Experiment-3

Aim: **To understand Data Modeling, create and manage tables and relationships in Power BI.**

Data modeling is the process of creating a visual representation of either a whole information system or parts of it to communicate connections between data points and structures. Benefits of data modelling

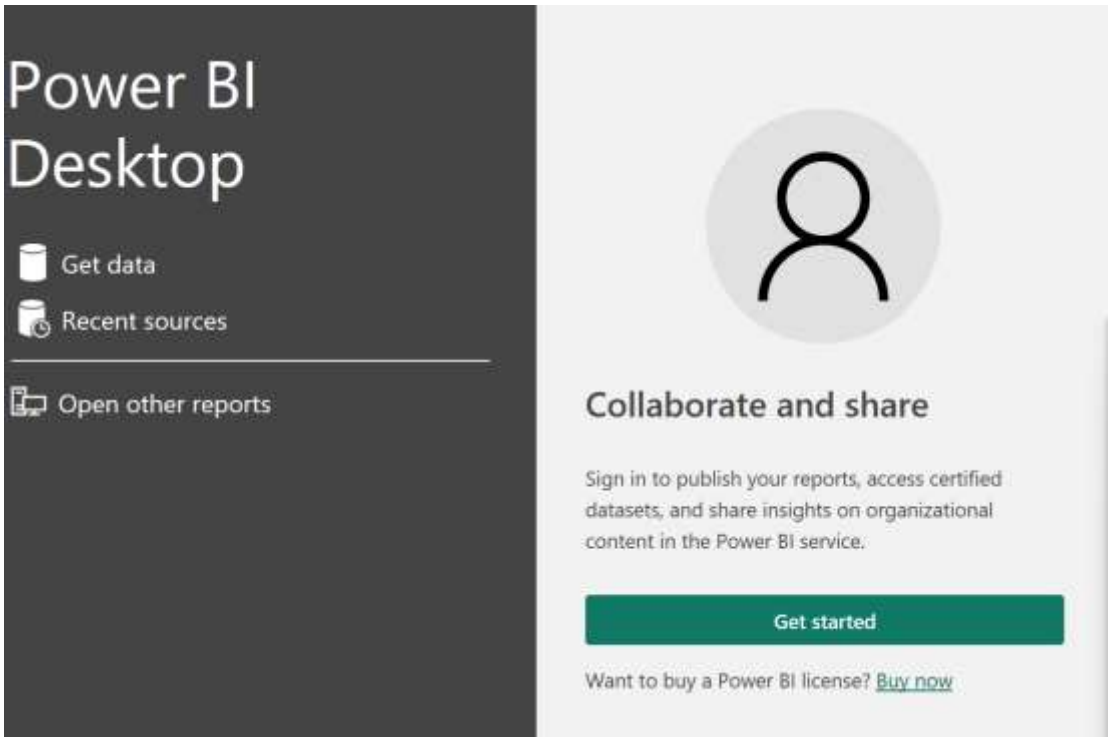
Data modelling makes it easier for developers, data architects, business analysts, and other stakeholders to view and understand relationships among the data in a database or data warehouse. In addition, it can:

- Reduce errors in software and database development.
- Increase consistency in documentation and system design across the enterprise.
- Improve application and database performance.
- Ease data mapping throughout the organization.
- Improve communication between developers and business intelligence teams.
- Ease and speed the process of database design at the conceptual, logical and physical levels.

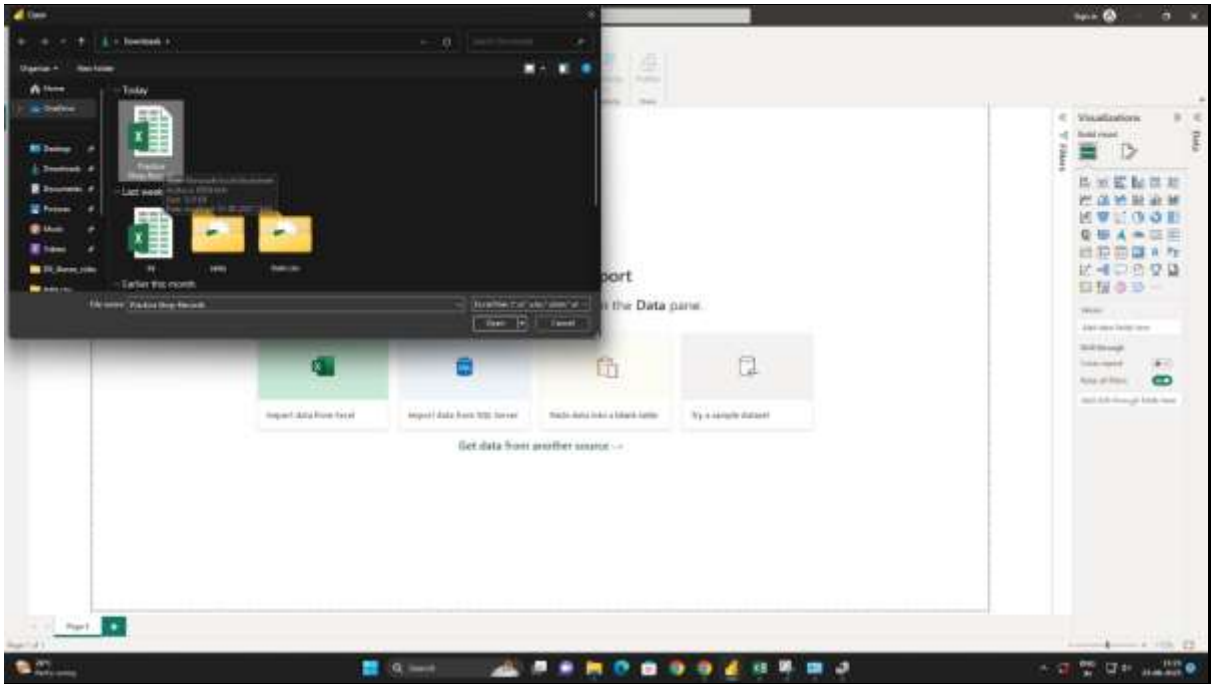
Understanding measures

In Power BI Desktop, measures are created and displayed in *Report View*, *Data View*, or *Model View*. Measures you create yourself appear in the **Fields** list with a calculator icon. You can name measures whatever you want, and add them to a new or existing visualization just like any other field.

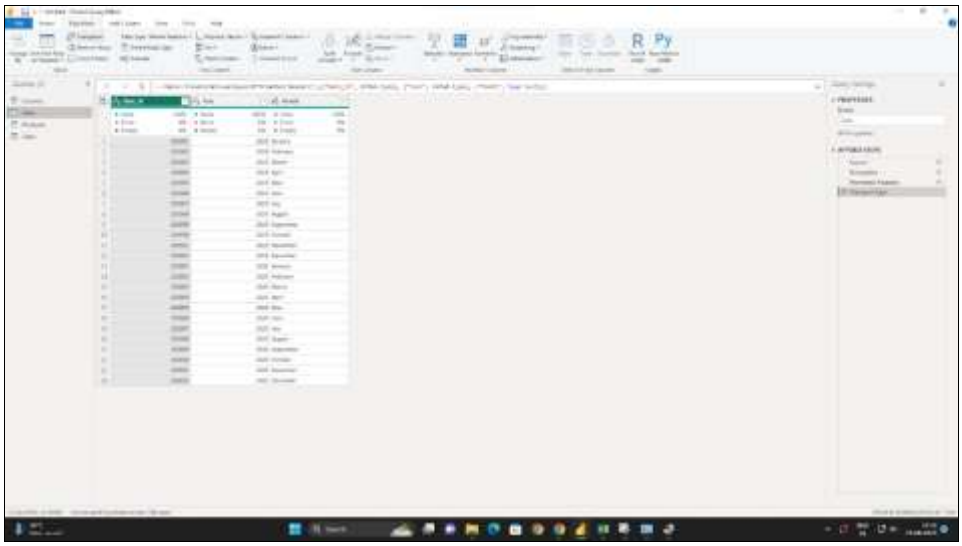
For Data visualization first of all we need data so we import the dataset from our personal computer for analysis of data.



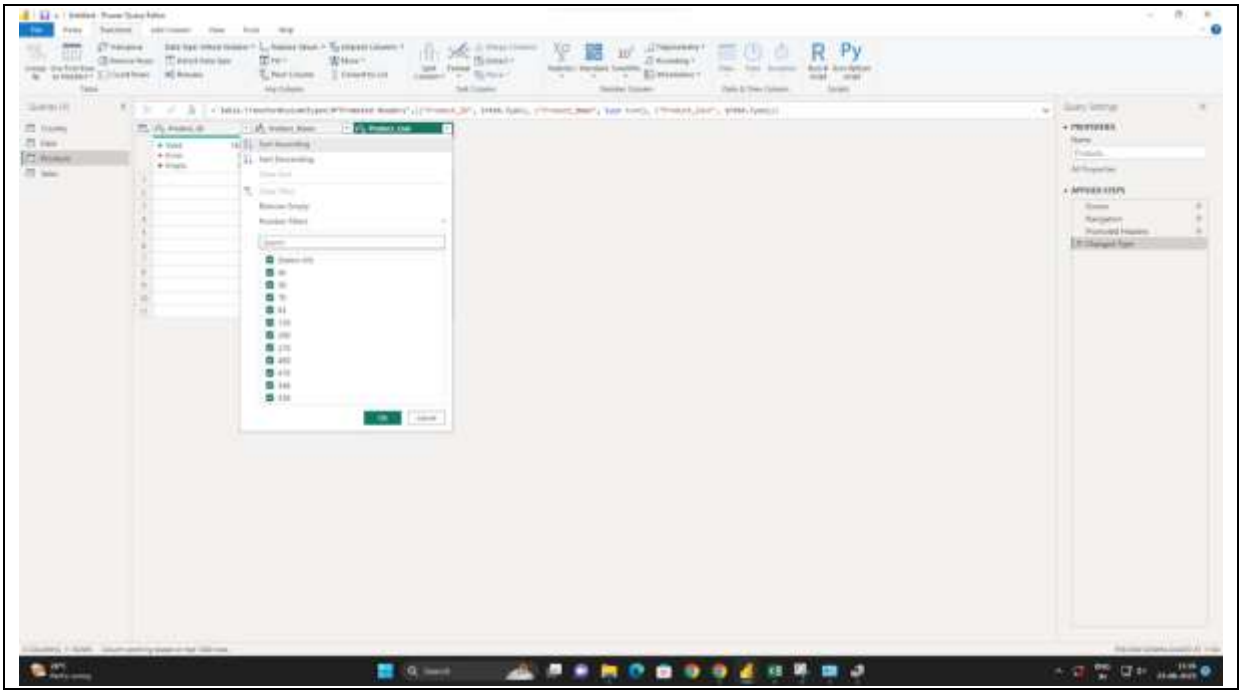
Our dataset is in Excel file so we click on the excel workbook and connect..

