



Sri Lanka Institute of Information Technology

Data Warehousing and Business Intelligence IT3021

**Assignment 1
2025**

Assignment 2 Report

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Step 1: Data source for the assignment 2

Description of the data source:

Dataset Name: Contoso 100K Database

Source: [Contoso 100K Database](#)

Data Period: The dataset spans over multiple years of sales transactions.

Data Format: SQL Database files, CSV files, TXT files

Description:

The **Retail Sales dataset** is designed to support the analysis and monitoring of activities related to an online retail business, focusing on sales transactions, customer behavior, product performance, and regional operations. This dataset provides a comprehensive view of the retail company's operations, capturing details about customers, products, orders, store locations, geographic regions, and currency exchange rates to facilitate international sales analysis.

The dataset spans over multiple years of sales transactions(2010-2020).The original dataset was sourced from a single transactional database, which has been edited, configured, and rearranged to suit the requirements of the project. To meet the assignment's need for multiple source types, the data has been split into three distinct sources: a SQL Server database (ContosoSourceDB), a text file (GeoRegions.txt), and a CSV file (CurrencyRates.csv).

It contains approximately 100,000 records, making it ideal for data warehousing, ETL, SSAS cube modeling, and business intelligence (BI) reporting. This dataset follows an **OLTP structure**, making it suitable for analysis and data warehouse design.

Data Warehouse Schema

The schema is organized into the following tables:

1. dbo.DimCustomer (Dimension Table)

- **Purpose:** Stores customer information for analyzing sales by customer demographics and geography.
- **Primary Key:** CustomerSK (int, not null)
- **Attributes:**
 - AlternateCustomerID (int, null), Gender (varchar(10), null), Title (varchar(10), null), GivenName (varchar(50), null), MiddleInitial (varchar(10), null), Surname (varchar(50), null), StreetAddress (varchar(100), null), City (varchar(50), null), State (varchar(50), null), StateFull (varchar(50), null), ZipCode (varchar(15), null), Country (varchar(50), null), CountryFull (varchar(50), null), Birthday (date,

null), Age (int, null), Occupation (varchar(100), null), Company (varchar(100), null), Vehicle (varchar(100), null), Latitude (float, null), Longitude (float, null), Continent (varchar(50), null), StartDate (datetime, null), EndDate (datetime, null), IsCurrent (bit, null), InsertDate (datetime, null), ModifiedDate (datetime, null)

2. **dbo.DimDate** (Dimension Table)

- **Purpose:** Provides a time dimension for analyzing sales trends over various time periods (e.g., by year, quarter, month).
- **Primary Key:** DateKey (int, not null)
- **Attributes:**
 - Date (date, null), Year (int, null), YearQuarter (varchar(10), null), YearQuarterNumber (int, null), Quarter (varchar(2), null), YearMonth (varchar(20), null), YearMonthShort (varchar(10), null), YearMonthNumber (int, null), Month (varchar(10), null), MonthShort (varchar(3), null), MonthNumber (int, null), DayOfWeek (varchar(10), null), DayOfWeekShort (varchar(3), null), DayOfWeekNumber (int, null), WorkingDay (bit, null), InsertDate (datetime, null), ModifiedDate (datetime, null)

3. **dbo.DimGeoRegion** (Dimension Table)

- **Purpose:** Stores geographical region data for analyzing sales by location.
- **Primary Key:** GeoRegionSK (int, not null)
- **Attributes:**
 - AlternateGeoLocationID (int, null), CountryCode (varchar(10), null), Country (varchar(50), null), State (varchar(50), null), StateCode (varchar(50), null), NumCustomers (int, null), InsertDate (datetime, null), ModifiedDate (datetime, null)

4. **dbo.DimProduct** (Dimension Table)

- **Purpose:** Stores product information for analyzing sales by product, category, and brand.
- **Primary Key:** ProductSK (int, not null)
- **Attributes:**
 - AlternateProductID (int, null), ProductCode (varchar(10), null), ProductName (varchar(100), null), Manufacturer (varchar(50), null), Brand (varchar(50), null), Color (varchar(20), null), Weight (varchar(20), null), WeightUnitMeasure (varchar(20), null), UnitCost (money, null), UnitPrice (money, null), SubcategoryCode (varchar(10), null), Subcategory (varchar(50), null), CategoryCode (varchar(10), null), Category (varchar(50), null), InsertDate (datetime, null), ModifiedDate (datetime, null)

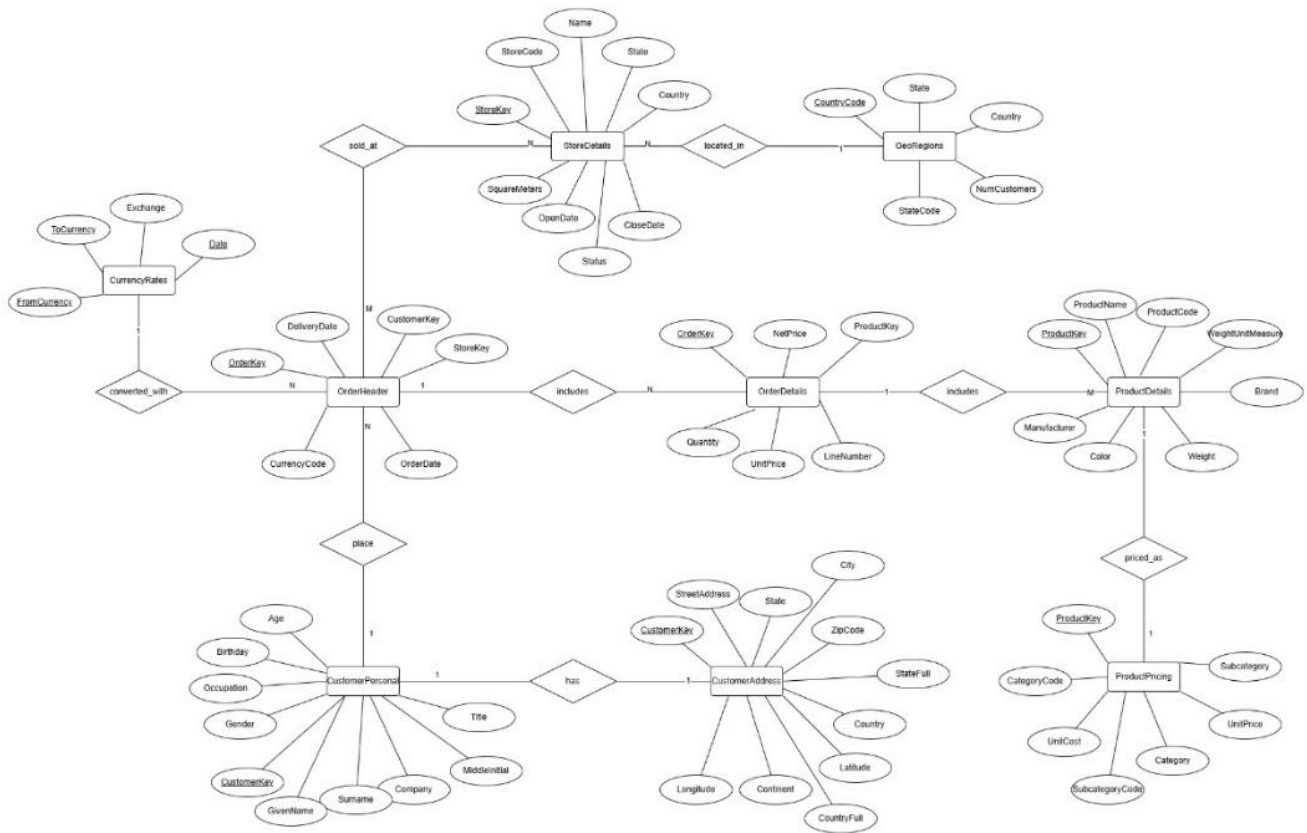
5. **dbo.DimStore** (Dimension Table, Inferred)

- **Purpose:** Stores store information for analyzing sales by store location.
- **Primary Key:** StoreSK (int, not null)
- **Attributes** (inferred):
 - AlternateStoreID (int, null), StoreCode (varchar(10), null), StoreName (varchar(100), null), StoreType (varchar(50), null), Address (varchar(100), null), City (varchar(50), null), State (varchar(50), null), Country (varchar(50), null), ZipCode (varchar(15), null), Latitude (float, null), Longitude (float, null), InsertDate (datetime, null), ModifiedDate (datetime, null)

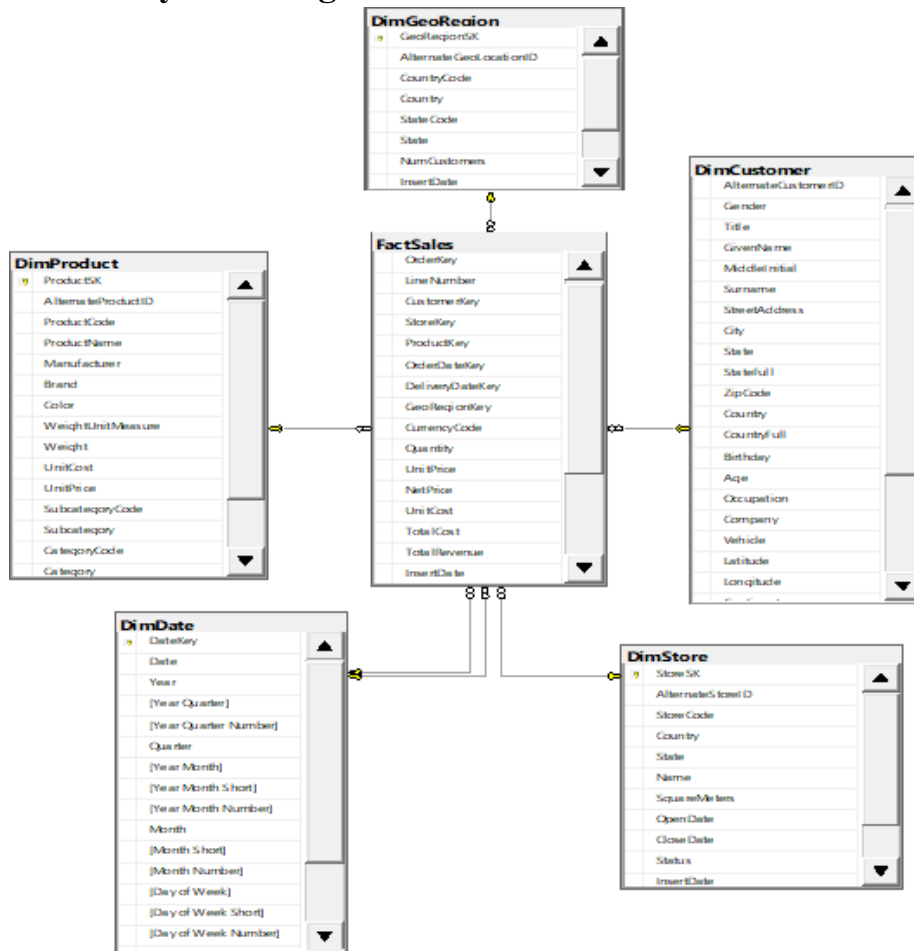
6. **dbo.FactSales** (Fact Table)

