SQL to Power BI
Pizza銷售資料視覺化

郭益華

GitHub

目錄

1. 簡介說明
2. 視覺化項目定義
3. Power BI 連接 SQL
4. 根據視覺化項目轉換為SQL查詢語法
5. 利用Power BI 建立 互動式 Dashboard

1. 簡介說明

實作說明

- 將Pizza銷售資料匯入 MS SQL
- 利用 Power BI 連線 至 MS SQL
- 製作互動式視覺化Dashboard
- 列出Pizza銷售指標

前置準備

- 下載 SQL Server Management
- 下載 Power BI

2. 視覺化項目定義

定義(1/2)

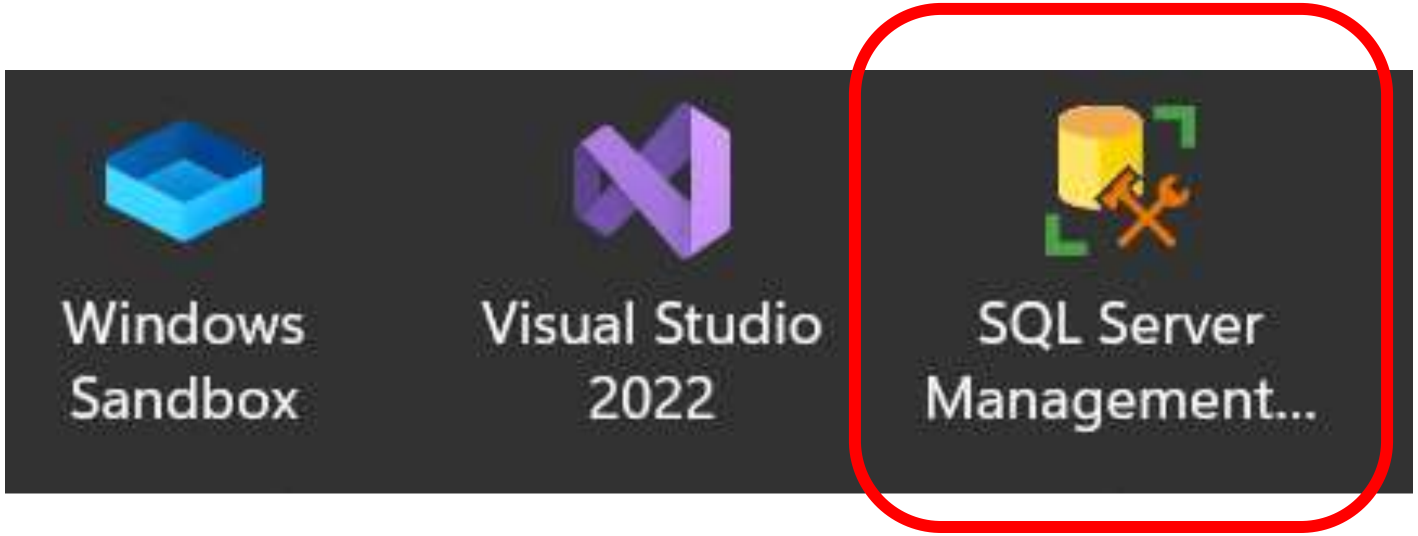
- KPI
    - Total Revenue(總收入)
    - Average Order Value(平均訂單價格)
    - Total Pizzas Sold(Pizza總銷售)
    - Total Orders(總訂單)
    - Average Pizzas Per Order(平均訂單)
- Daily Trend for Total Orders(每日總收入趨勢)
- Monthly Trend for Orders(每月訂單趨勢)
- % of Sales by Pizza Category(Pizza銷售類別百分比)
- % of Sales by Pizza Size(Pizza銷售尺寸百分比)
- Total Pizzas Sold by Pizza Category(各Pizza類別銷售百分比)

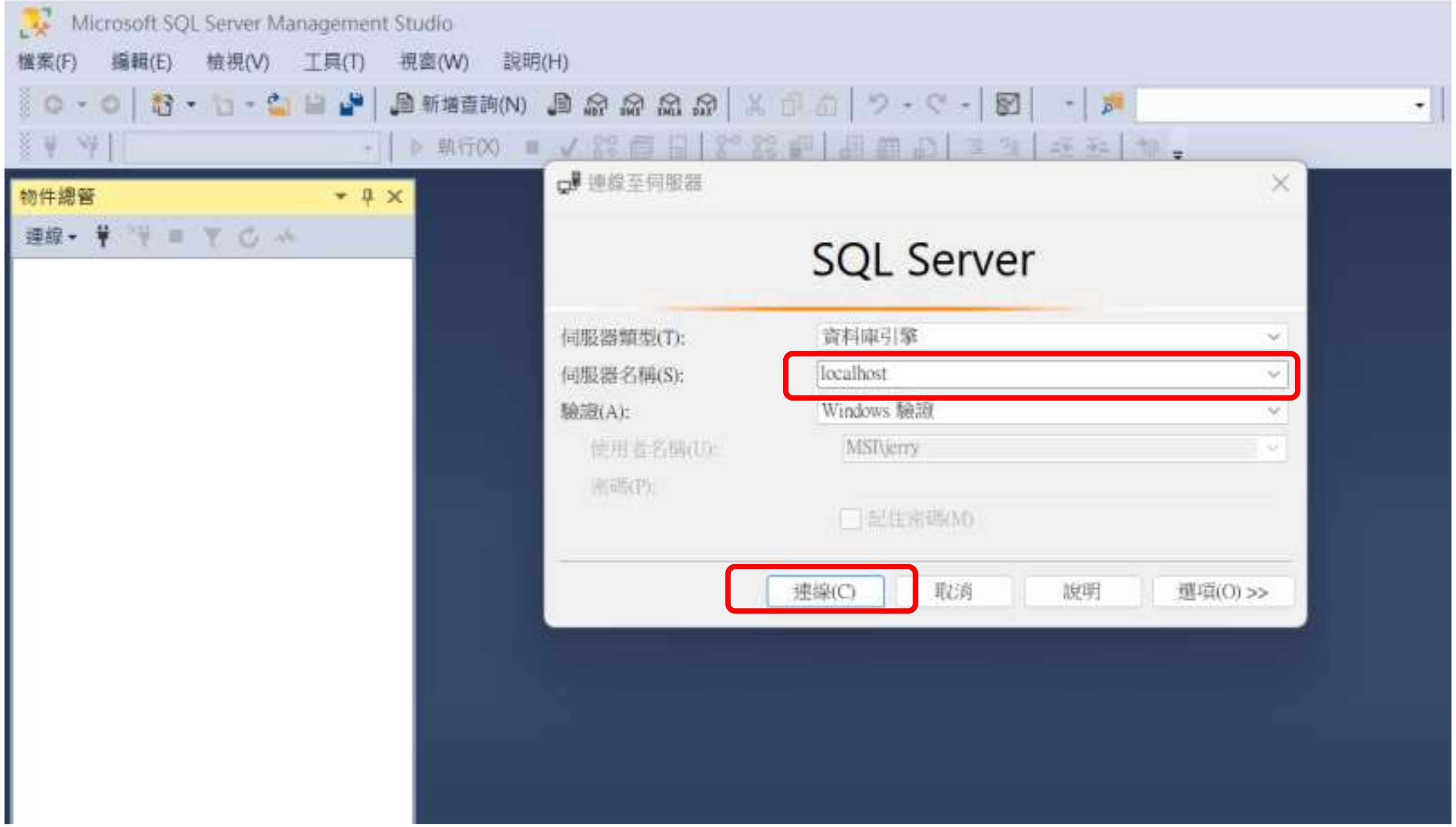
定義(2/2)

- Top 5 Pizzas by Revenue(收入前五名的Pizza)
- Bottom 5 Pizzas by Revenue (收入倒數五名的Pizza)
- Top 5 Pizzas by Quantity (賣出數量前五名的Pizza)
- Bottom 5 Pizzas by Quantity (賣出數量倒數五名的Pizza)
- Top 5 Pizzas by Total Orders (訂單前五名的Pizza)
- Borrom 5 Pizzas by Total Orders(訂單倒數五名的Pizza)