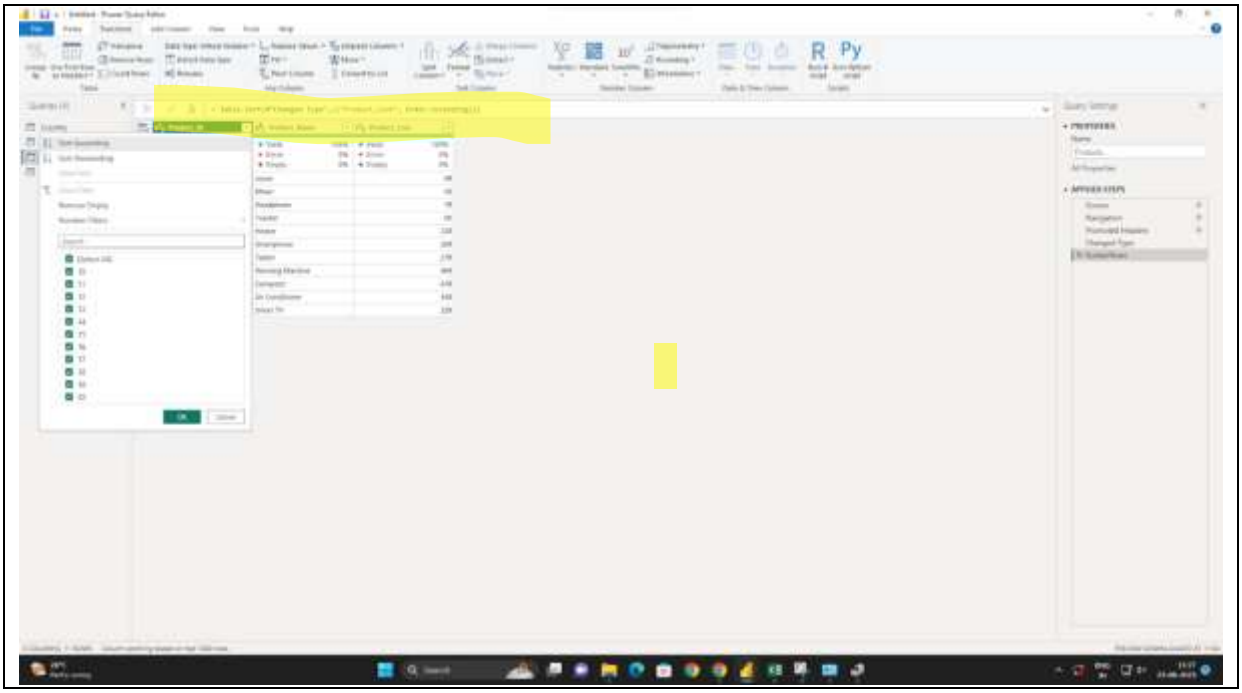


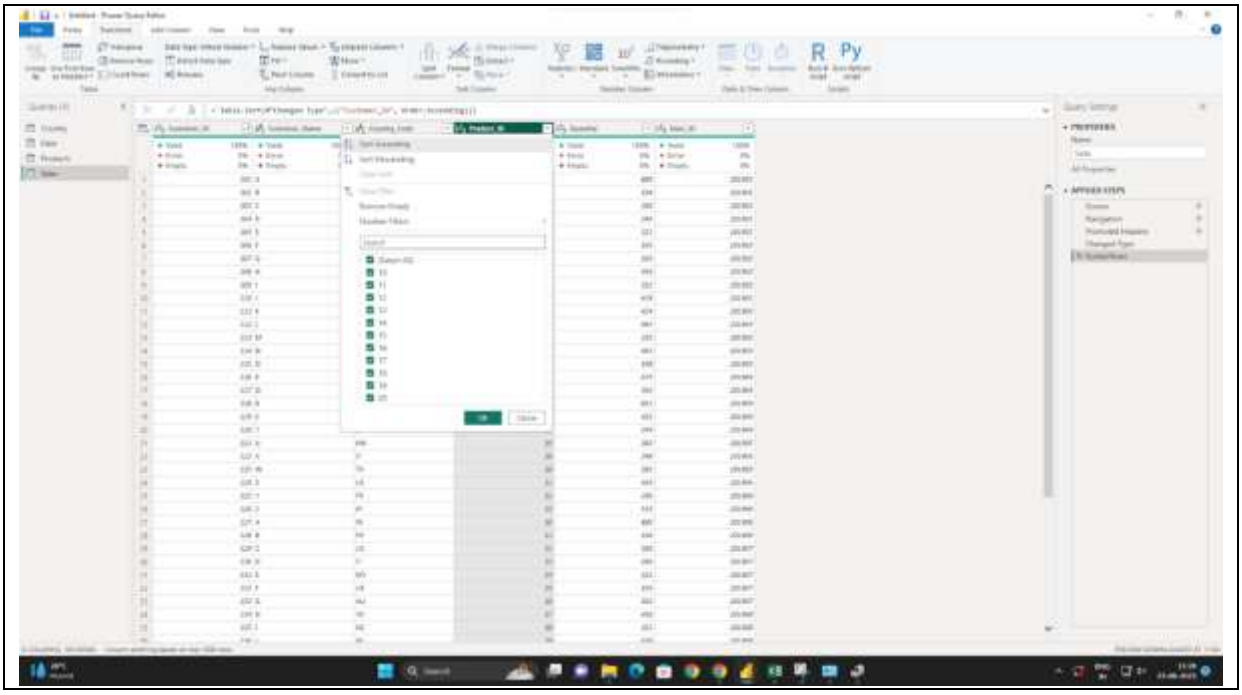
I have seen there are four tables **Country,Date,Product,Sales** in this dataset . We select the tables what we want to do for analysis.

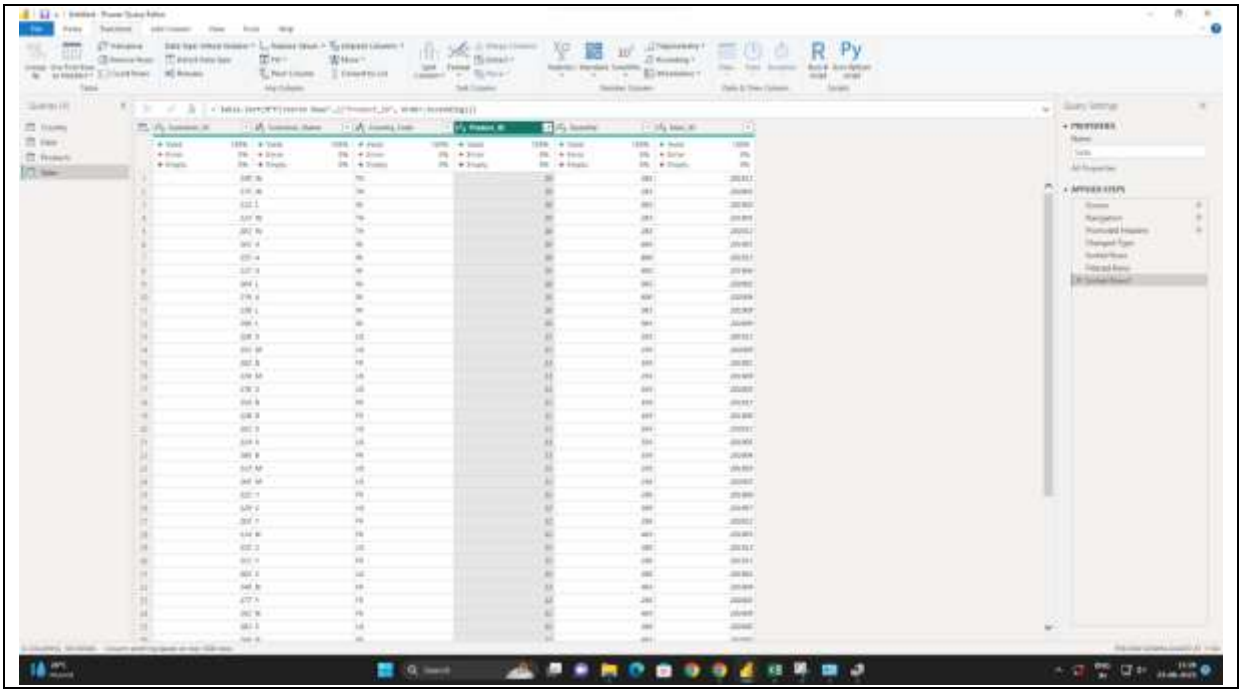


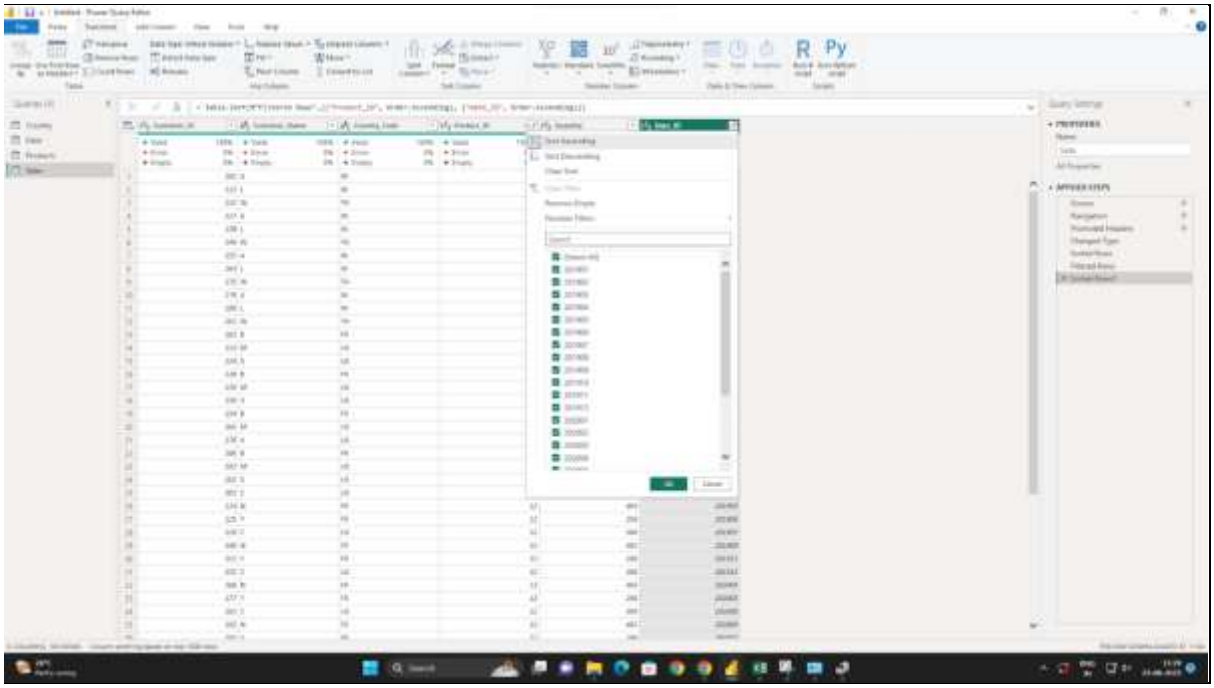
I have seen all the tables and done the data preprocessing . Why is this important ? Data preprocessing is an important step in the data mining process. It refers to the cleaning, transforming, and integrating of data in order to make it ready for analysis

