Data Warehousing & Business Intelligence
Y3 S2

Assignment 2

Submitted to
Sri Lanka Institute of Information Technology
By
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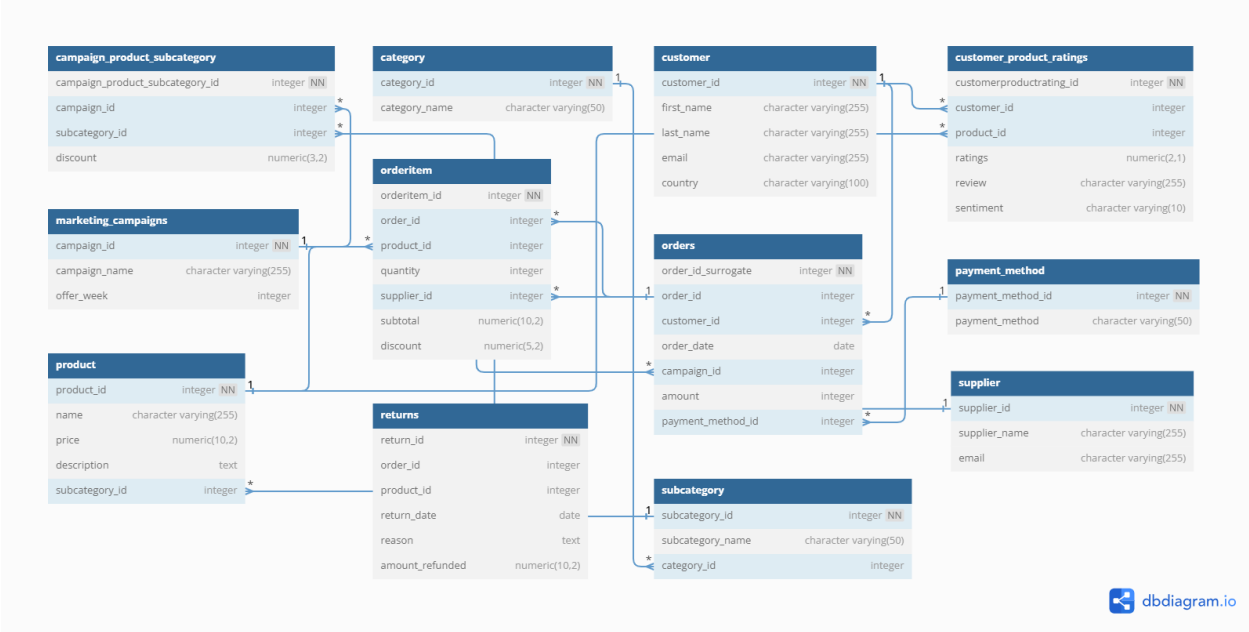
Weekend Batch

Step 1: Data Source for the Assignment 2

The selected dataset is a publicly available dataset that simulates a real-world e-commerce online retail platform. It can be used to create a data warehouse solution for order lifecycle tracking and advanced customer behavior analytics. Each table represents either a business entity or a transaction which aligns with the OLTP characteristics.

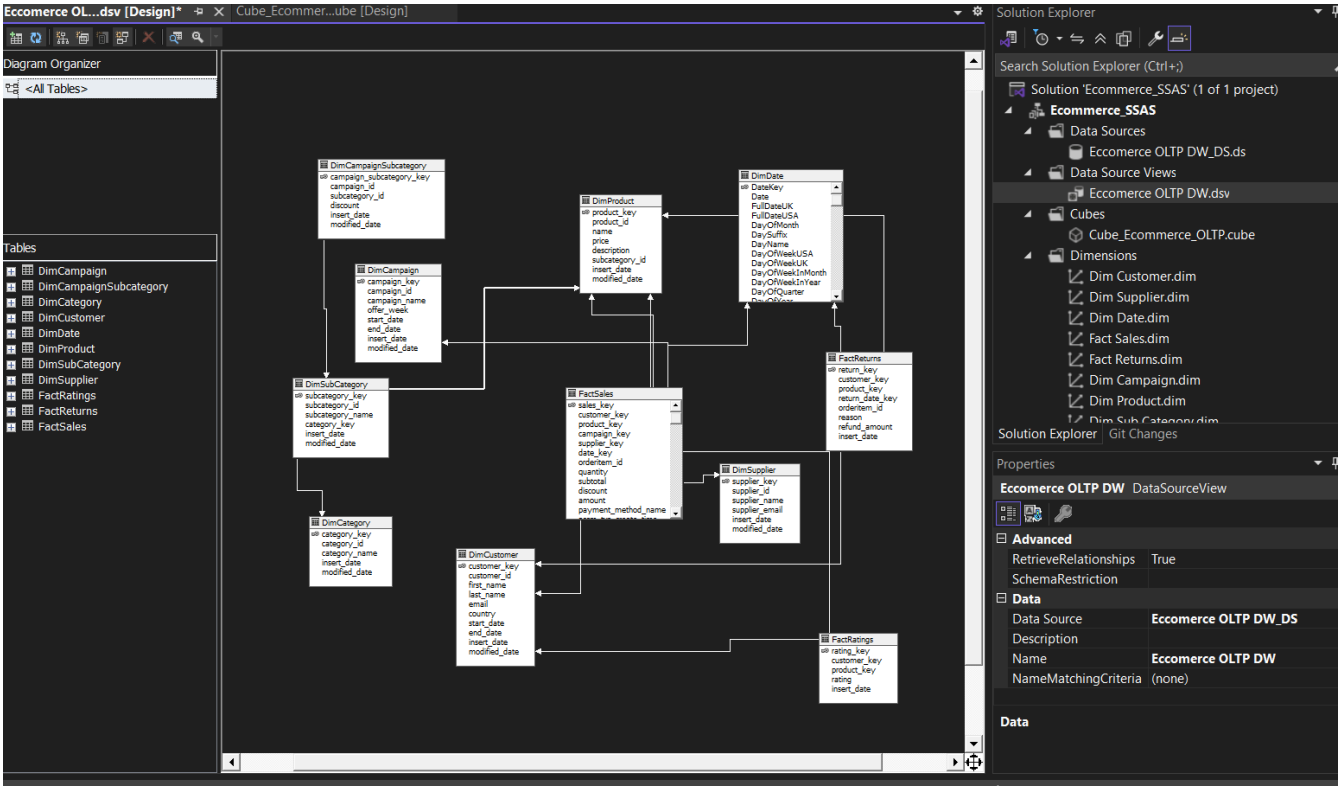
According to the requirements of the assignment, the data warehouse that was implemented and loaded in the assignment 1 was used in this assignment.