3. Power BI 連接 SQL

開啟 SQL Server Management





伺服器類型(T): 資料庫引擎

伺服器名稱(S): localhost

驗證(A): Windows 驗證

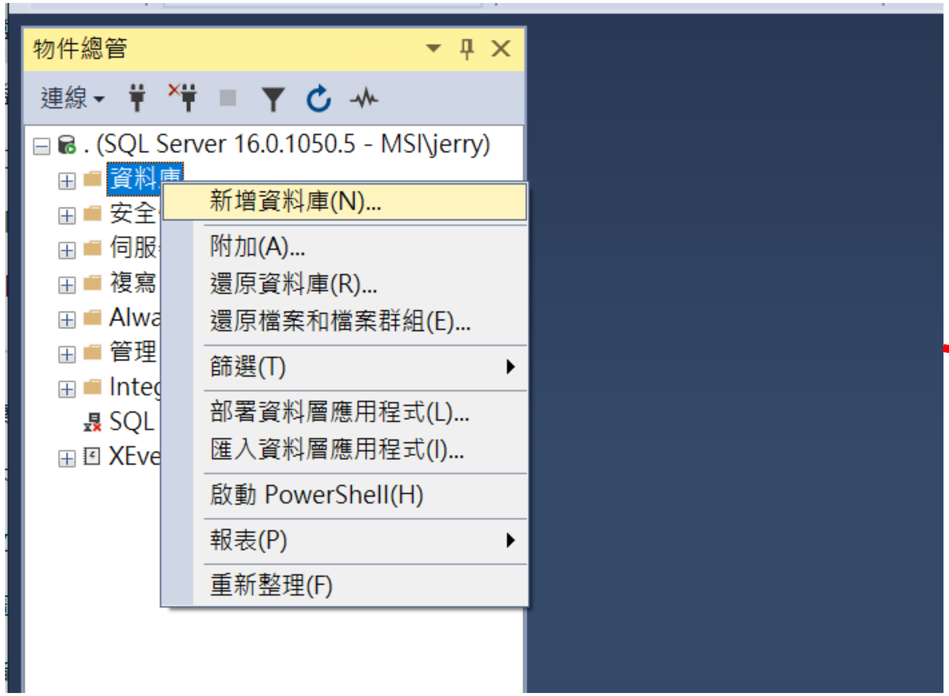
使用者名稱(U): MSI\jerry

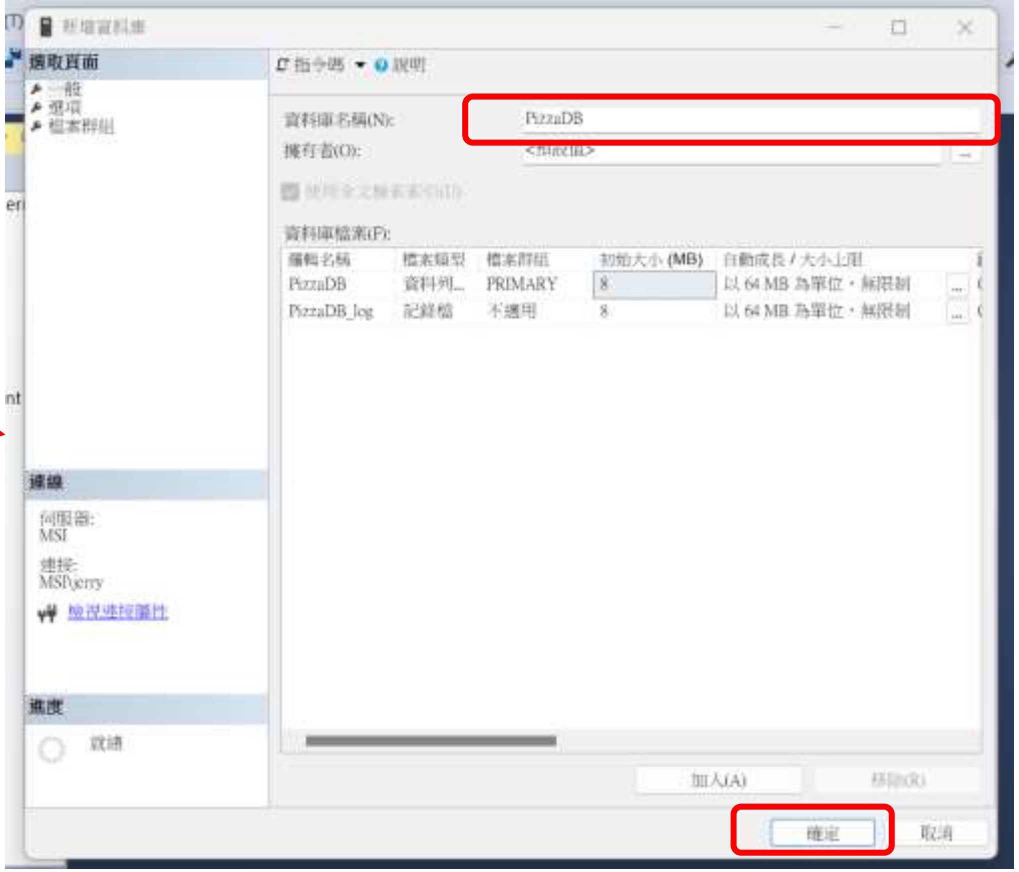
密碼(P):

□ 記住密碼(M)

- 伺服器名稱輸入Localhost即可
- 並點選連線

新增資料庫





資料庫名稱(N): PizzaDB

擁有者(O): <預設值>

□ 使用全文檢索索引(U)

資料庫檔案(F):

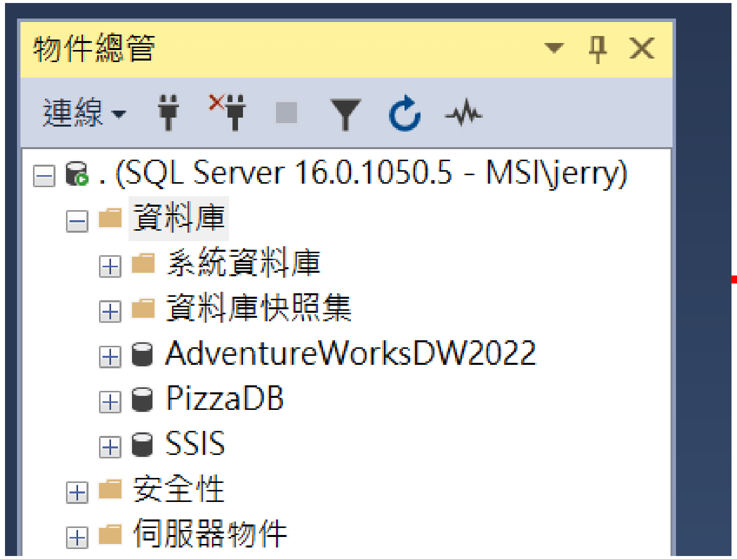
邏輯名稱	檔案類型	檔案群組	初始大小 (MB)	自動成長 / 大小上限
PizzaDB	資料列...	PRIMARY	8	以 64 MB 為單位，無限制
PizzaDB_log	記錄檔	不適用	8	以 64 MB 為單位，無限制

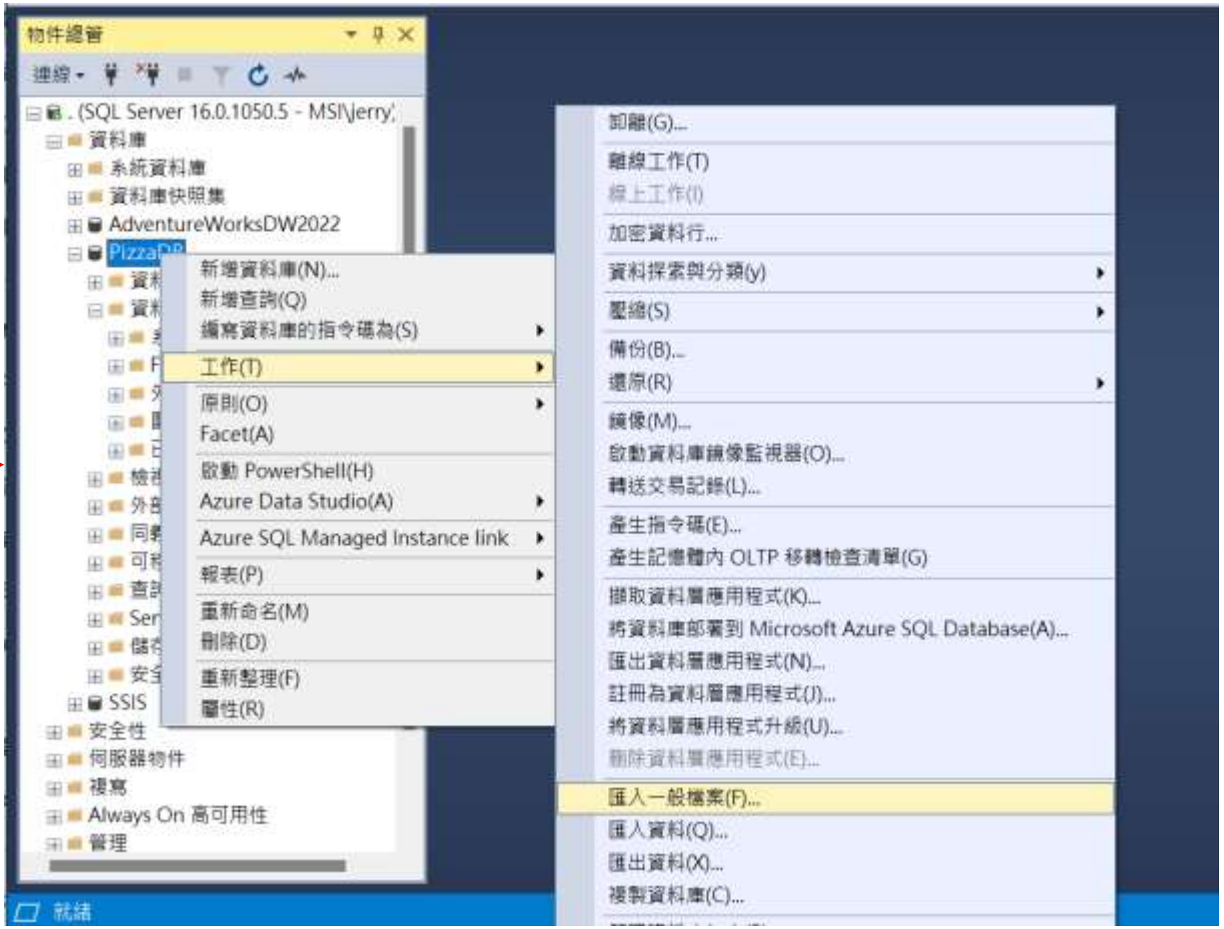
伺服器:
MSI

連接:
MSI\jerry

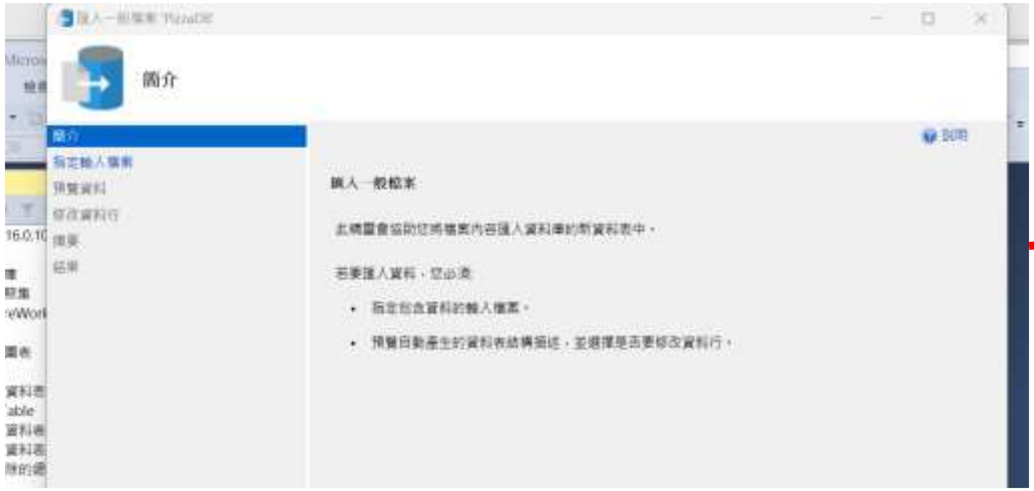
檢視連接屬性

匯入資料


物件總管
連線
. (SQL Server 16.0.1050.5 - MSI\jerry)
資料庫
系統資料庫
資料庫快照集
AdventureWorksDW2022
PizzaDB
SSIS
安全性
伺服器物件


物件總管
連線
. (SQL Server 16.0.1050.5 - MSI\jerry)
資料庫
系統資料庫
資料庫快照集
AdventureWorksDW2022
PizzaDB
SSIS
安全性
伺服器物件
複寫
Always On 高可用性
管理
就緒
新增資料庫(N)...
新增查詢(Q)
編寫資料庫的指令碼為(S)
工作(T)
原則(O)
Facet(A)
啟動 PowerShell(H)
Azure Data Studio(A)
Azure SQL Managed Instance link
報表(P)
重新命名(M)
刪除(D)
重新整理(F)
屬性(R)
卸離(G)...
離線工作(T)
線上工作(I)
加密資料行...
資料探索與分類(y)
壓縮(S)
備份(B)...
還原(R)
鏡像(M)...
啟動資料庫鏡像監視器(O)...
轉送交易記錄(L)...
產生指令碼(E)...
產生記憶體內 OLTP 移轉檢查清單(G)
擷取資料層應用程式(K)...
將資料庫部署到 Microsoft Azure SQL Database(A)...
匯出資料層應用程式(N)...
註冊為資料層應用程式(J)...
將資料層應用程式升級(U)...
刪除資料層應用程式(E)...
匯入一般檔案(F)...
匯入資料(Q)...
匯出資料(X)...
複製資料庫(C)...