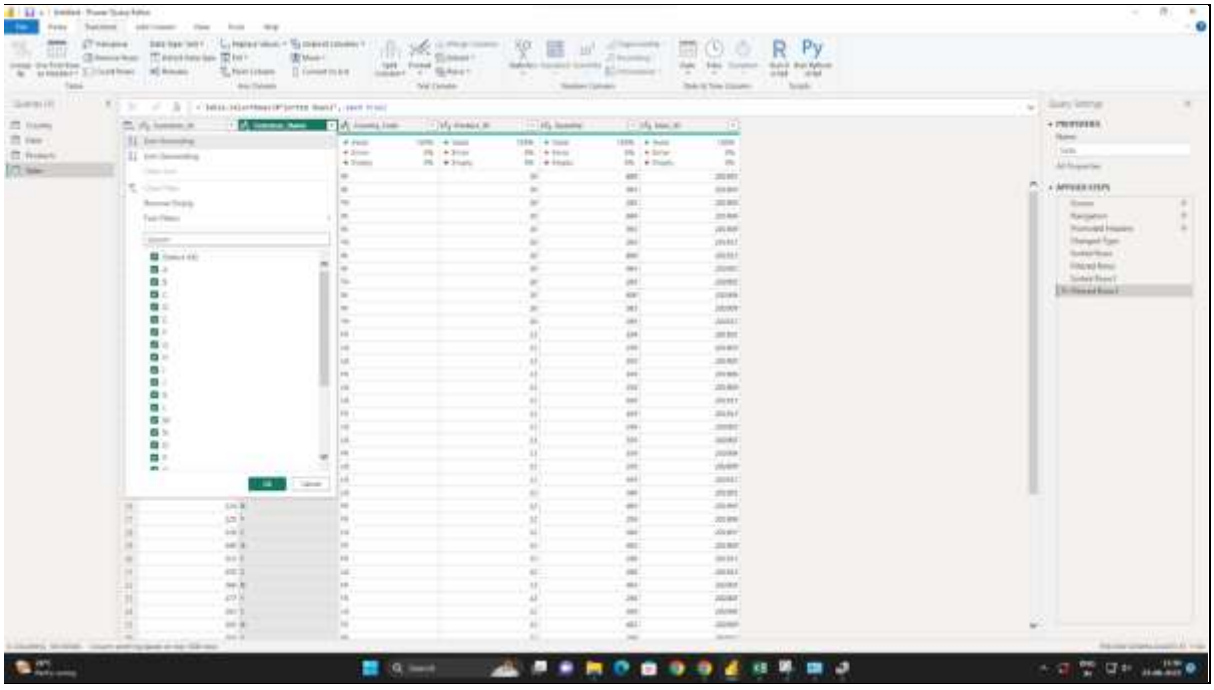


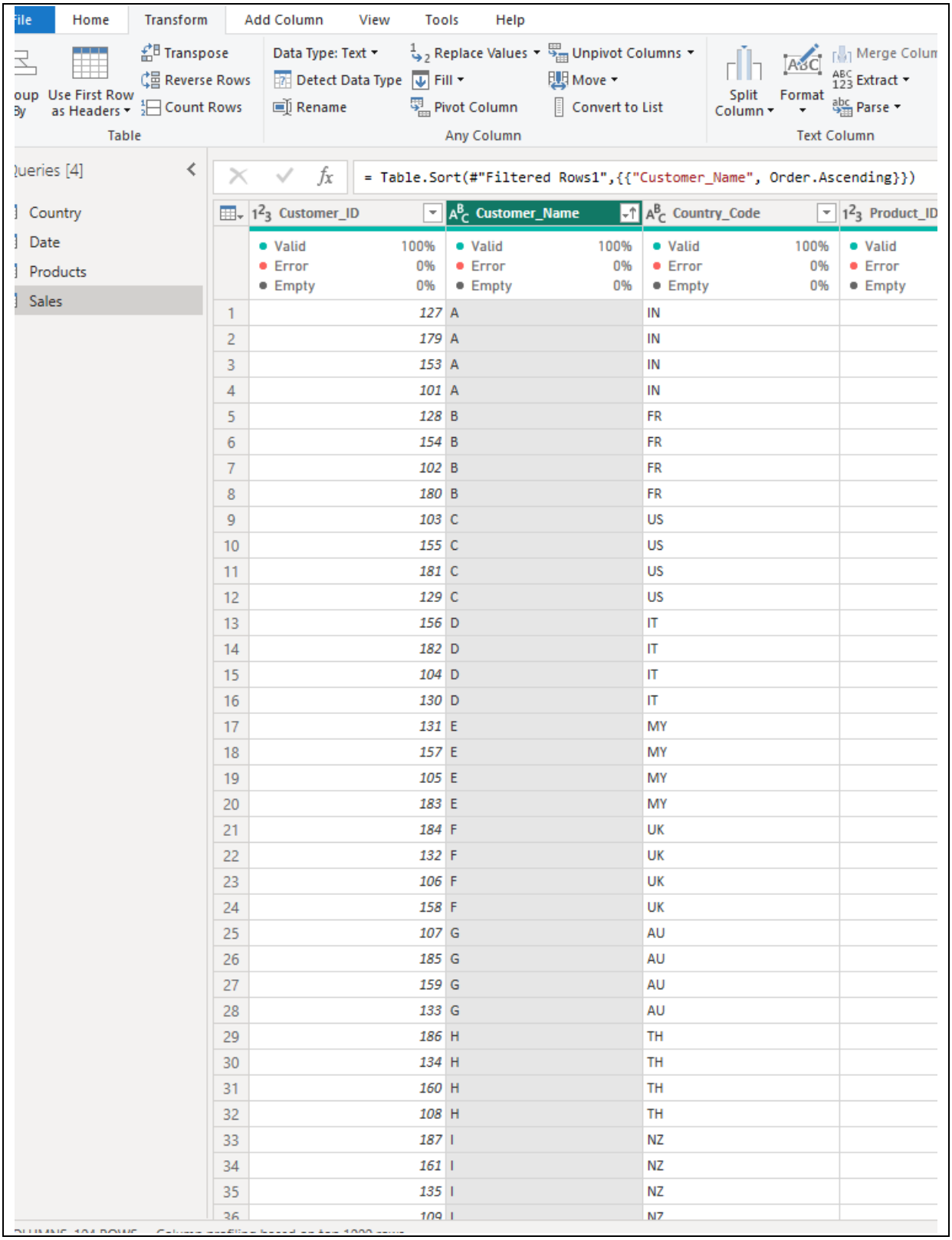




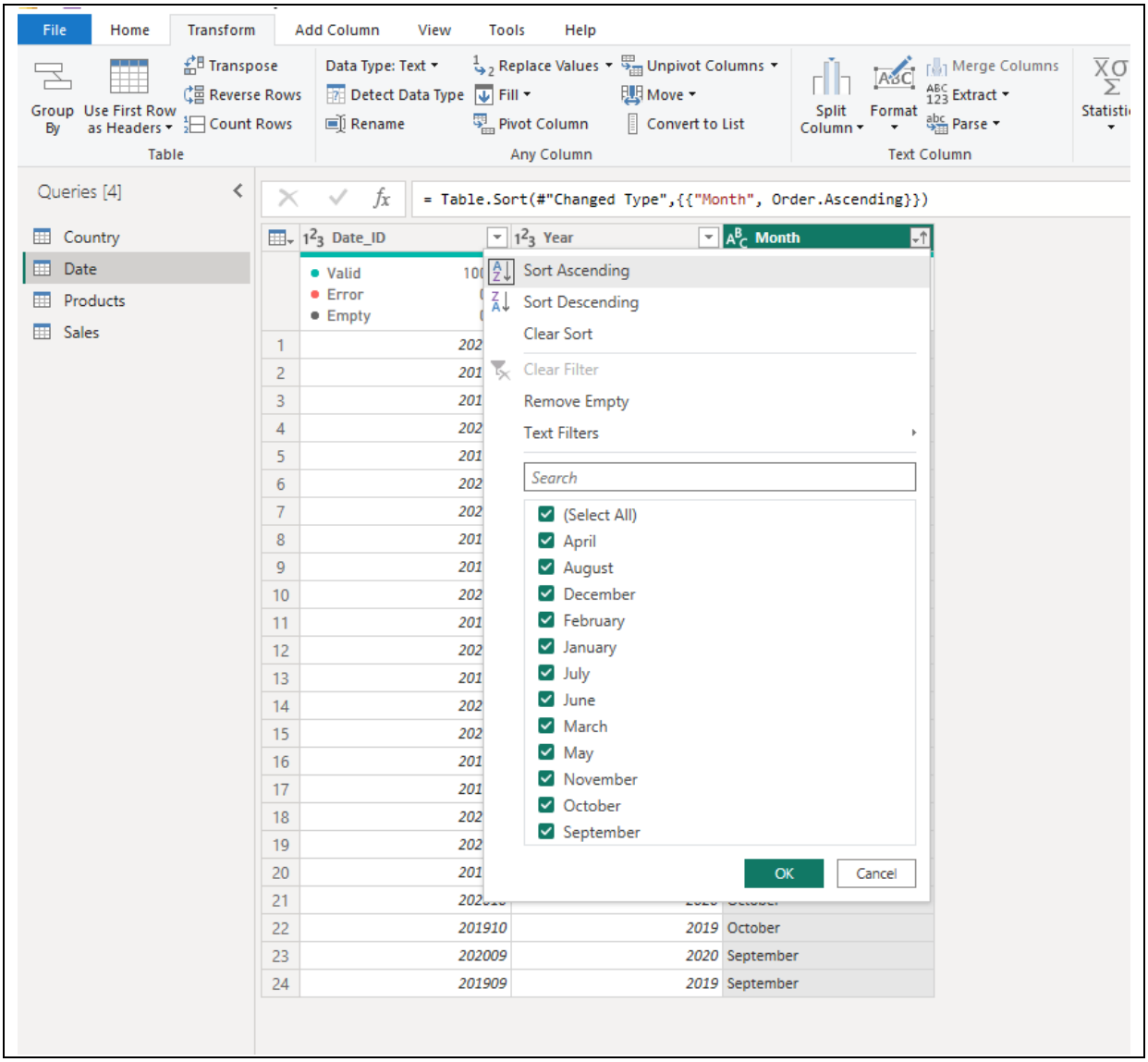








	Customer_ID	Customer_Name	Country_Code	Product_ID
1	127	A	IN	
2	179	A	IN	
3	153	A	IN	
4	101	A	IN	
5	128	B	FR	
6	154	B	FR	
7	102	B	FR	
8	180	B	FR	
9	103	C	US	
10	155	C	US	
11	181	C	US	
12	129	C	US	
13	156	D	IT	
14	182	D	IT	
15	104	D	IT	
16	130	D	IT	
17	131	E	MY	
18	157	E	MY	
19	105	E	MY	
20	183	E	MY	
21	184	F	UK	
22	132	F	UK	
23	106	F	UK	
24	158	F	UK	
25	107	G	AU	
26	185	G	AU	
27	159	G	AU	
28	133	G	AU	
29	186	H	TH	
30	134	H	TH	
31	160	H	TH	
32	108	H	TH	
33	187	I	NZ	
34	161	I	NZ	
35	135	I	NZ	
36	109	I	NZ	


File
Home
Transform
Add Column
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Tools
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Group By
Use First Row as Headers
Transpose
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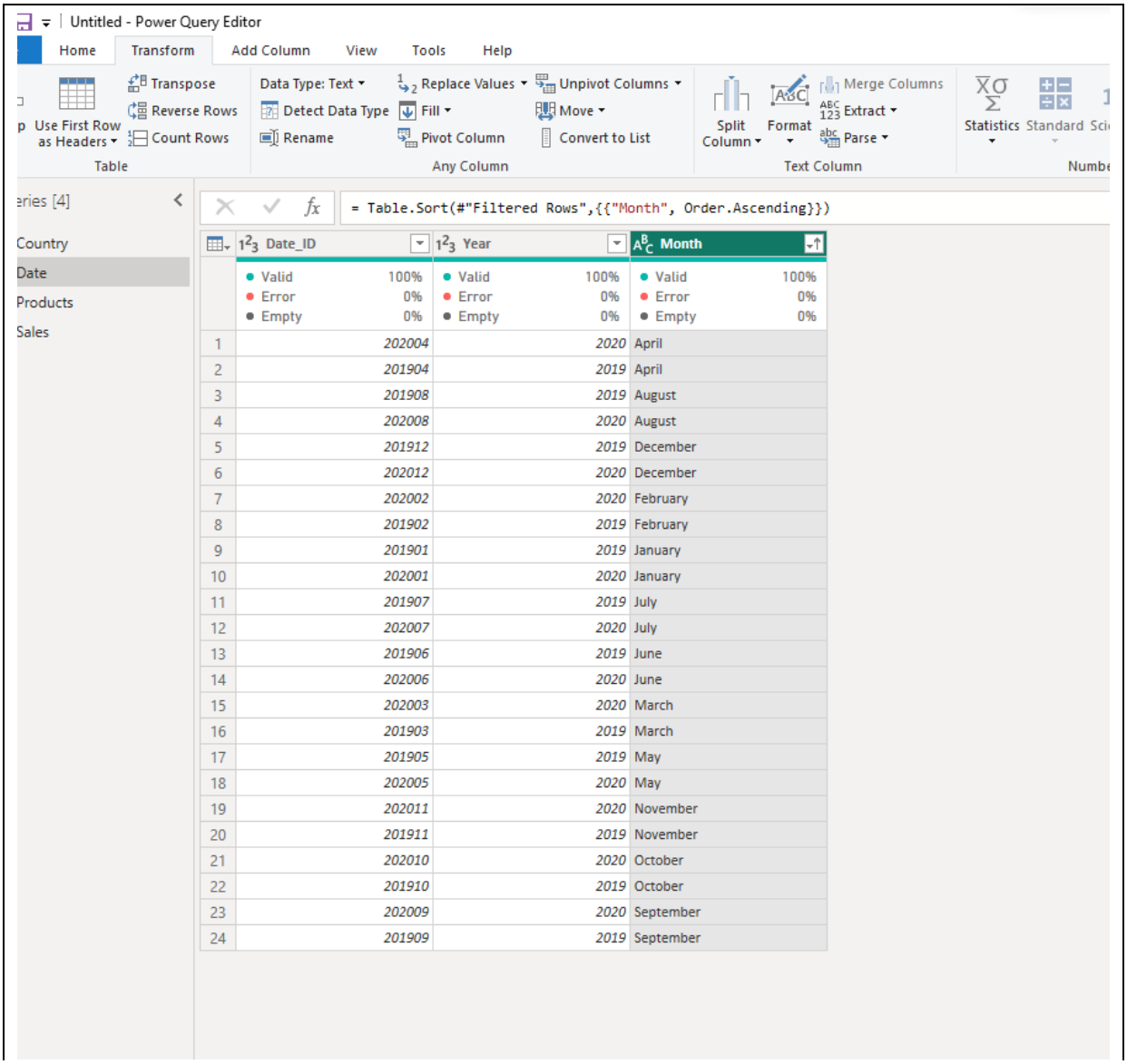
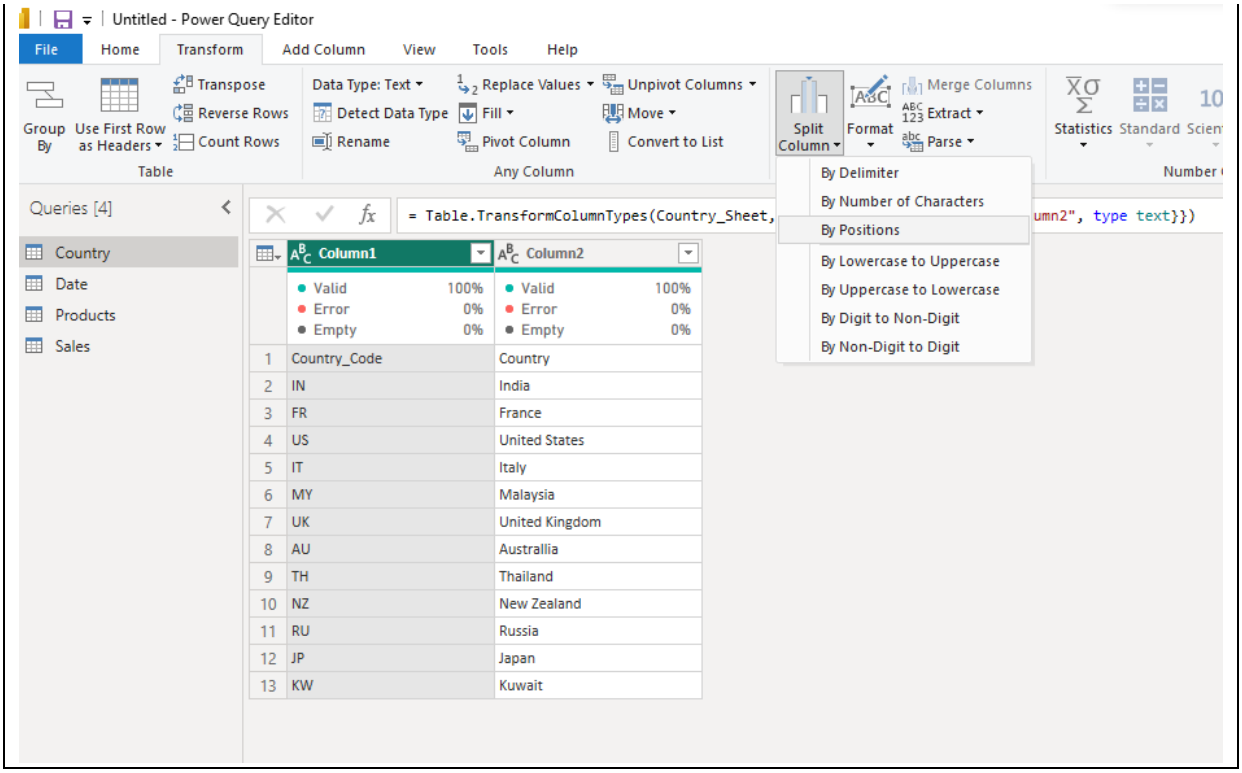
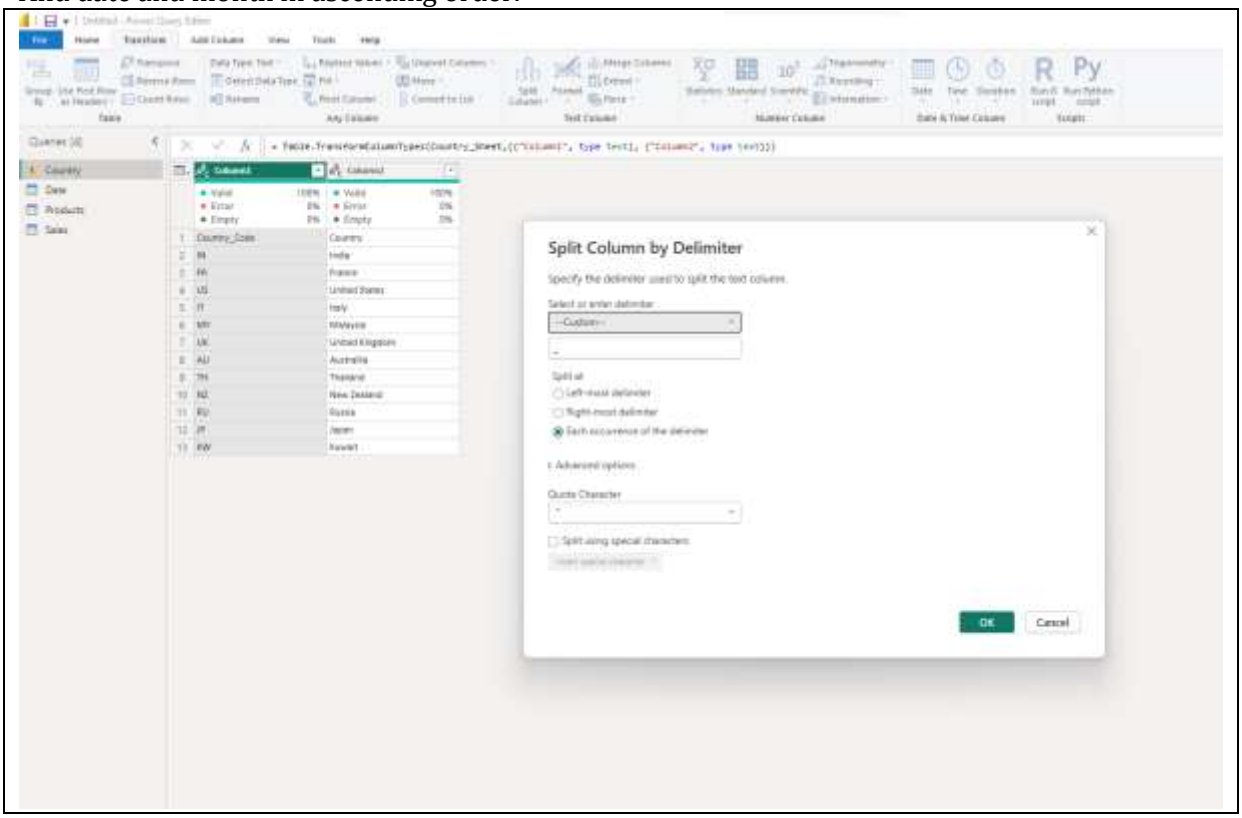
Count Rows
Table
Data Type: Text
Detect Data Type
Rename
Replace Values
Fill
Pivot Column
Unpivot Columns
Move
Convert to List
Any Column
Split Column
Format
Merge Columns
Extract
Parse
Text Column
Queries [4]
Country
Date
Products
Sales
= Table.Sort(#"Changed Type",{{"Month", Order.Ascending}})
Date_ID
Year
Month
Valid
Error
Empty
Sort Ascending
Sort Descending
Clear Sort
Clear Filter
Remove Empty
Text Filters
Search
(Select All)
April
August
December
February
January
July
June
March
May
November
October
September
OK
Cancel
201910 2019 October
202009 2020 September
201909 2019 September