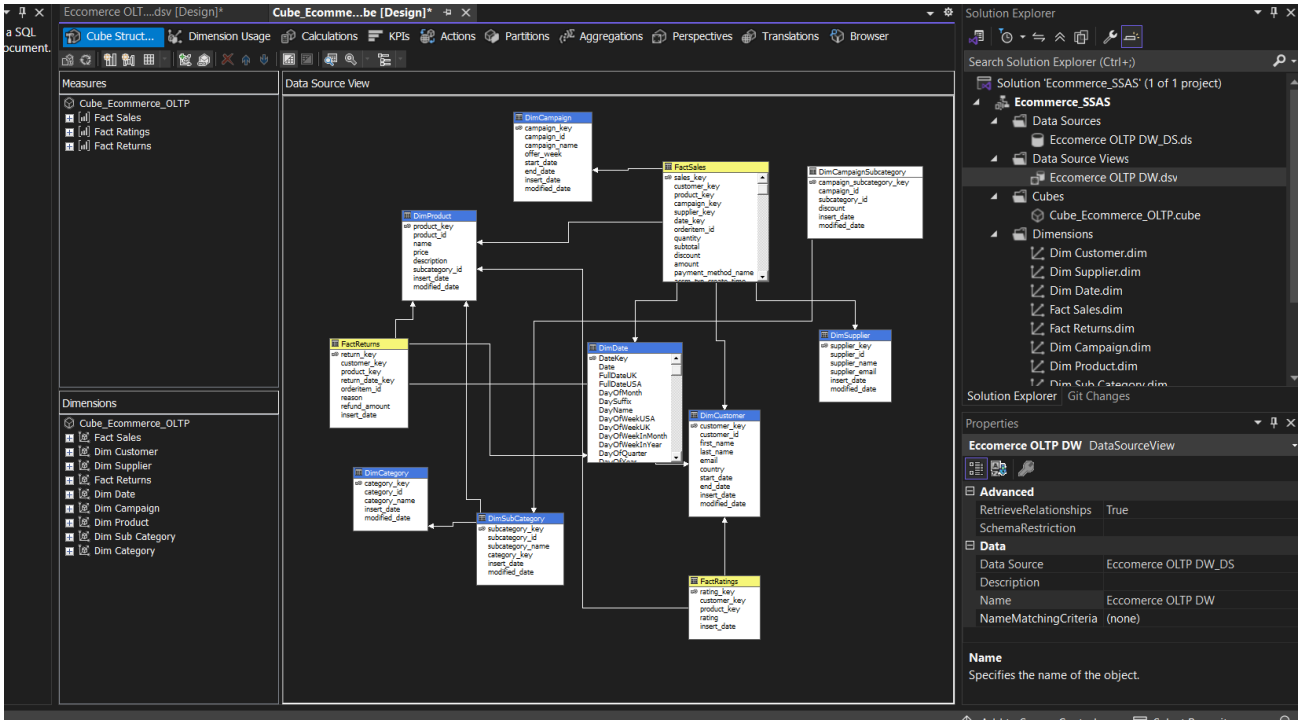
Step 2: SSAS Cube implementation

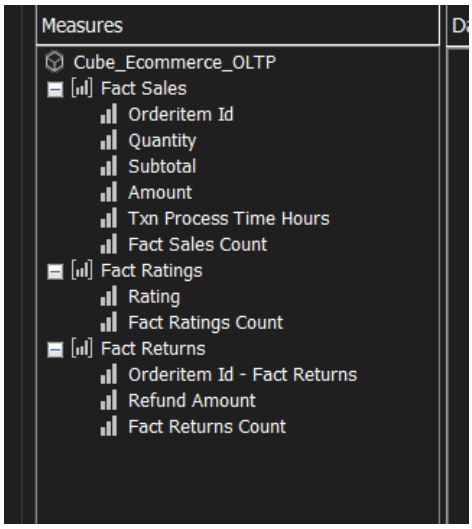
To first start with the Cube implementation, we will first create a new SSAS Multidimensional Project. We then configure a data source by connecting it to the data warehouse database that was created in the first assignment.

After creating the data source we can start to create a data source view. To create the view we can connect with the data source and create a view for all the tables. Once the data view was generated I went through each table to link the relationships using the existing keys.

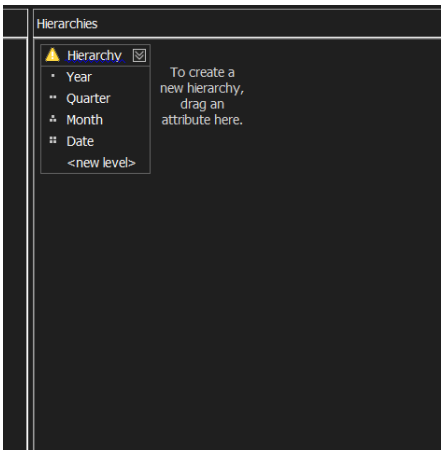


Once all relationships were mapped, I moved on to the creation of cubes. We used the existing tables to create the cube. When selecting the measures I selected the three different fact tables that I have, and selected all of the attributes. The cube was then generated.



