

# **Data and Artificial Intelligence**

## **Cyber Shujaa Program**

### **Week 4 Assignment**

### **Business intelligence using power Bi**

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## Introduction

This week's assignment was to develop hands-on experience in Business Intelligence using Power BI for Hotel Management and publishing my work on the cloud. I had never interacted with power BI before. Power BI is a business analytics service by Microsoft that helps users connect to, visualize, and analyse data to gain actionable insights. It is a unified platform for business intelligence that uses interactive dashboards, reports, and visualizations to make data easier to understand.

## Objectives

The purpose of the assignment is to gain hands-on practice:

1. Understand the Hotel business and client needs
2. Load Data
3. Transform Data
4. Build DAX
5. Visualize Dashboard
6. Publish your project as part of your portfolio collection

## Tasks Completed

### Step 1: load and transform the various data set

I loaded and transformed the dim\_date data set. I deleted the mmm yyy column because its values had included the days of the week instead of just month and year. I added a new column with the DAX expression; `FORMAT(dim_date[date], "MMM yyyy")` . all the values in the column were transformed to month and year. I also transformed the date\_type column to format Friday and saturday as the weekend and the rest as weekdays. This was achieved through the following DAX expression: `day_type =`

`IF(`

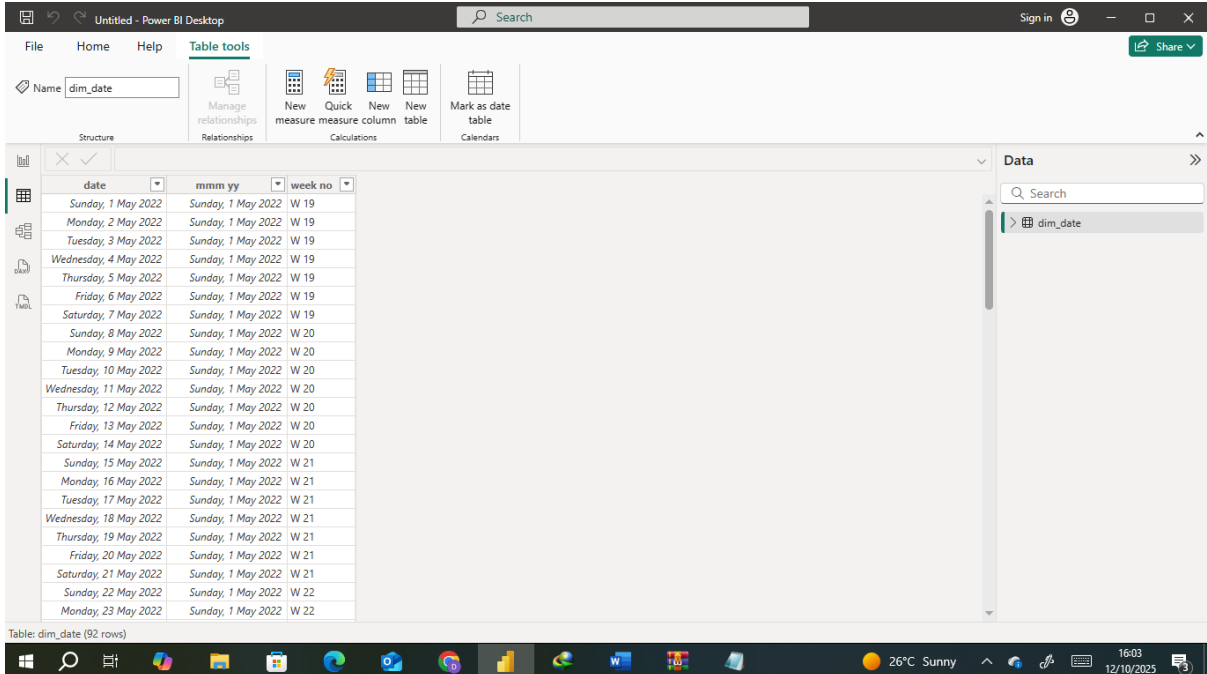
`WEEKDAY(dim_date[date], 2) IN {5, 6},`

`"Weekend",`

"Weekday"