相關設定

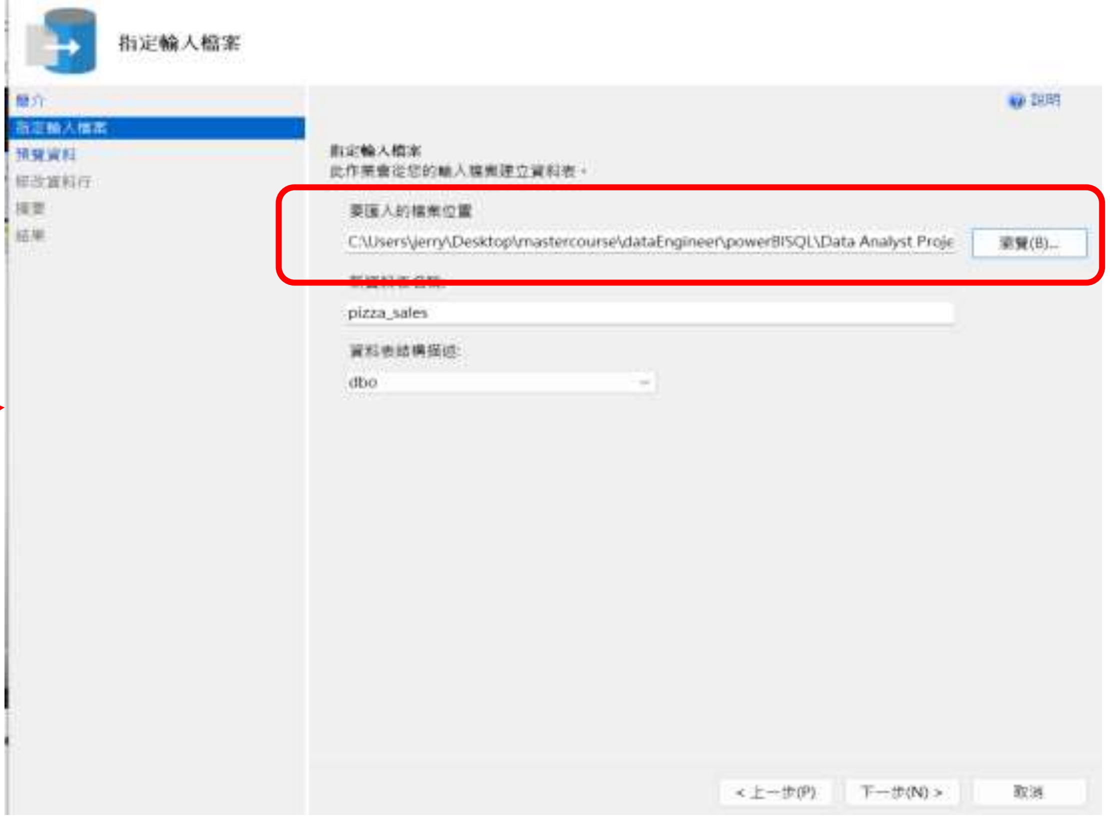


匯入一般檔案

此精靈會協助您將檔案內容匯入資料庫的新資料表中。

若要匯入資料，您必須:

- 指定包含資料的輸入檔案。
- 預覽自動產生的資料表結構描述，並選擇是否要修改資料行。



指定輸入檔案

此作業會從您的輸入檔案建立資料表。

要匯入的檔案位置

C:\Users\jerry\Desktop\mastercourse\dataEngineer\powerBISQL\Data Analyst Proje

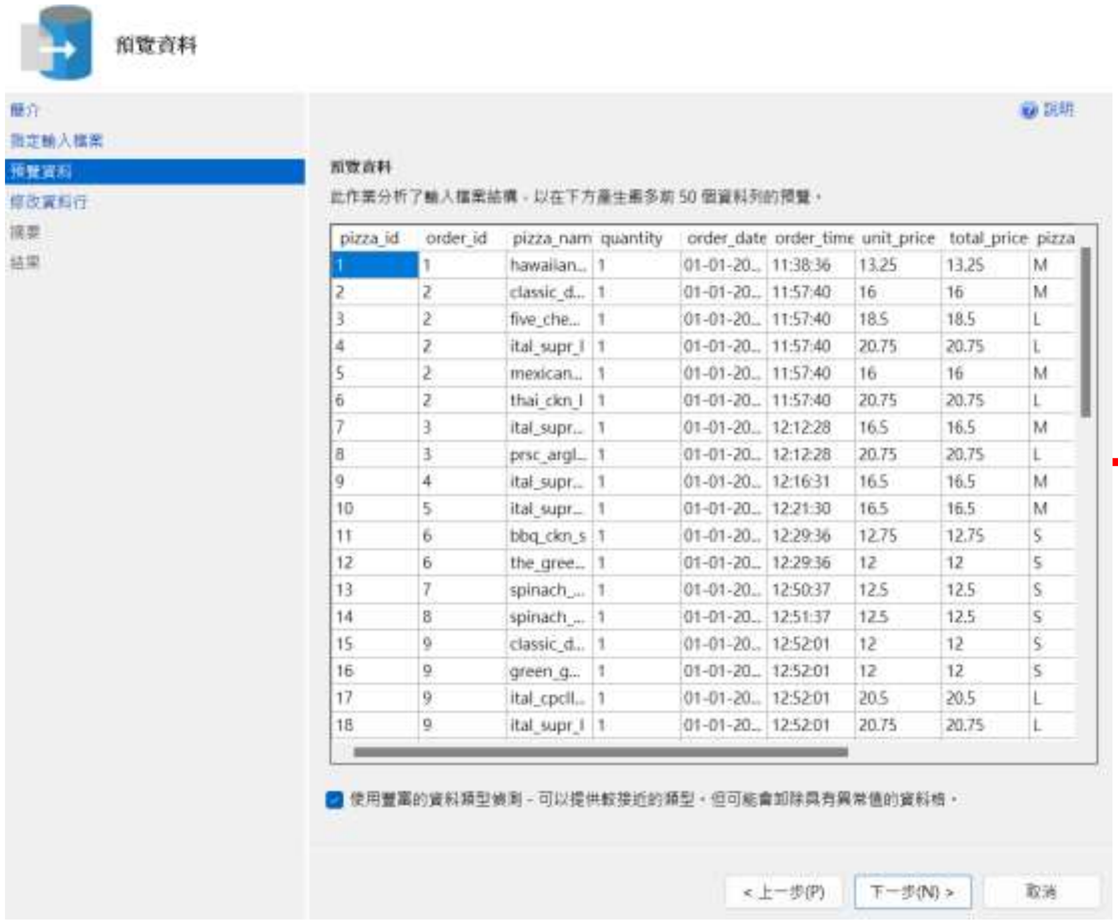
新資料表名稱:

pizza_sales

資料表結構描述:

dbo

相關設定

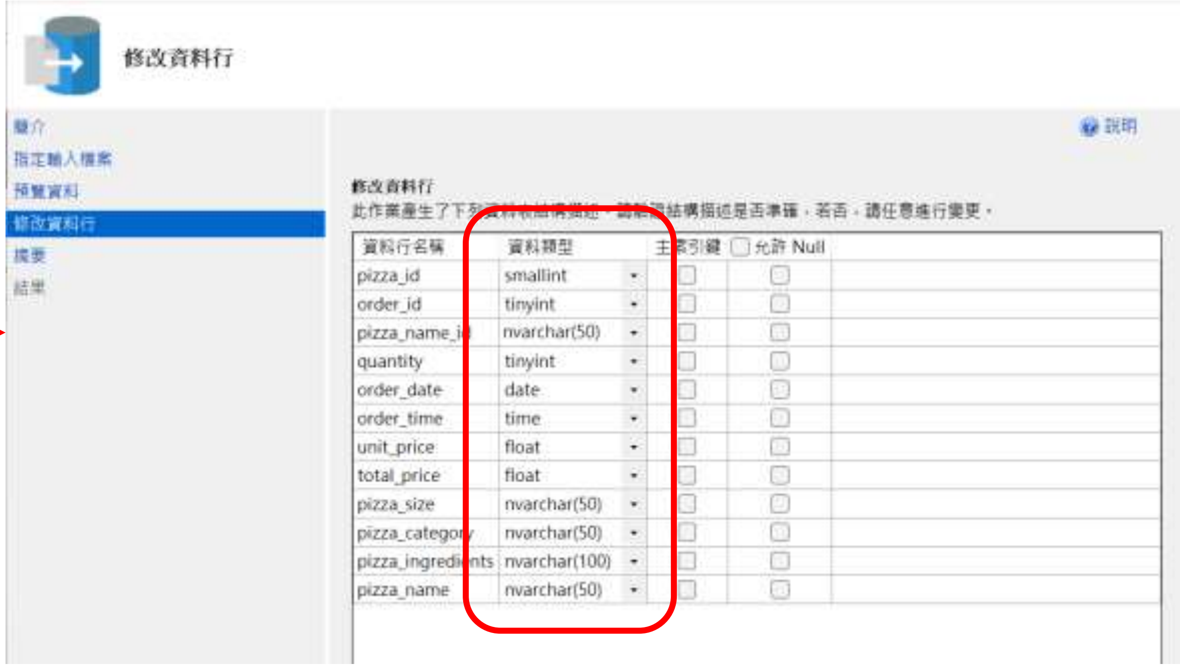


預覽資料

此作業分析了輸入檔案結構，以在下方產生最多前 50 個資料列的預覽。

pizza_id	order_id	pizza_nam	quantity	order_date	order_time	unit_price	total_price	pizza
1	1	hawaiian...	1	01-01-20...	11:38:36	13.25	13.25	M
2	2	classic_d...	1	01-01-20...	11:57:40	16	16	M
3	2	five_che...	1	01-01-20...	11:57:40	18.5	18.5	L
4	2	ital_supr_l	1	01-01-20...	11:57:40	20.75	20.75	L
5	2	mexican...	1	01-01-20...	11:57:40	16	16	M
6	2	thai_ckn_l	1	01-01-20...	11:57:40	20.75	20.75	L
7	3	ital_supr...	1	01-01-20...	12:12:28	16.5	16.5	M
8	3	prsc_argl...	1	01-01-20...	12:12:28	20.75	20.75	L
9	4	ital_supr...	1	01-01-20...	12:16:31	16.5	16.5	M
10	5	ital_supr...	1	01-01-20...	12:21:30	16.5	16.5	M
11	6	bbq_ckn_s	1	01-01-20...	12:29:36	12.75	12.75	S
12	6	the_gree...	1	01-01-20...	12:29:36	12	12	S
13	7	spinach_...	1	01-01-20...	12:50:37	12.5	12.5	S
14	8	spinach_...	1	01-01-20...	12:51:37	12.5	12.5	S
15	9	classic_d...	1	01-01-20...	12:52:01	12	12	S
16	9	green_g...	1	01-01-20...	12:52:01	12	12	S
17	9	ital_cpcll...	1	01-01-20...	12:52:01	20.5	20.5	L
18	9	ital_supr_l	1	01-01-20...	12:52:01	20.75	20.75	L