- **Purpose:** Stores sales transaction data, linking to dimension tables for analysis.
- **Primary Key:** FactSale_C952AAC04C4C4868 (int, not null)
- **Foreign Keys:**
 - CustomerKey (FK, int, null) → dbo.DimCustomer(CustomerSK)
 - OrderDateKey (FK, int, null) → dbo.DimDate(DateKey)
 - DeliveryDateKey (FK, int, null) → dbo.DimDate(DateKey)
 - GeoRegionKey (FK, int, null) → dbo.DimGeoRegion(GeoRegionSK)
 - ProductKey (FK, int, null) → dbo.DimProduct(ProductSK)
 - StoreKey (FK, int, null) → dbo.DimStore(StoreSK)
- **Attributes:**
 - OrderNumber (int, null), LineNumber (int, null), Quantity (int, null), UnitPrice (money, null), NetPrice (money, null), UnitCost (money, null), TotalCost (money, Computed, null), TotalRevenue (money, Computed, null), InsertDate (datetime, null), ModifiedDate (datetime, null), accm_txn_complete_time (datetime, null), accm_txn_process_time (datetime, null)

ER Diagram



Overall System Diagram



Step 2: SSAS Cube implementation

1. Creating the SSAS Project

- Opened Visual Studio.
- Created a new project:
 - Project Type: Analysis Services Multidimensional and Data Mining Project
 - Project Name: Contoso_SSAS_Project
- Clicked OK to create the SSAS project workspace.

Configure your new project

Analysis Services Multidimensional Project

Project name

Contoso_SSAS_Project

Location

D:\Dwbi assingment\assigmnt2_new

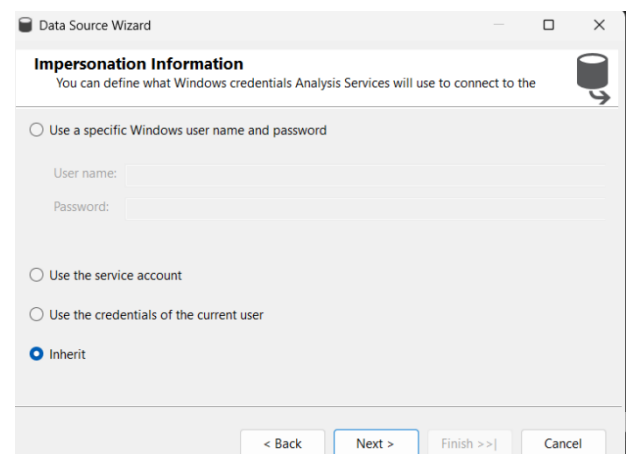
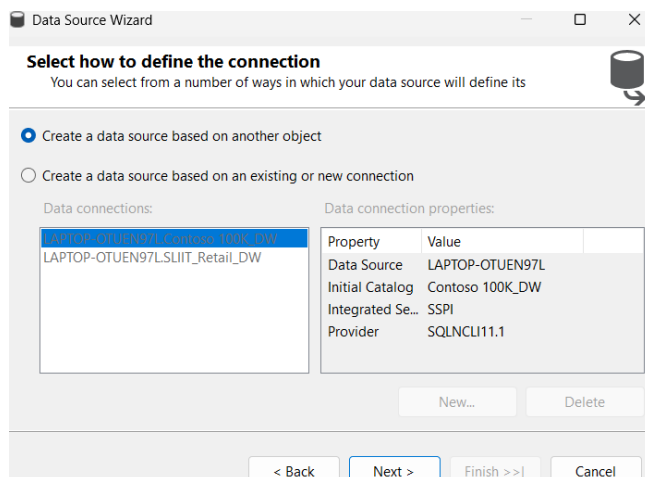
Solution name ⓘ

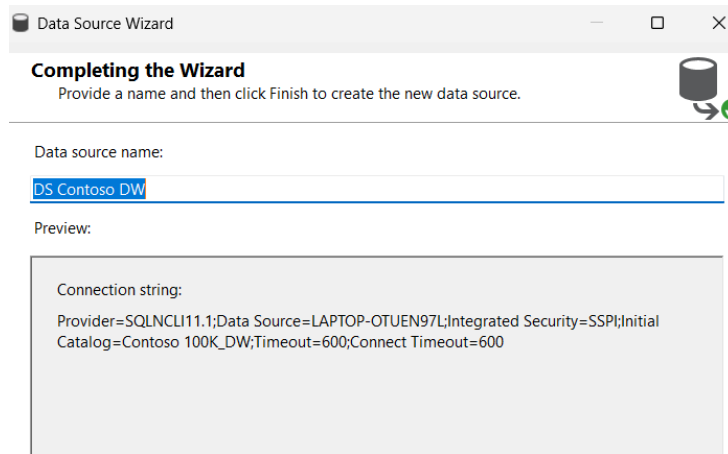
Contoso_SSAS_Project

☐ Place solution and project in the same directory

2. Setting up Data Source

- Right-clicked on **Data Sources** → **New Data Source**.
- Selected existing **Data Warehouse** database as source.
- Chose the connection:
 - Database: Contoso 100K_DW
- Selected Use the service account.
- Completed the Data Source wizard.

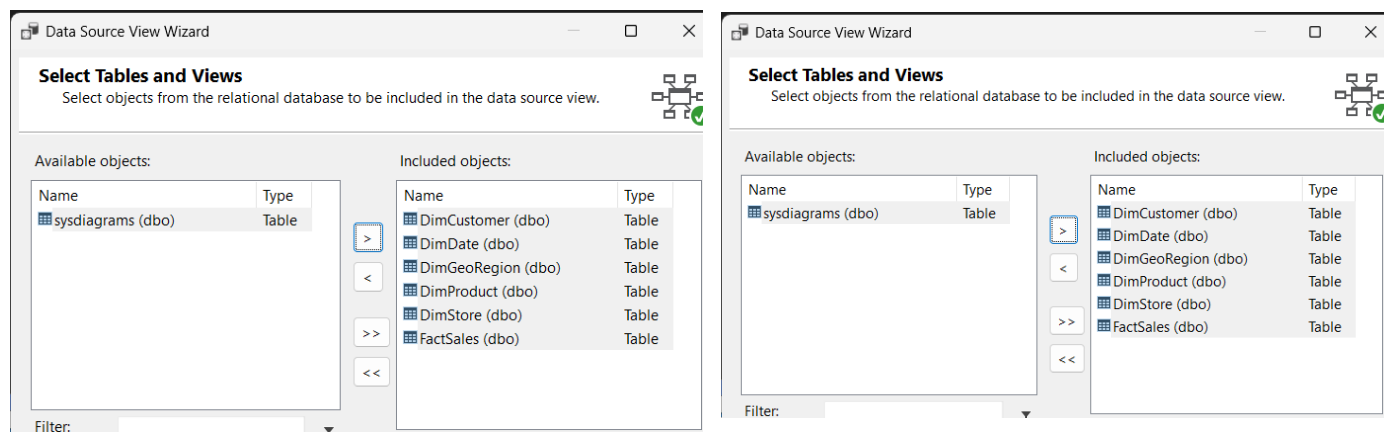




3. Setting up Data Source View (DSV)

- Right-clicked on **Data Source Views** → **New Data Source View**.
- Added relevant tables:
 - **Fact Table** (FactSales)
 - **Dimension Tables** (DimDate, DimCustomer, DimProduct, DimStore, DimGeoRegion)

Verified relationships were automatically detected (Fact Table foreign keys to Dimension)



4. Creating the Cube

- Right-clicked on **Cubes** → **New Cube** → **Cube Wizard**.
- Selected **Use Existing Tables**.
- Chose the **Fact Table** (FactSales).
- Selected measures automatically detected by the wizard.

- Added related dimensions (already connected in DSV).
- Completed the Cube Wizard.

Cube Wizard

Select Creation Method
Cubes can be created by using existing tables, creating an empty cube, or generating tables in the data source.

How would you like to create the cube?

☒ Use existing tables

☐ Create an empty cube

☐ Generate tables in the data source

Template:
(None)

Description:
Create a cube based on one or more tables in a data source.

< Back Next > Finish >> | Cancel

Cube Wizard

Select Measure Group Tables
Select a data source view or diagram and then select the tables that will be used for measure groups.

Data source view:
DSV_Contoso_DW

Measure group tables:

Suggest

- ☐ DimCustomer
- ☐ DimDate
- ☐ DimGeoRegion
- ☐ DimProduct
- ☐ DimStore
- ☒ FactSales

Cube Wizard

Select Measures
Select measures that you want to include in the cube.

Measure

- ☒ Fact Sales
- ☒ Order Key
- ☒ Line Number
- ☒ Quantity
- ☒ Unit Price
- ☒ Net Price
- ☒ Unit Cost
- ☒ Total Cost
- ☒ Total Revenue
- ☒ Txn Process Time
- ☒ Fact Sales Count

Cube Wizard

Select Existing Dimensions
Select existing dimensions to include in the cube.

