



END-TO-END DATA ANALYSIS PROJECT

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Preface

I am pleased to share a data analysis project that I've worked on, where I built a product analytics dashboard to track revenue, profits, and trends.

This project gave me the opportunity to practice key skills such as database design, SQL query writing, and using Power BI to create simple yet effective visualizations.

Although I'm still learning and refining my skills, I believe this project helped me better understand the practical steps involved in data analysis, and I hope it demonstrates my growing ability to apply these skills in real-world scenarios.

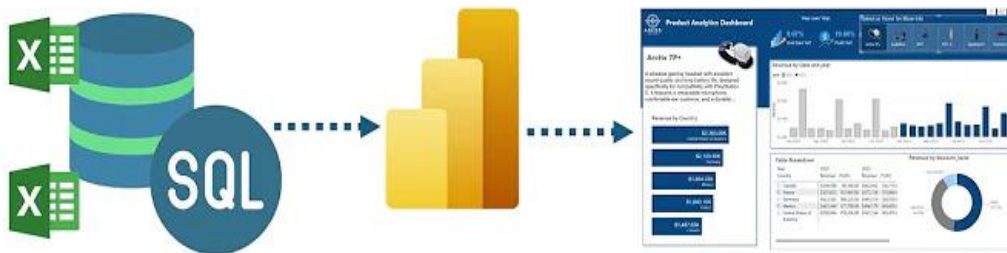
CHAPTER 1. Introduction

1.1 Overview of the Project

The goal of this project is to develop an end-to-end Product Analytics Dashboard that offers actionable insights into key business metrics such as revenue, profits, and sales trends. This dashboard was created using real-world business data, allowing me to apply various data analysis and visualization techniques to a practical use case.

End-to-End Data Analysis

Product Analytics Dashboard



Create a Database → Develop SQL → Build a Dashboard

1.2 Objective

The primary objective of this project is to build a comprehensive dashboard that enables stakeholders to monitor and understand product performance over time. By analyzing revenue, profit, and sales trends, the dashboard serves as a valuable tool for business decision-making.

1.3 Tools Used

SQL Server: To store and manage the data, and to perform queries for extracting meaningful insights.

Power BI: For visualizing the data and creating interactive reports that can be used by business leaders to track performance.

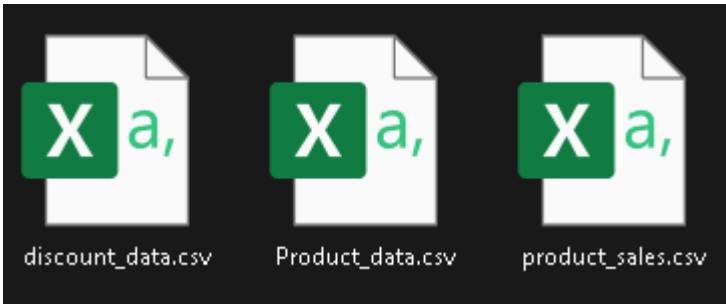
Excel: Used for initial data cleaning and basic analysis before transferring the data into SQL.

CHAPTER 2. Project data setup

2.1 Overview of the Data

The project uses real-world datasets: Product Data, Product Sales, and Discount Data, capturing product details, sales transactions, and discounts.

2.2 Data sources



Product Data: Product categories and prices.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	Product ID	Product	Category	Cost Price	Sale Price	Brand	Description	Image url								
2	SR1001	MV7	Dynamic N	\$174	\$199	Shure	A versatile	https://absentdata.com/wp-content/uploads/2024/11/m7_gif.gif								
3	RR10020	NT1-A	Condense	\$160	\$229	Rode	A popular c	https://absentdata.com/wp-content/uploads/2024/11/nt-1_image-removebg-preview.png								
4	FR10021	Scarlett 2i	Audio Inter	\$118	\$169	Focusrite	A compact	https://absentdata.com/wp-content/uploads/2024/11/focusrite-scarlett-2i2-2-removebg-preview.png								
5	PS10022	AudioBox i	Recording	\$90	\$199	PreSonus	A complete	https://absentdata.com/wp-content/uploads/2024/11/AudioBox-USB-96-Studio.png								
6	HY1004	QuadCast	Streaming	\$97	\$139	HyperX	A USB cor	https://absentdata.com/wp-content/uploads/2024/11/hyper_x_color_gif.gif								
7	AR1200	Arctis 7P+	Wireless C	\$104	\$149	SteelSeries	A wireless	https://absentdata.com/wp-content/uploads/2024/11/Arc_Headset-removebg-preview.png								

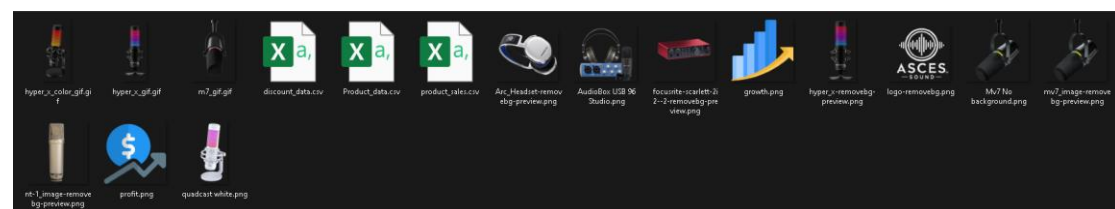
Product Sales: Sales volumes and revenue.

	A	B	C	D	E	F
1	Date	Customer	Country	Product	Discount	Units Sold
2	1/12/2023	Government	Germany	SR1001	None	15
3	1/12/2023	Education	United States	RR10020	None	6
4	1/12/2023	Government	Canada	FR10021	None	18
5	1/12/2023	Government	Germany	FR10021	None	15
6	1/12/2023	Government	Canada	HY1004	None	18
7	1/12/2023	Education	United States of America		None	6
8	1/12/2023	Government	France	SR1001	Low	22
9	1/12/2023	Government	France	FR10021	Low	22
10	1/12/2023	Government	Canada	SR1001	Low	29
11	1/12/2023	Government	Canada	FR10021	Low	18

Discount Data: Discounts and rates.

	B	C
1	Discount E	Discount
2	none	0
3	low	6
4	medium	10
5	high	5
6	none	0
7	low	6
8	medium	11
9	high	5
10	none	0
11	low	6

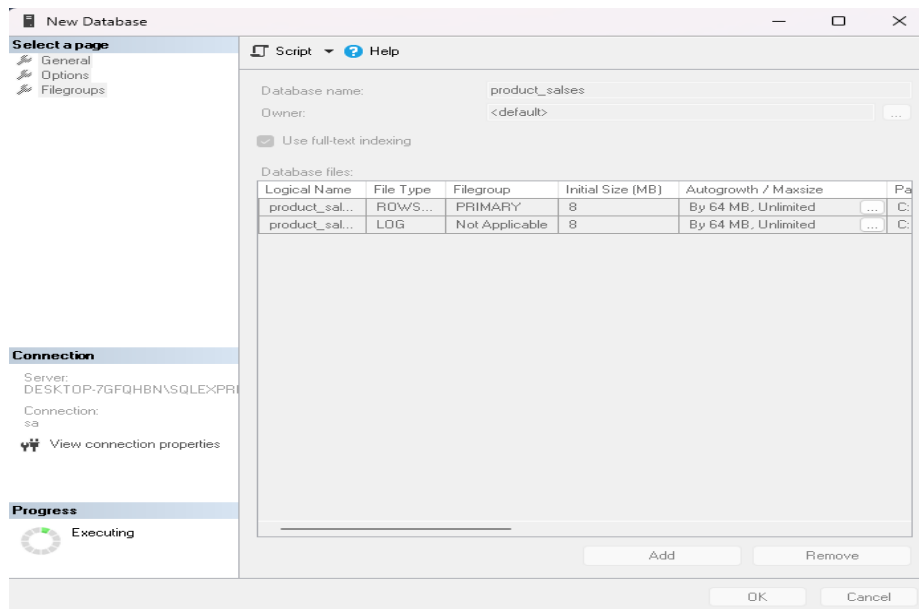
Icons: Growth and profit icons for visualizations.



