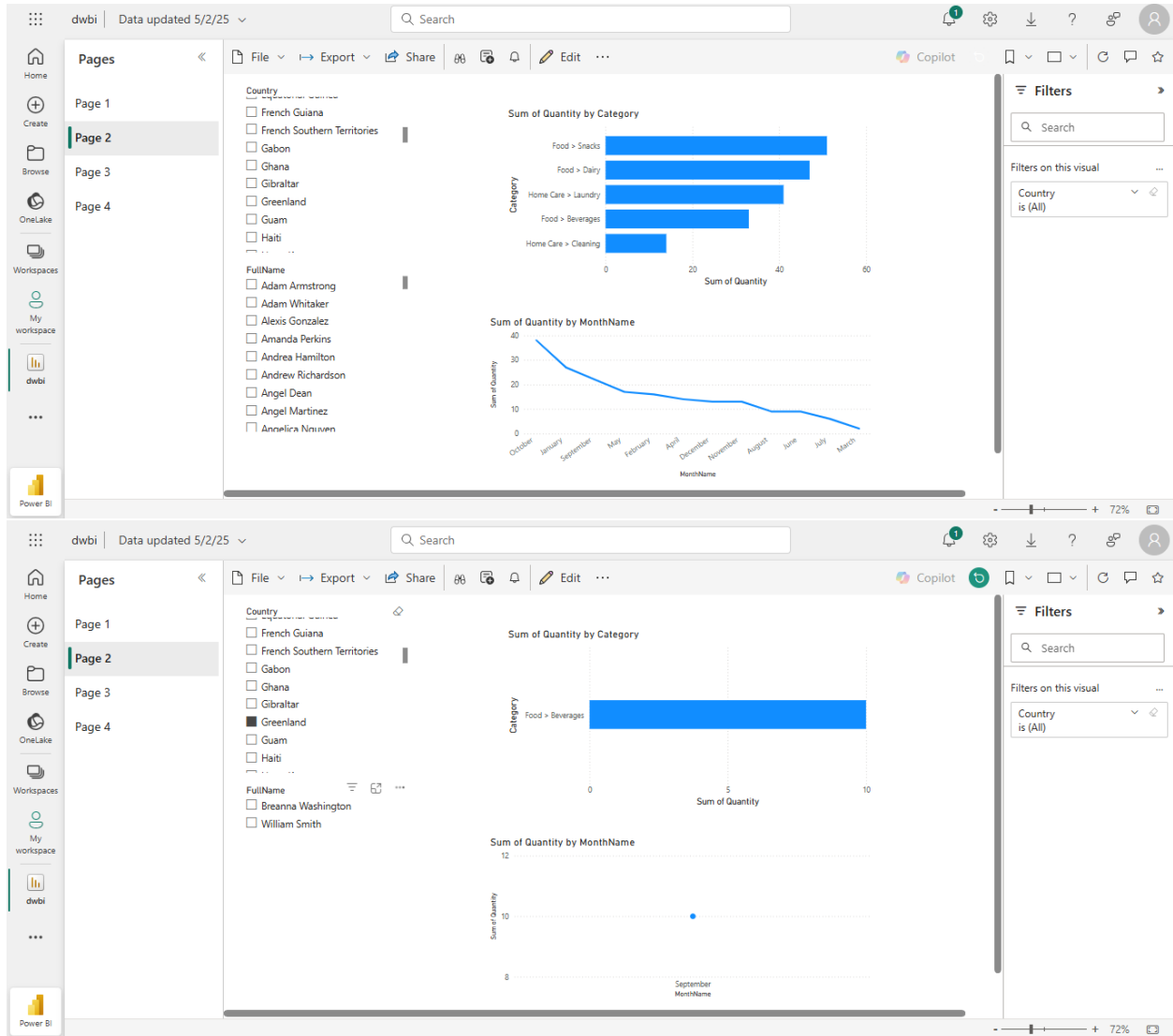
In this Report, it uses a matrix visual in Power BI to display the values of Quantity by Category from Product which is in rows and MonthName from Date which is in columns.

Steps :

- Open page and drag Matrix Icon from Visualization
- Dragging the fields from dim tables which Category from DimProduct to Rows , Month Name from Dim\_Date to Column ,and Quantity from Fact\_Transaction to Values

## Report 2: Cascading Slicers + Charts

The Country slicer filters available values in the Customer Name slicer, ensuring dynamic user control. Two interactive visuals bar chart and line chart which were created to analyze product categories with quantity and time-based on quantity in each month trends.