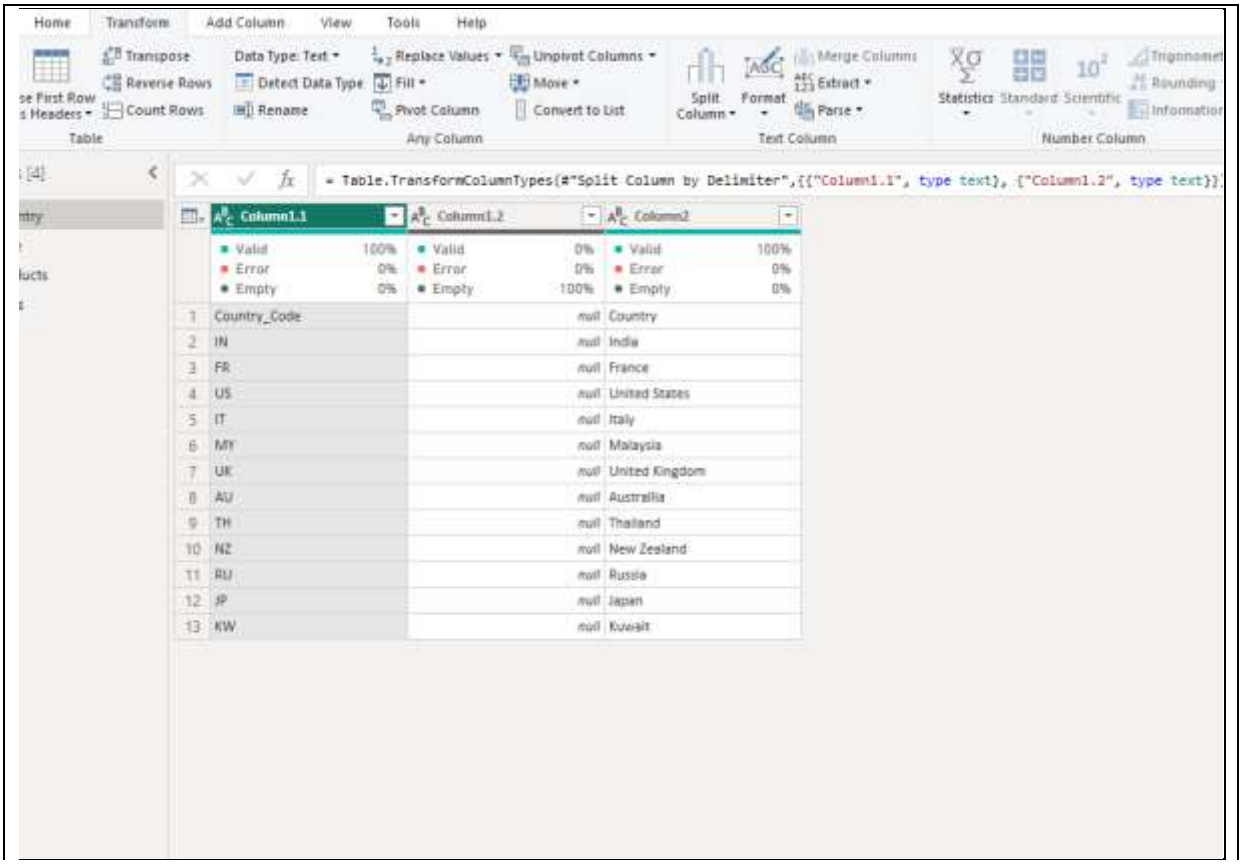
	Date_ID	Year	Month
1	202004	2020	April
2	201904	2019	April
3	201908	2019	August
4	202008	2020	August
5	201912	2019	December
6	202012	2020	December
7	202002	2020	February
8	201902	2019	February
9	201901	2019	January
10	202001	2020	January
11	201907	2019	July
12	202007	2020	July
13	201906	2019	June
14	202006	2020	June
15	202003	2020	March
16	201903	2019	March
17	201905	2019	May
18	202005	2020	May
19	202011	2020	November
20	201911	2019	November
21	202010	2020	October
22	201910	2019	October
23	202009	2020	September
24	201909	2019	September



Arrange the country dataset in Alphabetical order.
And date and month in ascending order.



In country table we apply the delimiter to specify more clear data.
Also create a new column.