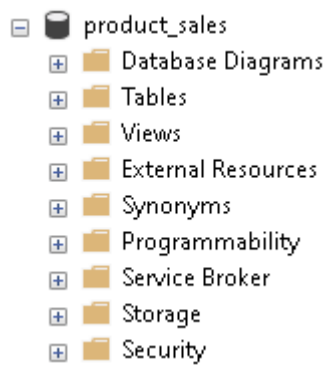
CHAPTER 3. Building the Database

3.1 Database Design and Structure

Create database product_sales to stored data



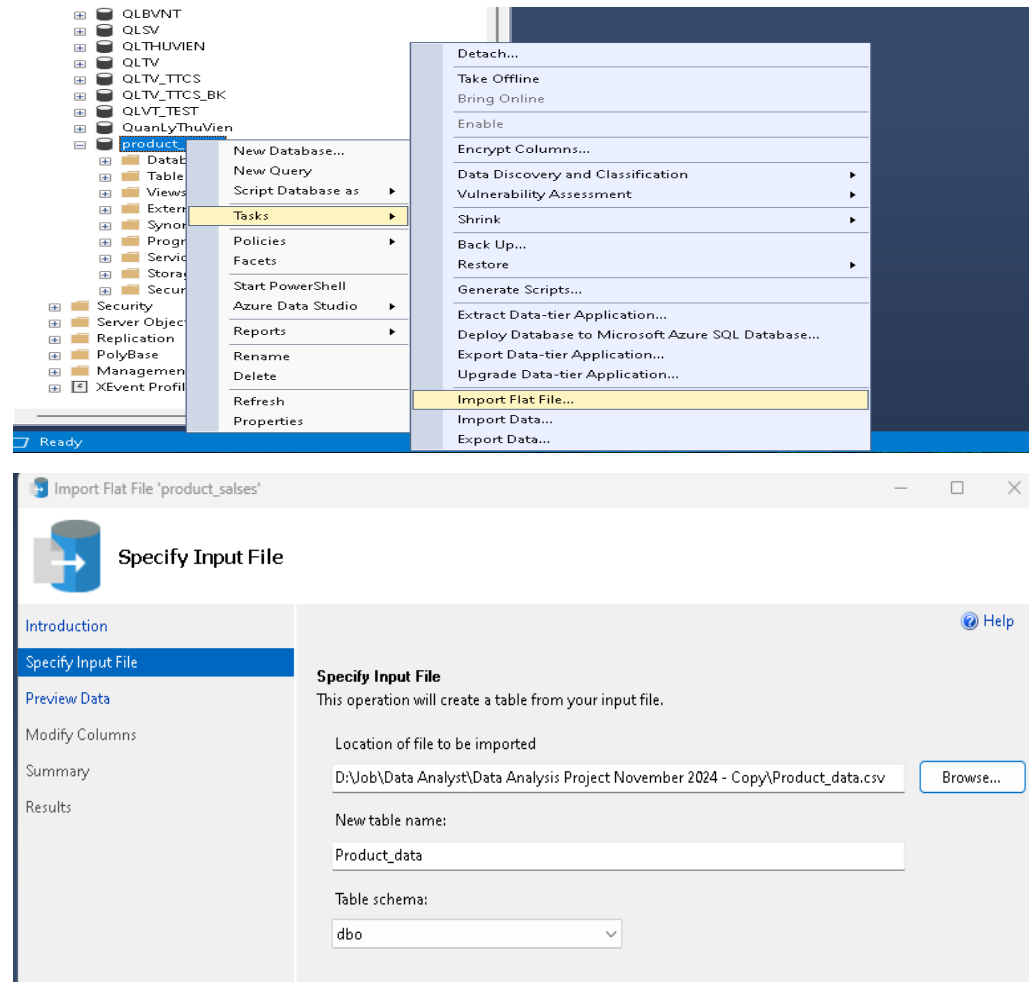
Result



3.2 Data Import and Preprocessing

3.2.1. Import file product_data.csv

File import operation



Review data

Import Flat File 'product_sales'

Preview Data

Introduction

Specify Input File

Preview Data

Modify Columns

Summary

Results

Preview Data

This operation analyzed the input file structure to generate the preview below for up to the first 50 rows.

Product_ID	Product	Category	Cost_Price	Sale_Price	Brand
SR1001	MV7	Dynamic Micro...	\$174	\$199	Shure
RR10020	NT1-A	Condenser Mic...	\$160	\$229	Rode
FR10021	Scarlett 2i2	Audio Interface	\$118	\$169	Focusrite
PS10022	AudioBox USB ...	Recording Bun...	\$90	\$199	PreSonus
HY1004	QuadCast S	Streaming Micr...	\$97	\$139	HyperX
AR1200	Arctis 7P+	Wireless Gamin...	\$104	\$149	SteelSeries

Column names changed due to invalid characters, duplication, etc. Column names can be edited in Modify Columns page.

☒

Use Rich Data Type Detection - may provide a closer type fit. However, cells with anomalous values may be dropped.

< Previous

Next >

Cancel

This table is pretty good so no need to Modify Columns for now

Introduction

Specify Input File

Preview Data

Modify Columns

Summary

Results

Modify Columns

This operation generated the following table schema. Please verify if schema is accurate, and if not, please make any changes.

Column Name	Data Type	Primary Key	<input type="checkbox"/> Allow Nulls
Product_ID	nvarchar(50)	<input type="checkbox"/>	<input type="checkbox"/>
Product	nvarchar(50)	<input type="checkbox"/>	<input type="checkbox"/>
Category	nvarchar(50)	<input type="checkbox"/>	<input type="checkbox"/>
Cost_Price	money	<input type="checkbox"/>	<input type="checkbox"/>
Sale_Price	money	<input type="checkbox"/>	<input type="checkbox"/>
Brand	nvarchar(50)	<input type="checkbox"/>	<input type="checkbox"/>
Description	nvarchar(250)	<input type="checkbox"/>	<input type="checkbox"/>
Image_url	nvarchar(100)	<input type="checkbox"/>	<input type="checkbox"/>

Operation Complete

Summary:

Name	Result
<input checked="" type="checkbox"/> Insert Data	Success

Result

SQL Server Enterprise Explorer showing the database structure for 'DESKTOP-7GFOHBN\...-dbo.Product_data'.

Product_ID	Product	Category	Cost_Price	Sale_Price	Brand	Description	Image_url
SR1001	MV7	Dynamic Micro...	174.0000	199.0000	Shure	A versatile USB/...	https://absentd...
RR10020	NT1-A	Condenser Mic...	160.0000	229.0000	Rode	A popular cond...	https://absentd...
FR10021	Scarlett 2i2	Audio Interface	118.0000	169.0000	Focusrite	A compact USB...	https://absentd...
PS10022	AudioBox USB ...	Recording Bun...	90.0000	199.0000	PreSonus	A complete rec...	https://absentd...
HY1004	QuadCast S	Streaming Micr...	97.0000	139.0000	HyperX	A USB condens...	https://absentd...
AR1200	Arctis 7P +	Wireless Gamin...	104.0000	149.0000	SteelSeries	A wireless gami...	https://absentd...
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

3.2.2 Import file product_sales.csv

Do not select Use Rich Data Type Detection because the Date column data may change.

Import Flat File 'product_sales'

Preview Data

Introduction
Specify Input File
Preview Data
Modify Columns
Summary
Results

Preview Data

This operation analyzed the input file structure to generate the preview below for up to the first 50 rows.

Date	Customer_Type	Country	Product	Discount_Band	Units_S
1/12/2023	Government	Germany	SR1001	None	15
1/12/2023	Education	United States of...	RR10020	None	6
1/12/2023	Government	Canada	FR10021	None	18
1/12/2023	Government	Germany	FR10021	None	15
1/12/2023	Government	Canada	HY1004	None	18
1/12/2023	Education	United States of...		None	6
1/12/2023	Government	France	SR1001	Low	22
1/12/2023	Government	France	FR10021	Low	22
1/12/2023	Government	Canada	SR1001	Low	29
1/12/2023	Small Business	Canada	FR10021	Low	19
1/12/2023	Government	Canada	FR10021	Low	29
1/12/2023	Enterprise	Canada	FR10021	Low	27
1/12/2023	Creator	France	FR10021	Low	11
1/12/2023	Creator	Mexico	FR10021	Low	11
1/12/2023	Creator	France	PS10022	Low	11

i Column names changed due to invalid characters, duplication, etc. Column names can be edited in Modify Columns page.

☐ Use Rich Data Type Detection - may provide a closer type fit. However, cells with anomalous values may be dropped.

< Previous Next > Cancel

Some products may be out of stock and may be Null

Modify Columns

This operation generated the following table schema. Please verify if schema is accurate, and if not, please make any changes.

Column Name	Data Type		Primary Key	<input type="checkbox"/> Allow Nulls	
Date	datetime2	▼	<input type="checkbox"/>	<input type="checkbox"/>	
Customer_Type	nvarchar(50)	▼	<input type="checkbox"/>	<input type="checkbox"/>	
Country	nvarchar(50)	▼	<input type="checkbox"/>	<input type="checkbox"/>	
Product	nvarchar(50)	▼	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Discount_Band	nvarchar(50)	▼	<input type="checkbox"/>	<input type="checkbox"/>	
Units_Sold	int	▼	<input type="checkbox"/>	<input type="checkbox"/>	

- product_sales
 - Database Diagrams
 - Tables
 - System Tables
 - FileTables
 - External Tables
 - Graph Tables
 - dbo.product_data
 - dbo.product_sales

3.2.3 Import file product_sales.csv

By default, SQL Server uses system regional settings to interpret date formats (e.g., DMY for Vietnam, MDY for US), then converts them to YMD format when storing.

-To handle DMY format, run SET DATEFORMAT DMY before importing.

1	Date,Cus
2	1/12/2023
3	1/12/2023
4	1/12/2023
5	1/12/2023

```
SET DATEFORMAT DMY;
```

Import Flat File 'product_sales'

Specify Input File

[Introduction](#)
[Specify Input File](#)
[Preview Data](#)
[Modify Columns](#)
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[Results](#)

[Help](#)

Specify Input File

This operation will create a table from your input file.

Location of file to be imported

D:\Job\Data Analyst\Data Analysis Project November 2024 - Copy\discount_data.csv
Browse...

New table name:

discount_data

Table schema:

dbo

▼

Preview Data

This operation analyzed the input file structure to generate the preview below for up to the first 50 rows.

Month	Discount_Band	Discount
April	none	0
April	low	3
April	medium	8
April	high	15
May	none	0
May	low	7
May	medium	11
May	high	9
June	none	0
June	low	6
June	medium	4
June	high	7
July	none	0
July	low	8
July	medium	9
July	high	20

Column names changed due to invalid characters, duplication, etc. Column names can be edited in Modify Columns page.

☒
Use Rich Data Type Detection - may provide a closer type fit. However, cells with anomalous values may be dropped.

Final result

- product_sales

+

Database Diagrams

-

Tables

+

System Tables

+

FileTables

+

External Tables

+

Graph Tables

+

dbo.discount_data

+

dbo.product_data

+

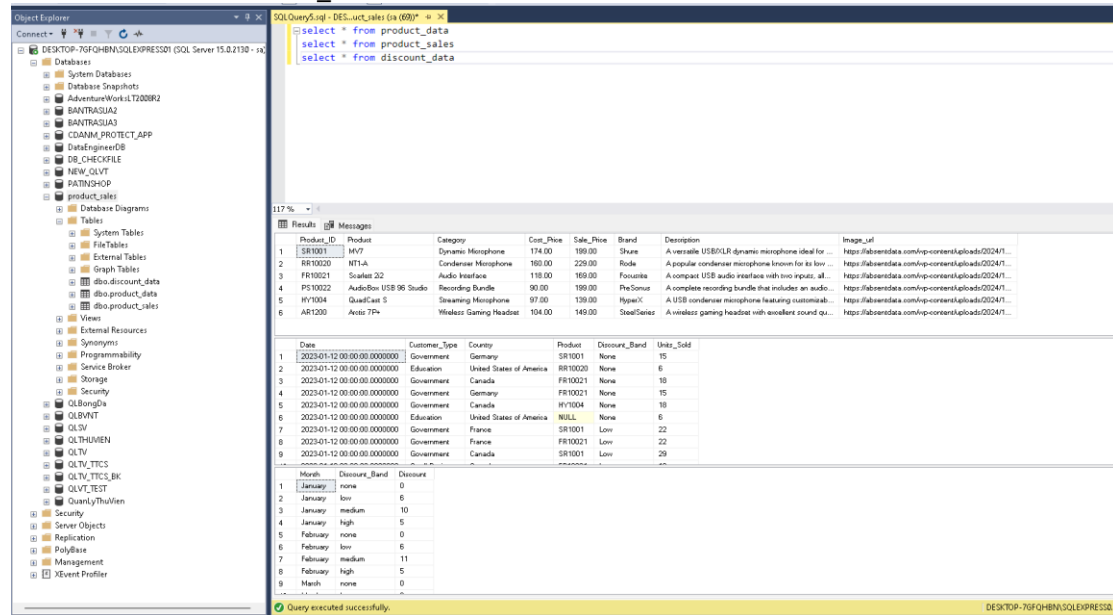
dbo.product_sales

CHAPTER 4. Developing SQL Queries

4.1 Writing SQL Queries to Extract Data

Check data in tables

```
select * from product_data
select * from product_sales
select * from discount_data
```