)

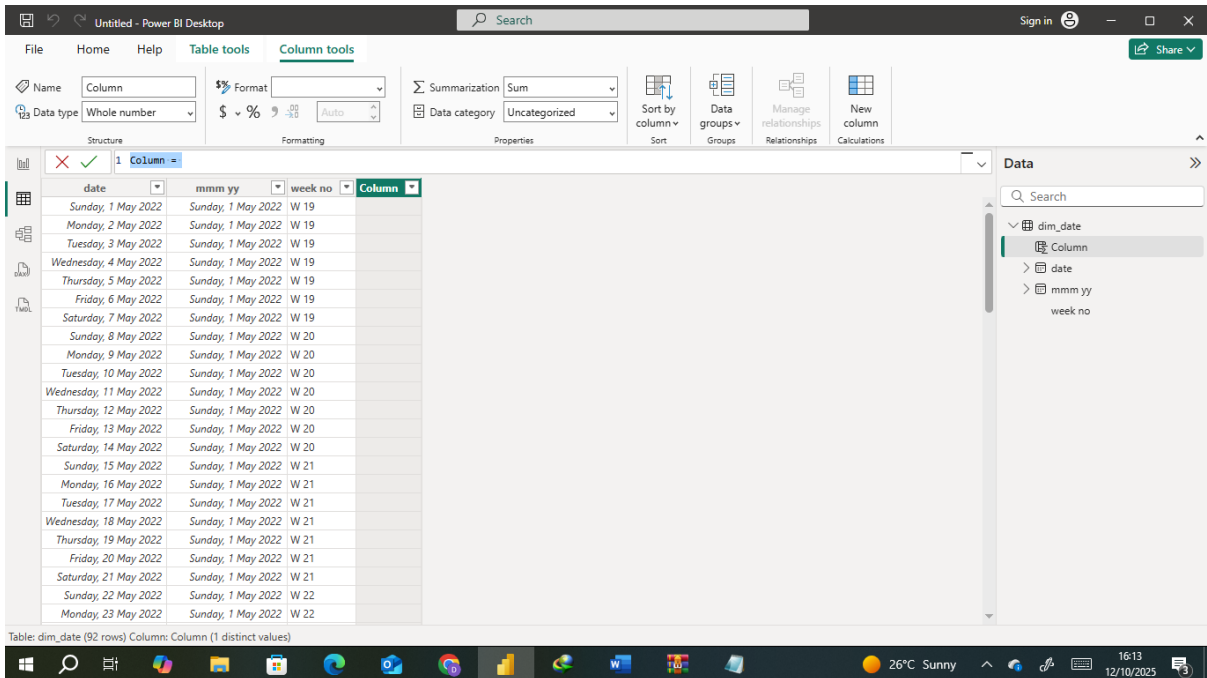
## Screenshots



The screenshot shows the Power BI Desktop interface with the 'Table tools' ribbon selected. The 'Table' view displays a table named 'dim\_date' with 92 rows. The columns are 'date', 'mmm yy', and 'week no'. The data shows dates from Sunday, 1 May 2022 to Monday, 23 May 2022, with corresponding month/year and week numbers.