Home
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Add Column
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Help
Transpose
Reverse Rows
Count Rows
Data Type: Text
Detect Data Type
Rename
Replace Values
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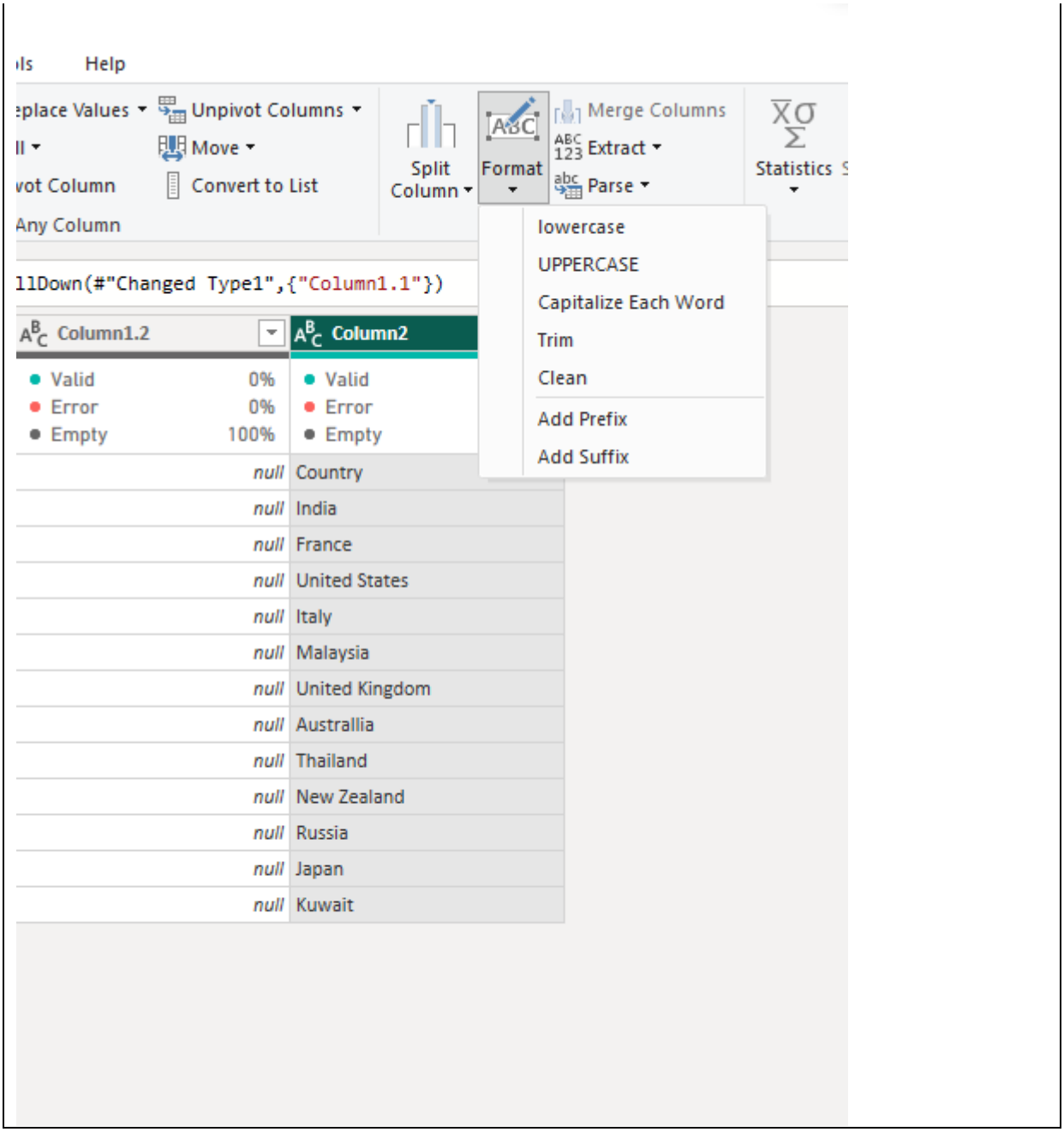
Pivot Column
Unpivot Columns
Move
Convert to List
Split Column
Format
Merge Columns
Extract
Parse
Statistics
Standard
Scientific
Trigonometry
Rounding
Information
Table
Any Column
Text Column
Number Column
= Table.TransformColumnTypes(#"Split Column by Delimiter",{{"Column1.1", type text}, {"Column1.2", type text}}
Column1.1
Column1.2
Column2
Valid 100%
Error 0%
Empty 0%
Valid 0%
Error 0%
Empty 100%
Valid 100%
Error 0%
Empty 0%
1 Country_Code null Country
2 IN null India
3 FR null France
4 US null United States
5 IT null Italy
6 MY null Malaysia
7 UK null United Kingdom
8 AU null Australia
9 TH null Thailand
10 NZ null New Zealand
11 RU null Russia
12 JP null Japan
13 KW null Kuwait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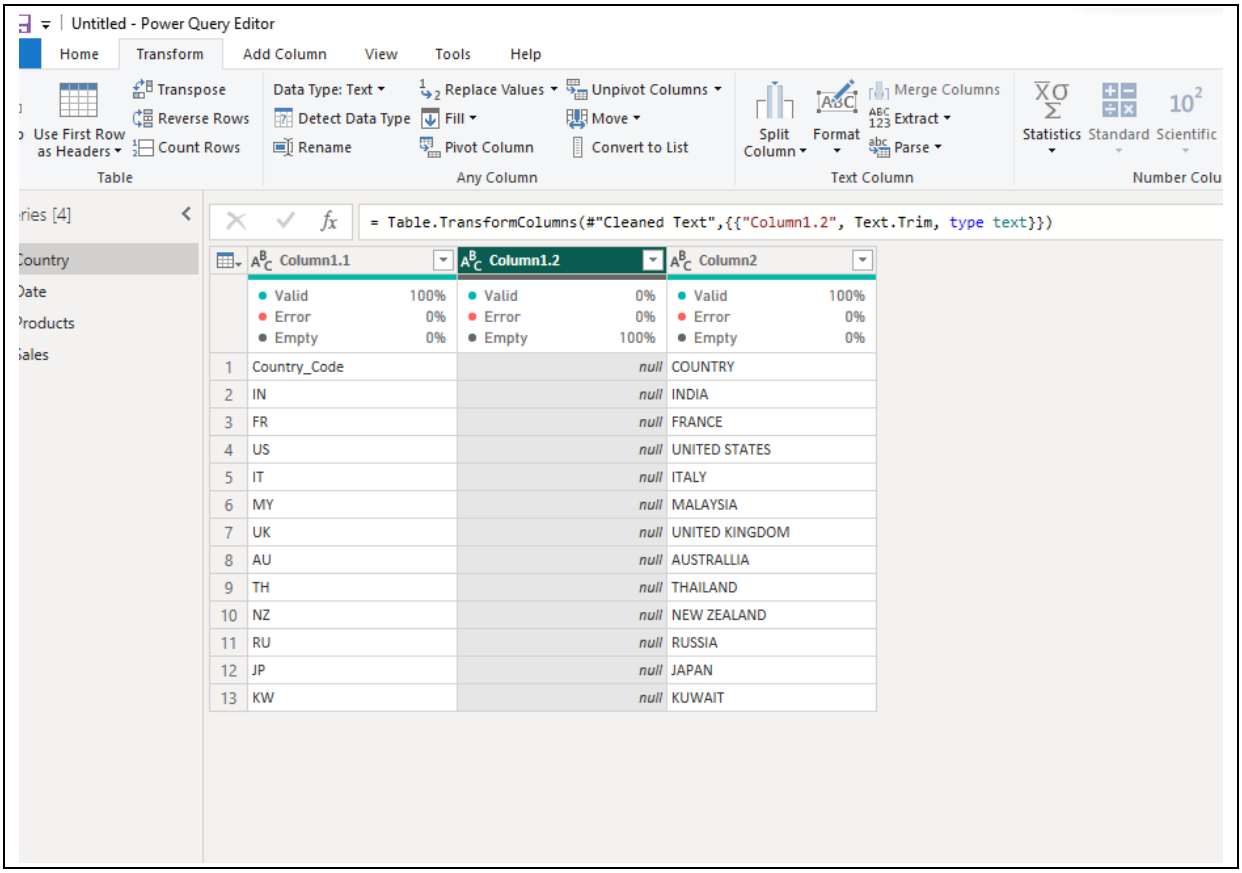
Convert to List
Any Column
Split Column
Format
Merge Columns
Extract
Parse
Statistics
lowercase
UPPERCASE
Capitalize Each Word
Trim
Clean
Add Prefix
Add Suffix
llDown(#"Changed Type1",{"Column1.1"})
Column1.2
Column2
Valid 0%
Error 0%
Empty 100%
Valid
Error
Empty
null Country
null India
null France
null United States
null Italy
null Malaysia
null United Kingdom
null Australlia
null Thailand
null New Zealand
null Russia
null Japan
null Kuwait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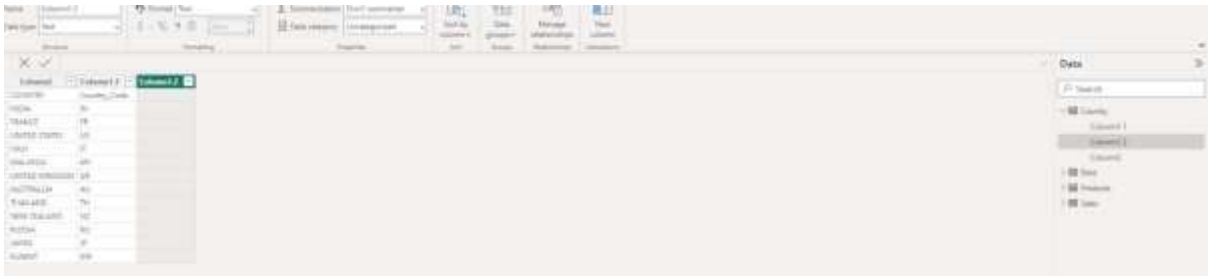
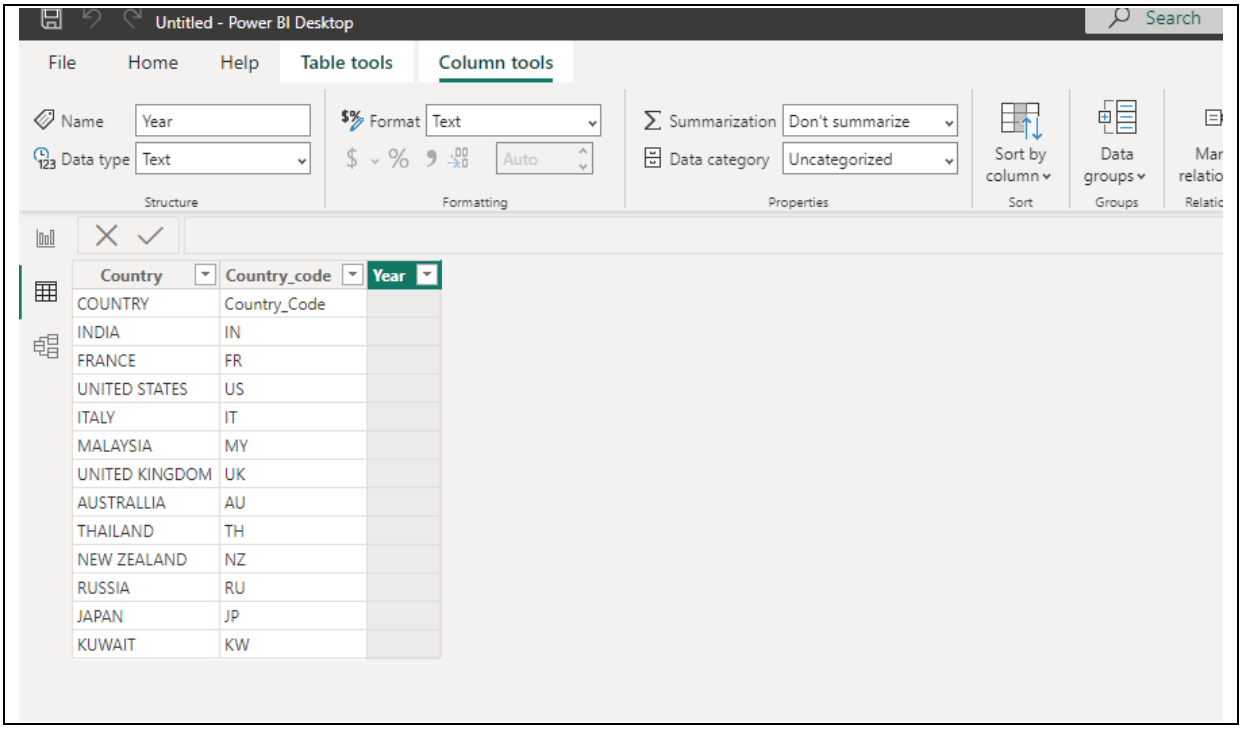
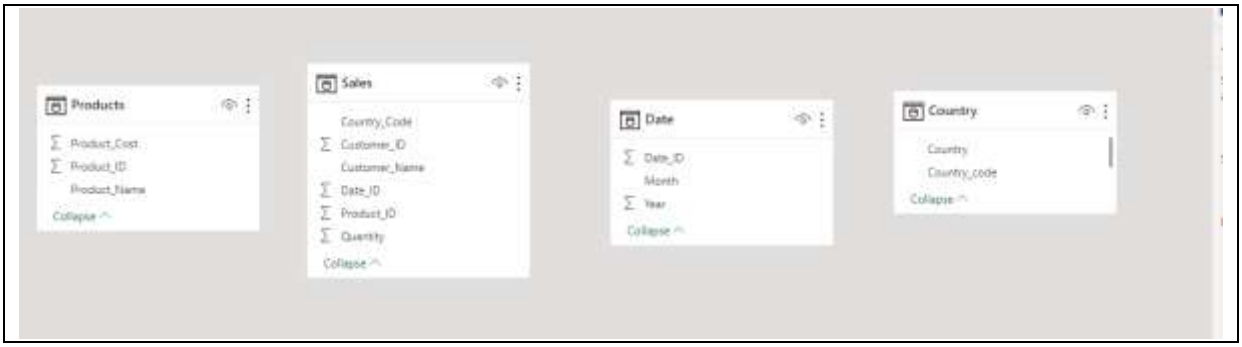
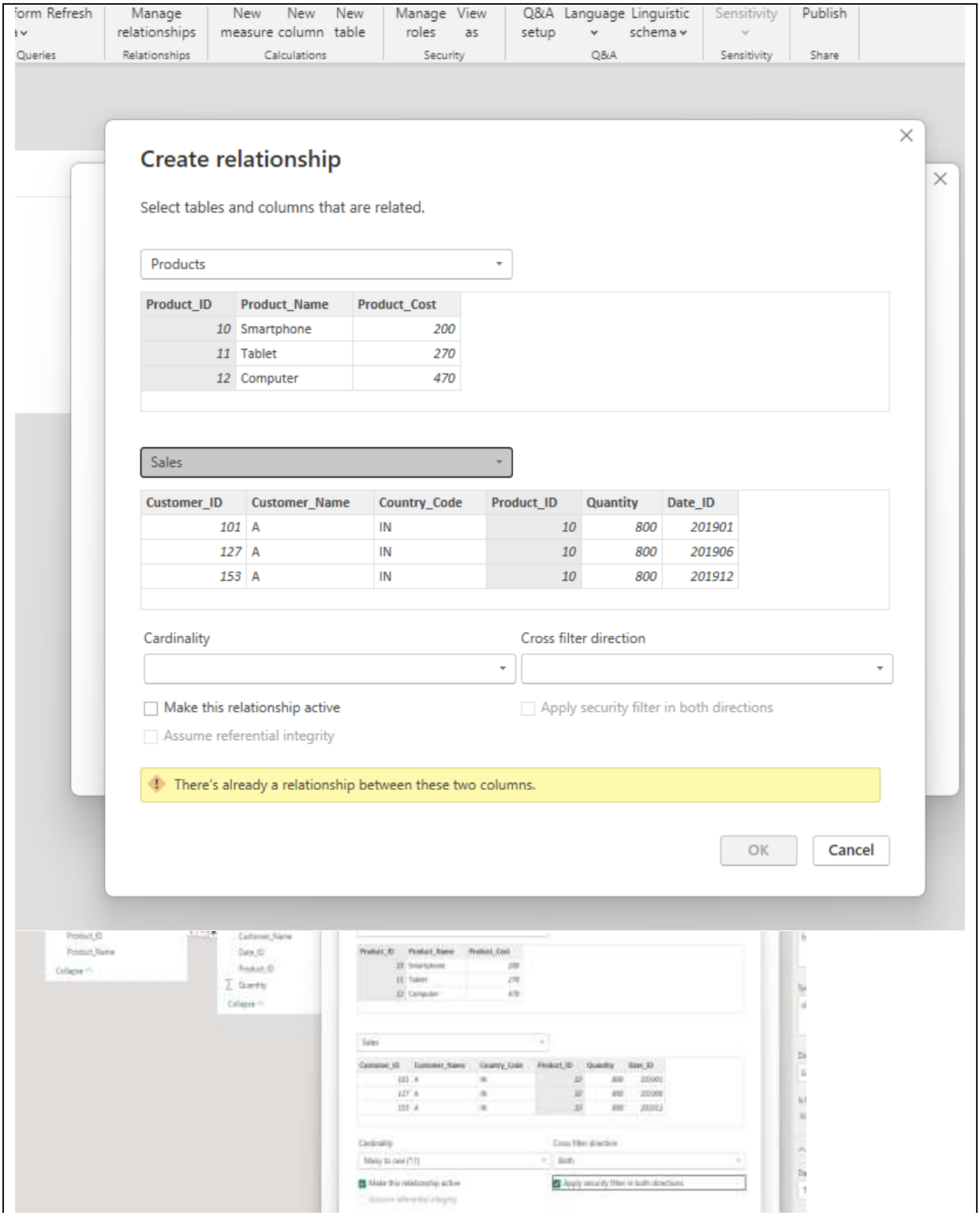
Home
Transform
Add Column
View
Tools
Help
Use First Row as Headers
Transpose
Reverse Rows
Count Rows
Table
Data Type: Text
Detect Data Type
Rename
Replace Values
Fill
Pivot Column
Unpivot Columns
Move
Convert to List
Any Column
Split Column
Format
Merge Columns
Extract
Parse
Text Column
Statistics
Standard
Scientific
Number Colu
ries [4]
Country
Date
Products
Sales
= Table.TransformColumns(#"Cleaned Text",{{"Column1.2", Text.Trim, type text}})
Column1.1
Column1.2
Column2
Valid 100%
Error 0%
Empty 0%
Valid 0%
Error 0%
Empty 100%
Valid 100%
Error 0%
Empty 0%
1 Country_Code null COUNTRY
2 IN null INDIA
3 FR null FRANCE
4 US null UNITED STATES
5 IT null ITALY
6 MY null MALAYSIA
7 UK null UNITED KINGDOM
8 AU null AUSTRALLIA
9 TH null THAILAND
10 NZ null NEW ZEALAND
11 RU null RUSSIA
12 JP null JAPAN
13 KW null KUWAIT