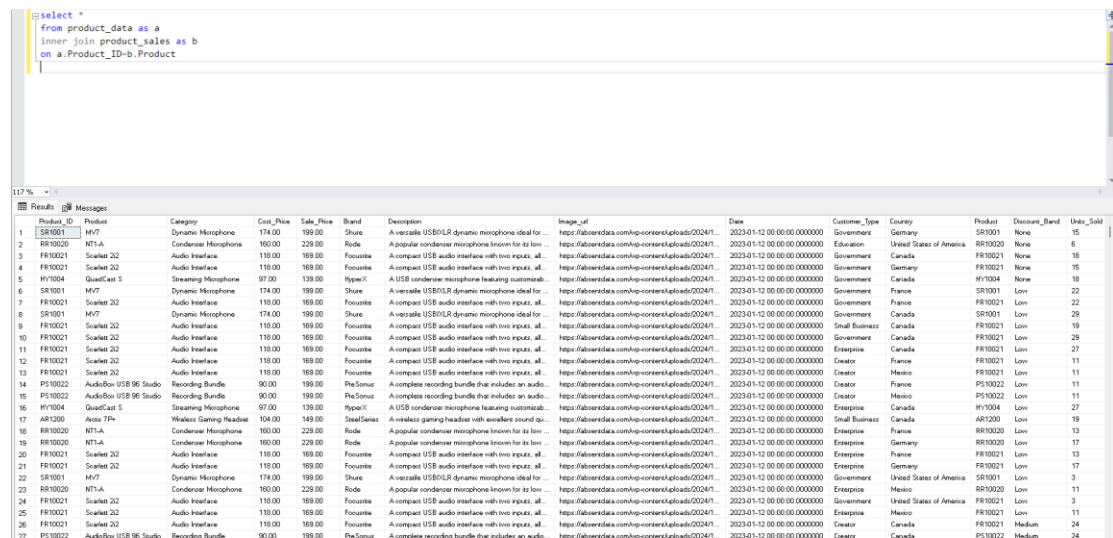
Query executed successfully.

Product_ID	Product	Category	Cost_Price	Sale_Price	Brand	Description	Image_url
SR1001	MV7	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/RLR dynamic microphone ideal for...	https://faberdata.com/wp-content/uploads/2024/1...
RR10020	MT1A	Condenser Microphone	160.00	229.00	Rode	A popular condenser microphone known for its lov...	https://faberdata.com/wp-content/uploads/2024/1...
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...
PS10022	AudioBox USB 96 Studio	Recording Bundle	90.00	199.00	PreSonus	A complete recording bundle that includes an audio...	https://faberdata.com/wp-content/uploads/2024/1...
HY1004	QuadCast S	Streaming Microphone	97.00	139.00	HyperX	A USB condenser microphone featuring customizab...	https://faberdata.com/wp-content/uploads/2024/1...
AR1200	Avia 7P4	Wireless Gaming Headset	104.00	149.00	SteelSeries	A wireless gaming headset with excellent sound qu...	https://faberdata.com/wp-content/uploads/2024/1...

Date	Customer_Type	Country	Product	Discount_Band	Units_Sold
2023-01-12 00:00:00.0000000	Government	Germany	SR1001	None	15
2023-01-12 00:00:00.0000000	Education	United States of America	RR10020	None	6
2023-01-12 00:00:00.0000000	Government	Canada	FR10021	None	18
2023-01-12 00:00:00.0000000	Government	Germany	FR10021	None	15
2023-01-12 00:00:00.0000000	Government	Canada	HY1004	None	18
2023-01-12 00:00:00.0000000	Education	United States of America	WILL	None	6
2023-01-12 00:00:00.0000000	Government	France	SR1001	Low	22
2023-01-12 00:00:00.0000000	Government	France	FR10021	Low	22
2023-01-12 00:00:00.0000000	Government	Canada	SR1001	Low	29

Month	Discount_Band	Discount
1 January	none	0
2 January	low	6
3 January	medium	10
4 January	high	5
5 February	none	0
6 February	low	6
7 February	medium	11
8 February	high	5
9 March	none	0

Check which products have been sold



Query executed successfully.

Product_ID	Product	Category	Cost_Price	Sale_Price	Brand	Description	Image_url	Date	Customer_Type	Country	Product	Discount_Band	Units_Sold
SR1001	MV7	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/RLR dynamic microphone ideal for...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	Germany	SR1001	None	15
RR10020	MT1A	Condenser Microphone	160.00	229.00	Rode	A popular condenser microphone known for its lov...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Education	United States of America	RR10020	None	6
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	Canada	FR10021	None	18
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	Germany	FR10021	None	15
HY1004	QuadCast S	Streaming Microphone	97.00	139.00	HyperX	A USB condenser microphone featuring customizab...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	Canada	HY1004	None	18
SR1001	MV7	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/RLR dynamic microphone ideal for...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	France	SR1001	Low	22
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	France	FR10021	Low	22
SR1001	MV7	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/RLR dynamic microphone ideal for...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	Canada	SR1001	Low	29
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Small Business	Canada	FR10021	Low	19
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	Canada	FR10021	Low	26
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	Canada	FR10021	Low	27
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Creator	France	FR10021	Low	11
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Creator	Mexico	FR10021	Low	11
PS10022	AudioBox USB 96 Studio	Recording Bundle	90.00	199.00	PreSonus	A complete recording bundle that includes an audio...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Creator	France	PS10022	Low	11
PS10022	AudioBox USB 96 Studio	Recording Bundle	90.00	199.00	PreSonus	A complete recording bundle that includes an audio...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Creator	Mexico	PS10022	Low	11
HY1004	QuadCast S	Streaming Microphone	97.00	139.00	HyperX	A USB condenser microphone featuring customizab...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	Canada	HY1004	Low	27
AR1200	Avia 7P4	Wireless Gaming Headset	104.00	149.00	SteelSeries	A wireless gaming headset with excellent sound qu...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Small Business	Canada	AR1200	Low	19
RR10020	MT1A	Condenser Microphone	160.00	229.00	Rode	A popular condenser microphone known for its lov...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	France	RR10020	Low	13
RR10020	MT1A	Condenser Microphone	160.00	229.00	Rode	A popular condenser microphone known for its lov...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	Germany	RR10020	Low	17
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	France	FR10021	Low	13
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	Germany	FR10021	Low	17
SR1001	MV7	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/RLR dynamic microphone ideal for...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	United States of America	SR1001	Low	3
RR10020	MT1A	Condenser Microphone	160.00	229.00	Rode	A popular condenser microphone known for its lov...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	Mexico	RR10020	Low	11
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Government	United States of America	FR10021	Low	3
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Entrepreneur	Mexico	FR10021	Low	11
FR10021	Scarlet 2i	Audio Interface	119.00	169.00	Focusrite	A compact USB audio interface with two inputs, al...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Creator	Canada	FR10021	Low	24
PS10022	AudioBox USB 96 Studio	Recording Bundle	90.00	199.00	PreSonus	A complete recording bundle that includes an audio...	https://faberdata.com/wp-content/uploads/2024/1...	2023-01-12 00:00:00.0000000	Creator	Canada	PS10022	Medium	24

4.2 Calculations: Revenue, Total Cost, Profit, Sales Trends

View Revenue and Total Cost by month and year

```
select *,
a.Sale_Price*b.Units_Sold as revenue,
a.Cost_Price*b.Units_Sold as total_cost,
format(b.Date, 'MMMM') as month,
format(b.Date, 'yyyy') as year
from product_data as a
inner join product_sales as b
on a.Product_ID=b.Product
```

```
select *,
a.Sale_Price*b.Units_Sold as revenue,
a.Cost_Price*b.Units_Sold as total_cost,
format(b.Date, 'MMMM') as month,
format(b.Date, 'yyyy') as year
from product_data as a
inner join product_sales as b
on a.Product_ID=b.Product
```

	Cost_Price	Sale_Price	Brand	Description	Image_url	Date	Customer_Type	Country	Product	Discount_Band	Units_Sold	revenue	total_cost	month	year
1	one	174.00	Shure	A versatile USB/XLR dynamic microphone ideal for...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Government	Germany	SR1001	None	15	2985.00	2610.00	December	2023
2	phone	160.00	Rode	A popular condenser microphone known for its low...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Education	United States of America	RR10020	None	6	1374.00	960.00	December	2023
3		118.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Government	Canada	FR10021	None	18	3042.00	2124.00	December	2023
4		118.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Government	Germany	FR10021	None	15	2535.00	1770.00	December	2023
5	ihone	97.00	HyperX	A USB condenser microphone featuring customizab...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Government	Canada	HY1004	None	18	2502.00	1746.00	December	2023

Filtering and Aggregating Data

```
select
a.Product,
a.Category,
a.Cost_Price,
a.Sale_Price,
a.Brand,
a.Description,
a.Image_url,
b.Date,
b.Country,
b.Discount_Band,
b.Units_Sold,
a.Sale_Price*b.Units_Sold as revenue,
a.Cost_Price*b.Units_Sold as total_cost,
format(b.Date, 'MMMM') as month,
format(b.Date, 'yyyy') as year
from product_data as a
inner join product_sales as b
on a.Product_ID=b.Product
```