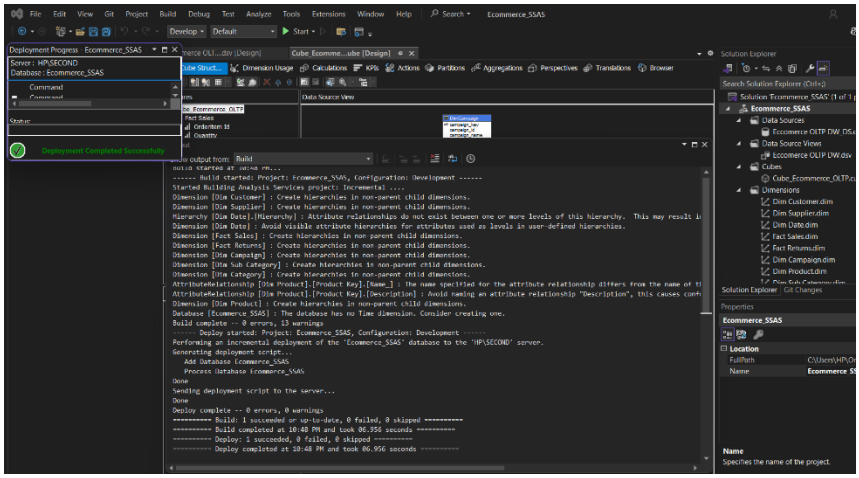


In the dimensions sector I went through each dimension table and added each of the missing attributes for the dimension tables. A hierarchy for the dates were added.

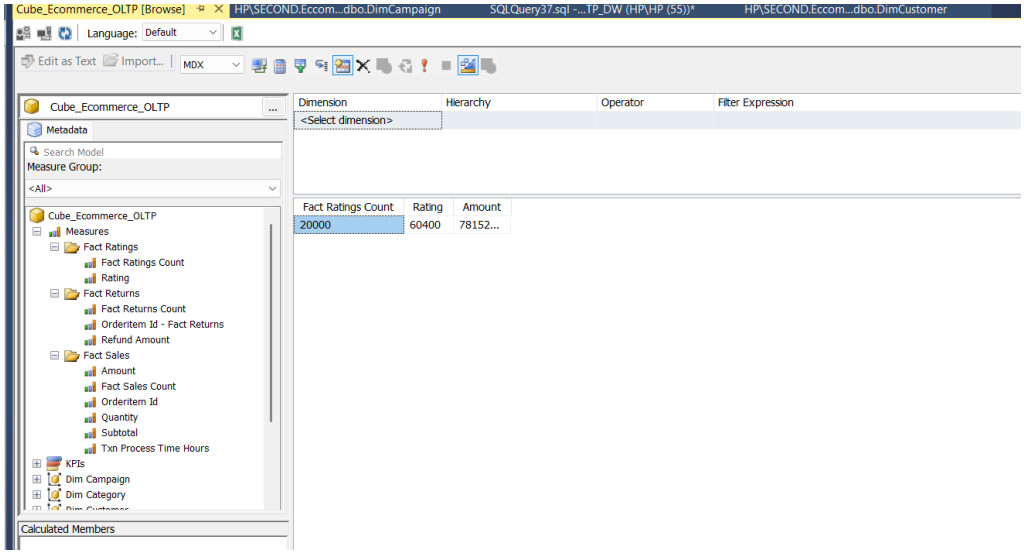


I then went through to check if each of the surrogate keys had been defined as a primary key.

Once everything looked good I moved on to deploying the cube.



Once it was deployed we can view the cube in the SSMS as well.

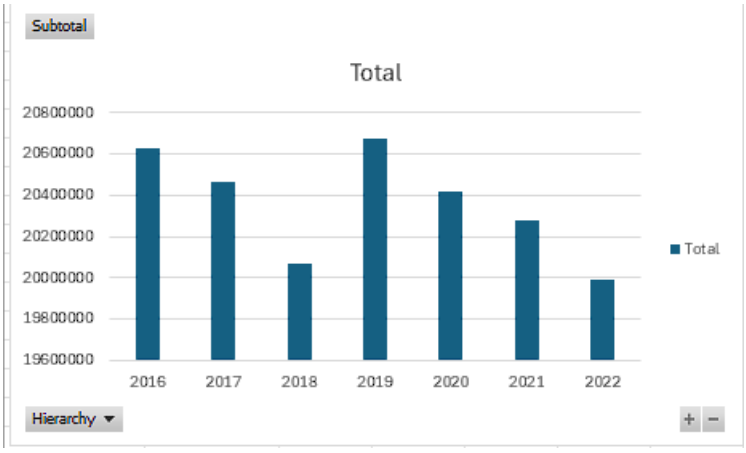


Step 3: Demonstration of OLAP operations

In an excel workbook I connected to the cube using the data tab. Connected to the cube and created Pivot tables using the connected server cube.