date	mmm yy	week no
Sunday, 1 May 2022	Sunday, 1 May 2022	W 19
Monday, 2 May 2022	Sunday, 1 May 2022	W 19
Tuesday, 3 May 2022	Sunday, 1 May 2022	W 19
Wednesday, 4 May 2022	Sunday, 1 May 2022	W 19
Thursday, 5 May 2022	Sunday, 1 May 2022	W 19
Friday, 6 May 2022	Sunday, 1 May 2022	W 19
Saturday, 7 May 2022	Sunday, 1 May 2022	W 19
Sunday, 8 May 2022	Sunday, 1 May 2022	W 20
Monday, 9 May 2022	Sunday, 1 May 2022	W 20
Tuesday, 10 May 2022	Sunday, 1 May 2022	W 20
Wednesday, 11 May 2022	Sunday, 1 May 2022	W 20
Thursday, 12 May 2022	Sunday, 1 May 2022	W 20
Friday, 13 May 2022	Sunday, 1 May 2022	W 20
Saturday, 14 May 2022	Sunday, 1 May 2022	W 20
Sunday, 15 May 2022	Sunday, 1 May 2022	W 21
Monday, 16 May 2022	Sunday, 1 May 2022	W 21
Tuesday, 17 May 2022	Sunday, 1 May 2022	W 21
Wednesday, 18 May 2022	Sunday, 1 May 2022	W 21
Thursday, 19 May 2022	Sunday, 1 May 2022	W 21
Friday, 20 May 2022	Sunday, 1 May 2022	W 21
Saturday, 21 May 2022	Sunday, 1 May 2022	W 21
Sunday, 22 May 2022	Sunday, 1 May 2022	W 22
Monday, 23 May 2022	Sunday, 1 May 2022	W 22

Figure 1: screenshot showing the day\_type column removed



The screenshot shows the Power BI Desktop interface with the 'Table tools' ribbon selected. The 'Table' view displays the same 'dim\_date' table as Figure 1, but with an additional column named 'Column' added. The 'Column' column is currently empty. The 'Data' pane on the right shows the table structure with the new column listed.

date	mmm yy	week no	Column
Sunday, 1 May 2022	Sunday, 1 May 2022	W 19	
Monday, 2 May 2022	Sunday, 1 May 2022	W 19	
Tuesday, 3 May 2022	Sunday, 1 May 2022	W 19	
Wednesday, 4 May 2022	Sunday, 1 May 2022	W 19	
Thursday, 5 May 2022	Sunday, 1 May 2022	W 19	
Friday, 6 May 2022	Sunday, 1 May 2022	W 19	
Saturday, 7 May 2022	Sunday, 1 May 2022	W 19	
Sunday, 8 May 2022	Sunday, 1 May 2022	W 20	
Monday, 9 May 2022	Sunday, 1 May 2022	W 20	
Tuesday, 10 May 2022	Sunday, 1 May 2022	W 20	
Wednesday, 11 May 2022	Sunday, 1 May 2022	W 20	
Thursday, 12 May 2022	Sunday, 1 May 2022	W 20	
Friday, 13 May 2022	Sunday, 1 May 2022	W 20	
Saturday, 14 May 2022	Sunday, 1 May 2022	W 20	
Sunday, 15 May 2022	Sunday, 1 May 2022	W 21	
Monday, 16 May 2022	Sunday, 1 May 2022	W 21	
Tuesday, 17 May 2022	Sunday, 1 May 2022	W 21	
Wednesday, 18 May 2022	Sunday, 1 May 2022	W 21	
Thursday, 19 May 2022	Sunday, 1 May 2022	W 21	
Friday, 20 May 2022	Sunday, 1 May 2022	W 21	
Saturday, 21 May 2022	Sunday, 1 May 2022	W 21	
Sunday, 22 May 2022	Sunday, 1 May 2022	W 22	
Monday, 23 May 2022	Sunday, 1 May 2022	W 22	