156 of 156														
Results		Messages												
	Category	Cost_Price	Sale_Price	Brand	Description	Image_url	Date	Country	Discount_Band	Units_Sold	revenue	total_cost	month	year
1	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/XLR dynamic microphone ideal for...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Germany	None	15	2985.00	2610.00	December	2023
2	Condenser Microphone	160.00	229.00	Rode	A popular condenser microphone known for its low...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	United States of America	None	6	1374.00	960.00	December	2023
3	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Canada	None	18	3042.00	2124.00	December	2023
4	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Germany	None	15	2535.00	1770.00	December	2023
5	Streaming Microphone	97.00	139.00	HyperX	A USB condenser microphone featuring customizab...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Canada	None	18	2502.00	1746.00	December	2023
6	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/XLR dynamic microphone ideal for...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	France	Low	22	4378.00	3628.00	December	2023
7	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	France	Low	22	3718.00	2596.00	December	2023
8	Dynamic Microphone	174.00	199.00	Shure	A versatile USB/XLR dynamic microphone ideal for...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Canada	Low	29	5771.00	5046.00	December	2023
9	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Canada	Low	19	3211.00	2242.00	December	2023
10	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Canada	Low	29	4901.00	3422.00	December	2023
11	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Canada	Low	27	4963.00	3198.00	December	2023
12	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	France	Low	11	1959.00	1298.00	December	2023
13	Audio Interface	118.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	Mexico	Low	11	1959.00	1296.00	December	2023
14	USB 96 Studio Recording Bundle	90.00	199.00	PreSonus	A complete recording bundle that includes an audio...	https://fibersdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.000000	France	Low	11	2189.00	990.00	December	2023

Combines data from three tables (product_data, product sales, discount data) to overall view of revenue and discounts for each month.

```
with cte as(
select
a.Product,
a.Category,
a.Cost_Price,
a.Sale_Price,
a.Brand,
a.Description,
a.Image_url,
b.Date,
b.Country,
b.Discount_Band,
b.Units_Sold,
a.Sale_Price*b.Units_Sold as revenue,
a.Cost_Price*b.Units_Sold as total_cost,
format(b.Date, 'MMMM') as month,
format(b.Date, 'yyyy') as year
from product_data as a
inner join product_sales as b
on a.Product_ID=b.Product )
select * from cte as a
inner join discount_data as b
on a.Discount_Band=b.Discount_Band and a.month=b.Month
```

56% - Results Messages															
est_Price	Sale_Price	Brand	Description	Image_url	Date	Country	Discount_Band	Units_Sold	revenue	total_cost	month	year	Month	Discount_Band	Discount
1	74.00	199.00	Shure	A versatile USB/ULR dynamic microphone ideal for ...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Germany	None	15	2985.00	2610.00	December	2023	December	none
2	60.00	229.00	Rode	A popular condenser microphone known for its low ...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	United States of America	None	6	1374.00	960.00	December	2023	December	none
3	18.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Canada	None	18	3042.00	2124.00	December	2023	December	none
4	18.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Germany	None	15	2535.00	1770.00	December	2023	December	none
5	17.00	139.00	HyperX	A USB condenser microphone featuring custom lab...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Canada	None	18	2502.00	1746.00	December	2023	December	none
6	74.00	199.00	Shure	A versatile USB/ULR dynamic microphone ideal for ...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	France	Low	22	4378.00	3628.00	December	2023	December	low
7	18.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	France	Low	22	3716.00	2596.00	December	2023	December	low
8	74.00	199.00	Shure	A versatile USB/ULR dynamic microphone ideal for ...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Canada	Low	29	5771.00	5046.00	December	2023	December	low
9	18.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Canada	Low	19	3211.00	2242.00	December	2023	December	low
10	18.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Canada	Low	29	4901.00	3422.00	December	2023	December	low
11	18.00	169.00	Focusrite	A compact USB audio interface with two inputs, all...	https://i.lbsendata.com/hip-content/uploads/002471...	2023-12-01 00:00:00 0000000	Canada	Low	27	4563.00	3186.00	December	2023	December	low

Calculate revenue after discount %

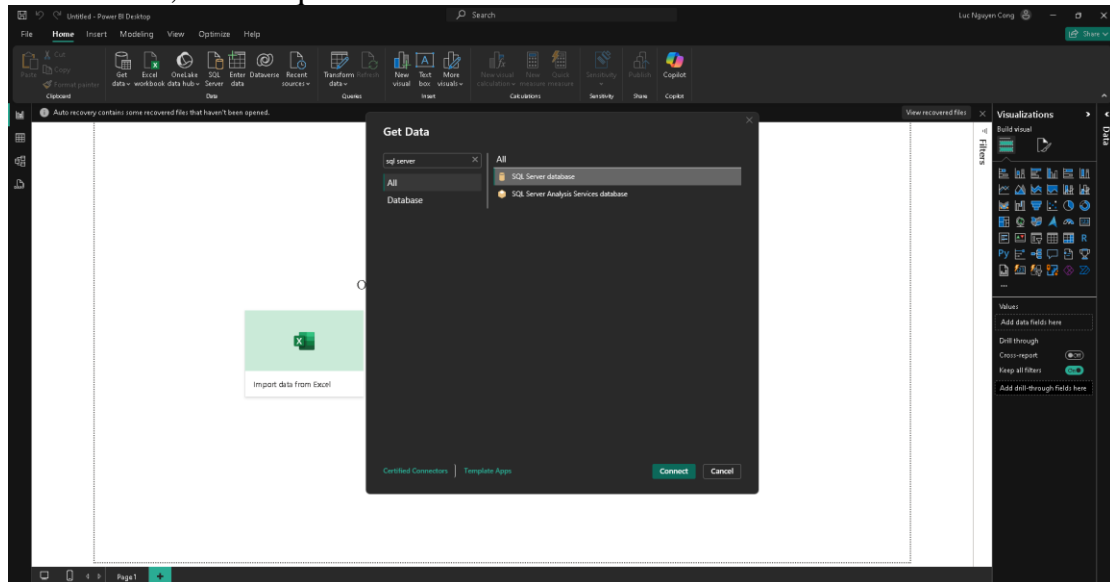
```
with cte as(
select
a.Product,
a.Category,
a.Cost_Price,
a.Sale_Price,
a.Brand,
a.Description,
a.Image_url,
b.Date,
b.Customer_Type,
b.Country,
b.Discount_Band,
b.Units_Sold,
a.Sale_Price*b.Units_Sold as revenue,
a.Cost_Price*b.Units_Sold as total_cost,
format(b.Date, 'MMMM') as month,
format(b.Date, 'yyyy') as year
from product_data as a
inner join product_sales as b
on a.Product_ID=b.Product )
select
*,
(1-CAST(b.Discount as float)/100)*revenue as discount_revenue
from cte as a
inner join discount_data as b
on a.Discount_Band=b.Discount_Band and a.month=b.Month
```

Row	Brand	Description	Image_url	Date	Country	Discount_Band	Units_Sold	revenue	total_cost	month	year	Month	Discount_Band	Discount	discount_revenue	
1	0	Shure	A versatile USB/OLR dynamic microphone ideal for ...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	Germany	None	15	2865.00	2910.00	December	2023	December	none	0	2865
2	0	Rode	A popular condenser microphone known for its lim...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	United States of America	None	6	1374.00	860.00	December	2023	December	none	0	1374
3	0	Focusrite	A compact USB audio interface with two inputs, all...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	Canada	None	18	3042.00	2124.00	December	2023	December	none	0	3042
4	0	Focusrite	A compact USB audio interface with two inputs, all...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	Germany	None	15	2535.00	1770.00	December	2023	December	none	0	2535
5	0	HyperX	A USB condenser microphone featuring customizab...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	France	None	18	2502.00	1746.00	December	2023	December	none	0	2502
6	0	Shure	A versatile USB/OLR dynamic microphone ideal for ...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	France	Low	22	4378.00	3626.00	December	2023	December	low	14	3765.08
7	0	Focusrite	A compact USB audio interface with two inputs, all...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	France	Low	22	3719.00	2596.00	December	2023	December	low	14	3197.48
8	0	Shure	A versatile USB/OLR dynamic microphone ideal for ...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	Canada	Low	29	5771.00	5046.00	December	2023	December	low	14	4963.08
9	0	Focusrite	A compact USB audio interface with two inputs, all...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	Canada	Low	19	3211.00	2242.00	December	2023	December	low	14	2761.46
10	0	Focusrite	A compact USB audio interface with two inputs, all...	https://liberdata.com/wp-content/uploads/2024/1...	2023-12-01 00:00:00.0000000	Canada	Low	29	4861.00	3422.00	December	2023	December	low	14	4214.88