Dimension

- ☒ Dim Product
- ☒ Dim Store
- ☒ Dim Geo Region
- ☒ Dim Date
- ☒ Dim Customer

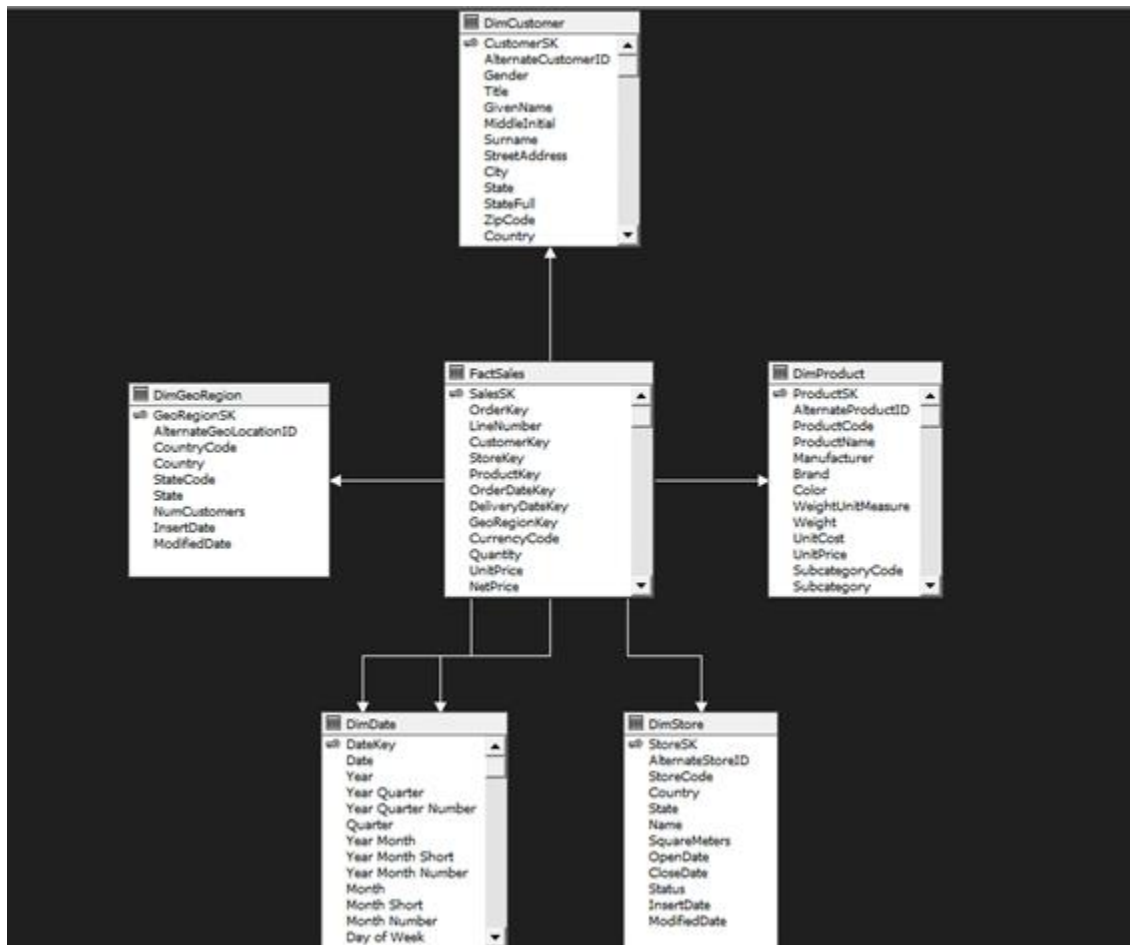
Cube Wizard

Completing the Wizard
Name the cube, review its structure, and then click Finish to save the cube.

Cube name:
DSV_Contoso_DW

Preview:

- Measure groups
 - Fact Sales
 - Order Key
 - Line Number
 - Quantity
 - Unit Price
 - Net Price
 - Unit Cost
 - Total Cost
 - Total Revenue
 - Txn Process Time
 - Fact Sales Count



DimCustomer

Attributes	Hierarchies	Data Source View
<ul style="list-style-type: none"> Dim Customer Age Alternate Customer ID Birthday City Company Continent Country Country Full Customer SK End Date Gender Given Name Insert Date Is Current Latitude Longitude Middle Initial Modified Date Occupation Start Date State State Full Street Address Surname Title Vehicle Zip Code 	<p>Hierarchy <input checked="" type="checkbox"/></p> <ul style="list-style-type: none"> Country State City <new level> <p>To create a new hierarchy, drag an attribute here.</p>	<p>DimCustomer</p> <ul style="list-style-type: none"> CustomerSK AlternateCustomerID Gender Title GivenName MiddleInitial Surname StreetAddress City State StateFull ZipCode Country

DimDate

The screenshot shows the Dimension Structure Designer for the DimDate dimension. The interface is divided into three main panes: Attributes, Hierarchies, and Data Source View.

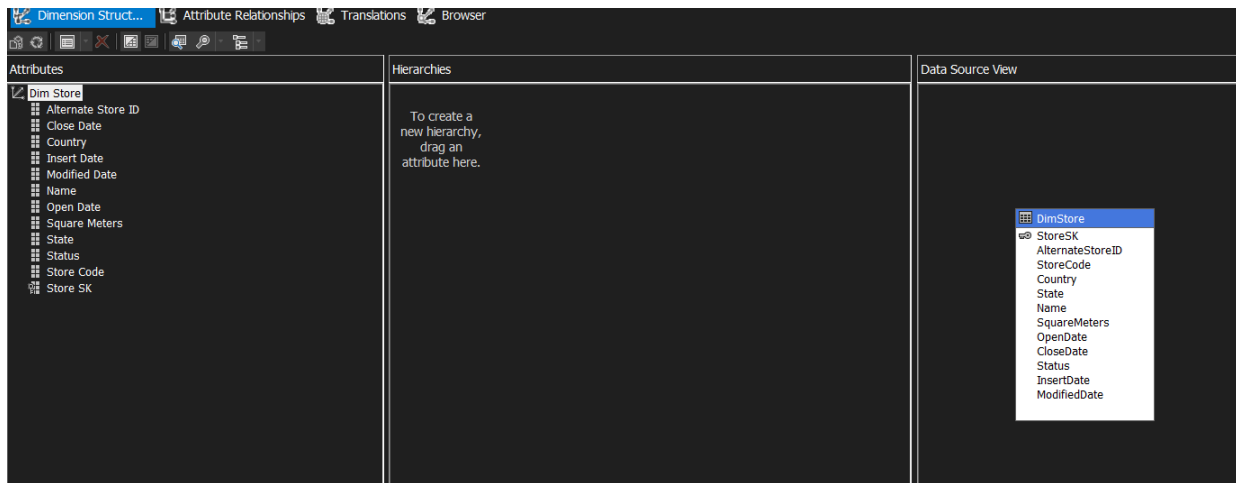
- Attributes Pane:** Lists the attributes of the DimDate dimension, including Date, Date Key, Day Of Week, Day Of Week Number, Day Of Week Short, Insert Date, Modified Date, Month, Month Number, Month Short, Quarter, Working Day, Working Day Number, Year, Year Month, Year Month Number, Year Month Short, Year Quarter, and Year Quarter Number.
- Hierarchies Pane:** Shows a single hierarchy named "Hierarchy" with a checkbox. Below it, a list of attributes is displayed: Year, Quarter, Month, Day Of Week, and <new level>. A tooltip message states: "To create a new hierarchy, drag an attribute here."
- Data Source View Pane:** Displays a list of data sources for the DimDate dimension, including DateKey, Date, Year, Year Quarter, Year Quarter Number, Quarter, Year Month, Year Month Short, Year Month Number, Month, Month Short, Month Number, and Day of Week.

DimProduct

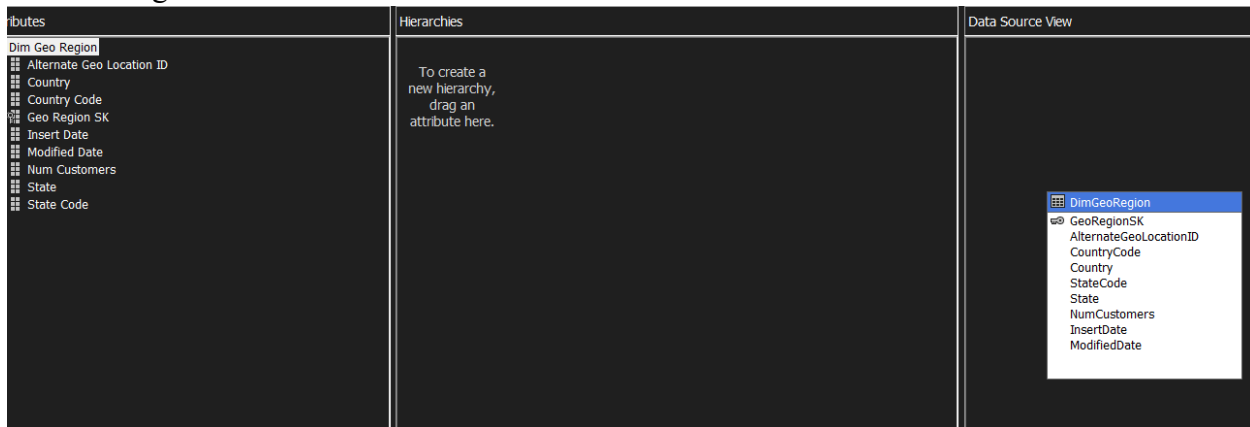
The screenshot shows the Dimension Structure Designer for the DimProduct dimension. The interface is divided into three main panes: Attributes, Hierarchies, and Data Source View.