Roll-up

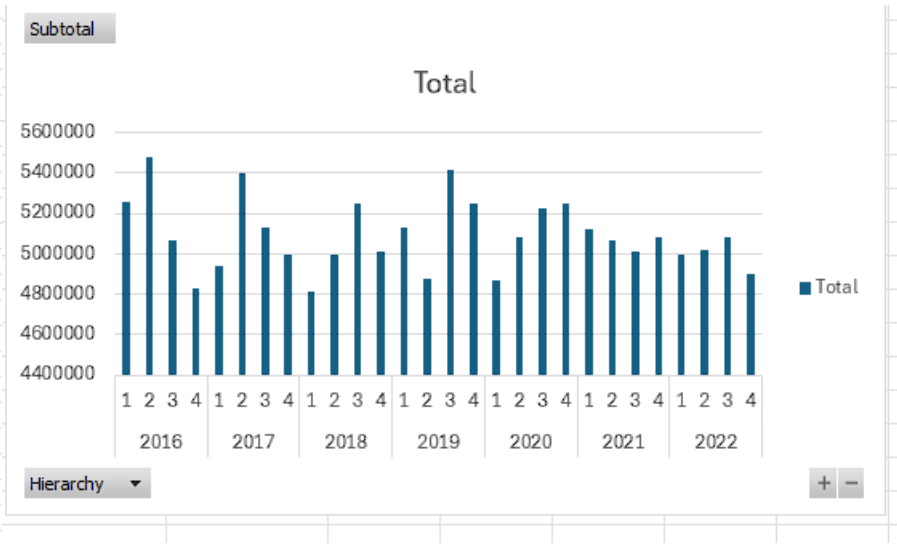
Row Labels	Subtotal
2016	20629240.43
2017	20464923.36
2018	20067391.28
2019	20676801.95
2020	20418277.4
2021	20281771.25
2022	19994622.26
Grand Total	142533027.9



I performed the Roll-Up operation on the DimDate hierarchy. I started from monthly data and then collapsed the hierarchy to aggregate at the quarterly level and then the yearly level to demonstrate the ability to summarize data up the hierarchy.

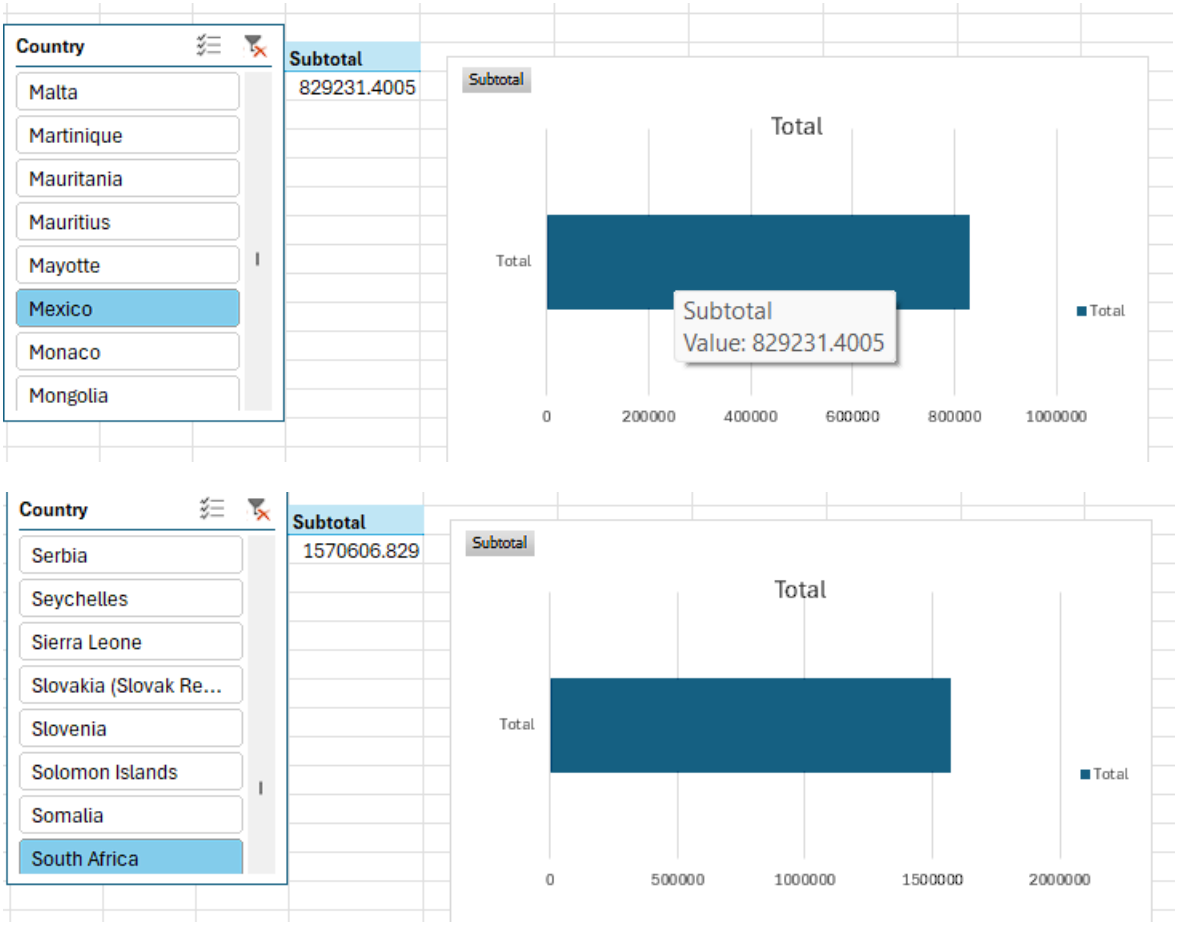
Drill-Down

Row Labels	Subtotal
2016	**20629240.4**
1	5255494.03
2	5479689.34
3	5064609.8
4	4829447.26
2017	**20464923.4**
1	4941995.84
2	5400259.9
3	5130690.25
4	4991977.37
2018	**20067391.3**
1	4810240.12
2	4994704.82
3	5252573.5
4	5009872.84
2019	**20676802**
1	5127426.03
2	4877629.61
3	5419019.73
4	5252726.58
2020	**20418277.4**
1	4865213.39
2	5082310.62
3	5223340.18
4	5247413.22
2021	**20281771.2**
1	5118301.51
2	5066239.04
3	5011390.11
4	5085840.59
2022	**19994622.3**
1	4993478.03
2	5015836.31
3	5084676.97
4	4900630.95
Grand Total	**142533028**



I created the drill down for Year to Quarter to Date using the DimDate hierarchy.