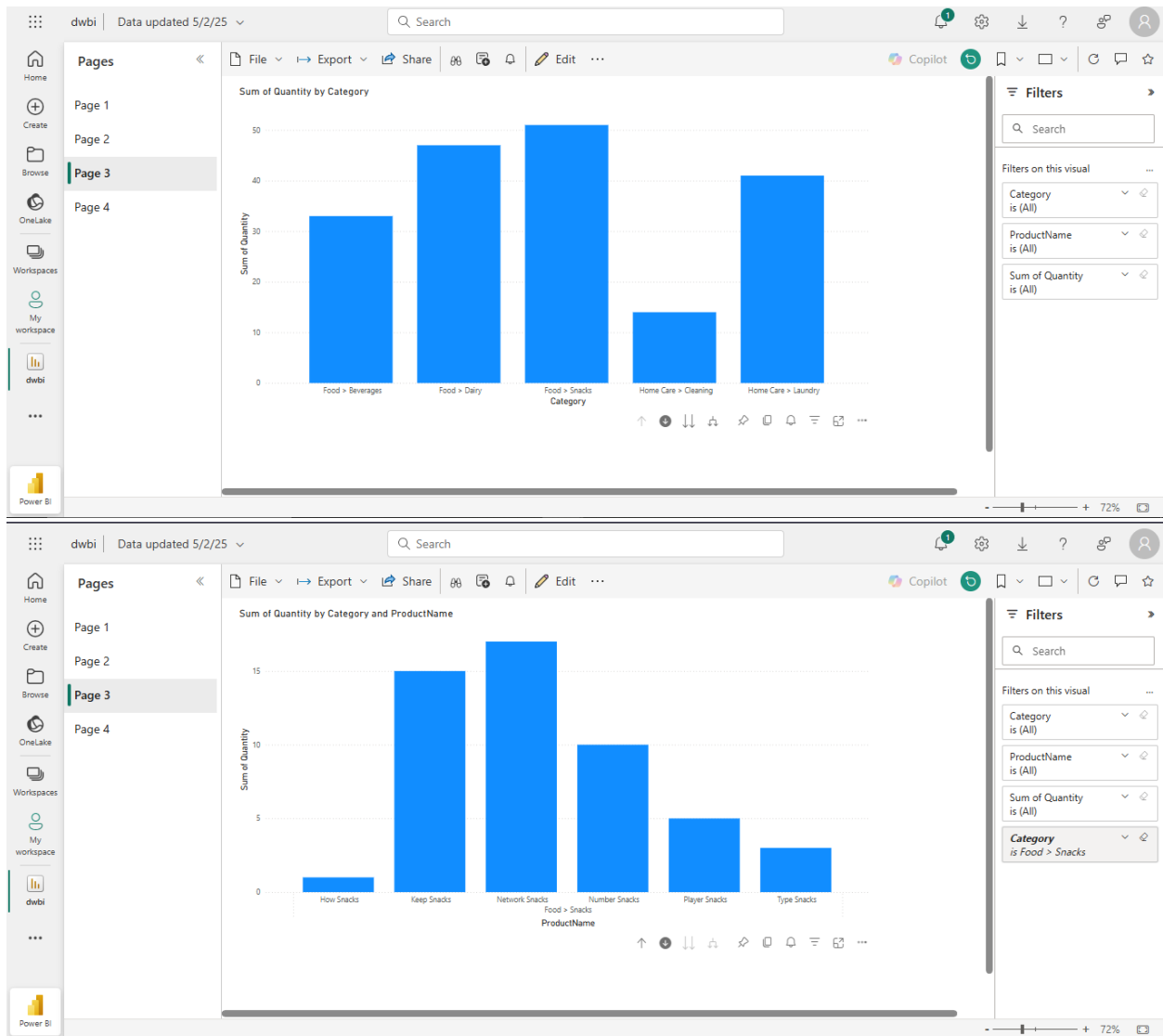
Steps:

- Open page and drag two slicer for country and Full name for the customer
- Drag Two charts and include related fields

- Then the chart will present the data according to the slicer selection or whole data

### Report 3: Drill-Down

In this report, it used a drill-down from Product Category to Product Name using a column chart. This helps users to explore how product categories break down into individual item with their Quantity.