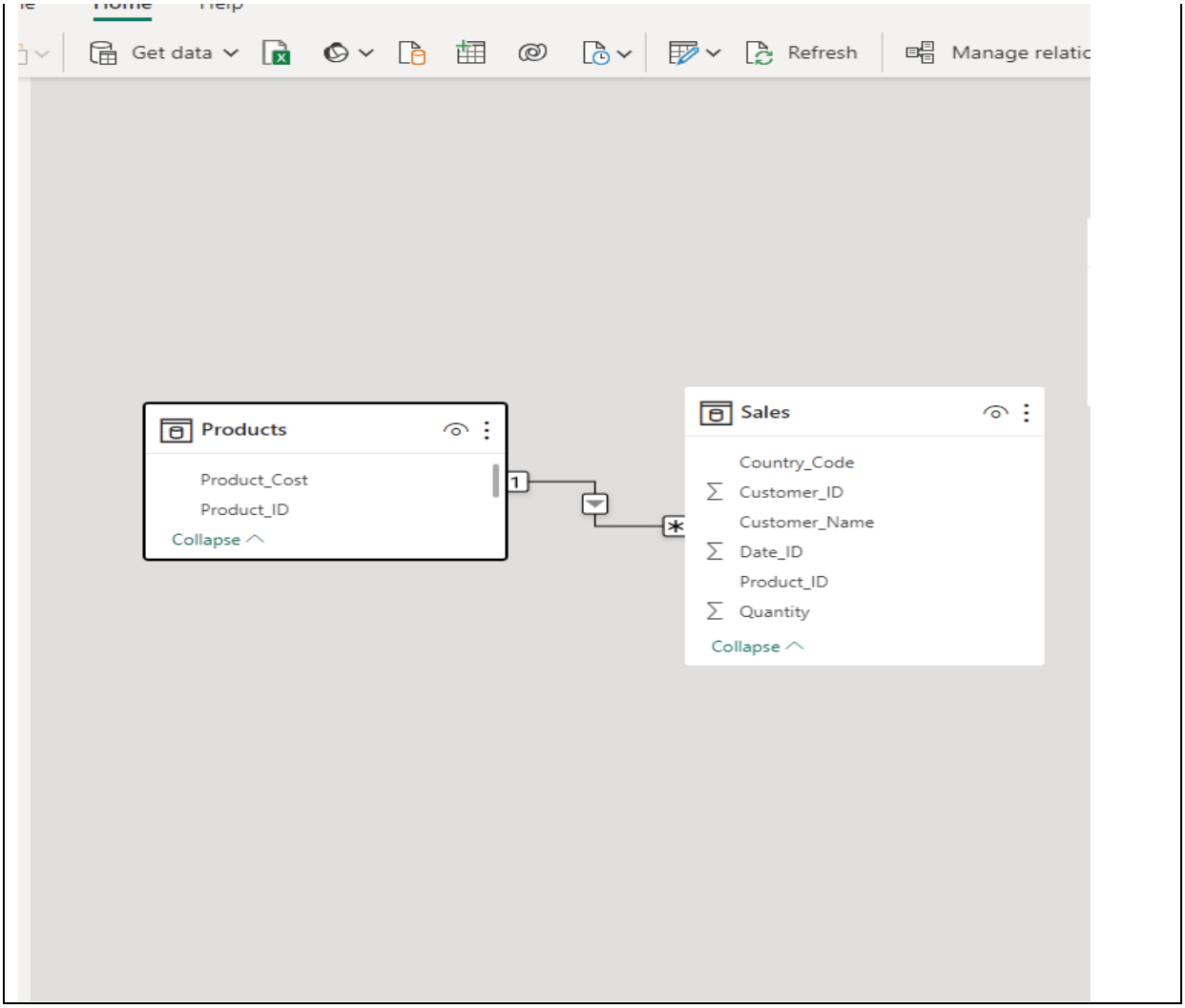




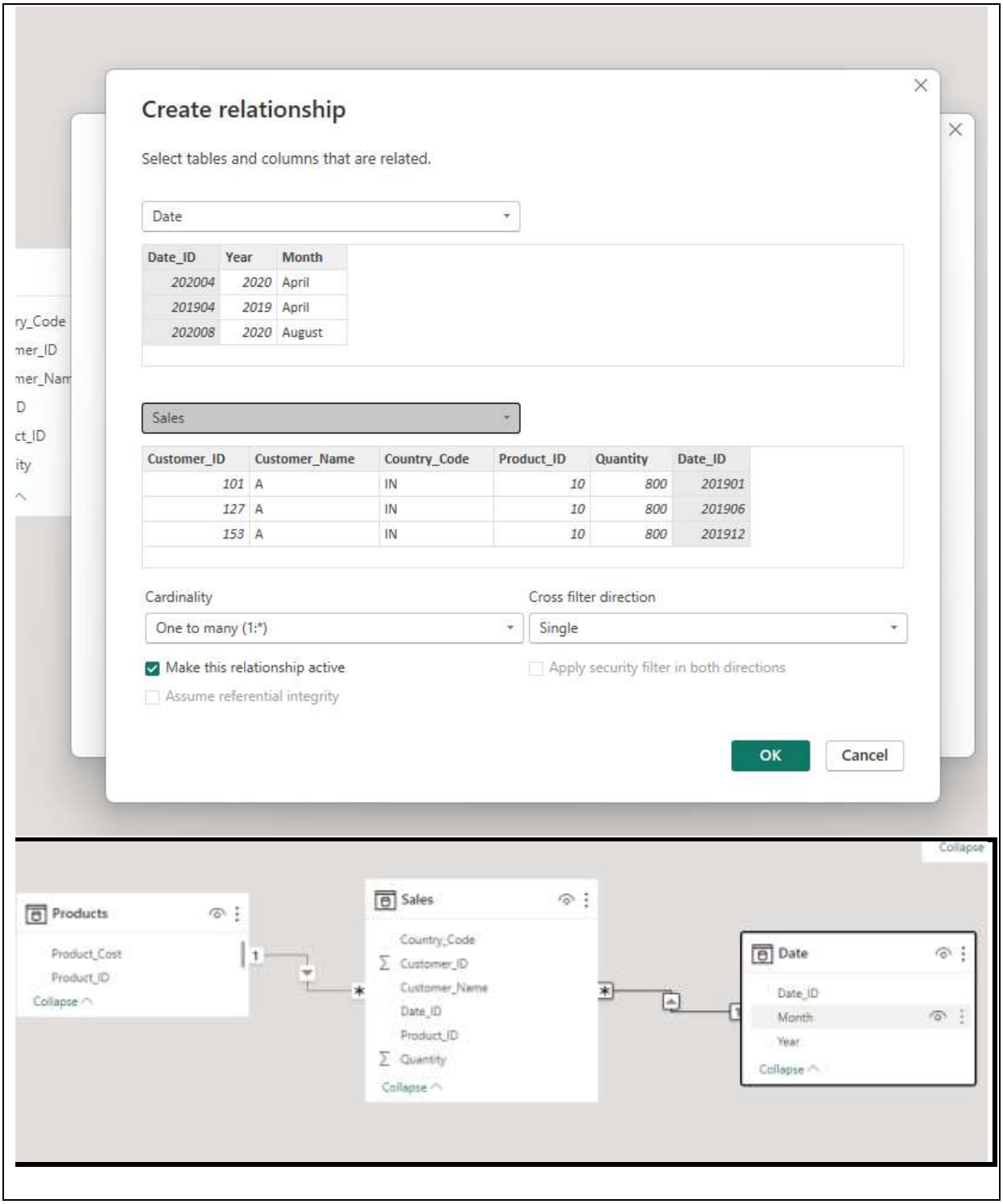


Now we do Data modelling in above screenshot there is no relationship between the tables, Check the relationship between those tables and draw a ER (Entity-Relationship) diagram.

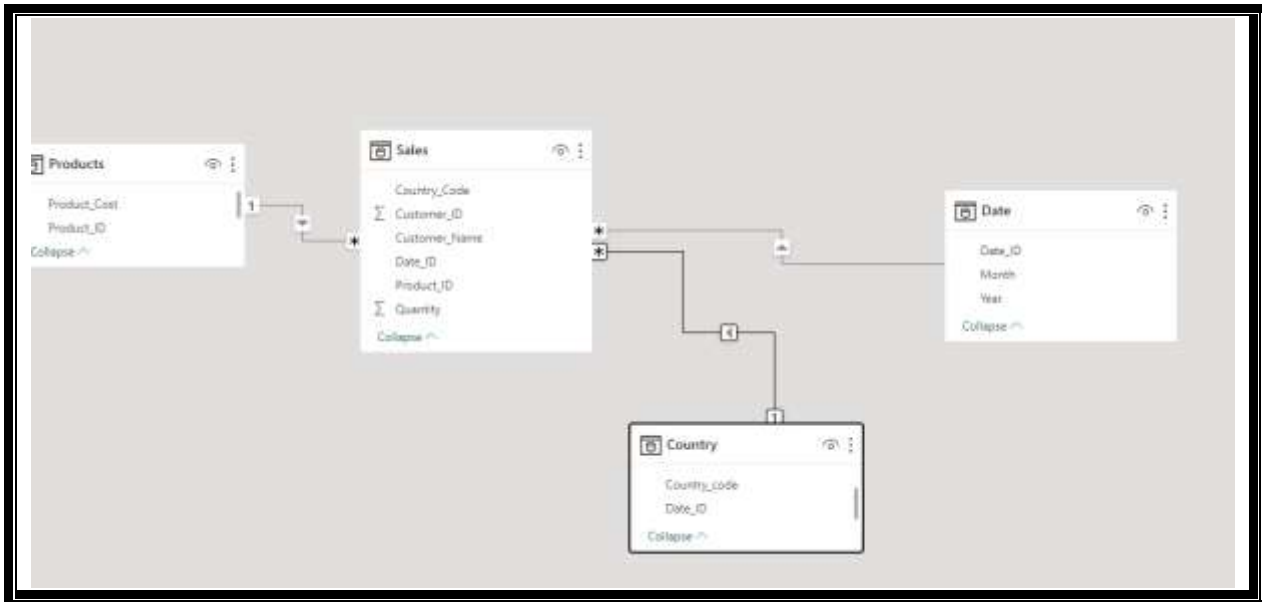

form Refresh
Queries
Manage relationships
Relationships
New measure
New column
New table
Calculations
Manage roles
View as
Security
Q&A setup
Language
Linguistic schema
Q&A
Sensitivity
Sensitivity
Publish
Share
Create relationship
Select tables and columns that are related.
Products
Product_ID
Product_Name
Product_Cost
10
Smartphone
200
11
Tablet
270
12
Computer
470
Sales
Customer_ID
Customer_Name
Country_Code
Product_ID
Quantity
Date_ID
101
A
IN
10
800
201901
127
A
IN
10
800
201906
153
A
IN
10
800
201912
Cardinality
Cross filter direction
Make this relationship active
Apply security filter in both directions
Assume referential integrity
There's already a relationship between these two columns.
OK
Cancel