Slice

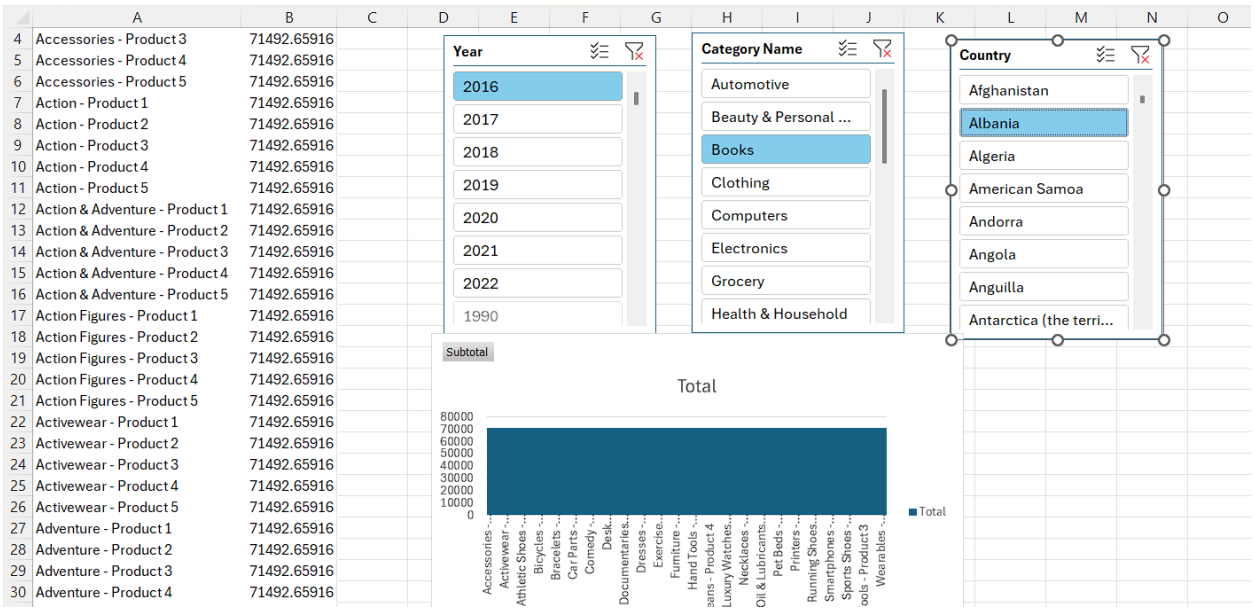


For Slice, I used a Slicer in Excel that's connected to your Pivot Table or Pivot Chart. The slicer acts as a filter UI, while the pivot table/chart shows the filtered result.

I did the Slice operation using the Country Slicer. Only the data for the selected country is shown.

Dice

Dice operation filtering data using multiple dimensions, years and product categories.



	A	B
4	Accessories - Product 3	71492.65916
5	Accessories - Product 4	71492.65916
6	Accessories - Product 5	71492.65916
7	Action - Product 1	71492.65916
8	Action - Product 2	71492.65916
9	Action - Product 3	71492.65916
10	Action - Product 4	71492.65916
11	Action - Product 5	71492.65916
12	Action & Adventure - Product 1	71492.65916
13	Action & Adventure - Product 2	71492.65916
14	Action & Adventure - Product 3	71492.65916
15	Action & Adventure - Product 4	71492.65916
16	Action & Adventure - Product 5	71492.65916
17	Action Figures - Product 1	71492.65916
18	Action Figures - Product 2	71492.65916
19	Action Figures - Product 3	71492.65916
20	Action Figures - Product 4	71492.65916
21	Action Figures - Product 5	71492.65916
22	Activewear - Product 1	71492.65916
23	Activewear - Product 2	71492.65916
24	Activewear - Product 3	71492.65916
25	Activewear - Product 4	71492.65916
26	Activewear - Product 5	71492.65916
27	Adventure - Product 1	71492.65916
28	Adventure - Product 2	71492.65916
29	Adventure - Product 3	71492.65916
30	Adventure - Product 4	71492.65916