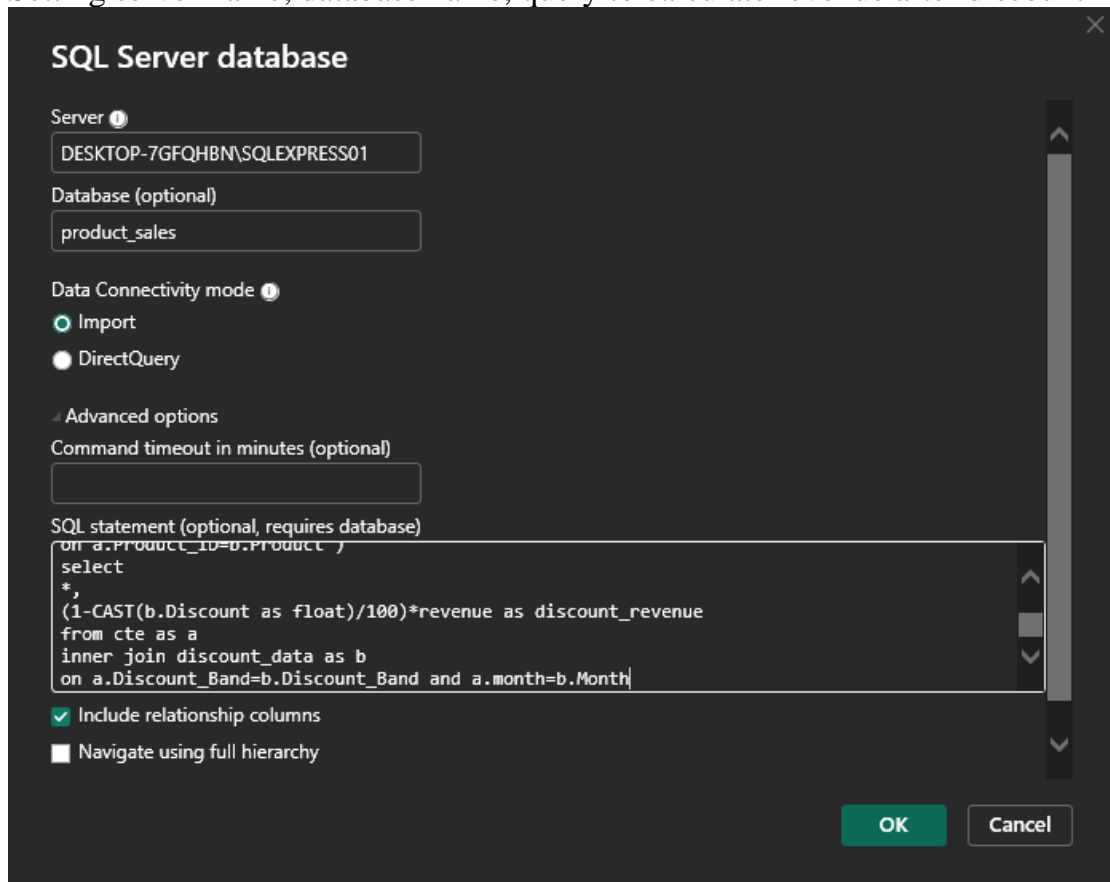
CHAPTER 5. Connecting to Power BI

5.1 Connecting SQL Database to Power BI

In Get Data, select sql server



Setting server name, database name, query to calculate revenue after discount



5.2 Check and load data

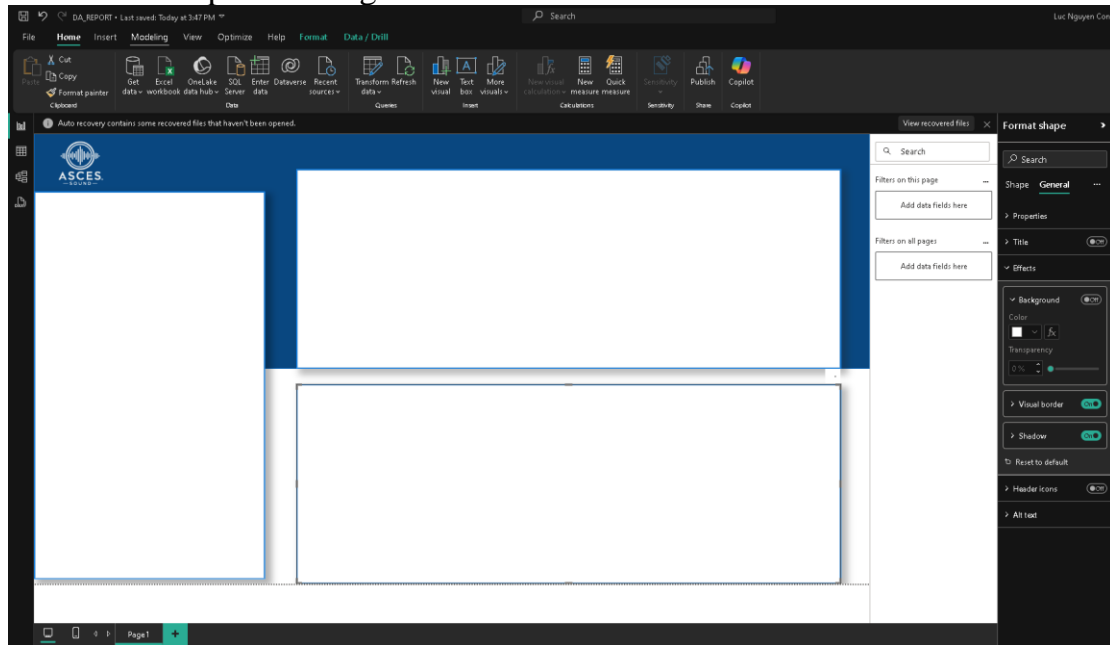
DESKTOP-7GFQHBN\SQLEXPRESS01: product_sales

	Discount_Band	Units_Sold	revenue	total_cost	month	year	Month.1	Discount_Band2	Discount	discount_revenue
merica	None	15	2985	2610	December	2023	December	none	0	2985
	None	6	1374	960	December	2023	December	none	0	1374
	None	18	3042	2124	December	2023	December	none	0	3042
	None	15	2535	1770	December	2023	December	none	0	2535
	None	18	2502	1746	December	2023	December	none	0	2502
	Low	22	4378	3828	December	2023	December	low	14	3765,08
	Low	22	3718	2596	December	2023	December	low	14	3197,48
	Low	29	5771	5046	December	2023	December	low	14	4963,06
	Low	19	3211	2242	December	2023	December	low	14	2761,46
	Low	29	4901	3422	December	2023	December	low	14	4214,86
Low	27	4563	3186	December	2023	December	low	14	3924,18	
Low	11	1859	1298	December	2023	December	low	14	1598,74	
Low	11	1859	1298	December	2023	December	low	14	1598,74	
Low	11	2189	990	December	2023	December	low	14	1882,54	
Low	11	2189	990	December	2023	December	low	14	1882,54	
Low	27	3753	2619	December	2023	December	low	14	3227,58	
Low	19	2831	1976	December	2023	December	low	14	2434,66	
Low	13	2977	2080	December	2023	December	low	14	2560,22	
Low	17	3893	2720	December	2023	December	low	14	3347,98	
Low	13	2197	1534	December	2023	December	low	14	1889,42	

CHAPTER 6. Building the Dashboard

6.1 Building the Dashboard Structure

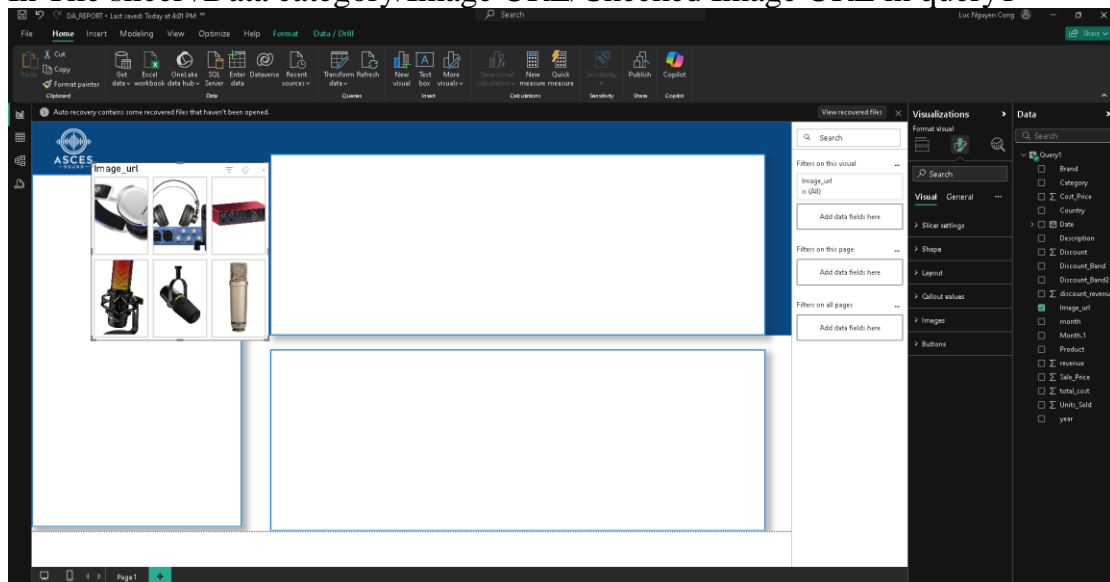
Insert / shape and image



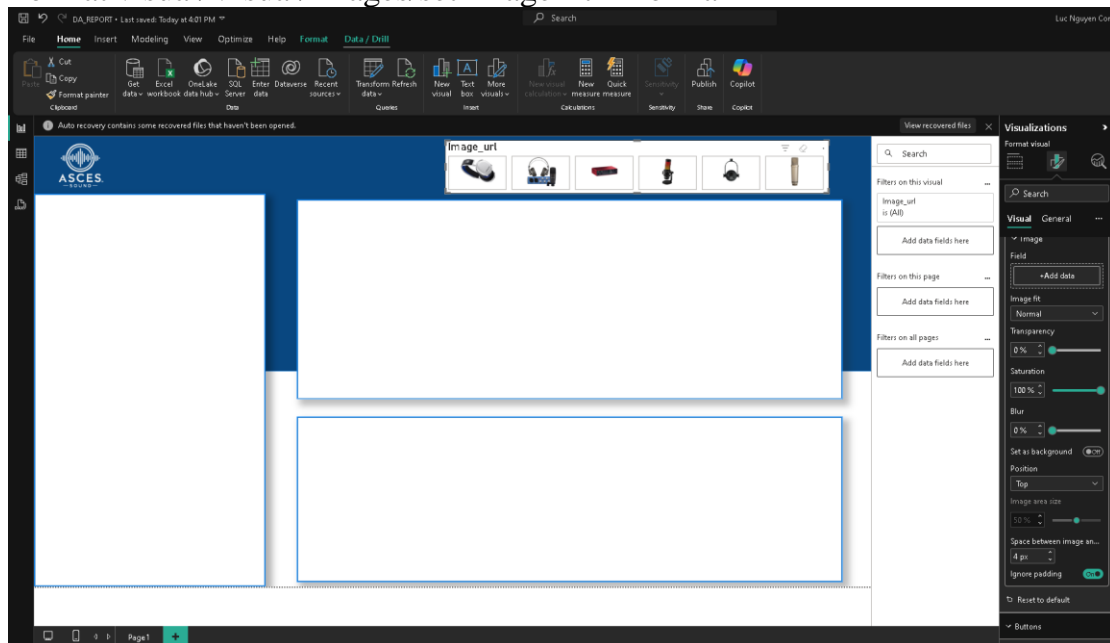
6.2 Image Slicer

Build visual/ Tile slicer /

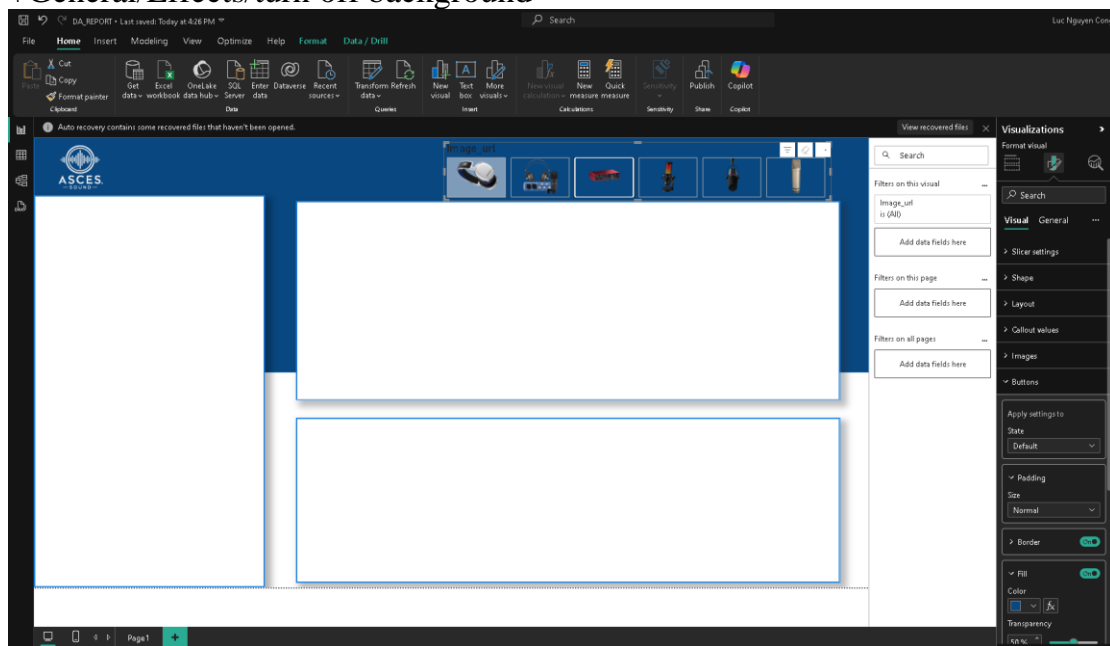
In Tile slicer /Data category/Image URL/Checked Image URL in query1