Figure 2: screenshot showing the data set with an added calculated column

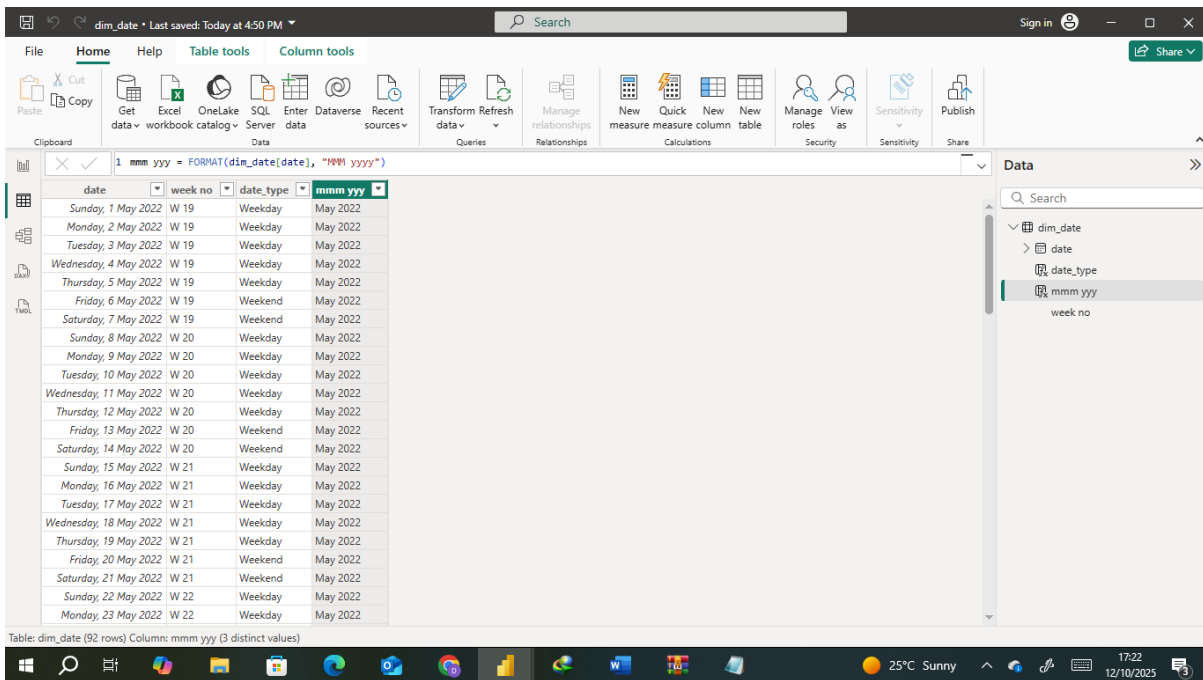


Table: dim\_date (92 rows) Column: mmm yyyy (3 distinct values)

date	week no	date_type	mmm yyyy
Sunday, 1 May 2022	W 19	Weekday	May 2022
Monday, 2 May 2022	W 19	Weekday	May 2022
Tuesday, 3 May 2022	W 19	Weekday	May 2022
Wednesday, 4 May 2022	W 19	Weekday	May 2022
Thursday, 5 May 2022	W 19	Weekday	May 2022
Friday, 6 May 2022	W 19	Weekend	May 2022
Saturday, 7 May 2022	W 19	Weekend	May 2022
Sunday, 8 May 2022	W 20	Weekday	May 2022
Monday, 9 May 2022	W 20	Weekday	May 2022
Tuesday, 10 May 2022	W 20	Weekday	May 2022
Wednesday, 11 May 2022	W 20	Weekday	May 2022
Thursday, 12 May 2022	W 20	Weekday	May 2022
Friday, 13 May 2022	W 20	Weekend	May 2022
Saturday, 14 May 2022	W 20	Weekend	May 2022
Sunday, 15 May 2022	W 21	Weekday	May 2022
Monday, 16 May 2022	W 21	Weekday	May 2022
Tuesday, 17 May 2022	W 21	Weekday	May 2022
Wednesday, 18 May 2022	W 21	Weekday	May 2022
Thursday, 19 May 2022	W 21	Weekday	May 2022
Friday, 20 May 2022	W 21	Weekend	May 2022
Saturday, 21 May 2022	W 21	Weekend	May 2022
Sunday, 22 May 2022	W 22	Weekday	May 2022
Monday, 23 May 2022	W 22	Weekday	May 2022

Figure 3: screenshot showing a fully transformed dataset

For the table dim\_room, Power Bi did not automatically detect the first row as headers.