Pivot

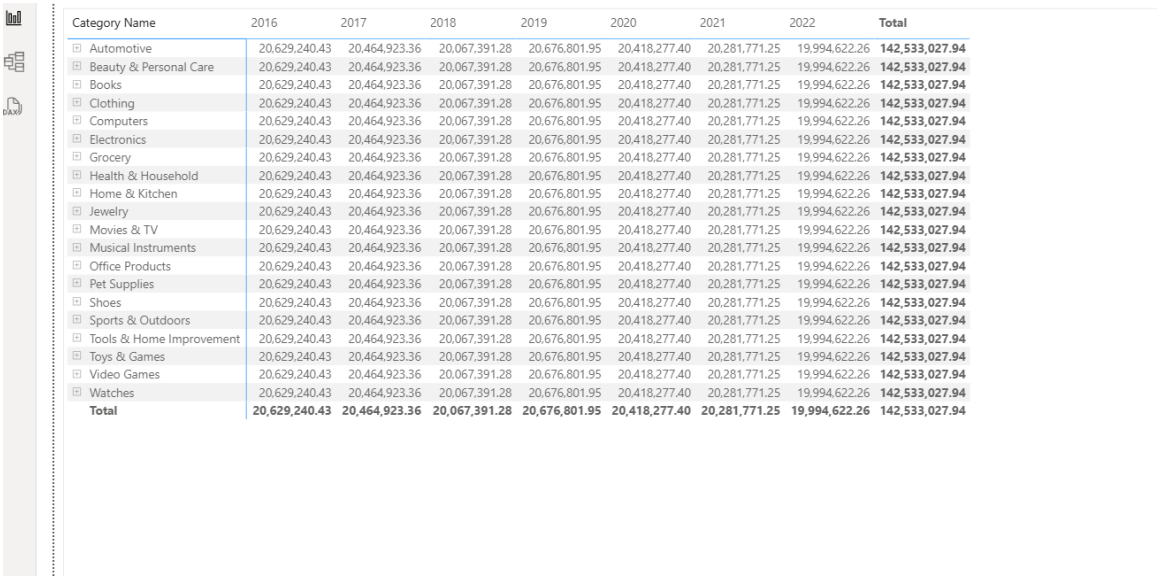
Pivoting data by switching dimensions between rows and columns to view total sales by category and year.

Subtotal	Column Labels							
Row Labels	2016	2017	2018	2019	2020	2021	2022	Grand Total
Automotive	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Beauty & Personal Care	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Books	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Clothing	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Computers	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Electronics	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Grocery	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Health & Household	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Home & Kitchen	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Jewelry	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Movies & TV	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Musical Instruments	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Office Products	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Pet Supplies	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Shoes	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Sports & Outdoors	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Tools & Home Improvement	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Toys & Games	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Video Games	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Watches	20629240.43	20464923.36	20067391.28	20676801.95	20418277.4	20281771.25	19994622.26	142533027.9
Grand Total	**20629240.43**	**20464923.36**	**20067391.28**	**20676801.95**	**20418277.4**	**20281771.25**	**19994622.26**	**142533027.9**

Subtotal	Column Labels									
Row Labels	Automotive	Beauty & Personal Care	Books	Clothing	Computers	Electronics	Grocery	Health & Household	Home & Kitchen	Jewel
2016	20629240.43	20629240.43	20629240.43	20629240.43	20629240.43	20629240.43	20629240.43	20629240.43	20629240.43	2062
2017	20464923.36	20464923.36	20464923.36	20464923.36	20464923.36	20464923.36	20464923.36	20464923.36	20464923.36	2046
2018	20067391.28	20067391.28	20067391.28	20067391.28	20067391.28	20067391.28	20067391.28	20067391.28	20067391.28	2006
2019	20676801.95	20676801.95	20676801.95	20676801.95	20676801.95	20676801.95	20676801.95	20676801.95	20676801.95	2067
2020	20418277.4	20418277.4	20418277.4	20418277.4	20418277.4	20418277.4	20418277.4	20418277.4	20418277.4	204
2021	20281771.25	20281771.25	20281771.25	20281771.25	20281771.25	20281771.25	20281771.25	20281771.25	20281771.25	2028
2022	19994622.26	19994622.26	19994622.26	19994622.26	19994622.26	19994622.26	19994622.26	19994622.26	19994622.26	1999
Grand Total	**142533027.9**	**142533027.9**	**142533027.9**	**142533027.9**	**142533027.9**	**142533027.9**	**142533027.9**	**142533027.9**	**142533027.9**	**1425**

Step 4: PowerBI Reports

Report 1



Category Name	2016	2017	2018	2019	2020	2021	2022	Total
Automotive	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Beauty & Personal Care	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Books	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Clothing	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Computers	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Electronics	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Grocery	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Health & Household	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Home & Kitchen	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Jewelry	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Movies & TV	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Musical Instruments	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Office Products	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Pet Supplies	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Shoes	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Sports & Outdoors	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Tools & Home Improvement	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Toys & Games	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Video Games	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Watches	20,629,240.43	20,464,923.36	20,067,391.28	20,676,801.95	20,418,277.40	20,281,771.25	19,994,622.26	**142,533,027.94**
Total	**20,629,240.43**	**20,464,923.36**	**20,067,391.28**	**20,676,801.95**	**20,418,277.40**	**20,281,771.25**	**19,994,622.26**	**142,533,027.94**

Objective: To display detailed tabular data with both row and column groupings.

Steps:

1. Inserted a **Matrix visual**.
2. Dragged Product Category and Product Name into **Rows**.
3. Added Year from the Date hierarchy to **Columns**.
4. Set Amount as the measure in **Values**.
5. Enabled **Totals and Subtotals** from the formatting pane.
6. Verified that the matrix dynamically aggregated data across both dimensions.

Result: A clear matrix showing total sales for each product per year with group-level summaries.