- Attributes Pane:** Lists the attributes of the DimProduct dimension, including Alternate Product ID, Brand, Category, Category Code, Color, Insert Date, Manufacturer, Modified Date, Product Code, Product Name, Product SK, Subcategory, Subcategory Code, Unit Cost, Unit Price, Weight, and Weight Unit Measure.
- Hierarchies Pane:** Shows a single hierarchy named "Hierarchy" with a checkbox. Below it, a list of attributes is displayed: To create a new hierarchy, drag an attribute here.
- Data Source View Pane:** Displays a list of data sources for the DimProduct dimension, including ProductSK, AlternateProductID, ProductCode, ProductName, Manufacturer, Brand, Color, WeightUnitMeasure, Weight, UnitCost, UnitPrice, SubcategoryCode, and Subcategory.

DimStore

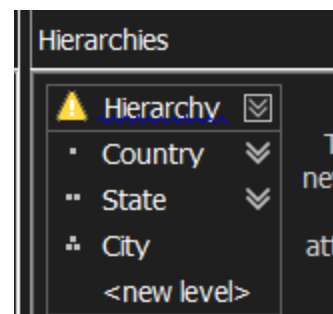
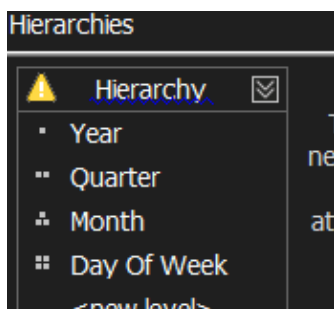


DimGeoRegion



6. Implementing Hierarchy

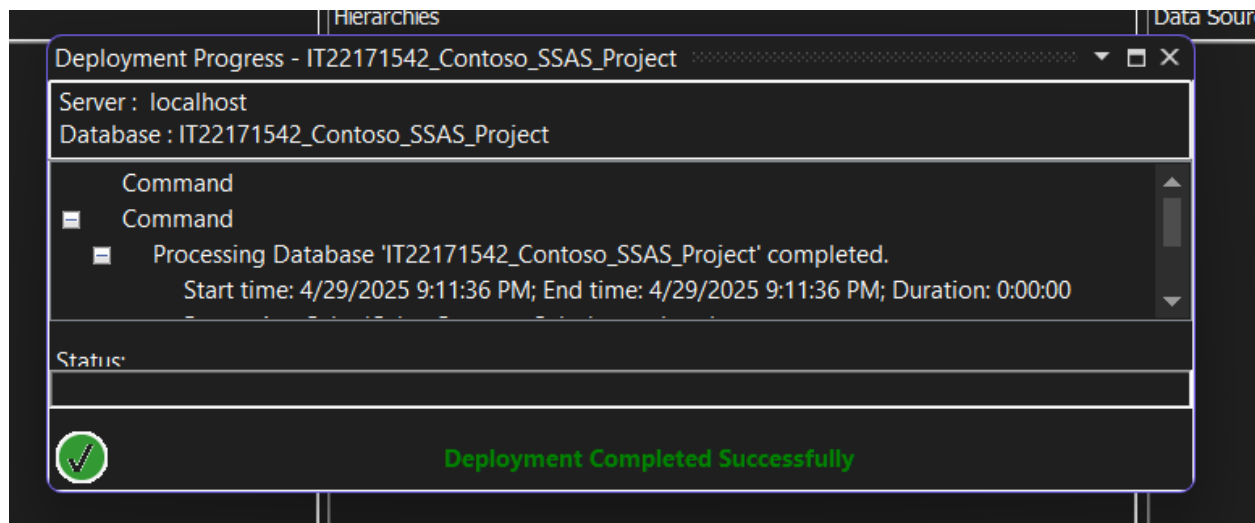
- Opened Dimension Designer (**DimDate.dimension**, **DimCustomer.dimension**).
- Created **Hierarchies**:
 - Dragged attributes, **Year > Quarter > Month > Date** to hierarchy.
 - Dragged attributes, **Country → State → City** to hierarchy.
- Verified Attribute Relationships to optimize query performance.



7. Deploying and Processing the Cube

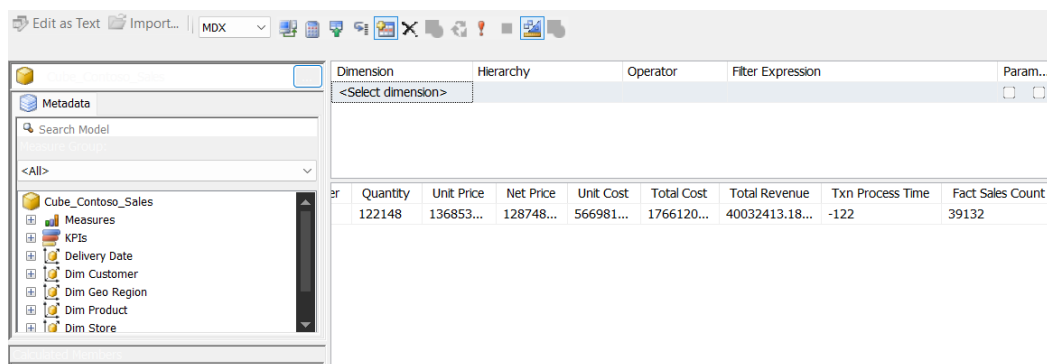
- Right-clicked the project → **Properties**.
- Set **Deployment Target Server**.
- Clicked **Deploy** to deploy cube to SSAS server.
- After successful deployment, **processed** the cube:
 - Right-click Cube → **Process** → Start.

Verified cube data loaded successfully.



8. Testing Cube

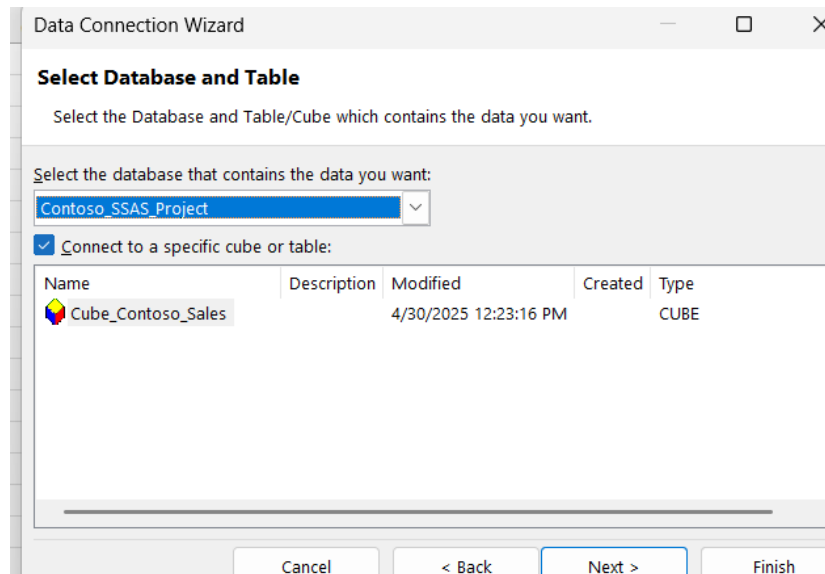
- Opened **Cube Browser** in Visual Studio.
- Dragged measures and dimensions into the browser to test:
 - Confirmed correct aggregation of measures.
 - Tested drill-down through the hierarchy (Year → Quarter → Month).



Step 3: Demonstration of OLAP operations

1. Connection to SSAS Cube

- Opened Microsoft Excel.
- Navigated to **Data** → **Get Data** → **From Database** → **From Analysis Services**.
- Entered server name
- Selected database Contoso 100K_DW and [Cube_Contoso_Sales].
- Created a PivotTable connected to the cube.



2. Demonstrate OLAP Operations

Create the Initial PivotTable:

In the PivotTable Fields pane on the right:

- Expand the Dim Date (Order Date) dimension → Drag the Year level to the Rows area to show sales by year.
- Expand the DimProduct dimension → Drag the Category level to the Columns area to show sales by product category.
- Expand the Fact Sales measure group → Drag TotalRevenue to the Values area to display the total revenue.
- **Roll-up:**
 - Aggregated TotalRevenue by Year and Product Category using the PivotTable Fields pane → Dragged Dim Date (Order Date).Year to Rows and DimProduct.Category to Columns.

AutoSave Off Book1 - Excel

File Home Insert Page Layout Formulas Data Review View Automate Help **PivotTable Analyze** Design

PivotTable Name: PivotTable1 Active Field: Total Revenue

PivotTable Fields

Choose fields to add to report:

☒ Total Revenue
☐ Txn Process Time
☐ Unit Cost
☐ Unit Price

☒ Delivery Date
☐ Delivery Date.Hierarchy

Drag fields between areas below:

Filters: Category

Columns: Category

Rows: Order Date.Hierarchy

Values: Total Revenue

	A	B	C	D	E	F	G	H	I	J
1	Total Revenue	Column Labels								
2	Row Labels	Audio	Cameras and camcorders	Cell phones	Computers	Games and Toys	Home Appliances	Music, Movies and Audio Books	TV and Video	Unknown
3	*2010	19721.4422	187658.5464	63993.254	238281.2927	5808.4351	136977.8917	30021.5599	139495.3237	66.1736 8218
4	*2011	37373.4316	250333.5885	156440.8805	668111.2402	8370.3903	223714.7745	42535.2933	115339.0178	213.2659 1502
5	*2012	52313.1484	130855.6032	157399.3784	724210.5234	6258.6818	244149.404	44325.2136	107354.0245	67.932 1466
6	*2013	79406.4109	205196.1649	285253.8698	1062814.038	18021.6458	281261.0562	85660.1646	121097.4061	59.1408 2138
7	*2014	106205.7602	317487.294	412534.3854	1553567.093	37091.9129	260846.558	120554.487	168326.1539	90.1496 2978
8	*2015	64265.6159	233026.636	335686.3632	1114501.711	22078.5996	174449.7119	96140.6242	123099.4372	46.1937 2163
9	*2016	39372.4465	160133.8703	263824.0849	702369.9932	16087.8092	144728.679	67253.5136	149805.1647	129.5098 1543
10	*2017	44514.8995	134515.1214	429066.5905	992961.4848	13265.0887	220048.7342	143337.6842	255309.0587	52.0276 2232
11	*2018	54207.9274	160391.8084	518926.8383	1060057.676	17230.5518	500972.3995	164721.1189	377927.4162	94.6053 2854
12	*2019	58908.1726	109805.8706	361789.9752	666007.6549	15458.0445	309585.8165	116140.1355	260721.3602	113.5863 1898
13	*2020	14266.5684	18565.954	87925.6282	152212.0053	2821.3397	75102.692	32503.0044	33748.9721	4171
14	Grand Total	570555.8236	1907970.458	3072841.248	8935094.713	162492.4994	2571837.718	943192.7992	1852221.335	932.5846 2001

○ Drill-down:

- Drilled down from Year to Quarter by clicking the expand button (+) next to 2010 in the PivotTable, showing TotalRevenue by Quarter within Year.