☑ 使用豐富的資料類型偵測 - 可以提供較接近的類型，但可能會卸除具有異常值的資料格。

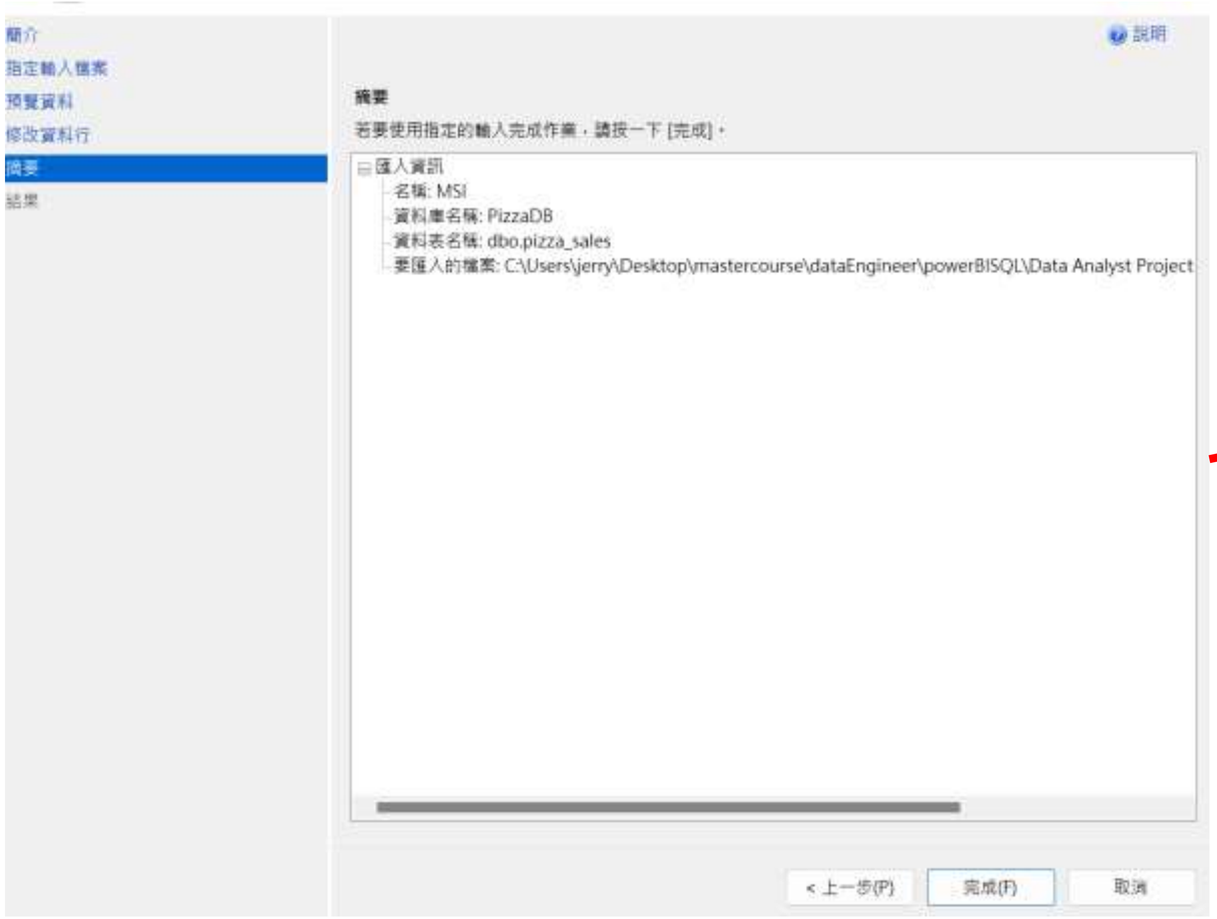


修改資料行

此作業產生了下列資料表結構描述。請確認結構描述是否準確，若否，請任意進行變更。

資料行名稱	資料類型	主索引鍵	□ 允許 Null
pizza_id	smallint	□	□
order_id	tinyint	□	□
pizza_name_id	nvarchar(50)	□	□
quantity	tinyint	□	□
order_date	date	□	□
order_time	time	□	□
unit_price	float	□	□
total_price	float	□	□
pizza_size	nvarchar(50)	□	□
pizza_category	nvarchar(50)	□	□
pizza_ingredients	nvarchar(100)	□	□
pizza_name	nvarchar(50)	□	□

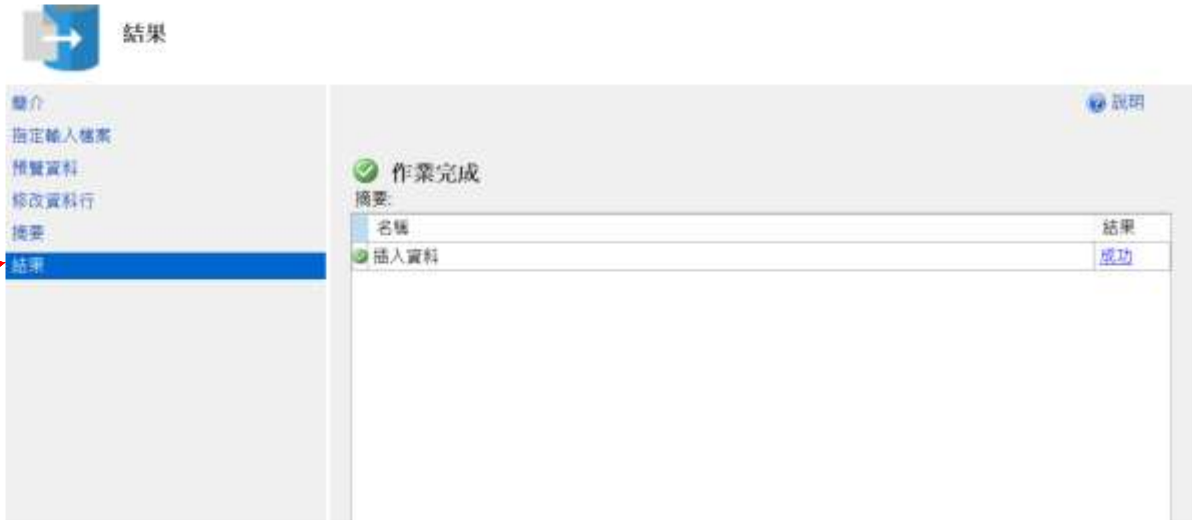
檢視並確認是否匯入成功



摘要

若要使用指定的輸入完成作業，請按一下 [完成]。

- 匯入資訊
  - 名稱: MSI
  - 資料庫名稱: PizzaDB
  - 資料表名稱: dbo.pizza_sales
  - 要匯入的檔案: C:\Users\jerry\Desktop\mastercourse\dataEngineer\powerBISQL\Data Analyst Project

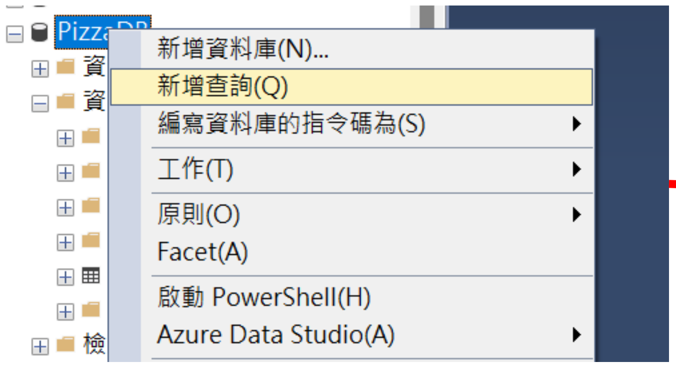


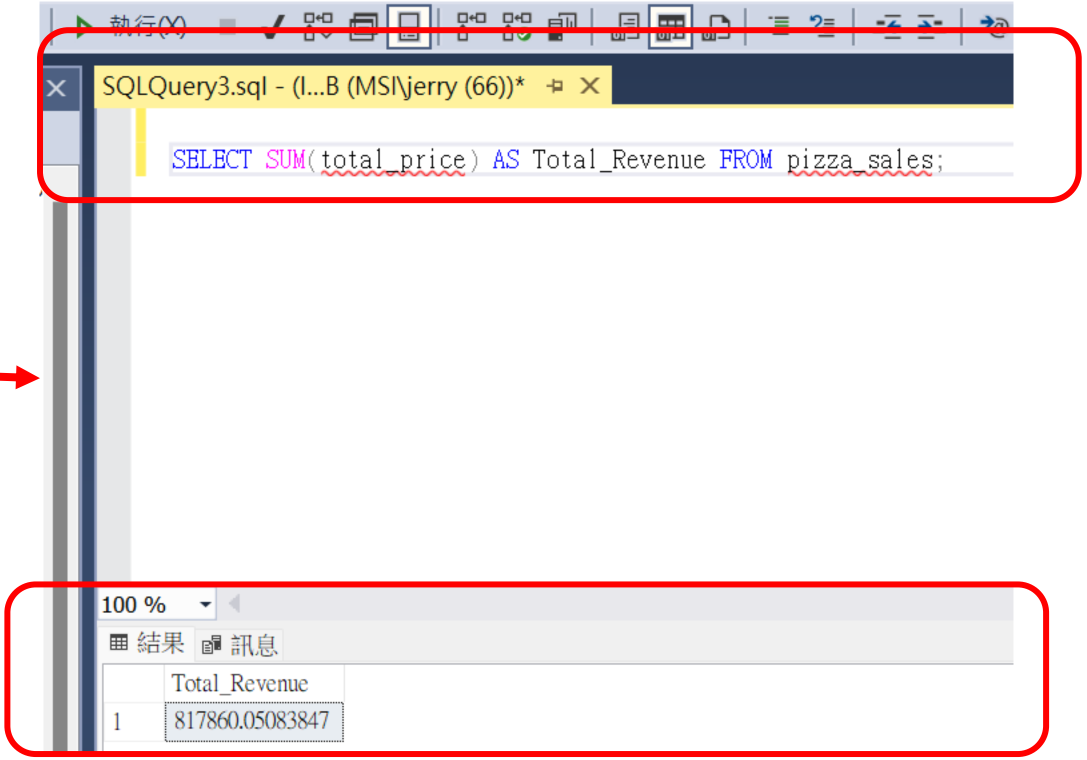
作業完成

摘要:

名稱	結果
插入資料	成功

測試



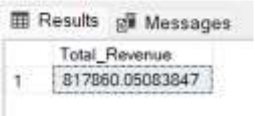


```sql
SELECT SUM(total_price) AS Total_Revenue FROM pizza_sales;
```

```
  Total_Revenue
1 817860.05083847
```

4. 根據問題轉換為SQL查詢語法

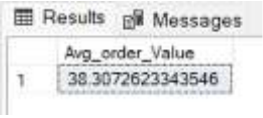
- **Total Revenue:**



```
   Total_Revenue
1  817860.05083847
```

- SELECT SUM(total_price) AS Total_Revenue FROM pizza_sales;

- **Average Order Value:**

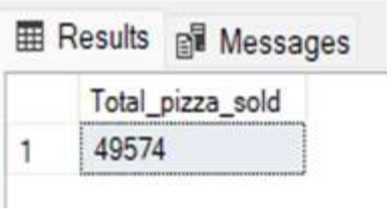


```
   Avg_order_Value
1  38.3072623343546
```

- SELECT (SUM(total_price) / COUNT(DISTINCT order_id)) AS Avg_order_Value FROM pizza_sales

- **Total Pizzas Sold:**

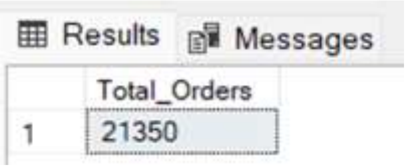
- SELECT SUM(quantity) AS Total_pizza_sold FROM pizza_sales



```
   Total_pizza_sold
1  49574
```