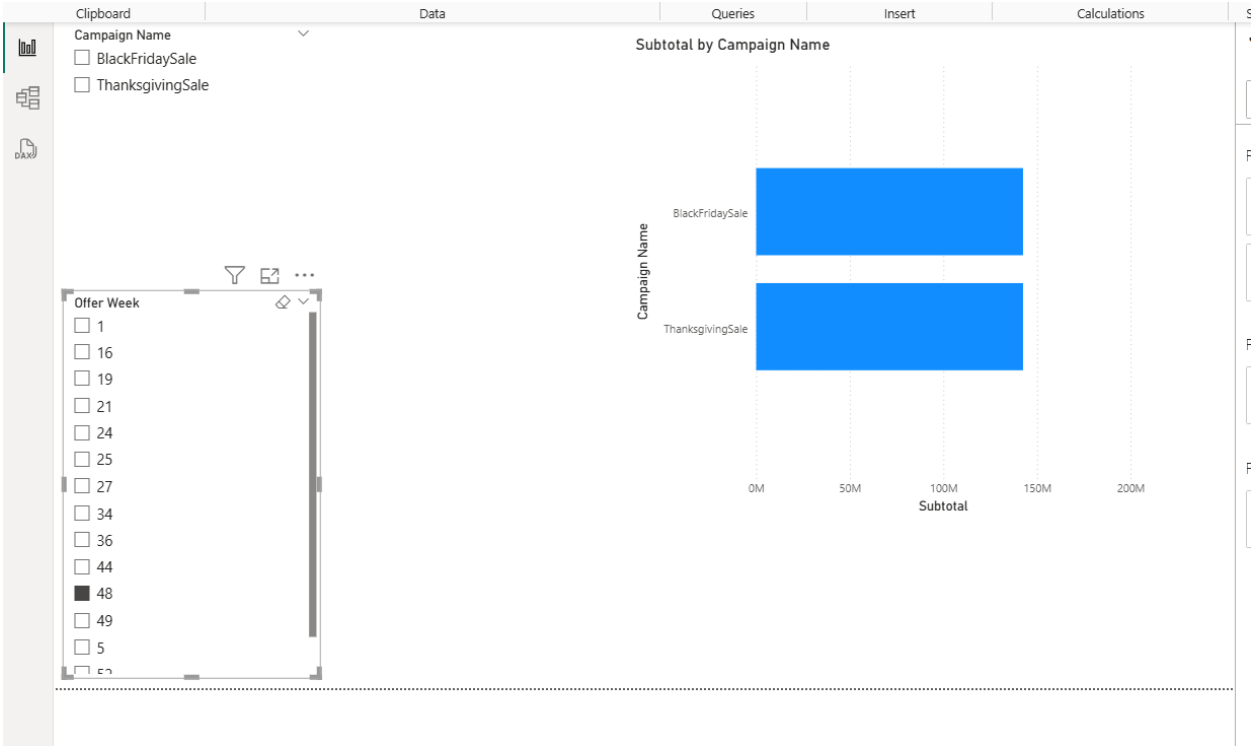
Report 2

Objective: To implement slicers where the selection in one dynamically filters the options in another.

Steps:

1. Inserted two **Slicer visuals**.
2. Assigned Campaign Name to the first slicer and Offer Week to the second.
3. Added a **bar chart** displaying total sales (Amount) by campaign.
4. Verified that selecting a campaign in the first slicer dynamically filtered the available weeks in the second.
5. Ensured visual responsiveness was intact.

Result: Successfully demonstrated cascading filtering behavior using two interdependent slicers and a visual.



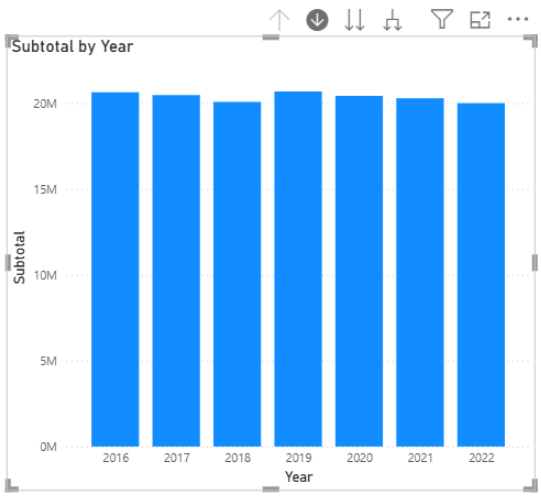
Report 3

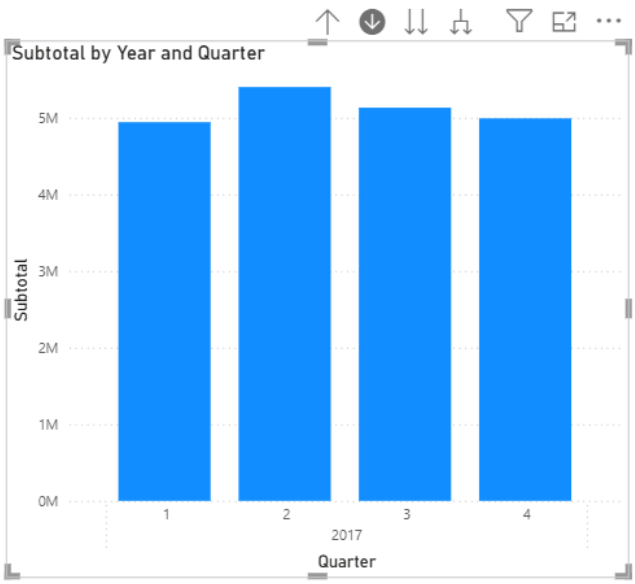
Objective: To enable users to explore data from summarized to detailed levels through hierarchy.