AutoSave Off Book1 - Excel

File Home Insert Page Layout Formulas Data Review View Automate Help **PivotTable Analyze** Design

PivotTable Name: PivotTable1 Active Field: Total Revenue

PivotTable Fields

Choose fields to add to report:

☒ Total Revenue
☐ Txn Process Time
☐ Unit Cost
☐ Unit Price

☒ Delivery Date
☐ Delivery Date.Hierarchy

Drag fields between areas below:

Filters: Category

Columns: Category

Rows: Order Date.Hierarchy

Values: Total Revenue

	A	B	C	D	E	F	G	H	I	J
1	Total Revenue	Column Labels								
2	Row Labels	Audio	Cameras and camcorders	Cell phones	Computers	Games and Toys	Home Appliances	Music, Movies and Audio Books	TV and Video	Unknown
3	*2010	19721.4422	187658.5464	63993.254	238281.2927	5808.4351	136977.8917	30021.5599	139495.3237	66.1736 8218
4	*2011	37373.4316	250333.5885	156440.8805	668111.2402	8370.3903	223714.7745	42535.2933	115339.0178	213.2659 1502
5	*2012	52313.1484	130855.6032	157399.3784	724210.5234	6258.6818	244149.404	44325.2136	107354.0245	67.932 1466
6	*2013	79406.4109	205196.1649	285253.8698	1062814.038	18021.6458	281261.0562	85660.1646	121097.4061	59.1408 2138
7	*2014	106205.7602	317487.294	412534.3854	1553567.093	37091.9129	260846.558	120554.487	168326.1539	90.1496 2978
8	*2015	64265.6159	233026.636	335686.3632	1114501.711	22078.5996	174449.7119	96140.6242	123099.4372	46.1937 2163
9	*2016	39372.4465	160133.8703	263824.0849	702369.9932	16087.8092	144728.679	67253.5136	149805.1647	129.5098 1543
10	*2017	44514.8995	134515.1214	429066.5905	992961.4848	13265.0887	220048.7342	143337.6842	255309.0587	52.0276 2232
11	*2018	54207.9274	160391.8084	518926.8383	1060057.676	17230.5518	500972.3995	164721.1189	377927.4162	94.6053 2854
12	*2019	58908.1726	109805.8706	361789.9752	666007.6549	15458.0445	309585.8165	116140.1355	260721.3602	113.5863 1898
13	*2020	14266.5684	18565.954	87925.6282	152212.0053	2821.3397	75102.692	32503.0044	33748.9721	4171
14	Grand Total	570555.8236	1907970.458	3072841.248	8935094.713	162492.4994	2571837.718	943192.7992	1852221.335	932.5846 2001



	A	B	C	D	E	F	G	H	I	J
	Total Revenue	Column Labels								
Row Labels	Audio	Cameras and camcorders	Cell phones	Computers	Games and Toys	Home Appliances	Music, Movies and Audio Books	TV and Video	Unknown	Unknown
2010	19721.4422	187658.5464	63993.254	238281.2927	5808.4351	136977.8917	30021.5599	139495.3237	66.1736	82.1
Q2	7198.7076	34542.48	5258.6018	29712.56	1642.7322	23265.2488	5644.7307	15910.4861	66.1736	12.1
Q3	5479.6555	79540.2137	25961.22	84532.7144	1859.6573	51491.9523	10938.4197	62031.1094		32.1
August	2348.9021	30573.3874	3667.104	35073.35	452.2804	16181.9361	3973.765	11246.416		10.1
July	1228.0287	19812.8368	11719.512	7421.7634	402.6184	18446.9386	3897.5618	29544.1935		9.1
September	1902.7247	29153.9895	10574.604	42037.601	1004.7585	16863.0776	3067.0929	21240.4999		12.1
Q4	7043.0791	73575.8527	32773.4322	124036.0183	2306.0456	62220.6906	13438.4095	61553.7282		37.1
2011	37373.4316	250333.5885	156440.8805	668111.2402	8370.3903	223714.7745	42535.2933	115339.0178	213.2659	15.1
Q1	8588.8603	95692.5002	37545.2826	71054.0015	2324.1413	71669.3617	11720.904	43338.1656	16.3636	34.1
Q2	8364.5705	36477.3247	31900.151	126845.5172	1348.1394	41771.4722	9855.6652	25709.7077		28.1
April		23.984	469.8	15576.8			120.109			
June	7410.8456	22369.9435	8411.0444	49990.2086	362.7073	12365.0965	3181.2636	11210.1439		11.1
May	953.7249	14083.3972	23019.3066	61278.5086	985.4321	29406.3757	6554.2726	14499.5638		15.1
Q3	8032.9466	77706.56	21627.7162	189971.6107	1797.4336	49897.3697	6659.5381	14434.3026		37.1
Q4	12387.0542	40457.2036	65367.7307	280240.1108	2900.676	60376.5709	14299.186	31856.8419	196.9023	50.1
2012	52313.1484	130855.6032	157399.3784	724210.5234	6258.6818	244149.404	44325.2136	107354.0245	67.932	14.1
Q1	6295.0185	49091.3422	41832.648	221400.4785	1140.6402	55385.2302	9955.2451	30429.4342		41.1
Q2	10367.2231	32001.582	31167.3037	166108.3574	1364.2669	63243.7638	5800.0706	17046.8408	35.964	32.1
April	599.85		3263.328	1730.4		1240.5804				
June	4277.4631	10682	15083.1379	82990.6975	564.7199	36380.5024	2878.0583	2963.408		15.1
May	5489.91	21319.562	12820.8378	81387.2599	799.547	25622.681	2922.0123	14083.4328	35.964	16.1
Q3	13537.2538	24294.0043	26502.4991	136020.9997	1258.6082	62840.6453	8932.1026	23887.1536		29.1
Q4	22113.453	25468.6747	57896.9276	206680.6878	2495.1665	62679.7647	19637.7953	35990.5959	31.968	42.1
2013	79406.4109	205196.1649	285253.8698	1062814.038	18021.6458	281261.0562	85660.1646	121097.4061	58.1408	21.1
2014	166205.7602	317487.294	412634.3854	1553567.093	37091.9129	280846.558	120554.487	168326.1539	90.1496	29.1

- Slice:
 - Filtered TotalRevenue for Year 2017 by dragging Dim Date (Order Date).Year to the Filters area → Clicked the Year filter dropdown → Selected 2017

	A	B	C	D	E	F	G	H	I
Order Date.Hierarchy	2017								
Row Labels	Total Revenue								
Audio	44514.8995								
Cameras and camcorders	134515.1214								
Cell phones	429066.5905								
Computers	992961.4848								
Games and Toys	13265.0887								
Home Appliances	220048.7342								
Music, Movies and Audio Books	143337.6842								
TV and Video	255309.0587								
Unknown	52.0276								
Unknown	2232966.634								
Grand Total	4466037.324								

- Dice:
 - Created a sub-cube by dragging DimStore.StoreName to Rows (below Year), DimGeoRegion.State to Columns, and filtering DimProduct.Category to Electronics using the Filters area → Selected Electronics from the Category filter dropdown.

Category	A	B	C	D	E	F	G	H	I	J	K
Total Revenue		Column Labels									
Row Labels	Aberdeen	Aberdeenshire	Allerdale	Amber Valley	Anglesey	Angus	Argyllshire	Arun	Ashfield	Ashford	
2010		44209.4799	1867.4117		2975.2661	3809.868	24797.079	7095.4136	1692.384		
Contoso Store Ayrshire		20035.1665					7497.871				
Contoso Store Blaenau Gwent		12492.2004				3782.4	2934.5496				
Contoso Store North Down		4916.3438	1867.4117		2975.2661		7807.5844				
Online store		6765.7692				27.468	6557.074	7095.4136	1692.384		
Unknown											
2011		9566.221	72577.3683	836.272		656.3954	1364.7168	45228.8896	6169.8824	3473.8676	
Contoso Store Ayrshire		9566.221	31736.776			656.3954		8526.5568		3473.8676	
Contoso Store Blaenau Gwent			9017.9387				1292.7288	8897.4663			
Contoso Store North Down			16162.2847	836.272				14991.1465			
Online store			15660.3689				71.988	12813.72	6169.8824		
Unknown											
2012		6757.048	46862.3012	4415.2312	5707.7202	4681.0728	5410.7227	34158.0634	14987.8676	576.3996	
Contoso Store Ayrshire		5094.84	392.7732	389.7	1915.9182			14252.4254	4981.16		
Contoso Store Blaenau Gwent			24001.7061					11594.5329			
Contoso Store Dungannon and South Tyrone			3550.464	4025.5312	3791.802	1367.75		3470.0099	10006.7076	576.3996	
Contoso Store North Down		1662.208	17849.7329				4787.0887	899.8103			
Online store			1067.625			3313.3228	623.634	3941.2849			
Unknown											
2013		6282.635	106772.3016	414.176	6454.171	10892.9708	7776.1285	51747.0017		7492.7491	
Contoso Store Ayrshire		2249.5118	11074.347			3133.447	2706.6601	14613.9808		4894.2899	
Contoso Store Blaenau Gwent		38.7	23437.222		5994.371		92.0616	488.253		738	
Contoso Store Dungannon and South Tyrone			19499.4405		459.8		3820.1034	9928.061			

- Pivot:
 - Pivot: Swapped axes by dragging DimStore.StoreName from Rows to Columns and DimGeoRegion.State from Columns to Rows in the PivotTable Fields pane.