- **Total Orders:**

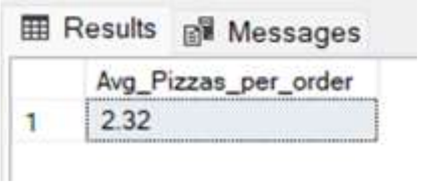
```
SELECT COUNT(DISTINCT order_id) AS Total_Orders FROM pizza_sales
```



	Total_Orders
1	21350

- **Average Pizzas Per Order**

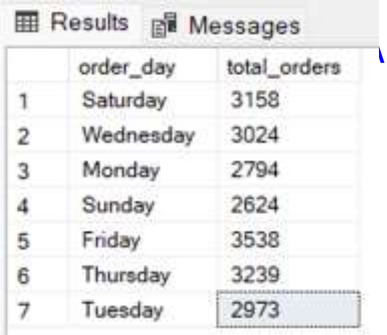
```
SELECT CAST(CAST(SUM(quantity) AS DECIMAL(10,2)) /
CAST(COUNT(DISTINCT order_id) AS DECIMAL(10,2)) AS DECIMAL(10,2))
AS Avg_Pizzas_per_order
FROM pizza_sales
```



	Avg_Pizzas_per_order
1	2.32

- **Daily Trend for Total Orders:**

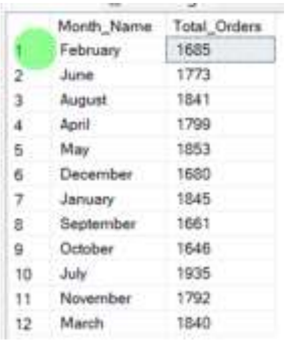
```
• SELECT DATENAME(DW, order_date) AS order_day, COUNT(DIS S total_orders

• FROM pizza_sales

• GROUP BY DATENAME(DW, order_date)
```



	order_day	total_orders
1	Saturday	3158
2	Wednesday	3024
3	Monday	2794
4	Sunday	2624
5	Friday	3538
6	Thursday	3239
7	Tuesday	2973

- **Monthly Trend for Orders:**

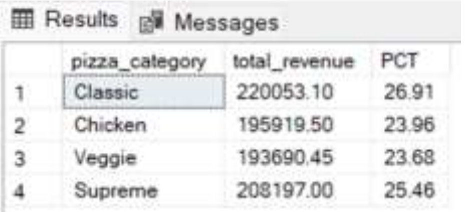
```
• select DATENAME(MONTH, order_date) as Month_Name, COUNT(DISTINCT order_id) as Total_Orders

• from pizza_sales

• GROUP BY DATENAME(MONTH, order_date)
```



	Month_Name	Total_Orders
1	February	1685
2	June	1773
3	August	1841
4	April	1799
5	May	1853
6	December	1680
7	January	1845
8	September	1661
9	October	1646
10	July	1935
11	November	1792
12	March	1840

- **% of Sales by Pizza Category:**

```
SELECT pizza_category, CAST(SUM(total_price) AS DECIMAL(10,2)) as total_revenue,
CAST(SUM(total_price) * 100 / (SELECT SUM(total_price) from pizza_sales) AS DECIMAL(10,2)) AS PCT
FROM pizza_sales
GROUP BY pizza_category
```



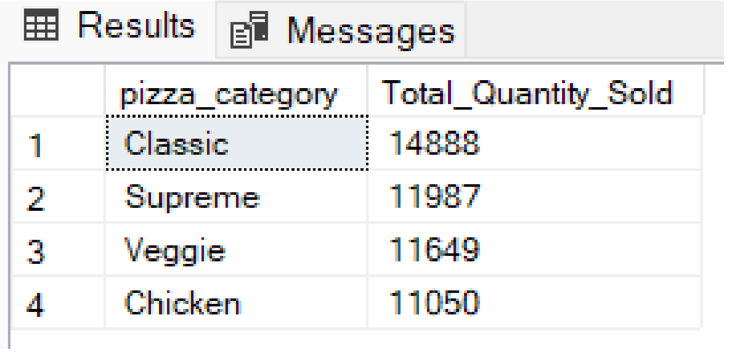
	pizza_category	total_revenue	PCT
1	Classic	220053.10	26.91
2	Chicken	195919.50	23.96
3	Veggie	193690.45	23.68
4	Supreme	208197.00	25.46

- **% of Sales by Pizza Size:**

```
SELECT pizza_size, CAST(SUM(total_price) AS DECIMAL(10,2)) as total_revenue,
CAST(SUM(total_price) * 100 / (SELECT SUM(total_price) from pizza_sales) AS DECIMAL(10,2)) AS PCT
FROM pizza_sales
GROUP BY pizza_size
ORDER BY pizza_size
```

- **Total Pizzas Sold by Pizza Category:**

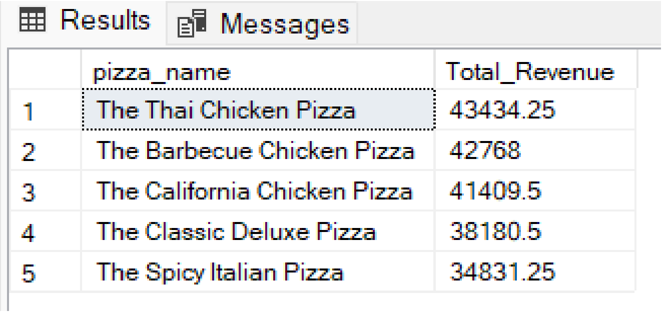
```sql
SELECT pizza_category, SUM(quantity) as Total_Quantity_Sold
FROM pizza_sales
WHERE MONTH(order_date) = 2
GROUP BY pizza_category
ORDER BY Total_Quantity_Sold DESC
```



	pizza_category	Total_Quantity_Sold
1	Classic	14888
2	Supreme	11987
3	Veggie	11649
4	Chicken	11050

- **Top 5 Pizzas by Revenue:**

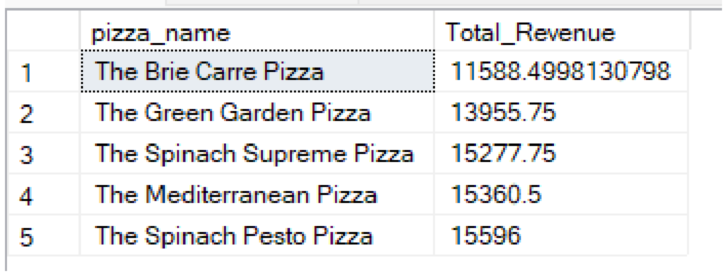
```sql
SELECT Top 5 pizza_name, SUM(total_price) AS Total_Revenue
FROM pizza_sales
GROUP BY pizza_name
ORDER BY Total_Revenue DESC
```



	pizza_name	Total_Revenue
1	The Thai Chicken Pizza	43434.25
2	The Barbecue Chicken Pizza	42768
3	The California Chicken Pizza	41409.5
4	The Classic Deluxe Pizza	38180.5
5	The Spicy Italian Pizza	34831.25

- **Bottom 5 Pizzas by Revenue:**

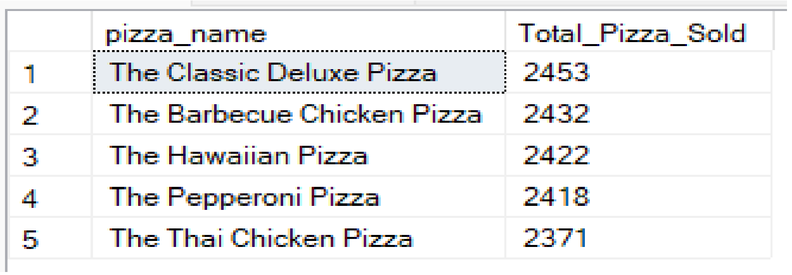
```
• SELECT Top 5 pizza_name, SUM(total_price) AS Total_Revenue
• FROM pizza_sales
• GROUP BY pizza_name
• ORDER BY Total_Revenue ASC
```



	pizza_name	Total_Revenue
1	The Brie Carre Pizza	11588.4998130798
2	The Green Garden Pizza	13955.75
3	The Spinach Supreme Pizza	15277.75
4	The Mediterranean Pizza	15360.5
5	The Spinach Pesto Pizza	15596

- **Top 5 Pizzas by Quantity:**

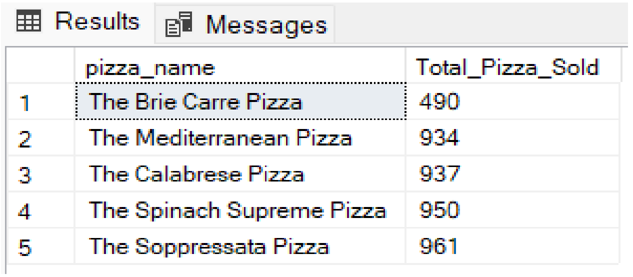
```
• SELECT Top 5 pizza_name, SUM(quantity) AS Total_Pizza_Sold
• FROM pizza_sales
• GROUP BY pizza_name
• ORDER BY Total_Pizza_Sold DESC
```



	pizza_name	Total_Pizza_Sold
1	The Classic Deluxe Pizza	2453
2	The Barbecue Chicken Pizza	2432
3	The Hawaiian Pizza	2422
4	The Pepperoni Pizza	2418
5	The Thai Chicken Pizza	2371

- **Bottom 5 Pizzas by Quantity:**

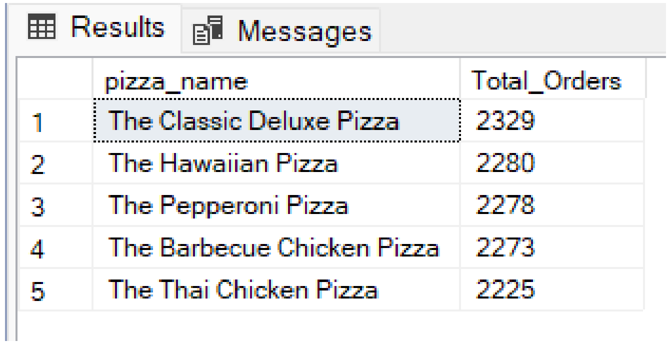
```
SELECT TOP 5 pizza_name, SUM(quantity) AS Total_Pizza_Sold
FROM pizza_sales
GROUP BY pizza_name
ORDER BY Total_Pizza_Sold ASC
```



	pizza_name	Total_Pizza_Sold
1	The Brie Carre Pizza	490
2	The Mediterranean Pizza	934
3	The Calabrese Pizza	937
4	The Spinach Supreme Pizza	950
5	The Soppressata Pizza	961

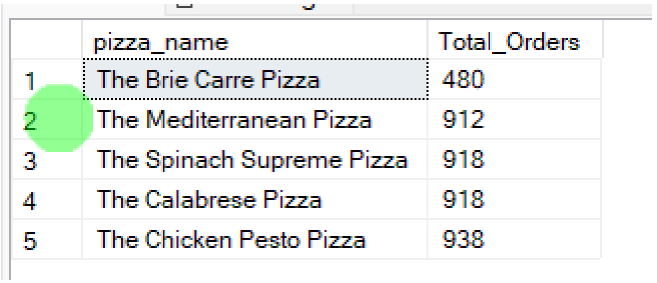
- **Top 5 Pizzas by Total Orders:**

```
SELECT Top 5 pizza_name, COUNT(DISTINCT order_id) AS Total_Orders
FROM pizza_sales
GROUP BY pizza_name
ORDER BY Total_Orders DESC
```



	pizza_name	Total_Orders
1	The Classic Deluxe Pizza	2329
2	The Hawaiian Pizza	2280
3	The Pepperoni Pizza	2278
4	The Barbecue Chicken Pizza	2273
5	The Thai Chicken Pizza	2225