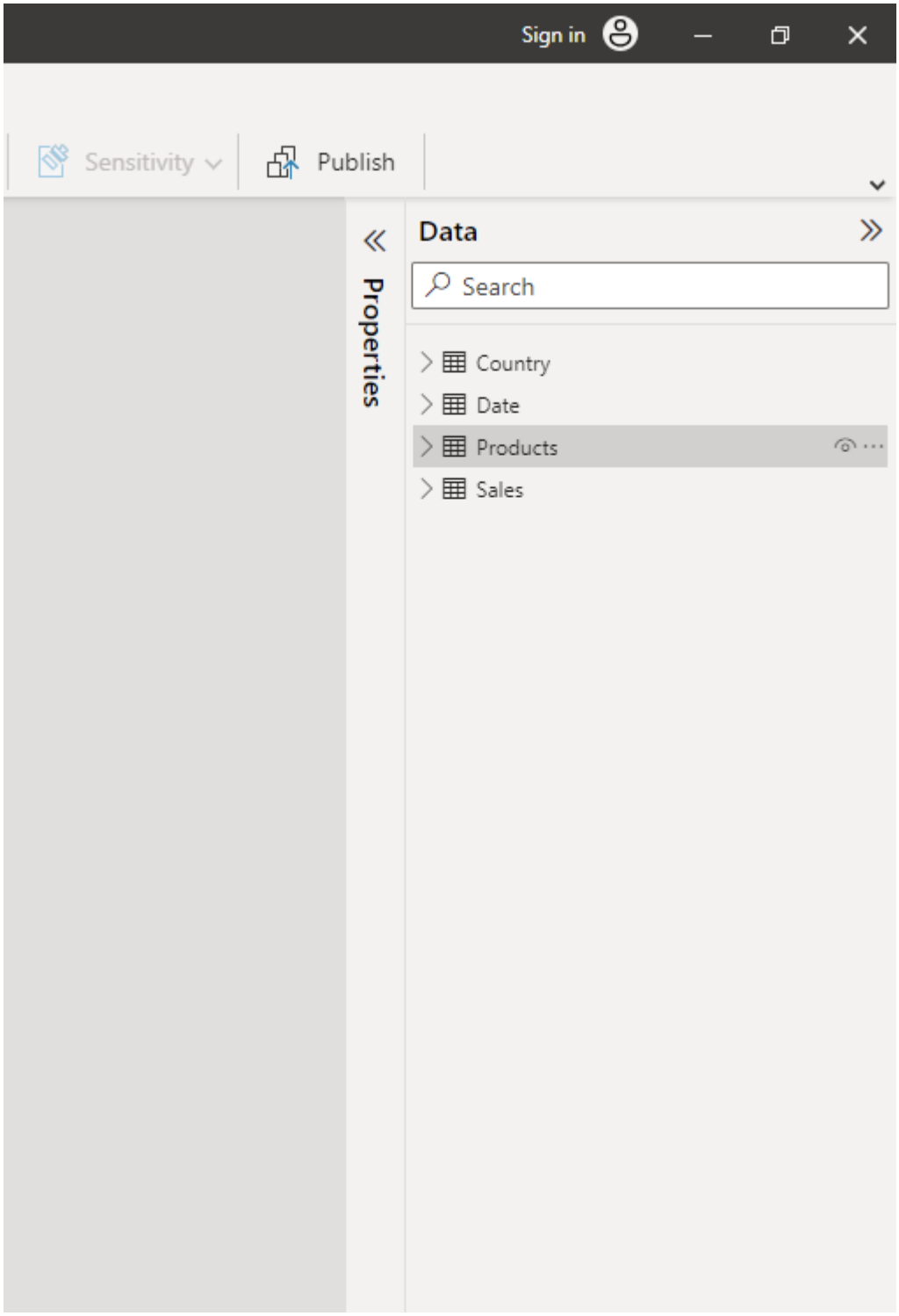


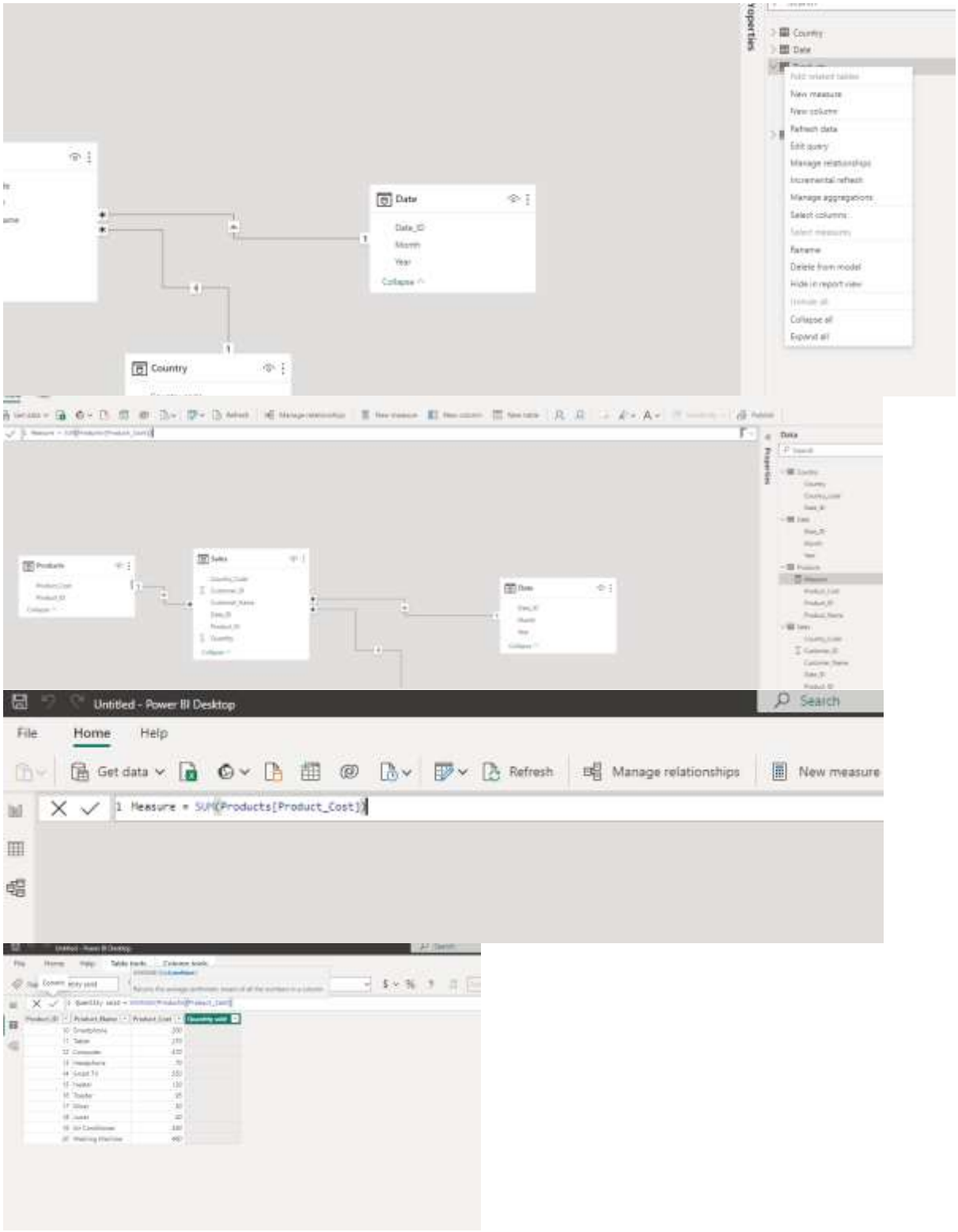
We found that relationship between Products and Sales tables.



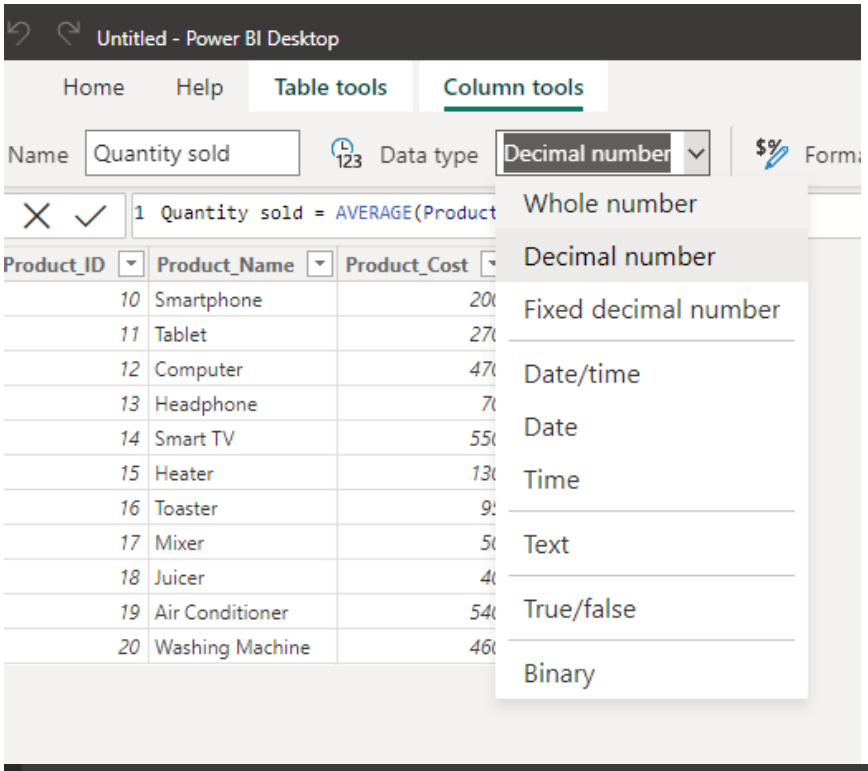
E-R Diagram is created. We found one to many relationships in those tables.

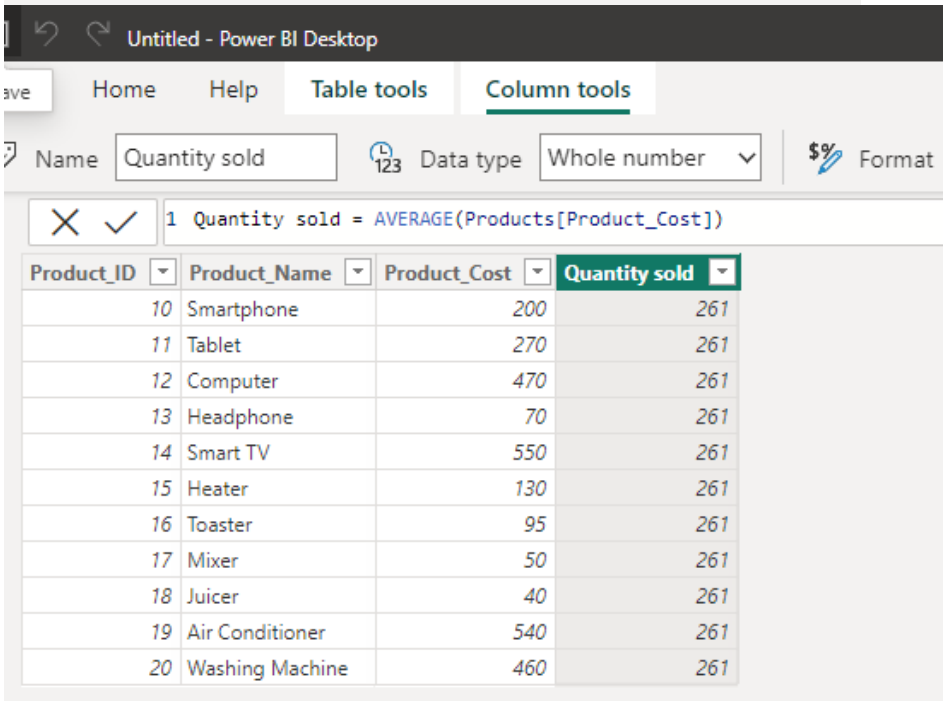

Products
Product_Cost
Product_ID
Collapse
1
Sales
Country_Code
Customer_ID
Customer_Name
Date_ID
Product_ID
Quantity
Collapse
Date
Date_ID
Month
Year
Collapse
1
Country
Country_code
Date_ID
Collapse

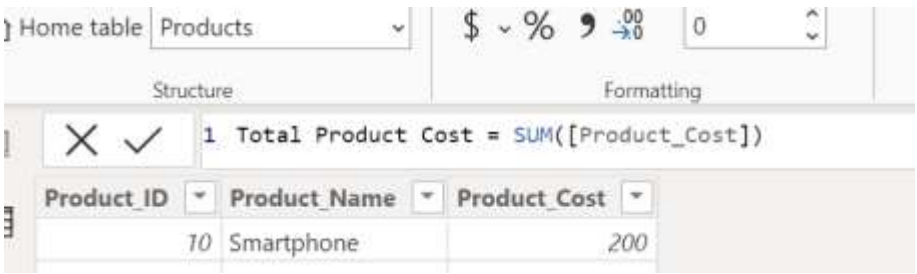

Sign in
Sensitivity
Publish
Properties
Data
Search
Country
Date
Products
Sales

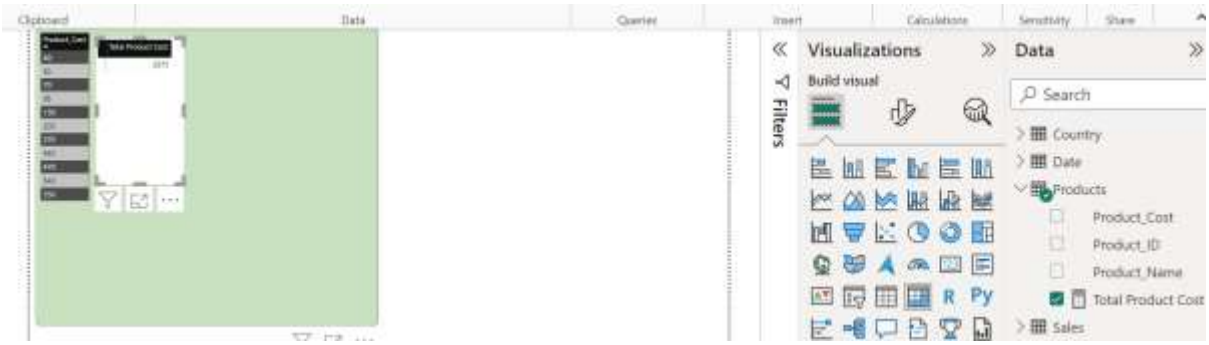


We create measures using DAX(Data Analysis Expression) for creating various expressions and filters.


Untitled - Power BI Desktop
Home
Help
Table tools
Column tools
Name
Quantity sold
Data type
Decimal number
Whole number
Decimal number
Fixed decimal number
Date/time
Date
Time
Text
True/false
Binary
1 Quantity sold = AVERAGE(Product
Product_ID
Product_Name
Product_Cost
10 Smartphone
11 Tablet
12 Computer
13 Headphone
14 Smart TV
15 Heater
16 Toaster
17 Mixer
18 Juicer
19 Air Conditioner
20 Washing Machine


Untitled - Power BI Desktop
Home
Help
Table tools
Column tools
Name
Quantity sold
Data type
Whole number
Format
1 Quantity sold = AVERAGE(Products[Product_Cost])
Product_ID
Product_Name
Product_Cost
Quantity sold
10 Smartphone 200 261
11 Tablet 270 261
12 Computer 470 261
13 Headphone 70 261
14 Smart TV 550 261
15 Heater 130 261
16 Toaster 95 261
17 Mixer 50 261
18 Juicer 40 261
19 Air Conditioner 540 261
20 Washing Machine 460 261

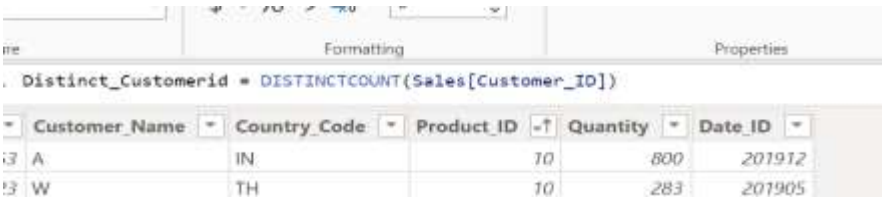

Home table
Products
Structure
Formatting
0
1 Total Product Cost = SUM([Product_Cost])
Product_ID
Product_Name
Product_Cost
10 Smartphone 200

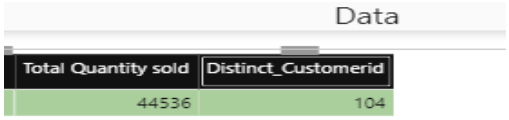


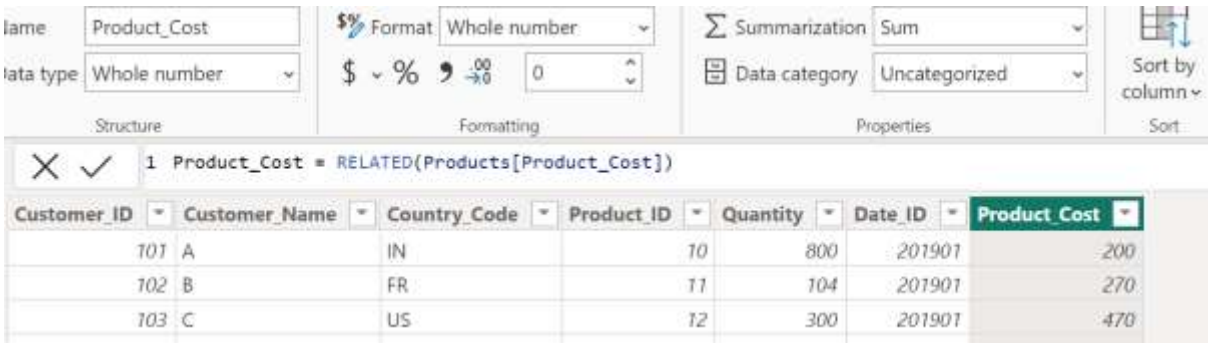
After using Sum dax expression we visualize the sum of total product in matrix form above screenshot shows the representation of matrix.