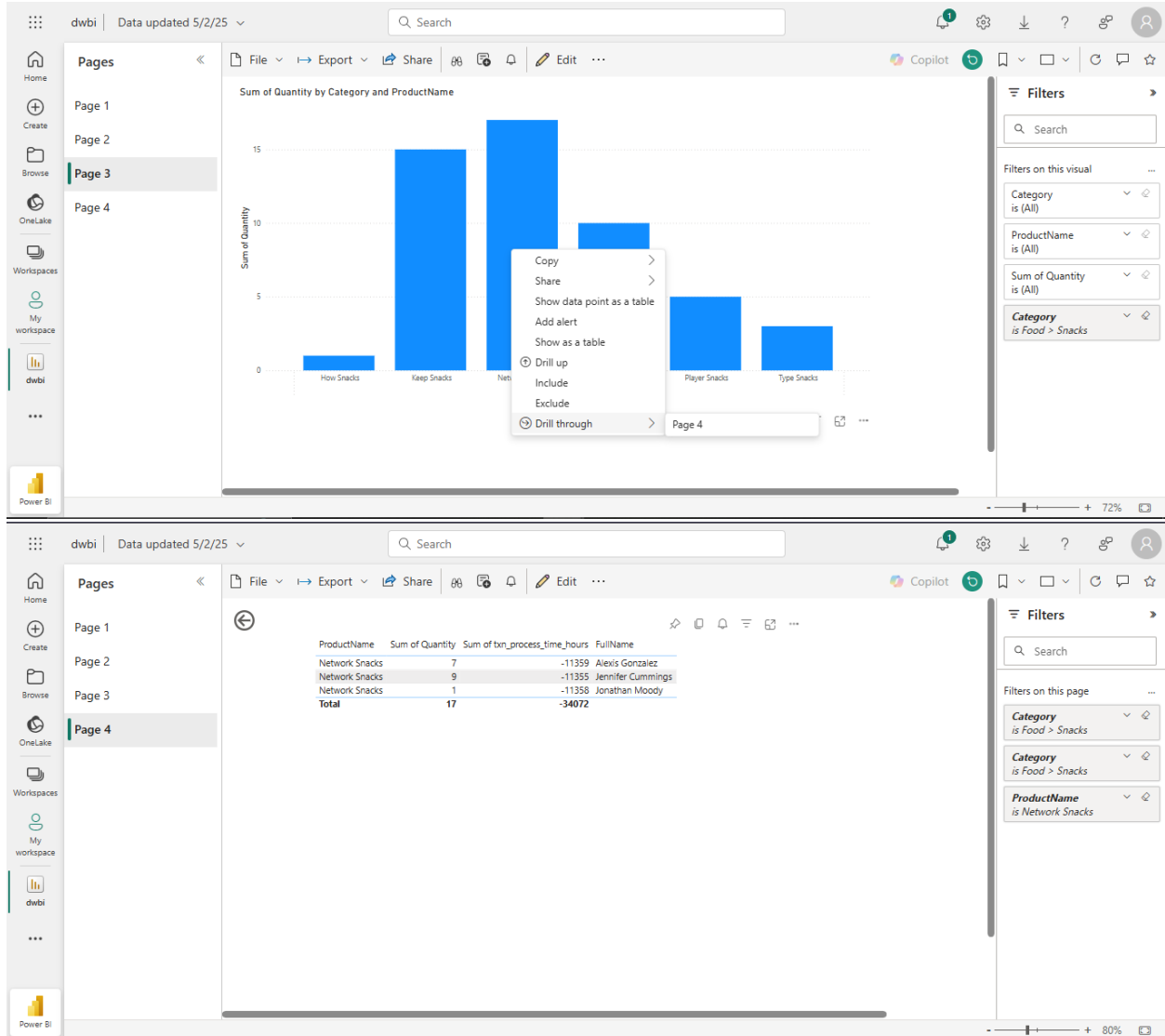
Steps:

- Drag a chart

- Add the category and the product name to the x axis
- drag Quantity into Values
- Enable Drill-Down

## Report 4: Drill-Through Report

implements a drill-through page using Product Category as the filter. When do right-click on a category in the main report and navigate to a detail page, where related transactional records are displayed.



## Steps:

- Scroll down to find the section “Drill-through”
- Drag a field
- Add a table and populate with details(Product\_name, Quantity, Date, CustomerName)
- Back to the page of report 3 chart
- Right click and click Drill-Through
- Then, it will appear the details of the relevant filtered detail.

## **Conclusion**

This assignment use the the complete OLAP lifecycle by demonstrating and using the data warehouse built in Assignment 1.

It added a cude creation with SSAS, OLAP analysis in Excel and interactive report using PowerBI.