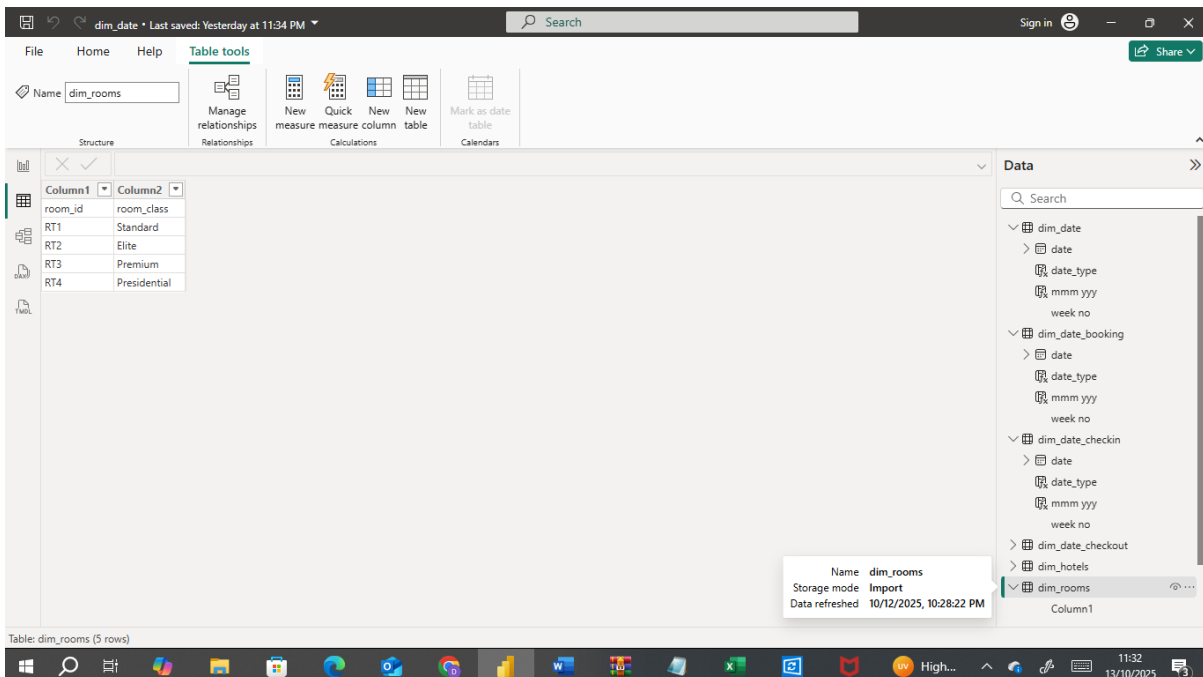


Table: dim\_rooms (5 rows)

room_id	room_class
RT1	Standard
RT2	Elite
RT3	Premium
RT4	Presidential

Figure 4: dim\_room table before transformation

I transformed the data by opening the power query and promoted the first row to be the header. This was the result:

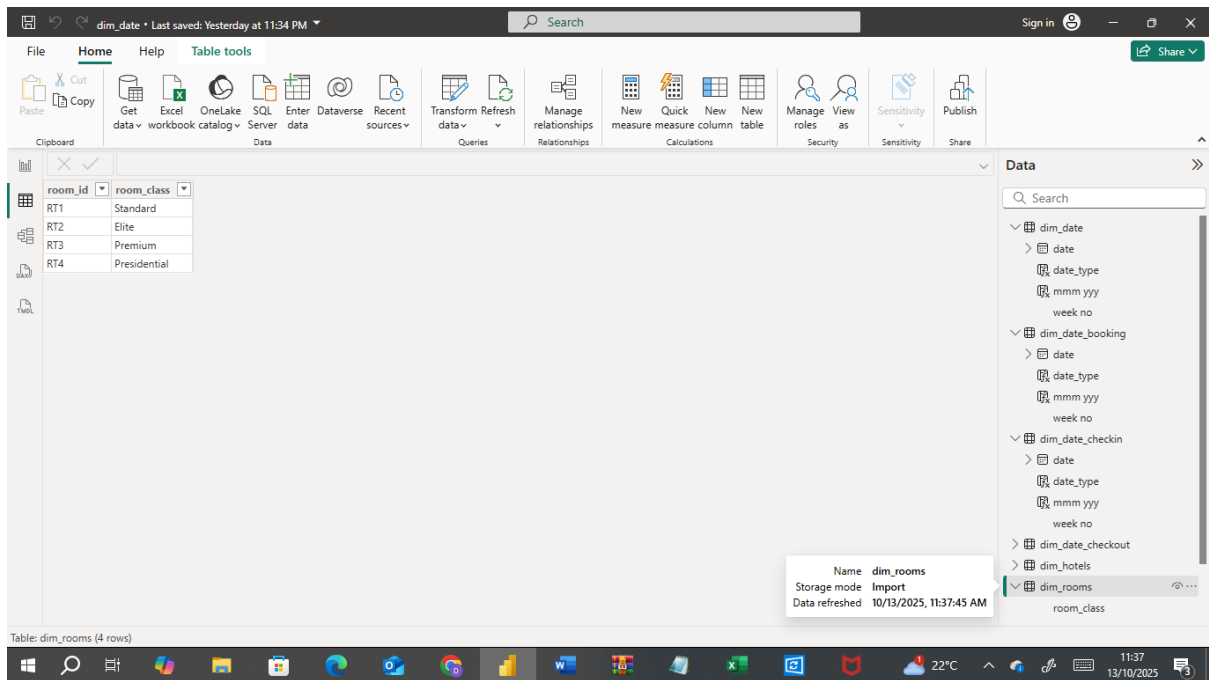


Figure 5: *dim\_room* with updated headers

## Step 2: Build the Data Model

in this step I created the date-fact relationship. I connected the date in *dim\_date* booking to booking date column in *fact\_bookings*. Property\_id was connected to property id in *fact\_aggregated bookings* and *fact\_bookings*. Cardinality was one to many.

Screenshot:

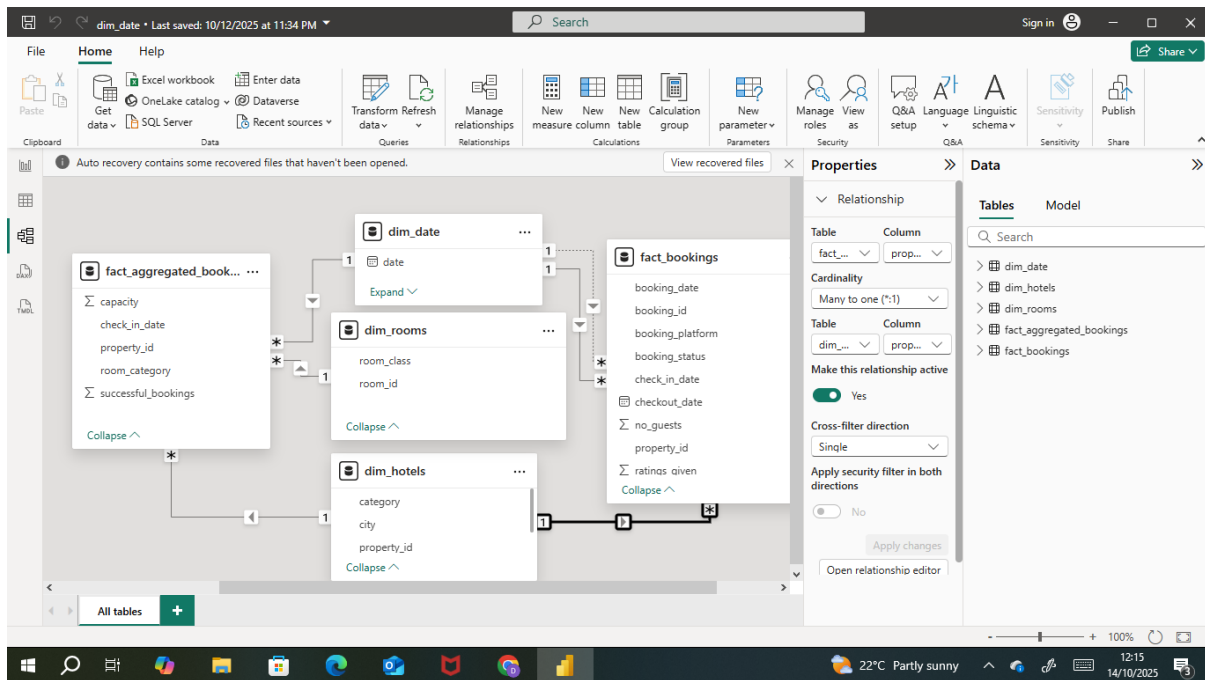


Figure 6: data model showing star schema relationship

### Step 3: Data Analysis Expressions

In this step I created a measures table, and added new measures. I inserted the following DAX expressions:

1. Revenue = SUM(fact\_bookings[revenue\_realized])
2. Total Bookings = COUNT(fact\_bookings[booking\_id])
3. Total Capacity = SUM(fact\_aggregated\_bookings[capacity])
4. Total Successful Bookings = SUM(fact\_aggregated\_bookings[successful\_bookings])
5. Occupancy % = DIVIDE([Total Successful Bookings],[Total Capacity],0)
6. Average Rating = AVERAGE(fact\_bookings[ratings\_given])
7. No of days = DATEDIFF(MIN(dim\_date[date]),MAX(dim\_date[date]),DAY) +1
8. Total cancelled bookings = CALCULATE([Total Bookings],fact\_bookings[booking\_status]="Cancelled")
9. Cancellation % = DIVIDE([Total cancelled bookings],[Total Bookings])
10. Total Checked Out = CALCULATE([Total Bookings],fact\_bookings[booking\_status]="Checked Out")
11. Total no show bookings = CALCULATE([Total Bookings],fact\_bookings[booking\_status]="No Show")

12. No Show rate % = DIVIDE([Total no show bookings],[Total Bookings])

13. Booking % by Platform = DIVIDE([Total Bookings],

CALCULATE([Total Bookings],  
ALL(fact\_bookings[booking\_platform])  
) \* 100

14. Booking % by Room class = DIVIDE([Total Bookings],

CALCULATE([Total Bookings],  
ALL(dim\_rooms[room\_class])  
) \* 100

15. ADR = DIVIDE([Revenue], [Total Bookings], 0)

16. Realisation % = 1 - ([Cancellation %] + [No Show rate %])

17. RevPAR = DIVIDE([Revenue], [Total Capacity])

18. DBRN = DIVIDE([Total Bookings], [No of days])

19. DSRN = DIVIDE([Total Capacity], [No of days])

20. DURN = DIVIDE([Total Checked Out], [No of days])

21. Revenue WoW change % =

Var selv =

IF(HASONEFILTER(dim\_date[wn]), SELECTEDVALUE(dim\_date[wn]), MAX(dim\_date[wn]))

var revcw = CALCULATE([Revenue], dim\_date[wn] = selv)

var revpw = CALCULATE([Revenue], FILTER(ALL(dim\_date), dim\_date[wn] = selv - 1))

return

DIVIDE(revcw, revpw, 0) - 1

22. ADR WoW change % =

Var selv =

IF(HASONEFILTER(dim\_date[wn]), SELECTEDVALUE(dim\_date[wn]), MAX(dim\_date[wn]))

var revcw = CALCULATE([ADR], dim\_date[wn] = selv)

var revpw = CALCULATE([ADR], FILTER(ALL(dim\_date), dim\_date[wn] = selv - 1))

return

DIVIDE(revcw,revpw,0)-1

23. Revpar WoW change % =

Var selv =

IF(HASONEFILTER(dim\_date[wn]),SELECTEDVALUE(dim\_date[wn]),MAX(dim\_date[wn]))

var revcw = CALCULATE([RevPAR],dim\_date[wn]= selv)

var revpw = CALCULATE([RevPAR],FILTER(ALL(dim\_date),dim\_date[wn]= selv-1))

return

DIVIDE(revcw,revpw,0)-1

24. Realisation WoW change % =

Var selv =

IF(HASONEFILTER(dim\_date[wn]),SELECTEDVALUE(dim\_date[wn]),MAX(dim\_date[wn]))