In Format visual/Layout/set Max rows shown = 1/set Columns shown = 6
 Format visual/Visual/Images/set Image fit = normal

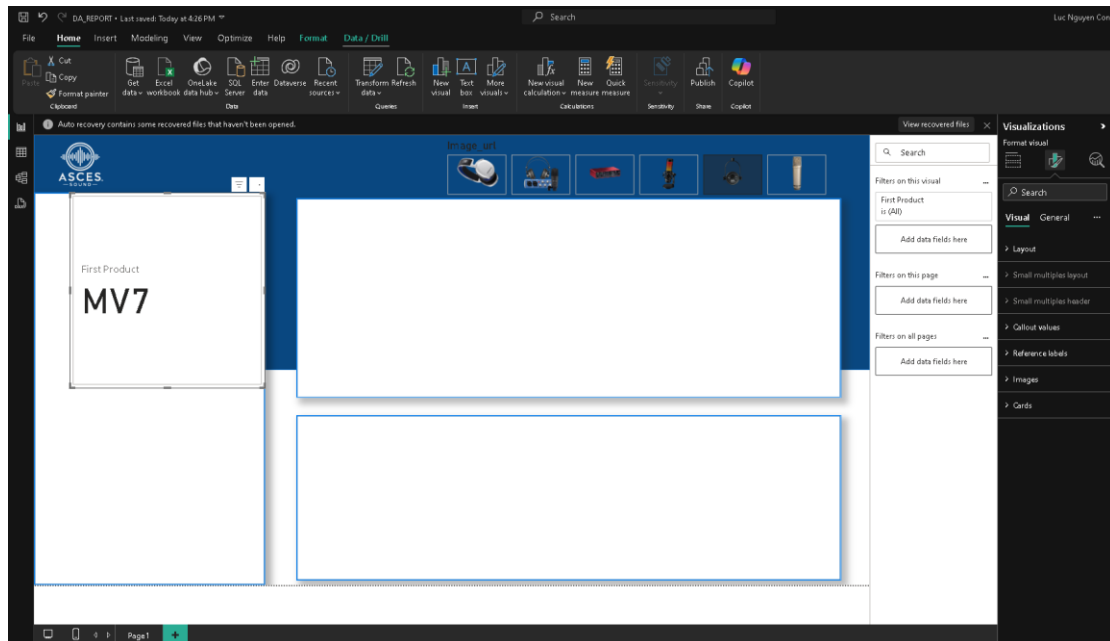


+ Visual/button/fill/set color with blue and set Transparency 50 %
 + General/Effects/turn off background

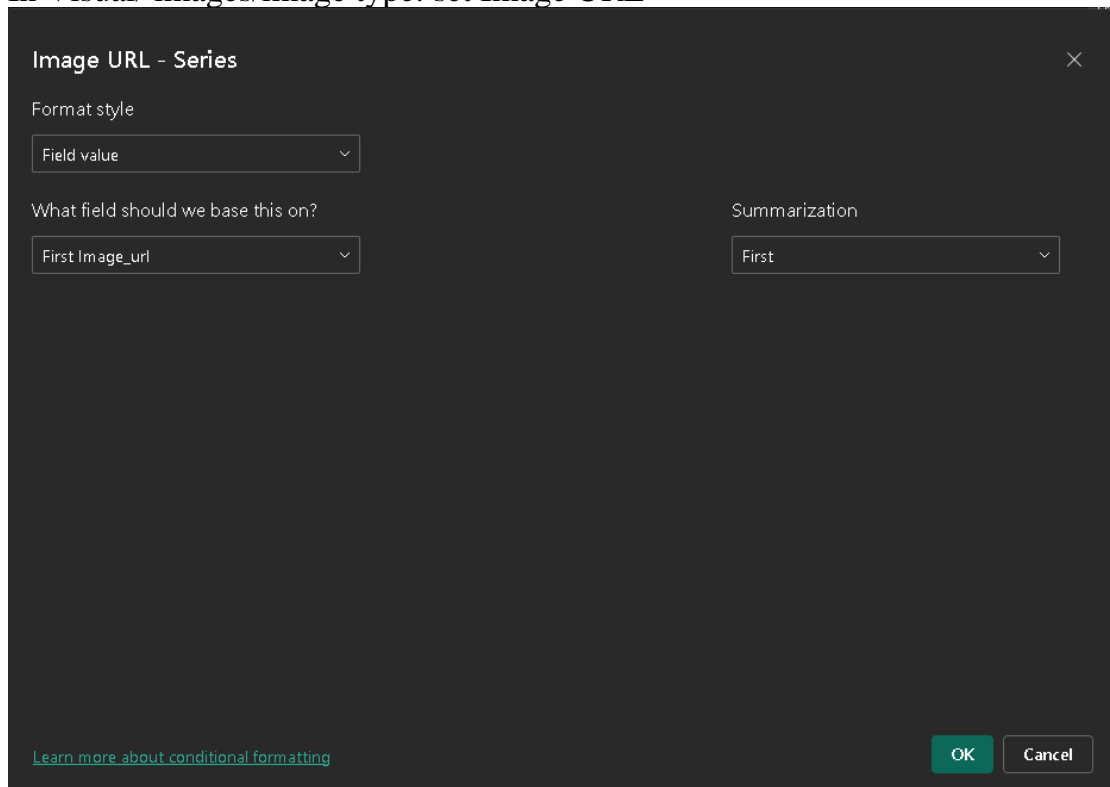


6.3 Create Animated Image

In Build visual click Card -> click column product in Query1->click Card(new) in Build visual



In Visual/ images/image type: set Image URL



Click ok

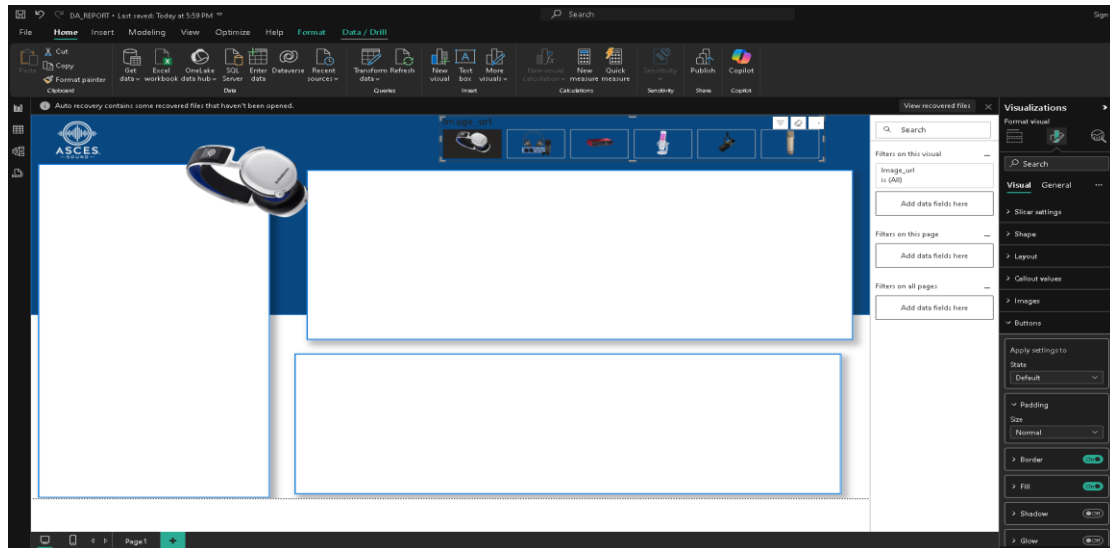
Visual/ Callout values/ Turn off values and turn off label

General/Header icons->turn off

Visual/Images/Position=Above Text and Size =250px

Visual/Card/turn off background and turn off border

General/Effects/Turn off background



Create description: Build visual /Card/checked Description in query1/click Card(new)

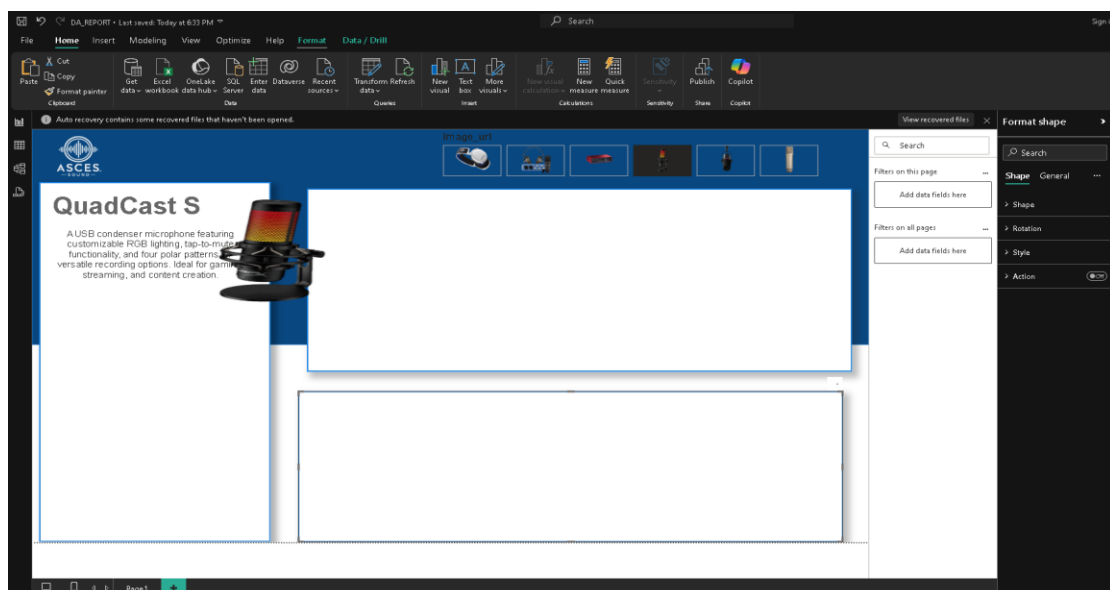
Visual/ Callout values/ Values/ font=Arial and text size =11 and Text wrap = on