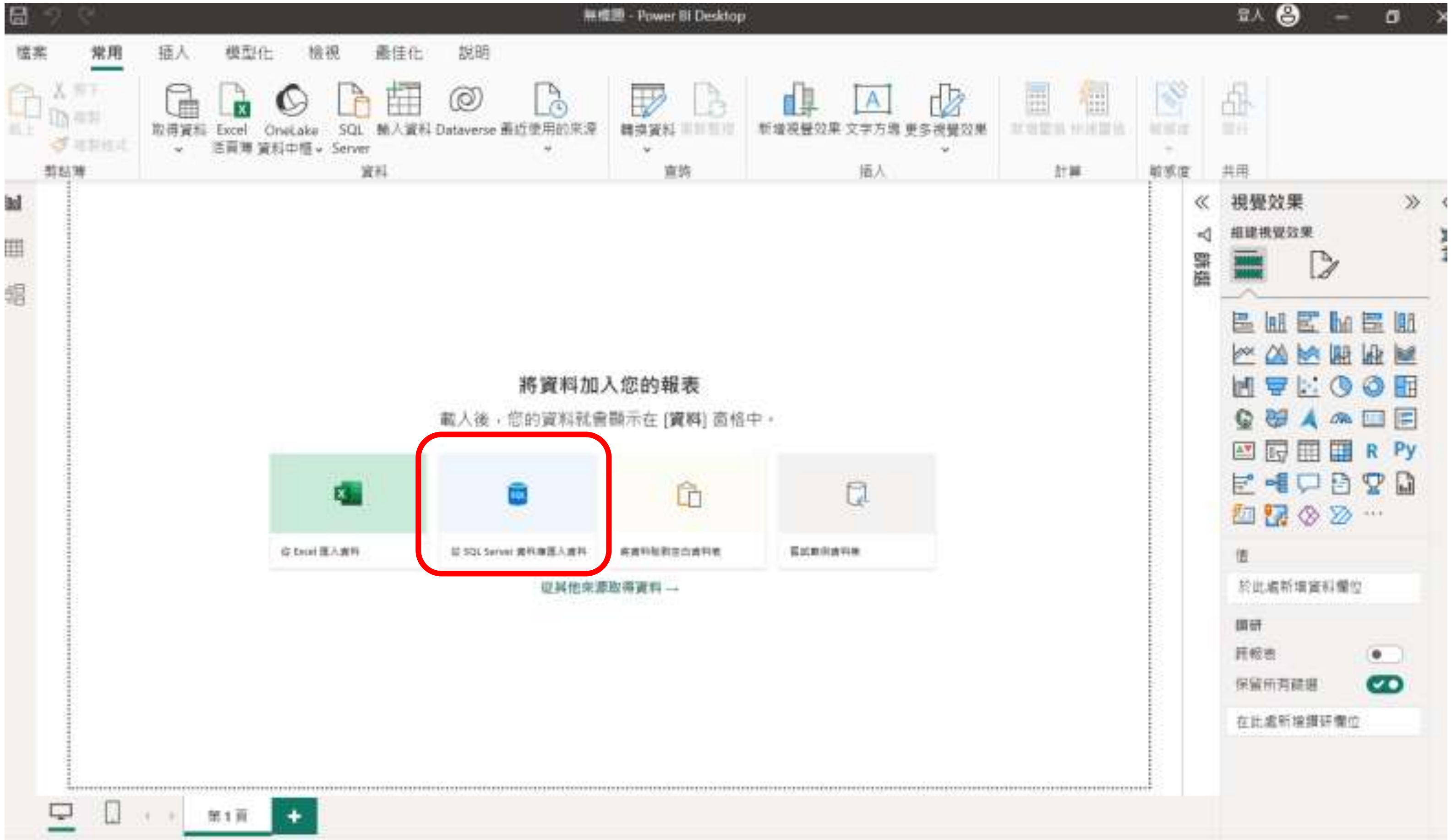
- **Borrom 5 Pizzas by Total Orders:**
- SELECT Top 5 pizza_name, COUNT(DISTINCT order_id) AS Total_Orders
- FROM pizza_sales
- GROUP BY pizza_name
- ORDER BY Total_Orders ASC



	pizza_name	Total_Orders
1	The Brie Carre Pizza	480
2	The Mediterranean Pizza	912
3	The Spinach Supreme Pizza	918
4	The Calabrese Pizza	918
5	The Chicken Pesto Pizza	938

5. 利用Power BI 建立 互動式 Dashboard

開啟 Power BI 點選 SQL server匯入



將資料加入您的報表

載入後，您的資料就會顯示在 [資料] 窗格中。

從 Excel 匯入資料

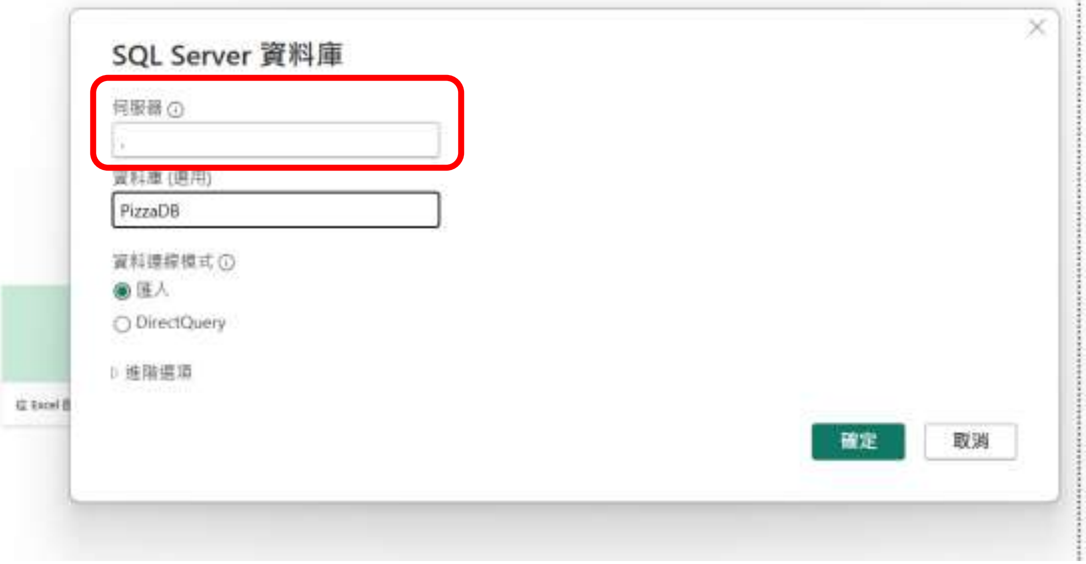
從 SQL Server 資料庫匯入資料

將資料貼到空白資料表

嘗試範例資料集

從其他來源取得資料 →

伺服器輸入 localhost



SQL Server 資料庫

伺服器 ⓘ

.

資料庫 (選用)