var revcw = CALCULATE([Realisation %],dim\_date[wn]= selv)

var revpw = CALCULATE([Realisation %],FILTER(ALL(dim\_date),dim\_date[wn]= selv-1))

return

DIVIDE(revcw,revpw,0)-1

25. DSRN WoW change % =

Var selv =

IF(HASONEFILTER(dim\_date[wn]),SELECTEDVALUE(dim\_date[wn]),MAX(dim

```

_date[wn]))
var revcw = CALCULATE([DSRN],dim_date[wn]= selv)
var revpw = CALCULATE([DSRN],FILTER(ALL(dim_date),dim_date[wn]= selv-
1))

return

DIVIDE(revcw,revpw,0)-1

```

## Step 4: dashboard

In this step I created an interactive dashboard in the report view

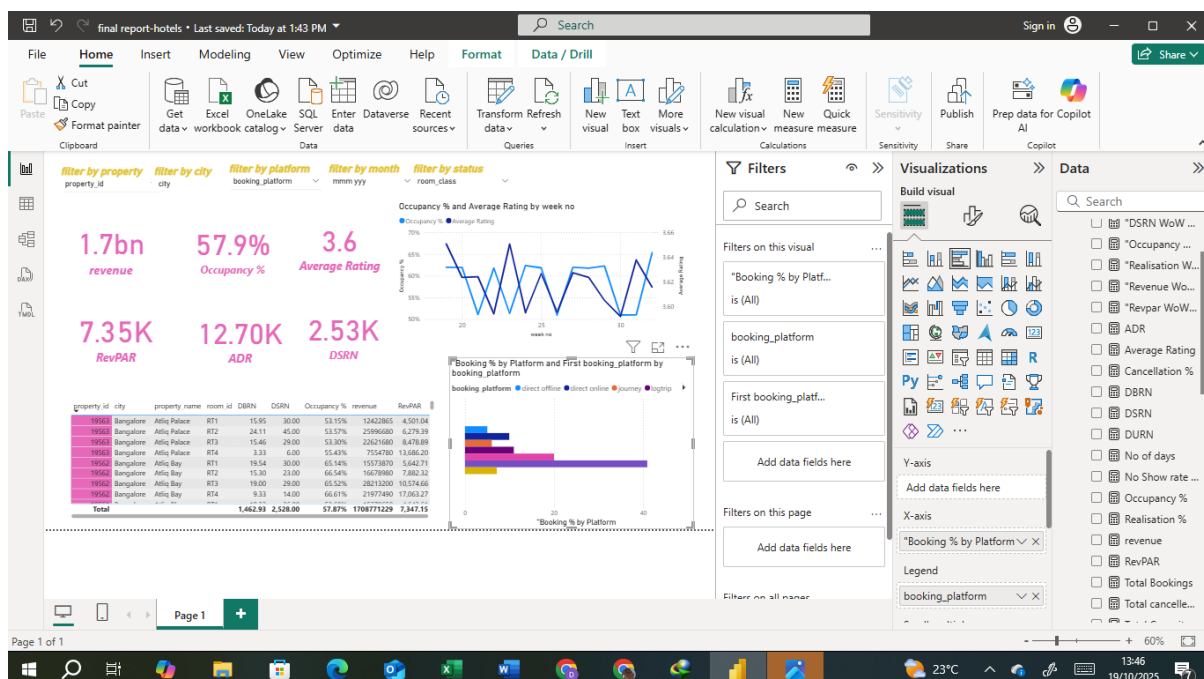


Figure 7: screenshot showing the created dashboard

## **Link to code**

### **Link to Code:**

<https://drive.google.com/drive/folders/1PPem3NkpDq6RPFhnyOGvdKReFmKt1nKd?usp=s>  
haring

## **Conclusion**

This week's project has helped me interact with Power BI. It is a really helpful tool in data visualization. It provides a clear and concise way to communicate complex data, improves efficiency, and enables interactive exploration of insights.