Category	A	B	C	D	E	F	G	H	I	J	K
Total Revenue		Column Labels									
Row Labels	Aberdeen	Aberdeenshire	Allerdale	Amber Valley	Anglesey	Angus	Argyllshire	Arun	Ashfield	Ashford	Ayl
Contoso Store Armagh		1026.51	16720.4124	5366.1212			6537.7657	40660.1867		3756.663	
Contoso Store Ayrshire		24674.8513	100750.58	5691.6545	12501.33	5656.1052	2782.6642	72600.9799	15064.58	11992.8628	
Contoso Store Belfast		8792.9539	10463.3391	3277.9077		3173.7545	9435.0812	13768.3576		8230.078	
Contoso Store Blaenau Gwent		38.7	88112.19	3444.754	5994.371	8038.898	20617.4816	56858.2087		5759.1411	
Contoso Store Dungannon and South Tyrone		3694.5846	50943.7383	4803.5312	4251.602	11495.8587	19824.6577	36597.2104	10790.1405	3155.7984	
Contoso Store Fermanagh		5543.5502	28679.0828	6010.0818	43.4116	8874.2968	28966.0934	48485.8744	267.2757	8095.6318	
Contoso Store North Down		7808.113	79771.6737	5425.3977	2213.7908	22212.9811	24384.7325	67096.3204		82.944	
Online store		38899.0775	185518.5521	25044.9125	8380.3414	32953.1989	38566.0784	177118.5682	28802.7375	2612.354	26864.974
Unknown											
Grand Total		90478.3405	560959.5684	59064.3606	33384.8468	92405.0932	151114.5547	513185.7063	54657.458	2879.6297	67938.0931

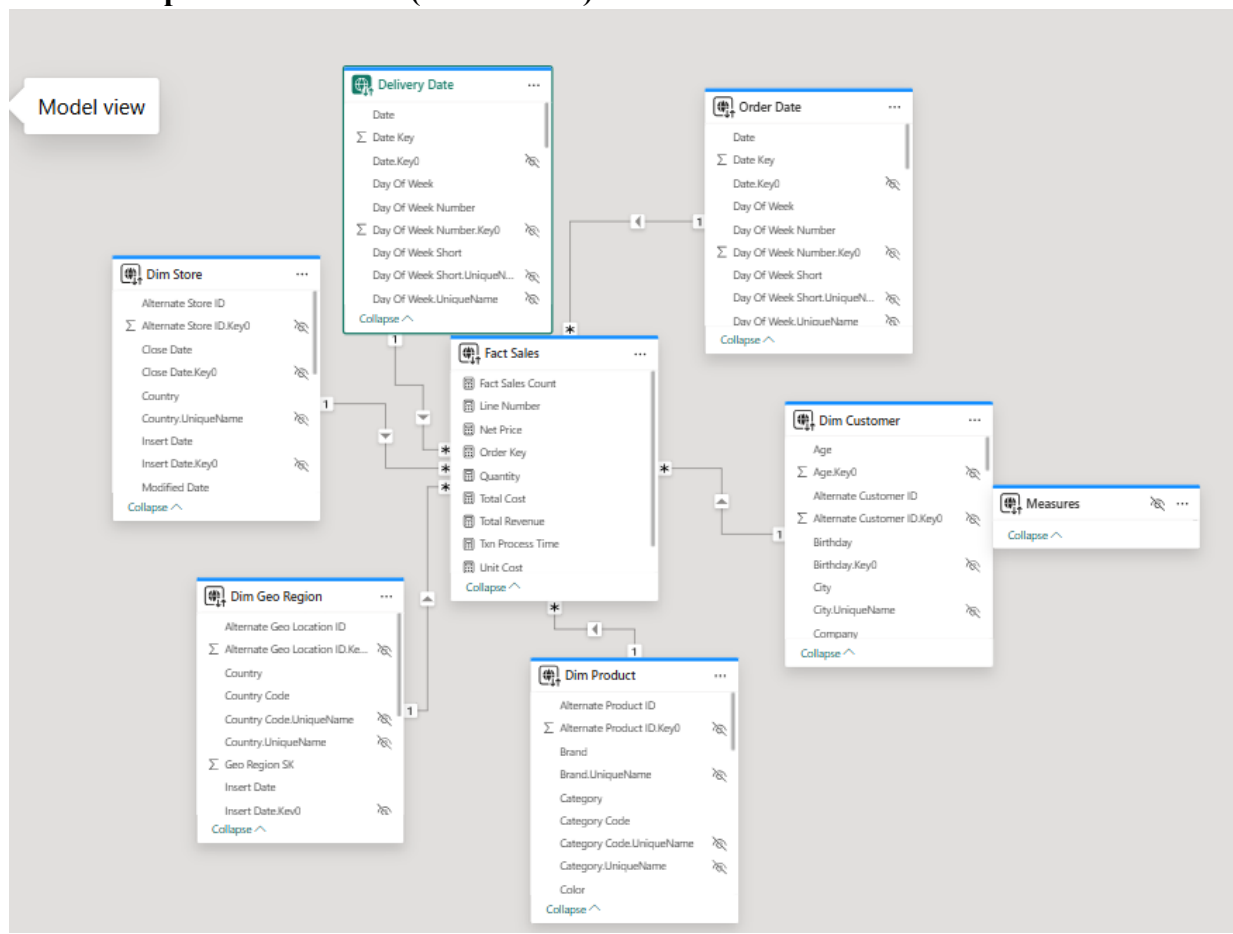
Category	A	B	C	D	E	F	G	H	I	J	K
Total Revenue		Column Labels									
Row Labels	Contoso Store Armagh	Contoso Store Ayrshire	Contoso Store Belfast	Contoso Store Blaenau Gwent	Contoso Store Dungannon and South Tyrone	Contoso Store Fermanagh	Contoso Store North Down	Online store	Unknown		
Aberdeen		1026.51	24674.8513		8792.9539		38.7		3694.5846		
Aberdeenshire		16720.4124	100750.58		10463.3391		88112.19		50943.7383		
Allerdale		5366.1212	5691.6545		3277.9077		3444.754		4803.5312		
Amber Valley			12501.33		5994.371		4251.602		4251.602		
Anglesey			5656.1052		3173.7545		8038.898		11495.8587		
Angus		6537.7657	2782.6642		9435.0812		20617.4816		19824.6577		
Argyllshire		40660.1867	72600.9799		13768.3576		56858.2087		36597.2104		
Arun			15064.58						10790.1405		
Ashfield											
Ashford		3756.663	11992.8628		8230.078				5759.1411		
Aylesbury Vale		2898.5424	56.637						34514.425		
Babergh		1175.838	10252.3177				10397.0481				
Barnet			21648.46		550.03						
Basildon											
Bassetlaw		20073.119			1045.8711		8578.1148			1112	
Bath and North East Somerset		3058.5861	20593.837		1253.98		6082.5183			2886.3148	
Bedford		15743.5737	2132.7629				920.8			25.344	
Berkshire			14409.5291				1746.1865				
Birmingham			4181.5647		7831.3477		12273.8248			440.9182	
Bolsover		140.62					407.1372				
Bolton							1875.748			1768.2425	
Boston		1548.1603	347.0295		1648.62		2729.327			17435.2661	
Bracknell Forest			9796.2071				2489.335				

Step 4: PowerBI Reports

Steps:

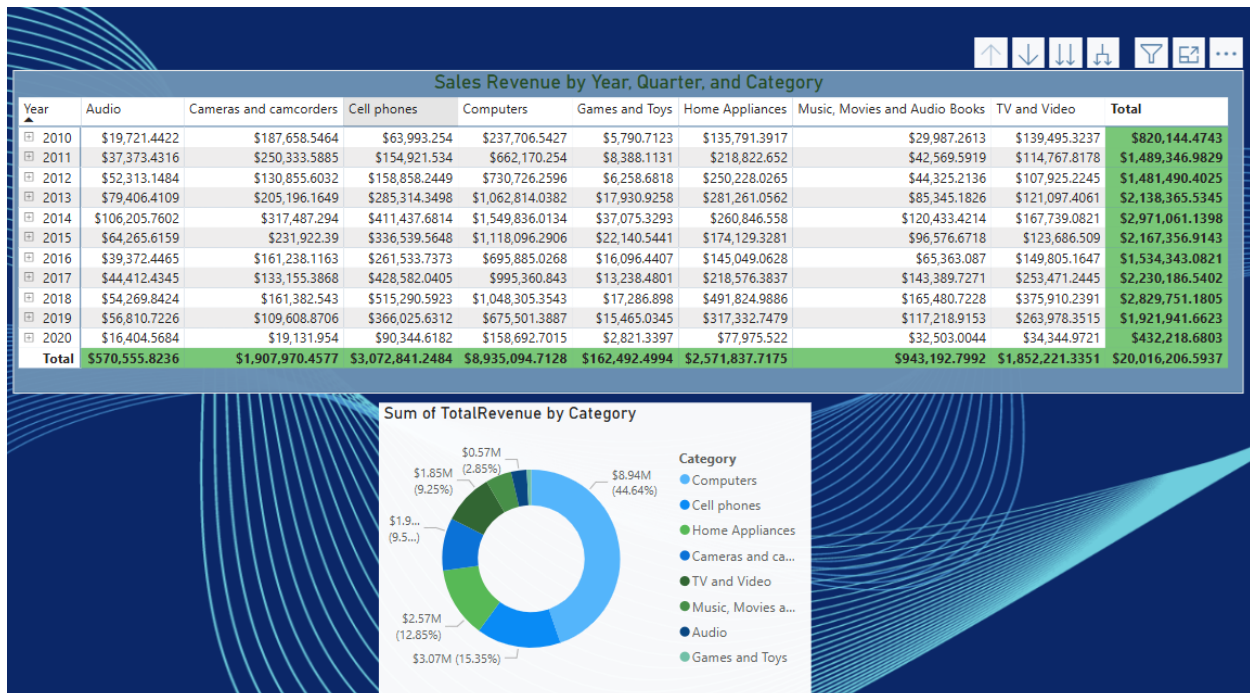
- Open Power BI Desktop.
- Connected to the OLAP Cube : **Home** → **Get Data** → **More...** → **Database** → **SQL Server Analysis Services**. (used Cube_Contoso_Sales)
- Build Relationships between tables (use Model view).
- Save the Power BI file (Contoso_PowerBI_Reports).