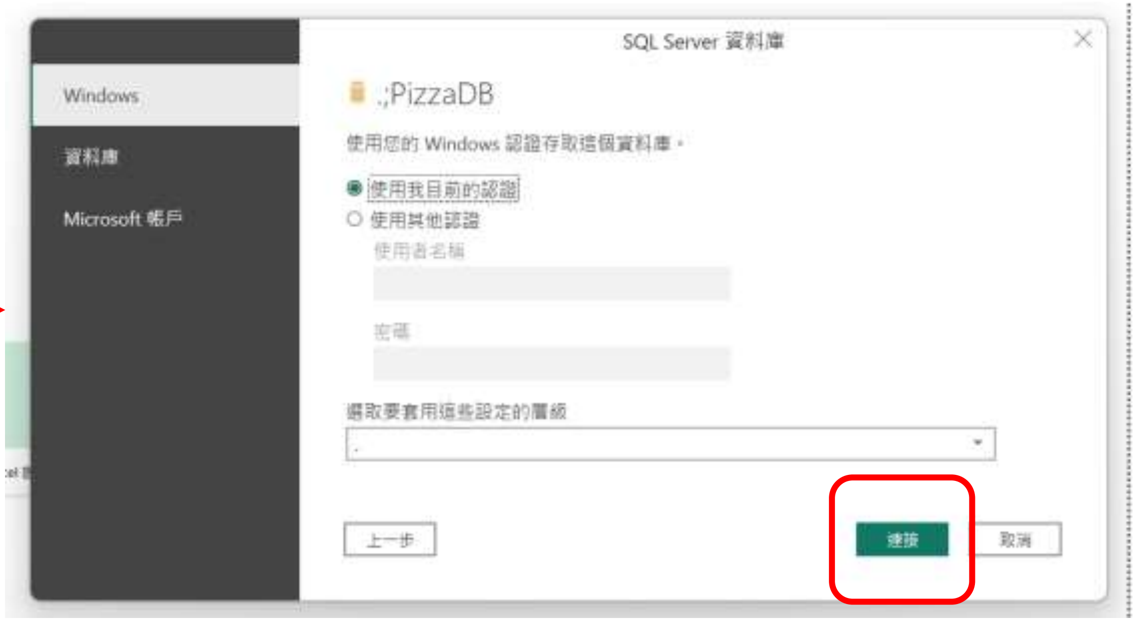
PizzaDB

資料連線模式 ⓘ

● 匯入

○ DirectQuery

▷ 進階選項



SQL Server 資料庫

Windows

資料庫

Microsoft 帳戶

.;PizzaDB

使用您的 Windows 認證存取這個資料庫。

● 使用我目前的認證

○ 使用其他認證

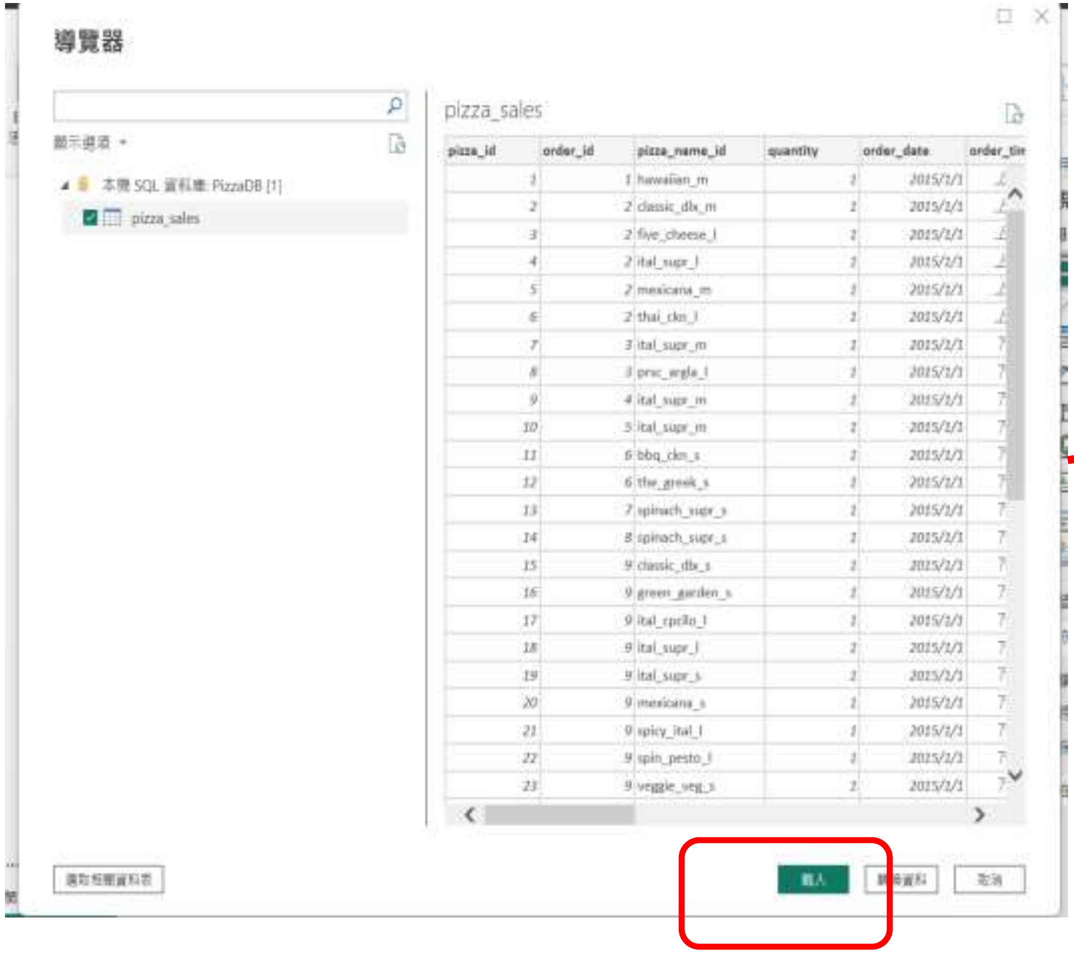
使用者名稱

密碼

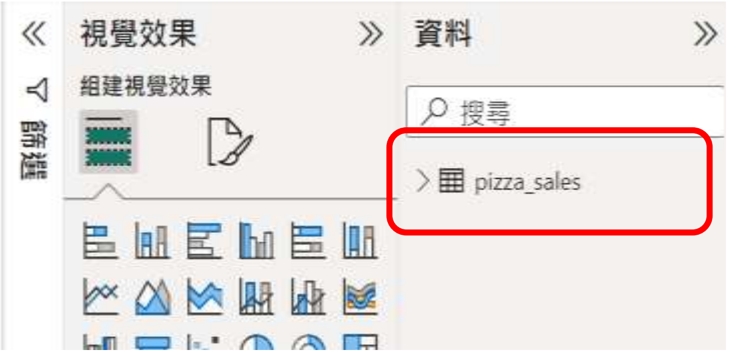
選取要套用這些設定的層級

.

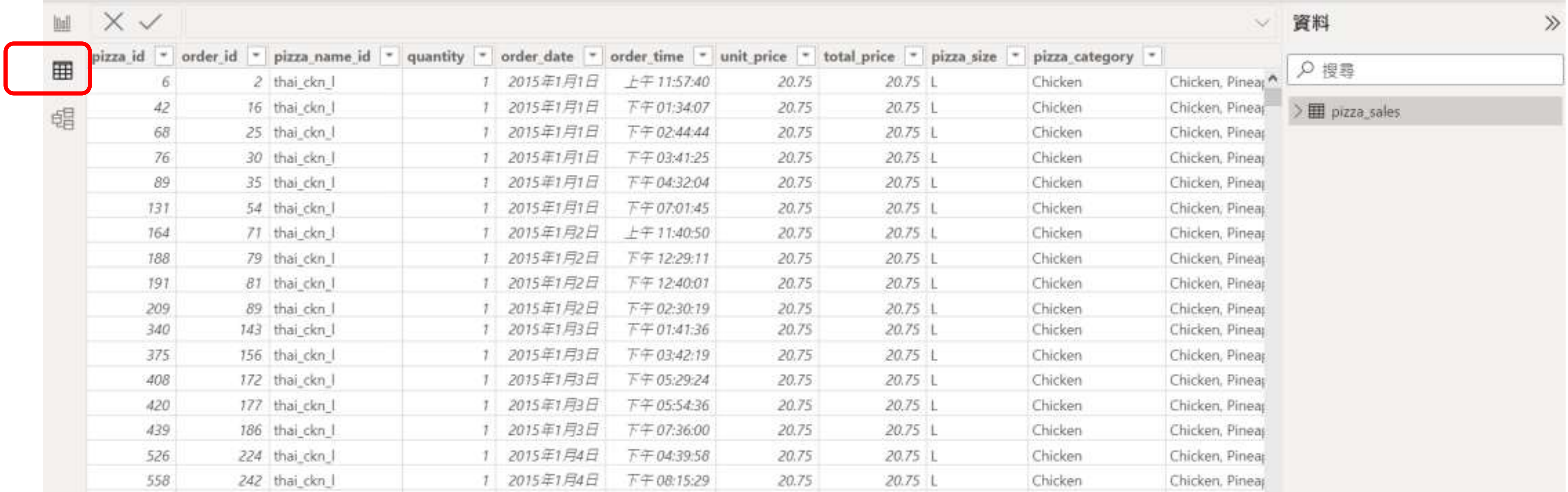
載入資料



pizza_id	order_id	pizza_name_id	quantity	order_date	order_tin
1	1	hawaiian_m	1	2015/1/1	[illegible]
2	2	classic_dlx_m	1	2015/1/1	[illegible]
3	2	five_cheese_l	1	2015/1/1	[illegible]
4	2	ital_supr_l	1	2015/1/1	[illegible]
5	2	mexicana_m	1	2015/1/1	[illegible]
6	2	thai_ckn_l	1	2015/1/1	[illegible]
7	3	ital_supr_m	1	2015/1/1	7
8	3	prsc_argla_l	1	2015/1/1	7
9	4	ital_supr_m	1	2015/1/1	7
10	5	ital_supr_m	1	2015/1/1	7
11	6	bbq_ckn_s	1	2015/1/1	7
12	6	the_greek_s	1	2015/1/1	7
13	7	spinach_supr_s	1	2015/1/1	7
14	8	spinach_supr_s	1	2015/1/1	7
15	9	classic_dlx_s	1	2015/1/1	7
16	9	green_garden_s	1	2015/1/1	7
17	9	ital_cpcllo_l	1	2015/1/1	7
18	9	ital_supr_l	1	2015/1/1	7
19	9	ital_supr_s	1	2015/1/1	7
20	9	mexicana_s	1	2015/1/1	7
21	9	spicy_ital_l	1	2015/1/1	7
22	9	spin_pesto_l	1	2015/1/1	7
23	9	veggie_veg_s	1	2015/1/1	7