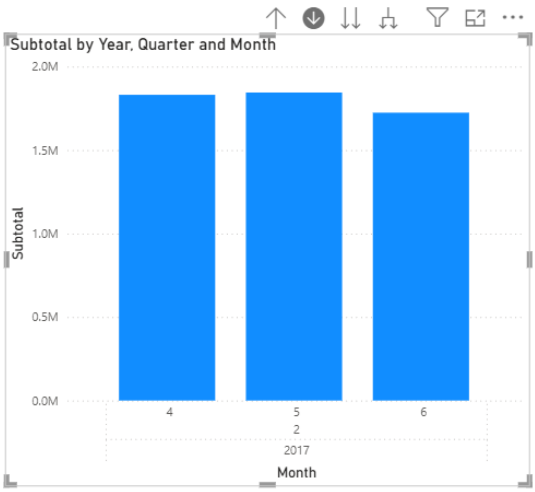
Steps:

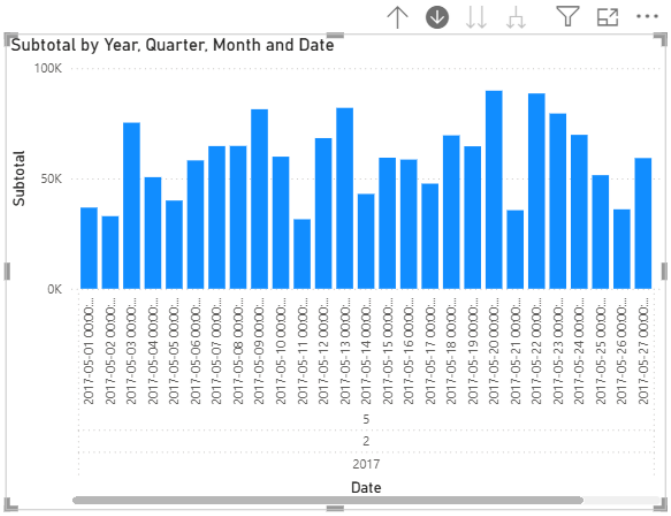
1. Inserted a **Stacked Column Chart**.
2. Used the Date hierarchy (Year > Quarter > Month) in the **X-axis**.
3. Set Amount as the measure on the **Y-axis**.
4. Enabled **drill mode** via the chart's top-right arrow icon.
5. Tested interactions by drilling from Year into Quarter and Month within the chart.

Result: A fully interactive chart allowing users to analyze sales trends over time at varying granularity levels.









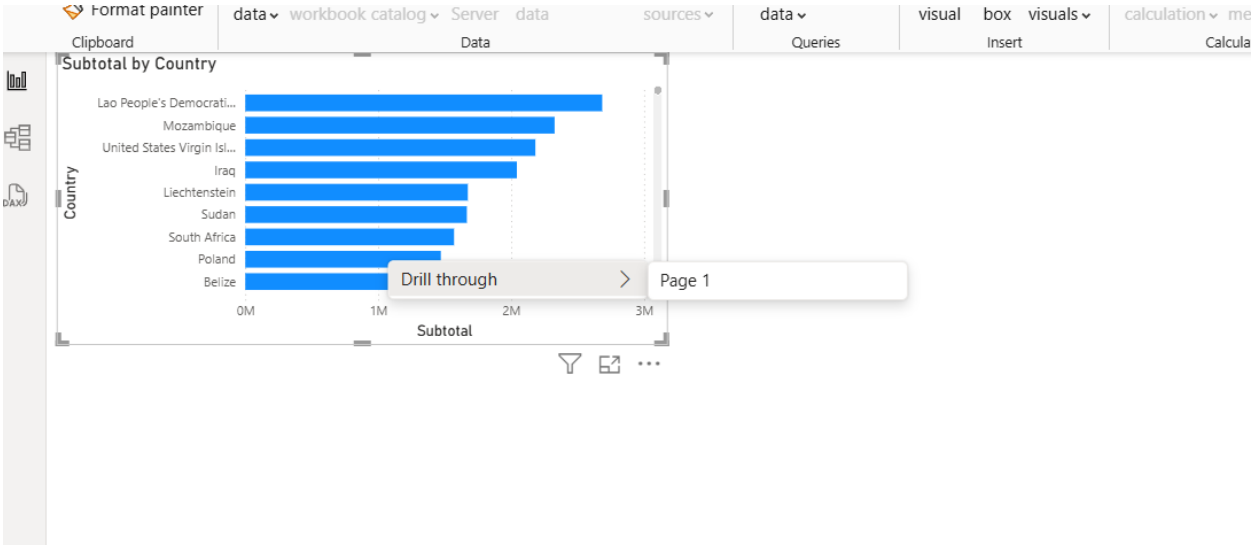
Report 4

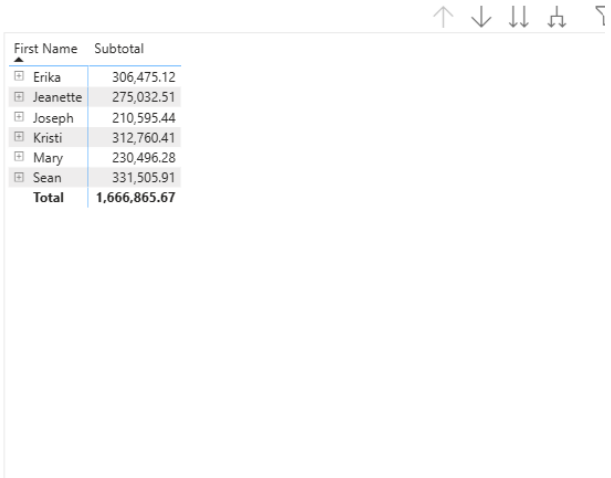
Objective: To allow navigation from a summary report to a detailed report using drill-through.

Steps:

1. Created a new report page.
2. Dragged Country from DimCustomer to the **Drill-through filters pane**.
3. Added a **Table visual** to show customer details (Name, Email, etc.).
4. On the main page, inserted a **Bar Chart** summarizing Amount by Country.
5. Tested by right-clicking a country in the bar chart and selecting **Drill Through**.

Result: Enabled users to jump from country-level summaries to customer-level details with one click.





First Name	Subtotal
Erika	306,475.12
Jeanette	275,032.51
Joseph	210,595.44
Kristi	312,760.41
Mary	230,496.28
Sean	331,505.91
Total	**1,666,865.67**