Relationships between tables (Model View)



Report 1 - Matrix Visual

- Created a page named Matrix Report.
- Added a Matrix visual:
 - Rows: DimDate.Year, DimDate.Quarter.
 - Columns: DimProduct.Category.
 - Values: FactSales.TotalRevenue (Sum).
- Formatted with subtotals and conditional formatting.
- Title: “Sales Revenue by Year, Quarter, and Category”.



Report 2 - Cascading Slicers

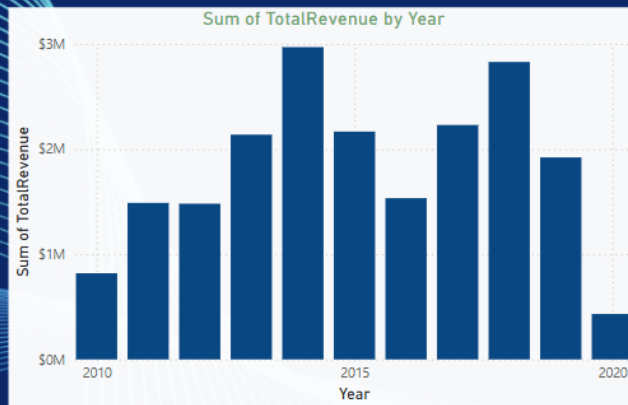
- Created a page named Slicer Report.
- Added slicers: DimGeoRegion.Country, DimGeoRegion.State.
- Ensured cascading filters via relationships.
- Added visuals:
 - Clustered Column Chart: DimDate.Year, FactSales.TotalRevenue, DimProduct.Category.
 - Line Chart: DimDate.YearMonth, FactSales.Quantity.
 - Card: FactSales.TotalRevenue.
- Title: “Sales Analysis with Country and State Filters”.



Report 3 - Drill-down

- Created a page named Drilldown Report by right-clicking the page tab and selecting Rename Page.
- Added a Clustered Column Chart:
 - Axis: DimDate.Date Hierarchy.
 - Value: FactSales.TotalRevenue.
- Enabled drill-down to navigate from Year to Month using the Drill Down button.
- Added a Table visual:
 - Fields: DimDate.Year, DimDate.Quarter, FactSales.TotalRevenue.
 - Fixed Sum of Year issue by setting Year to **Don't summarize** in the Fields pane, ensuring Year displays as categorical values (e.g., 2018, 2019).
- Added a text box with title: "Drill-down Sales by Date Hierarchy".
- Tested drill-down in the chart and verified Table data.

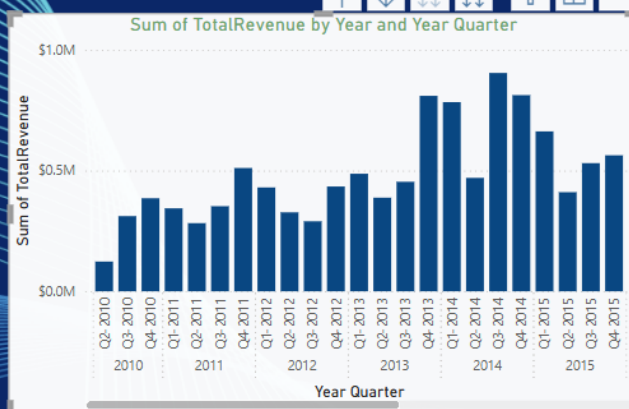
Drill-down Sales by Date Hierarchy



Year	Quarter	Sum of TotalRevenue
2010	Q2	\$123,148.0792
2010	Q3	\$311,511.2006
2010	Q4	\$385,485.1945
2011	Q1	\$343,746.4886
2011	Q2	\$282,272.5479
2011	Q3	\$352,515.1661
2011	Q4	\$510,812.7803
2012	Q1	\$430,214.9421
2012	Q2	\$327,099.4083
2012	Q3	\$289,991.7041
2012	Q4	\$434,184.348
2013	Q1	\$487,025.2901
2013	Q2	\$387,807.7198
2013	Q3	\$453,714.0162
2013	Q4	\$809,818.5084
2014	Q1	\$783,833.3146
Total		\$20,016,206.5937



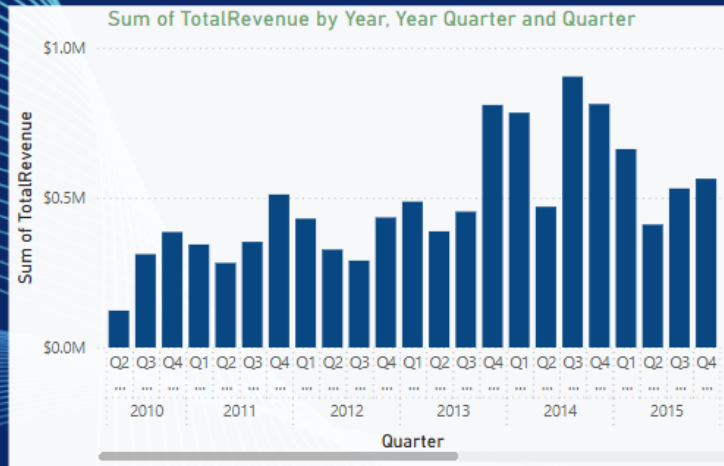
Drill-down Sales by Date Hierarchy



Year	Quarter	Sum of TotalRevenue
2010	Q2	\$123,148.0792
2010	Q3	\$311,511.2006
2010	Q4	\$385,485.1945
2011	Q1	\$343,746.4886
2011	Q2	\$282,272.5479
2011	Q3	\$352,515.1661
2011	Q4	\$510,812.7803
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2012	Q4	\$434,184.348
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2013	Q4	\$809,818.5084
2014	Q1	\$783,833.3146
Total		\$20,016,206.5937



Drill-down Sales by Date Hierarchy



Year	Quarter	Sum of TotalRevenue
2010	Q2	\$123,148.0792
2010	Q3	\$311,511.2006
2010	Q4	\$385,485.1945
2011	Q1	\$343,746.4886
2011	Q2	\$282,272.5479
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2012	Q2	\$327,099.4083
2012	Q3	\$289,991.7041
2012	Q4	\$434,184.348
2013	Q1	\$487,025.2901
2013	Q2	\$387,807.7198
2013	Q3	\$453,714.0162
2013	Q4	\$809,818.5084
2014	Q1	\$783,833.3146
Total		\$20,016,206.5937



Drill-down Sales by Date Hierarchy

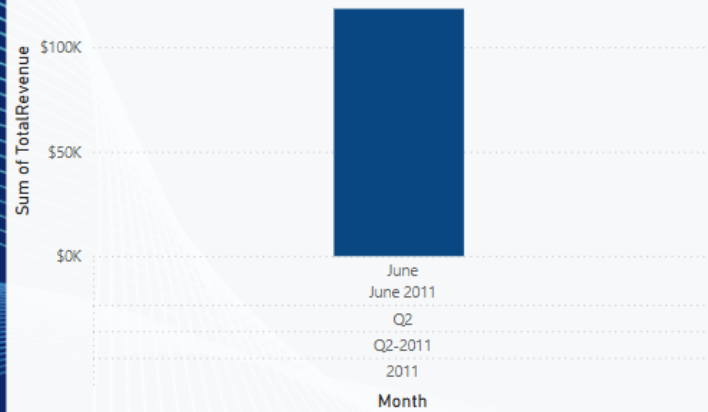


Year	Quarter	Sum of TotalRevenue
2010	Q2	\$123,148.0792
2010	Q3	\$311,511.2006
2010	Q4	\$385,485.1945
2011	Q1	\$343,746.4886
2011	Q2	\$282,272.5479
2011	Q3	\$352,515.1661
2011	Q4	\$510,812.7803
2012	Q1	\$430,214.9421
2012	Q2	\$327,099.4083
2012	Q3	\$289,991.7041
2012	Q4	\$434,184.348
2013	Q1	\$487,025.2901
2013	Q2	\$387,807.7198
2013	Q3	\$453,714.0162
2013	Q4	\$809,818.5084
2014	Q1	\$783,833.3146
Total		\$20,016,206.5937