Total Quantity sold is sum of all quantity.

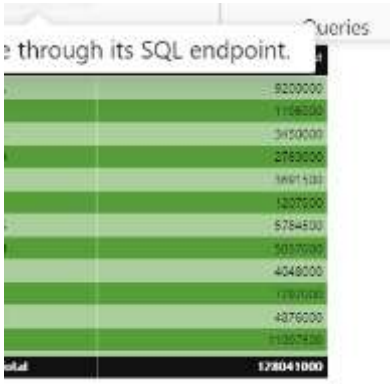
- We use DISTINCTCOUNT function counts the BLANK value. To skip the BLANK value, use the [DISTINCTCOUNTNOBLANK] function.



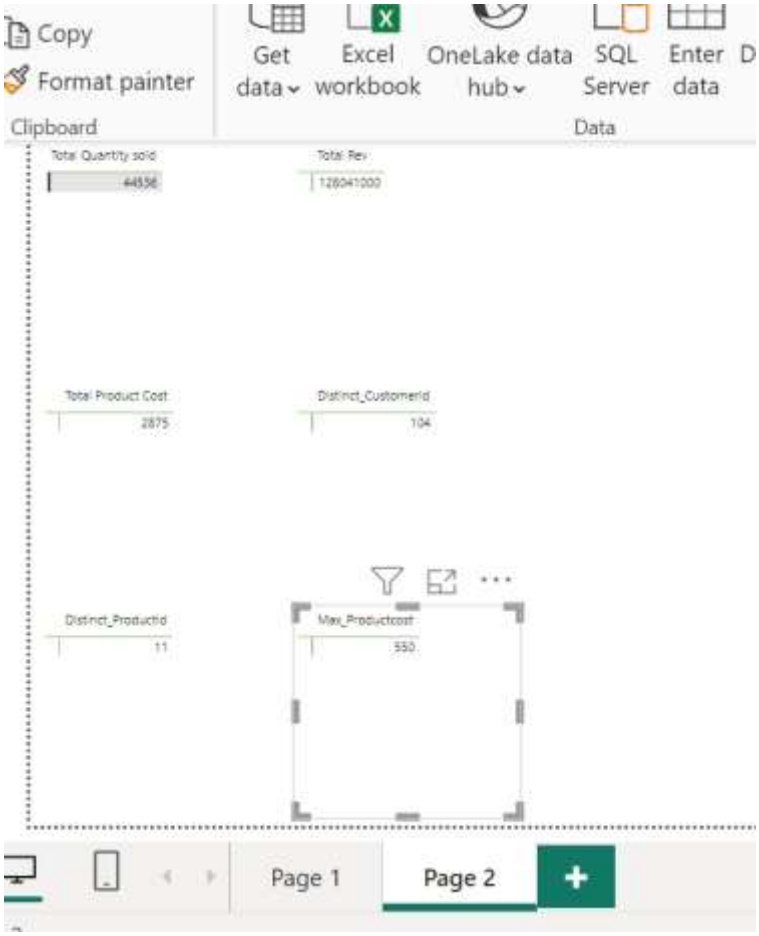




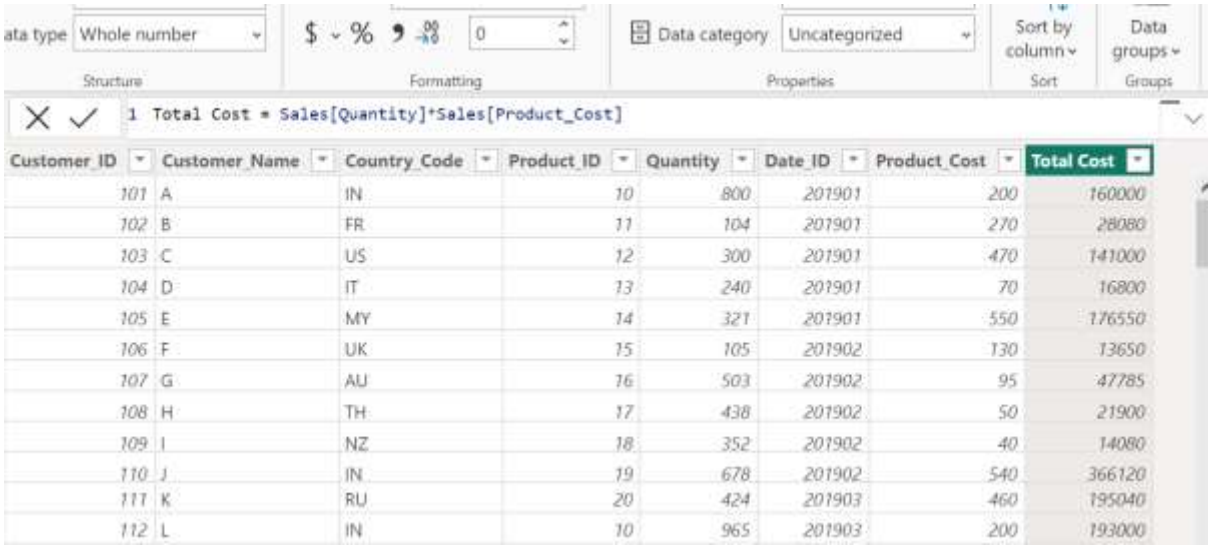
TOTAL REVENUE = `[Total Quantity sold] * [Total Product Cost]`



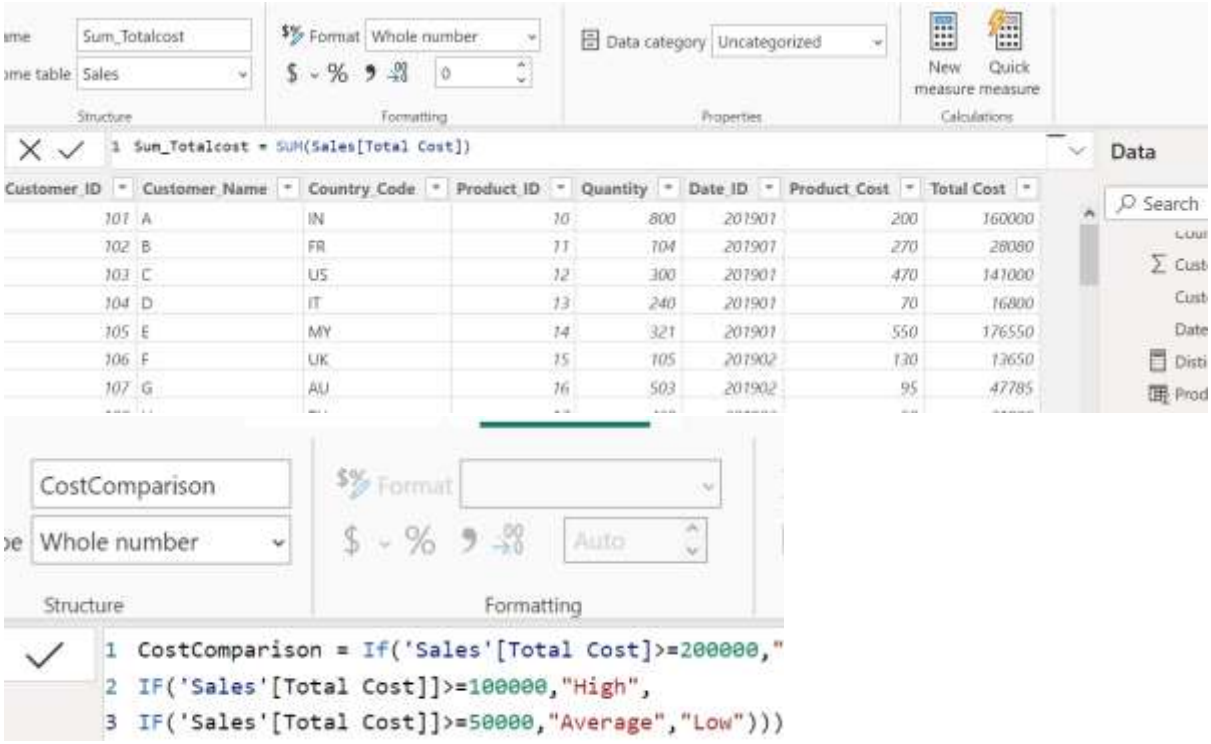
Matrix Dashboard in POWER BI



Create new Columns--

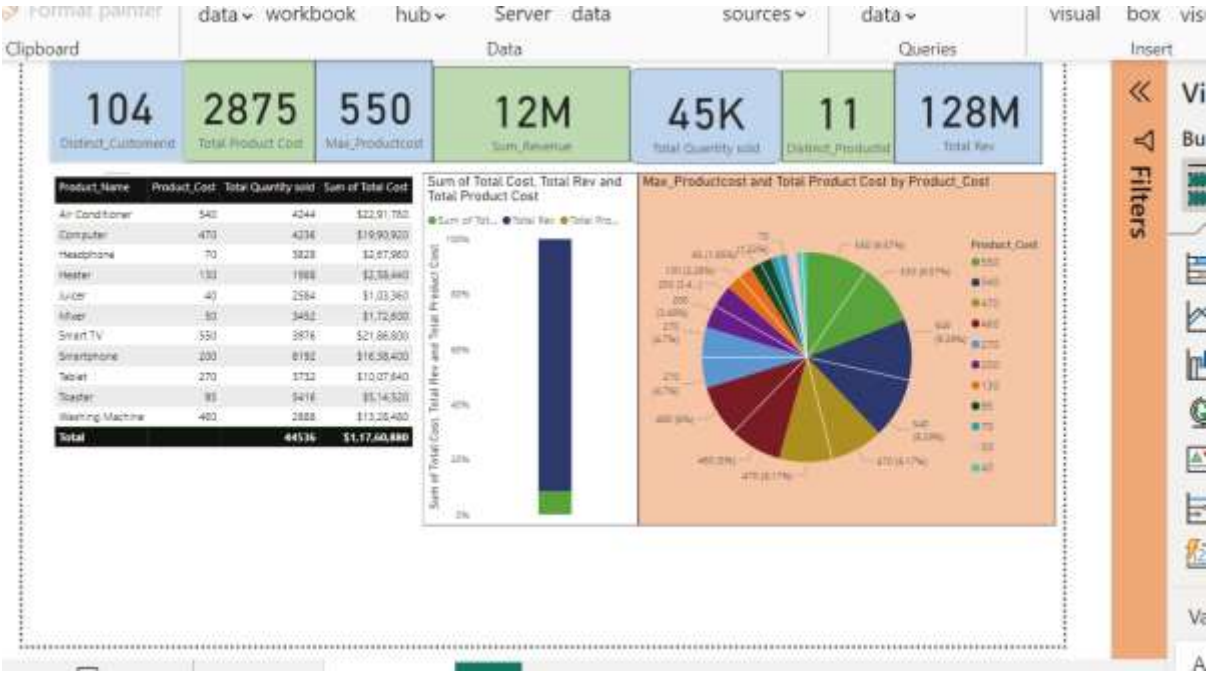


Customer_ID	Customer_Name	Country_Code	Product_ID	Quantity	Date_ID	Product_Cost	Total Cost
101	A	IN	10	800	201901	200	160000
102	B	FR	11	104	201901	270	28080
103	C	US	12	300	201901	470	141000
104	D	IT	13	240	201901	70	16800
105	E	MY	14	321	201901	550	176550
106	F	UK	15	105	201902	130	13650
107	G	AU	16	503	201902	95	47785
108	H	TH	17	438	201902	50	21900
109	I	NZ	18	352	201902	40	14080
110	J	IN	19	678	201902	540	366120
111	K	RU	20	424	201903	460	195040
112	L	IN	10	965	201903	200	193000



Why We Create Power Bi Dashboard-

Power BI report service, just like the desktop version, includes a variety of page formatting options, including visuals, shapes, and images, that can help your report stand out. One of the most efficient ways to identify and communicate insights is to **use Power BI to create visuals**.



Product_Name	Product_Cost	Total Quantity sold	Sum of Total Cost
Air Conditioner	540	4244	$22,91,760
Computer	470	4236	$19,90,920
Headphone	70	3828	$2,67,960
Heater	130	1988	$2,58,440
Juicer	40	2584	$1,03,360
Mixer	50	3452	$1,72,600
Smart TV	550	3976	$21,86,800
Smartphone	200	8192	$16,38,400
Tablet	270	3732	$10,07,640
Toaster	95	5416	$5,14,520
Washing Machine	460	2888	$13,28,480
Total		**44536**	**$1,17,60,880**