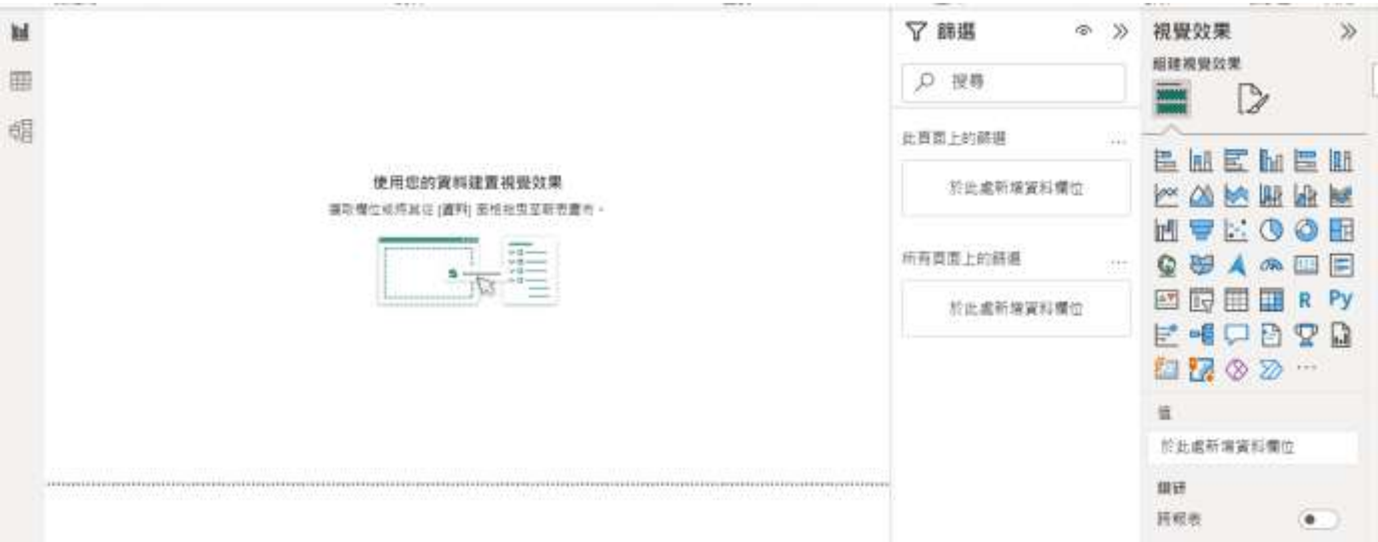


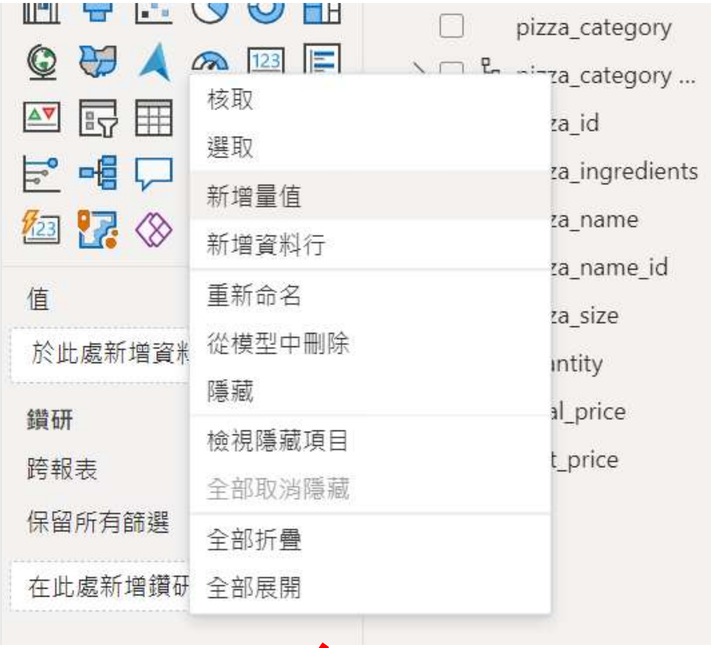
查看資料

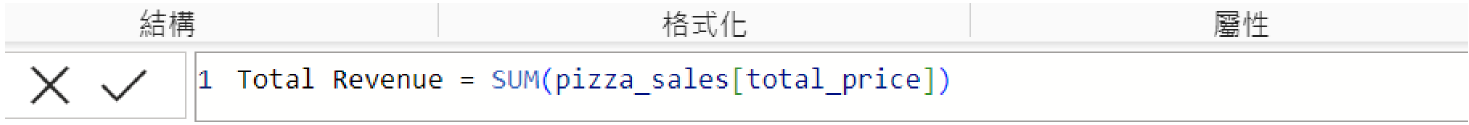


pizza_id	order_id	pizza_name_id	quantity	order_date	order_time	unit_price	total_price	pizza_size	pizza_category	
6	2	thai_ckn_l	1	2015年1月1日	上午 11:57:40	20.75	20.75	L	Chicken	Chicken, Pineap
42	16	thai_ckn_l	1	2015年1月1日	下午 01:34:07	20.75	20.75	L	Chicken	Chicken, Pineap
68	25	thai_ckn_l	1	2015年1月1日	下午 02:44:44	20.75	20.75	L	Chicken	Chicken, Pineap
76	30	thai_ckn_l	1	2015年1月1日	下午 03:41:25	20.75	20.75	L	Chicken	Chicken, Pineap
89	35	thai_ckn_l	1	2015年1月1日	下午 04:32:04	20.75	20.75	L	Chicken	Chicken, Pineap
131	54	thai_ckn_l	1	2015年1月1日	下午 07:01:45	20.75	20.75	L	Chicken	Chicken, Pineap
164	71	thai_ckn_l	1	2015年1月2日	上午 11:40:50	20.75	20.75	L	Chicken	Chicken, Pineap
188	79	thai_ckn_l	1	2015年1月2日	下午 12:29:11	20.75	20.75	L	Chicken	Chicken, Pineap
191	81	thai_ckn_l	1	2015年1月2日	下午 12:40:01	20.75	20.75	L	Chicken	Chicken, Pineap
209	89	thai_ckn_l	1	2015年1月2日	下午 02:30:19	20.75	20.75	L	Chicken	Chicken, Pineap
340	143	thai_ckn_l	1	2015年1月3日	下午 01:41:36	20.75	20.75	L	Chicken	Chicken, Pineap
375	156	thai_ckn_l	1	2015年1月3日	下午 03:42:19	20.75	20.75	L	Chicken	Chicken, Pineap
408	172	thai_ckn_l	1	2015年1月3日	下午 05:29:24	20.75	20.75	L	Chicken	Chicken, Pineap
420	177	thai_ckn_l	1	2015年1月3日	下午 05:54:36	20.75	20.75	L	Chicken	Chicken, Pineap
439	186	thai_ckn_l	1	2015年1月3日	下午 07:36:00	20.75	20.75	L	Chicken	Chicken, Pineap
526	224	thai_ckn_l	1	2015年1月4日	下午 04:39:58	20.75	20.75	L	Chicken	Chicken, Pineap
558	242	thai_ckn_l	1	2015年1月4日	下午 08:15:29	20.75	20.75	L	Chicken	Chicken, Pineap

新增量值-依序輸入前面所列之SQL語法



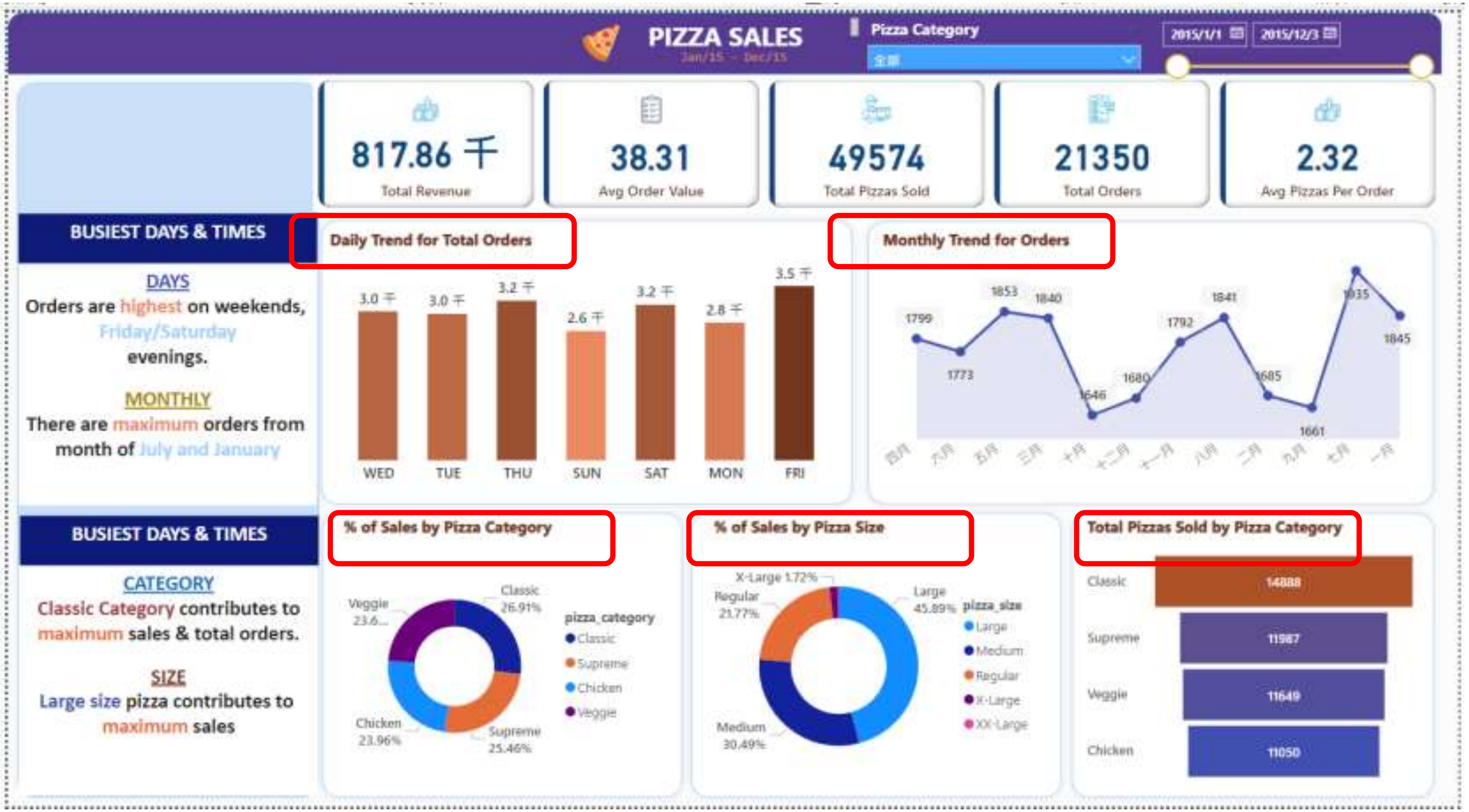




```
Total Revenue = SUM(pizza_sales[total_price])
```

互動式Dashboard(1/2)

紅框為所定義
的視覺化項目



BUSIEST DAYS & TIMES

DAYS

Orders are highest on weekends, Friday/Saturday evenings.

MONTHLY

There are maximum orders from month of July and January

BUSIEST DAYS & TIMES

CATEGORY

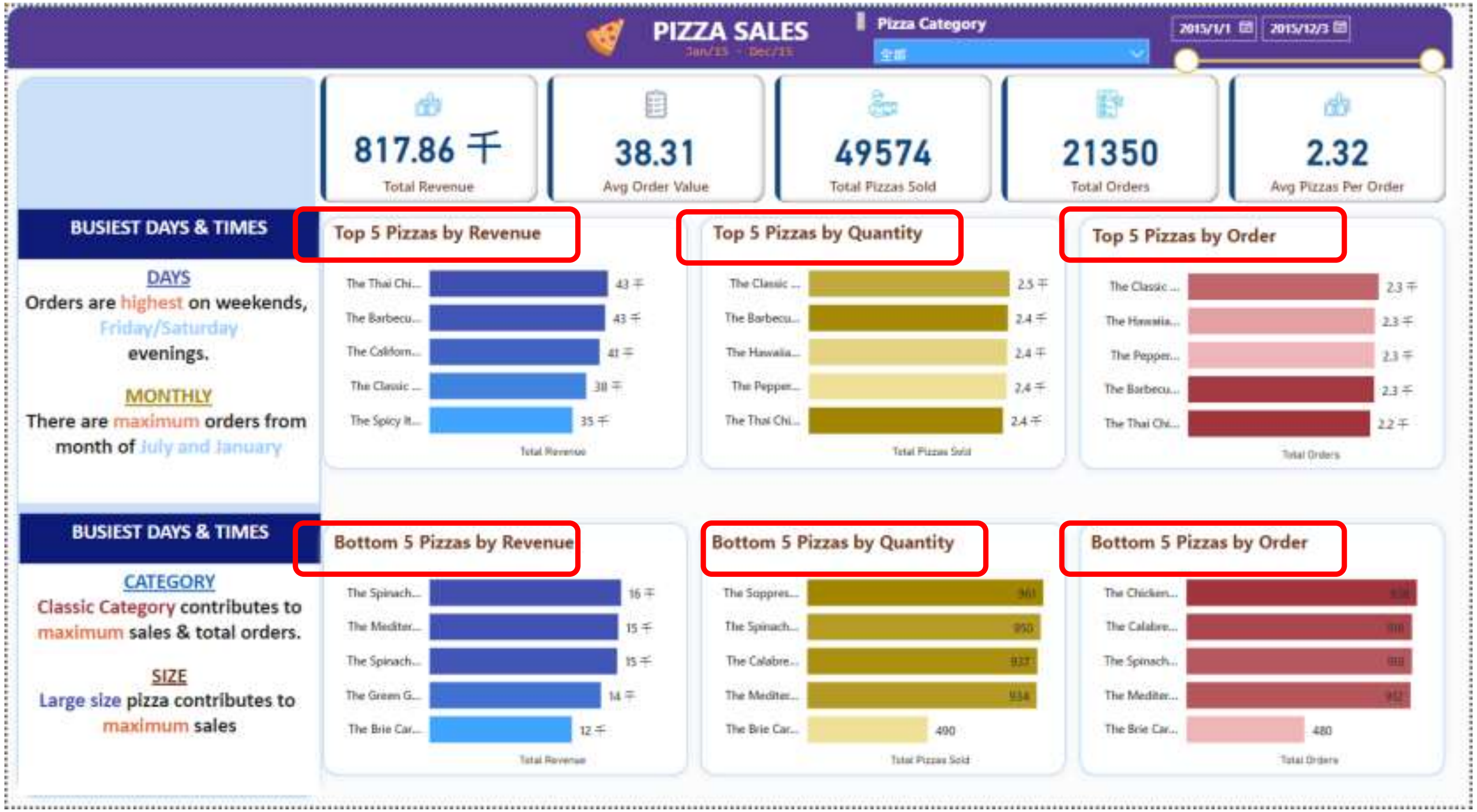
Classic Category contributes to maximum sales & total orders.

SIZE

Large size pizza contributes to maximum sales

互動式Dashboard(2/2)

紅框為所定義
的視覺化項目



PIZZA SALES
Jan/15 - Dec/15

Pizza Category: 全部

2015/1/1 – 2015/12/3

817.86 千
Total Revenue

38.31
Avg Order Value

49574
Total Pizzas Sold

21350
Total Orders

2.32
Avg Pizzas Per Order

BUSIEST DAYS & TIMES

DAYS
Orders are highest on weekends, Friday/Saturday evenings.

MONTHLY
There are maximum orders from month of July and January

BUSIEST DAYS & TIMES

CATEGORY
Classic Category contributes to maximum sales & total orders.

SIZE
Large size pizza contributes to maximum sales

End