General/Effects/Turn off background

Visual/ Callout values/turn off label

Visual/Card/turn of background and border

Create Name: Build visual /Card/checked product in query1/click Card(new) and manual editing



6.4 Bar Charts (Revenue by Country and Over Time)

6.4.1. Revenue by Country

Build visual/clustered bar chart/ click column revenue and column Country in query

visual/ X-axis/turn off values and title

visual/ Y-axis/turn off title

Visual/Bars/color=blue

Visual/Data labels = on/ Options/Position = inside end/

Visual/Data labels /Detail/ Date/Add data/Click column contry

Visual/Data labels /Layout/ select multi-line

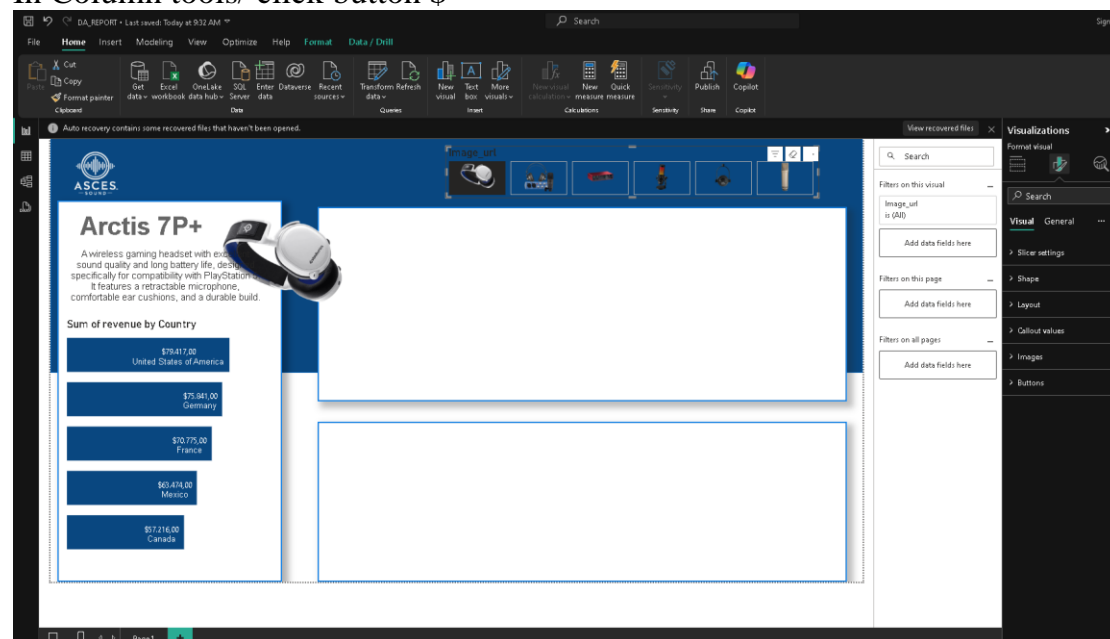
Visual/Data labels /Detail/ Font/select Arial font and select 10 size font

visual/ Y-axis/turn off values

Visual/Data labels/Value/ Display units =None and Value decimal places = 2/

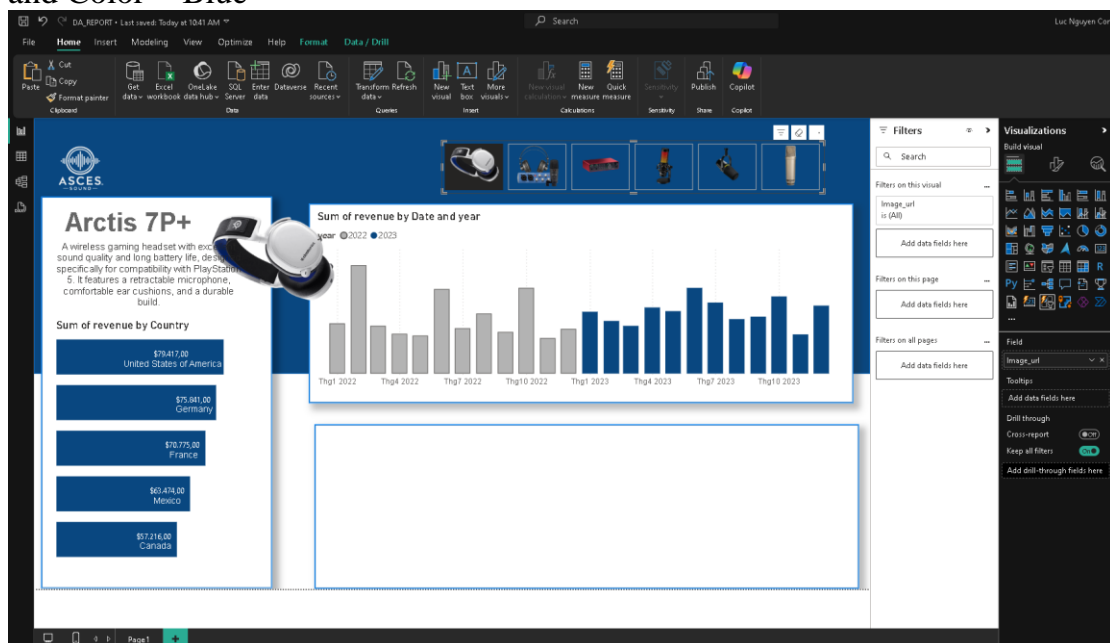
click column revenue/

In Column tools/ click button \$



6.4.2. Revenue by Over Time

Build visual/stacked column chart/ X-axis/ Add data fields here / pull Date column to inside / Click right mouse at there/ change Date hierarchy to Date .
Build visual/ Y-axis/ Add data fields here / pull Revenue column to inside
Build visual/ Legend/ Add data fields here/ pull Year column to inside
Format visual/Visual/ Y-axis/ Turn off Title and turn off Values
Format visual /Visual/ X-axis/ Turn off Title
Format visual / General / Effects / Background -> set off
Format visual /Visual/ Columns/ Apply settings to Series -> Change to 2022 and Color = Gray and Border = on
Format visual /Visual/ Columns/ Apply settings to Series -> Change to 2023 and Color = Blue



6.5 Pie Charts

Build visual/Donut chart/Click column Revenue and column Discount band

Format visual/Visual/Legend = off

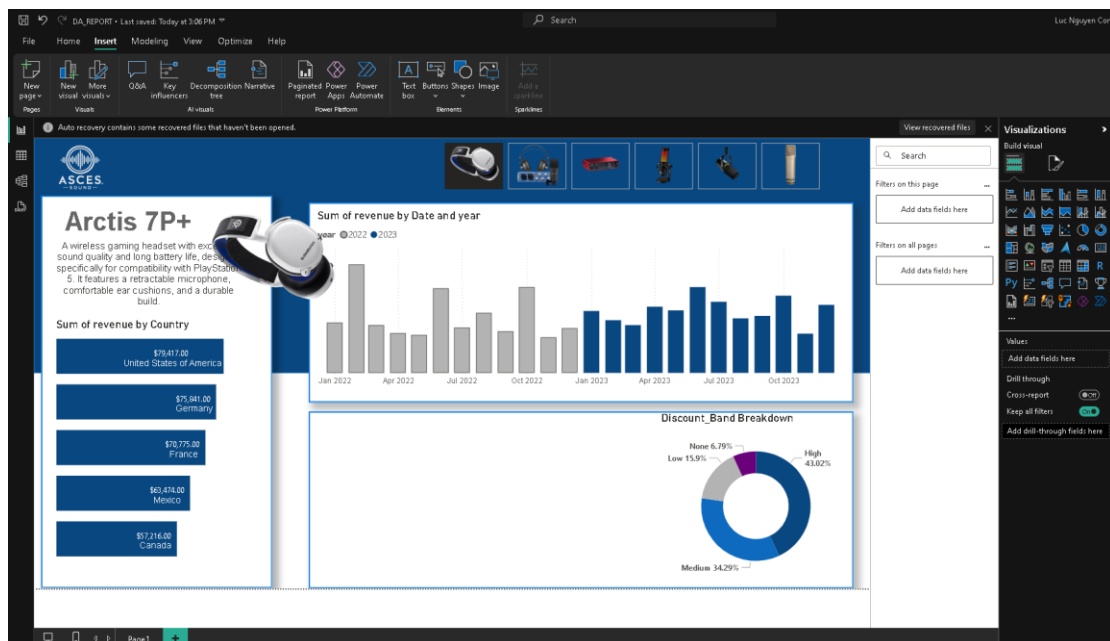
Format visual/Datalabel/ Label contents -> select Category, percent of...