Drill-down Sales by Date Hierarchy

Sum of TotalRevenue by Year, Year Quarter, Quarter, Year Month and Month

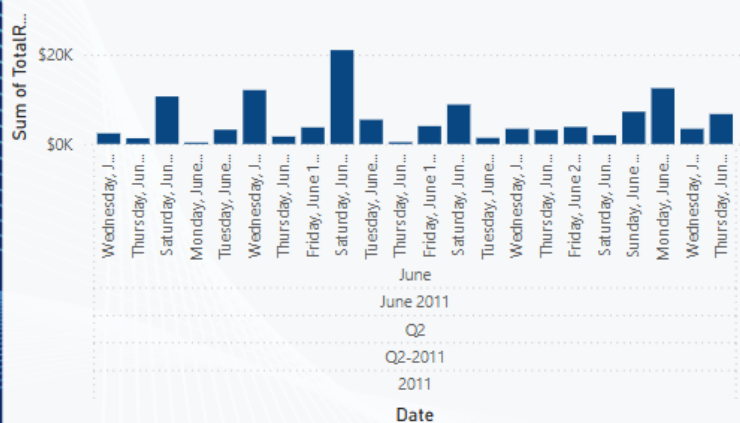


Year	Quarter	Sum of TotalRevenue
2011	Q2	\$118,343.781
Total		\$118,343.781



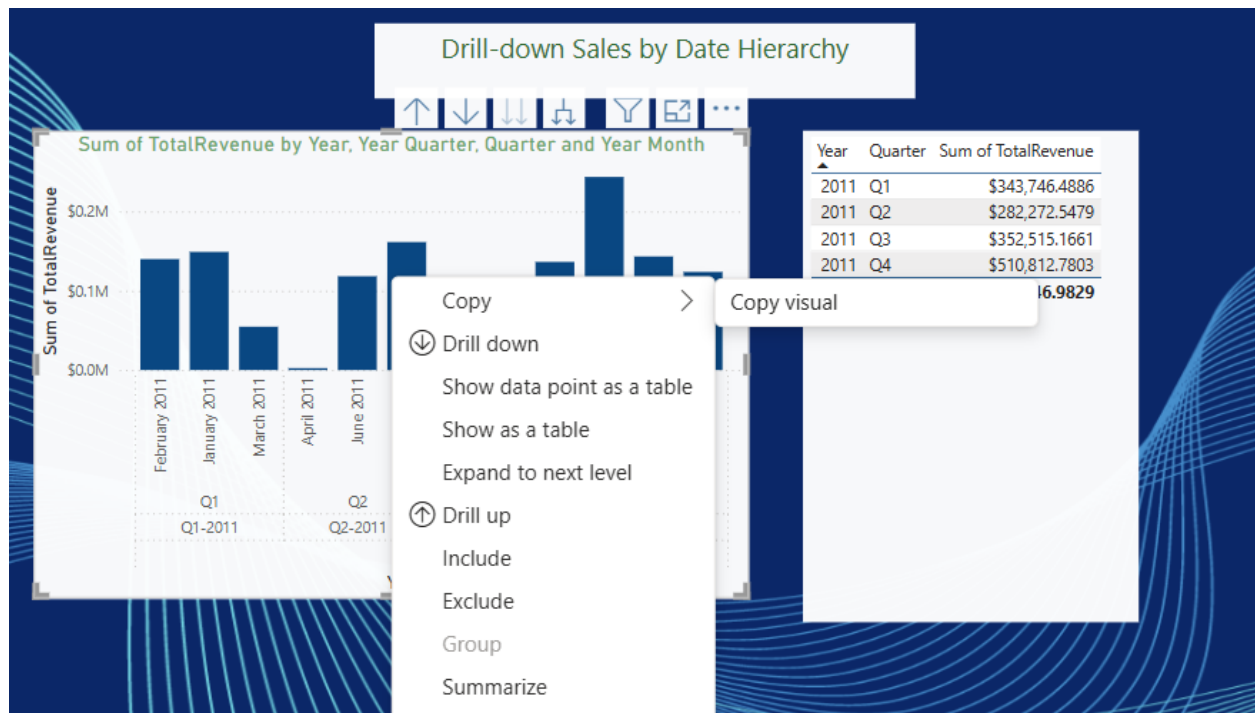
Drill-down Sales by Date Hierarchy

Sum of TotalRevenue by Year, Year Quarter, Quarter, Year Month, Month and Date



Year	Quarter	Sum of TotalRevenue
2011	Q2	\$118,343.781
Total		\$118,343.781





Report 4 - Drill-through

- Created a page named Main Report by adding a new page and renaming it via right-click on the page tab.
- Main Report:
 - Clustered Column Chart: DimCustomer.City, FactSales.TotalRevenue.
 - Slicer: DimGeoRegion.Country.
 - Text box title: “Main Sales Report”.
- Created a page named Drillthrough Details:
 - Table: DimCustomer.GivenName, DimCustomer.Surname, DimProduct.ProductName, FactSales.Quantity, FactSales.TotalRevenue.
 - Drill-through field: DimCustomer.CustomerSK.
- Tested drill-through from City in Main Report to customer details in Drillthrough Details.
- Titles: “Main Sales Report”, “Customer Sales Details”.

GivenName	Surname	ProductName	Sum of Quantity	Sum of TotalRevenue
Aaliyah	Coates	SV DVD Player M120 White	4	\$212.364
Aaliyah	Coates	WWI Desktop PC2.33 X2330 Black	1	\$1,838
Aaliyah	Hill	Contoso 16GB Mp5 Player M1600 Black	5	\$721.239
Aaliyah	Hill	Contoso DVD 38 DVD Storage Binder E25 Silver	7	\$90.909
Aaliyah	Hill	Contoso USB Optical Mouse E200 Grey	1	\$19.995
Aaliyah	Hill	SV 8xDVD E140 Silver	1	\$62.7
Aaliyah	Hill	The Phone Company PDA Handheld 3.5 inch M610 Black	1	\$310.59
Aaliyah	Hill	The Phone Company Pen Touch Screen Phones M320 Grey	2	\$714.56
Aaliyah	Potts	Adventure Works 52" LCD HDTV X590 White	2	\$4,750.1836
Aaliyah	Potts	SV Hand Games for kids E30 Black	2	\$9.702
Aaliyah	Richards	Contoso DVD 58 DVD Storage Binder M55 Silver	6	\$108.342
Aaliyah	Richards	Contoso Phone Tough Skin Case E140 White	5	\$149.436
Aaliyah	Richards	Contoso Touch Stylus Pen E150 Silver	3	\$41.958
Aaliyah	Richards	MGS Rise of Nations: Gold Edition M300	3	\$139.104
Aaliyah	Richards	The Phone Company PDA Handheld 3.7 inch M630 Silver	1	\$372.4
Aaliyah	Wong	A. Datum Compact Digital Camera M200 Black	5	\$1,011.36
Aaliyah	Wong	A. Datum SLR Camera X135 Black	8	\$5,517.6
Aaliyah	Wong	A. Datum Ultra Compact Digital Camera M190 Black	1	\$179.685
Aaliyah	Wong	Adventure Works 13" Color TV E25 Silver	2	\$205.1828
Aaliyah	Wong	Adventure Works 20" Analog CRT TV E45 White	1	\$169.1
Aaliyah	Wong	Adventure Works Desktop PC1.80 ED180 Brown	6	\$3,940.92
Aaliyah	Wong	Adventure Works Desktop PC1.80 ED180 White	7	\$5,166
Aaliyah	Wong	Contoso DVD 14-Inch Player Portable L100 White	3	\$467.982
Aaliyah	Wong	Contoso Microwave 2.2CuFt M0125 Grey	2	\$299.985
Aaliyah	Wong	Contoso Screen 85in E085 White	3	\$625.5
Aaliyah	Wong	Contoso Water Heater 4.0GPM M1250 Blue	1	\$711.9
Aaliyah	Wong	Contoso Wireless Notebook Optical Mouse X205 Blue	3	\$508.7541
Aaliyah	Wong	MGS Age of Empires Expansion: The Rise of Rome 2009 E181	1	\$28.8
Aaliyah	Wong	MGS Hand Games for students E400 Silver	3	\$16.4193
Aaliyah	Wong	NT Wireless Bluetooth Stereo Headphones E302 Yellow	1	\$21.7506
Total			61074	\$20,016,206.5937

Columns

GivenName

Surname

ProductName

Sum of Quantity

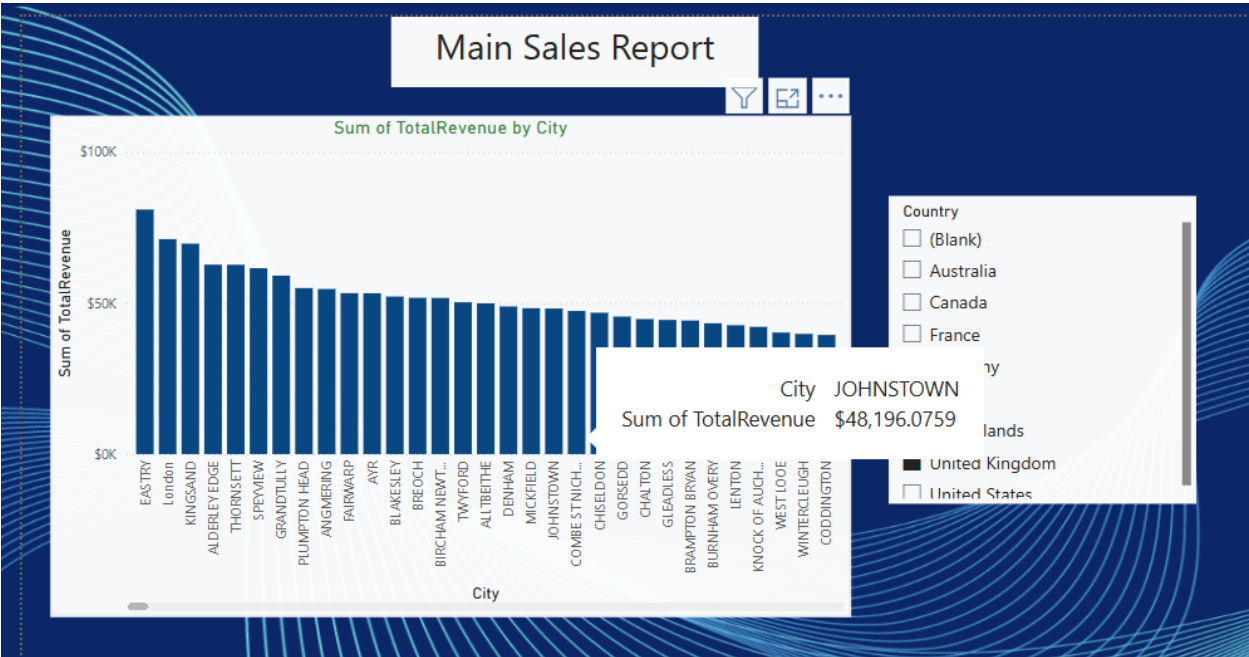
Sum of TotalRevenue

Drill through

Cross-report

Keep all filters

CustomerSK is (All)



Publish
Saved as Contoso_PowerBI_Reports.pbix.