Format visual/General/Effects/Background = off

Change color: Format visual/ Visual/ Slices/ Colors

Format visual/Datalabel/ Values/ Click “B button” to Bold

Format visual/General/



6.6 Add Column and Profit Calculation

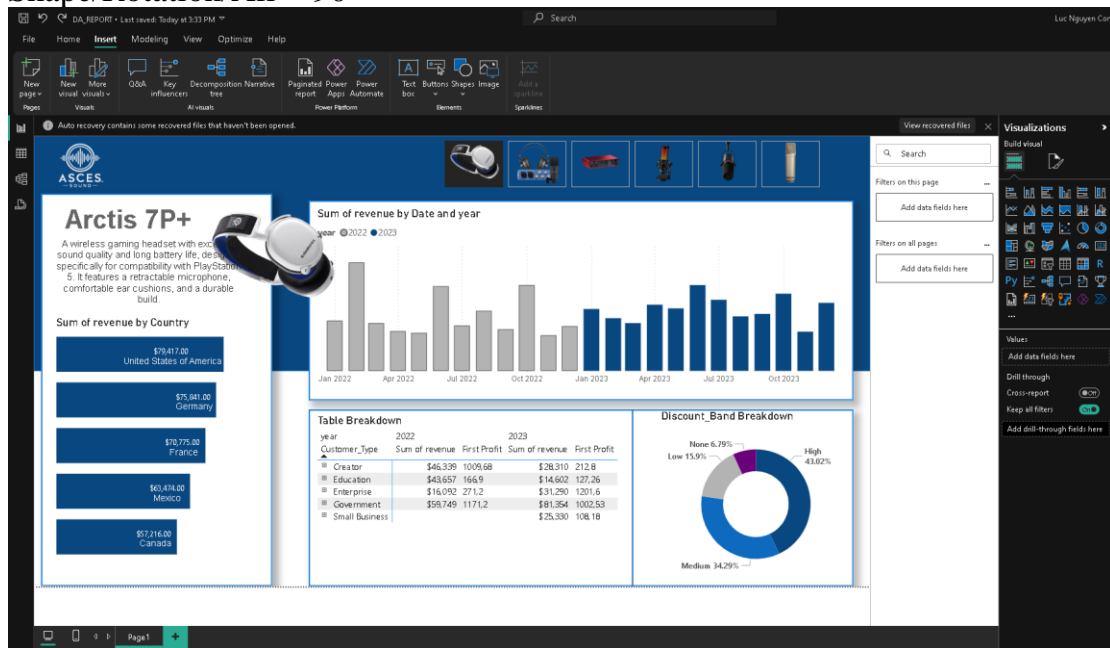
Click to Transform Data/ Add Column / Custom column/ Set column = Profit
Profit = Revenue after discount – Total Cost
(It is still possible to create Profit column in sql server before)

The screenshot shows the 'Custom Column' dialog box in a data transformation tool. The dialog has a 'New column name' field containing 'Profit' and a 'Custom column formula' field containing '[discount_revenue]-[total_cost]'. Below the formula field, it says 'No syntax errors have been detected.' There are 'OK' and 'Cancel' buttons. In the background, a table is visible with columns: Product, Category, Units_Sold, revenue, total_cost, month, year, and Discount_Band2. The table contains 27 rows of data.

Select Home, Close & Apply

The screenshot shows the 'Home' tab of the data transformation tool. The 'Add Column' button is highlighted in the 'Transform' section. The background shows the same table as the previous screenshot, but with an additional 'Profit' column calculated as 'Revenue after discount - Total Cost'. The table now has 27 rows and 9 columns: Product, Category, Units_Sold, revenue, total_cost, month, year, Discount_Band2, and Profit.

Build visual/Matrix/ Rows -> pull Customer_Type column to inside
 and Columns-> pull year column to inside
 and Values -> pull revenue column to inside & pull profit column to inside too
 Format visual/visual/ Column subtotals = off and Row subtotals = off
 Build visual/ Rows -> pull product column inside to add a row under
 Customer_Type
 Format visual/ General/ Title = on / Text = Table Breakdown
 Create a boundary between table breakdown and pie chart: Insert/shapes/lines/
 Shape/Rotation/All = 90



6.6 Year on Year Calculation and Visual Card

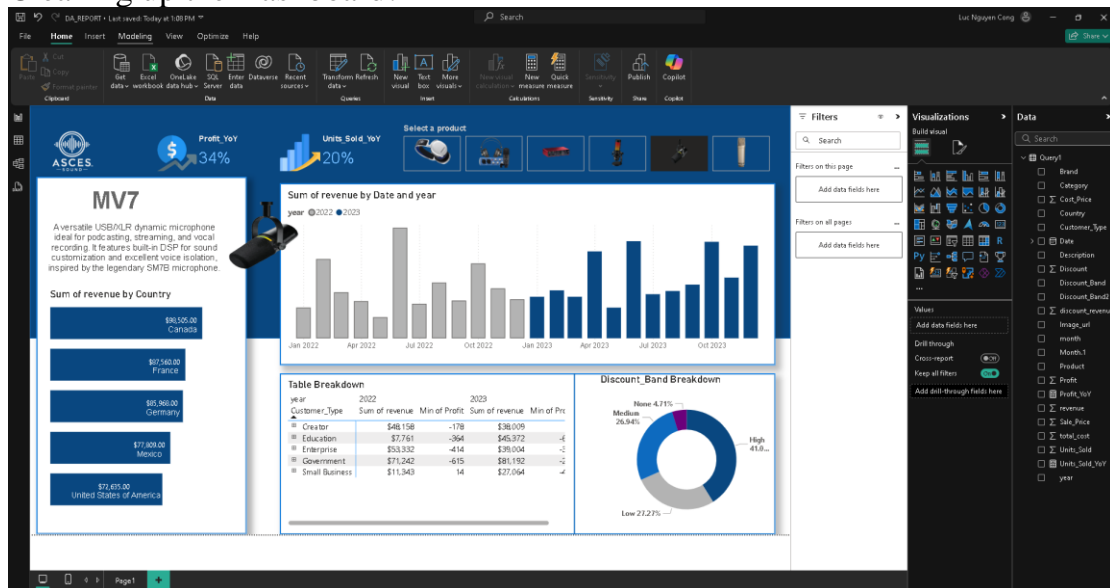
Create Measure Profit_YoY to Calculate the percentage change in profits from the current year compared to the previous year.

```
Profit_YoY =
VAR Profit_Current = SUM(Query1[Profit])
VAR Profit_Previous = CALCULATE(SUM(Query1[Profit]), DATEADD(Query1[Date], -1, YEAR))
VAR FINAL = (DIVIDE(Profit_Current - Profit_Previous, Profit_Previous, 0) * 100) - 100
RETURN FORMAT(FINAL, "0") & "%"
```

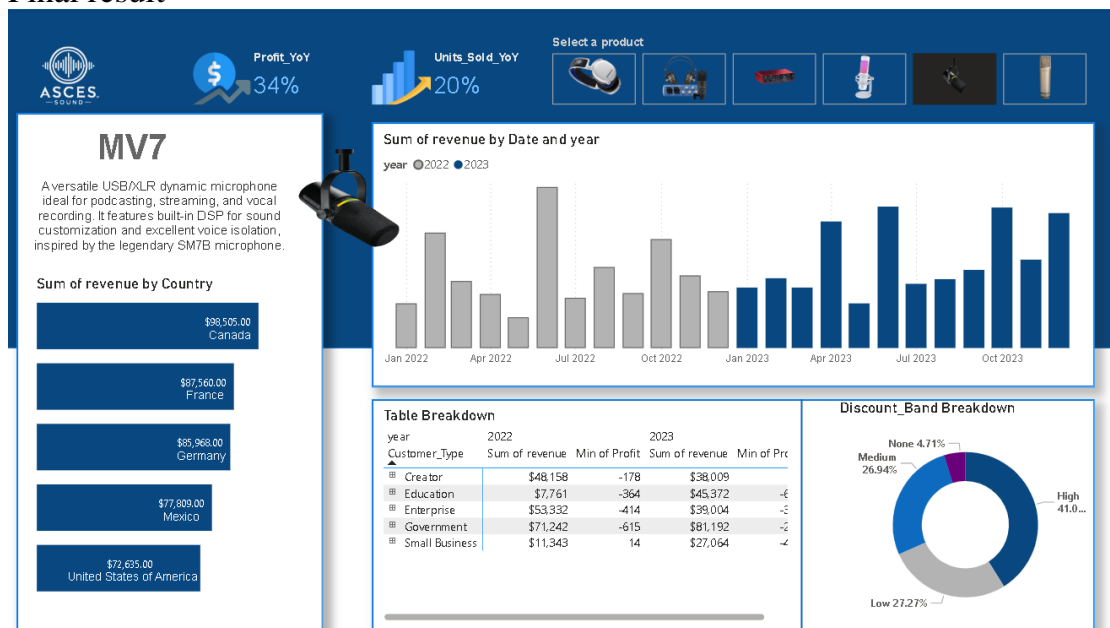
Create Measure Units_Sold_YoY to calculate the percentage change in the number of units sold between the current year and the previous year,

```
Units_Sold_YoY =
VAR Units_Current = SUM(Query1[Units_Sold])
VAR Units_Previous = CALCULATE(SUM(Query1[Units_Sold]), DATEADD(Query1[Date], -1, YEAR))
VAR FINAL = (DIVIDE(Units_Current - Units_Previous, Units_Previous, 0) * 100) - 100
RETURN FORMAT(FINAL, "0") & "%"
```

Build visual/Card(New)/ Pull Measure Profit_YoY and Measure Units_Sold_YoY to Data
 Format Visual/ Visual/ Images/ Add image to 2 data
 Cleaning up the Dashboard!



Final result



Link project: [OneDrive](#)

CHAPTER 7. Conclusion

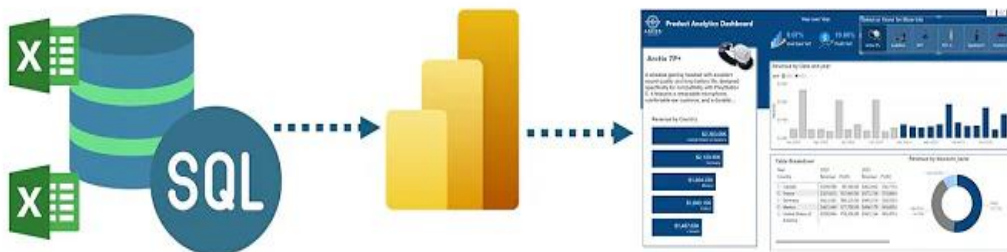
This project involved creating a Product Analytics Dashboard, aimed at understanding key business metrics such as revenue, profit, and sales trends. The process allowed me to explore tasks like data setup, database design, SQL query writing, and data visualization using Power BI.

While this project served as a demonstration of the steps involved in data analysis, it was a valuable learning experience in applying foundational skills to real-world scenarios.

Although I am still in the process of refining my abilities, this project helped me gain a better understanding of the practical aspects of data analysis and how such tools can assist in business decision-making. I look forward to improving these skills through future opportunities.

End-to-End Data Analysis

Product Analytics Dashboard



Create a Database → Develop SQL → Build a Dashboard
