WEEK 4 ASSIGNMENT REPORT

CYBER SHUJAA

ADM NO: CS-DA01-2507
COURSE: DATA AND AI
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TASK: BUSINESS INTELLIGENCE

Contents

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INTRODUCTION

- This report presents a comprehensive business intelligence analysis of the hospitality sector, utilizing a detailed dataset encompassing hotel operations, room occupancy, and customer metrics.
- Through the application of Microsoft Power BI, raw data has been transformed into a series of interactive dashboards and visualizations.
- The primary objective of this analysis is to uncover key trends, identify patterns in customer behavior, and assess operational performance.
- The resulting insights are intended to provide a clear, data-driven foundation for strategic decision-making and to highlight opportunities for growth and optimization within the competitive hospitality landscape.

Strating point

- Get to have the following:

1. Requirements Understanding
2. Mockups and solution Design
3. Data collection and data modelling
4. Data dashboarding and insights Generation
5. Stakeholders feedback.
    a) Requirements Understanding:
        a. Problem Statement:
            i. Revenue
            ii. Total Bookings
            iii. Average rating
            iv. Total Capacity
            v. Total Successful bookings
            vi. Occupancy %
            vii. Total Cancelled Bookings
            viii. Cancellation Rate
    b) Mockups and solution Design
        a. Metrics
            i. Revenue = SUM (fact_bookings[revenue_realized])
            ii. Total Bookings= COUNT (fact_bookings[booking_id])
            iii. Total Capacity = SUM (fact_aggregated_bookings[capacity])
            iv. Total Successful Bookings = SUM (fact_aggregated_bookings[successful_bookings])
            v. Occupancy % = DIVIDE ([Total Succesful Bookings],[Total Capacity],0)
            vi. Average Rating = AVERAGE (fact_bookings[ratings_given])
            vii. No of days = DATEDIFF (MIN (dim_date[date]), MAX(dim_date[date]),DAY) +1
            viii. Total cancelled bookings = CALCULATE ([Total Bookings],fact_bookings[booking_status] ="Cancelled")
            ix. Cancellation % = DIVIDE ([Total cancelled bookings],[Total Bookings])
            x. Total Checked Out = CALCULATE ([Total Bookings], fact_bookings[booking_status] ="Checked Out")
            xi. Total no show bookings = CALCULATE ([Total Bookings],fact_bookings[booking_status] ="No Show")
            xii. No Show rate % = DIVIDE ([Total no show bookings],[Total Bookings])

xiii. Booking % by Platform = DIVIDE ([Total Bookings],
CALCULATE ([Total Bookings],
ALL (fact_bookings[booking_platform])
))*100

xiv. "Booking % by Room class = DIVIDE ([Total Bookings], CALCULATE ([Total Bookings], ALL(dim_rooms[room_class])))*100"

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

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

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

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

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

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

xxi. "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"

xxii. Occupancy WoW change % =
Var selv =
IF(HASONEFILTER(dim_date[wn]),SELECTEDVALUE(dim_date[wn]),MAX(dim_date[wn]))
var revcw = CALCULATE([Occupancy %],dim_date[wn]= selv)
var revpw = CALCULATE([Occupancy %],FILTER(ALL(dim_date),dim_date[wn]= selv-1))

return

DIVIDE(revcw,revpw,0)-1

xxiii. 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

xxiv. 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
```

xxv. 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"
```

c) Data Collection and Data modelling (Data Transformation using Power Query)
   a. Data collection of the various files/loading of data and saving them in a folder
d) Data Dashboarding and insights generation
   a. The creation of the dashboard using the available data and generate insights form it
e) Publish work

Application starting point

- Open Power BI desktop.

STEP 1: LOAD AND TRANSFORM DATA

- Load the dataset from the folder where the files have been saved.
- As shown in the image below, click on the “Get Data”.

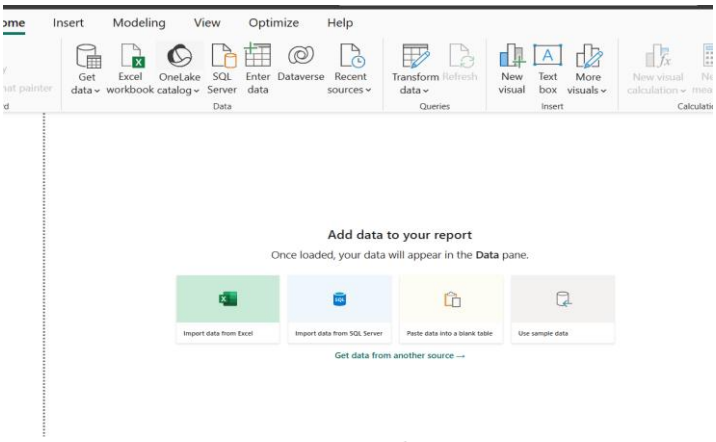


Figure 1. Load Data

- A window pops up of where to choose the location. In my case, I pasted the location of the folder that contains my files.
- See the image shown below:

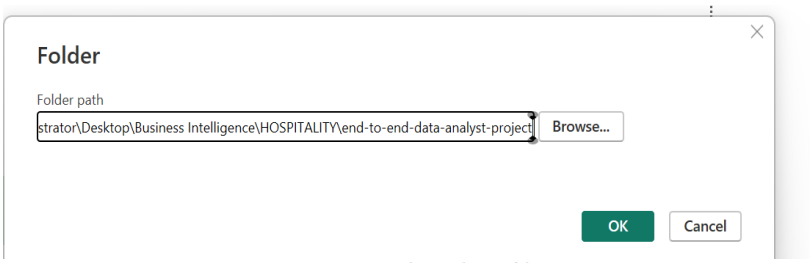


Figure 2. Path to data files

- The click “OK”.

- The following Power Query Editor shows up.

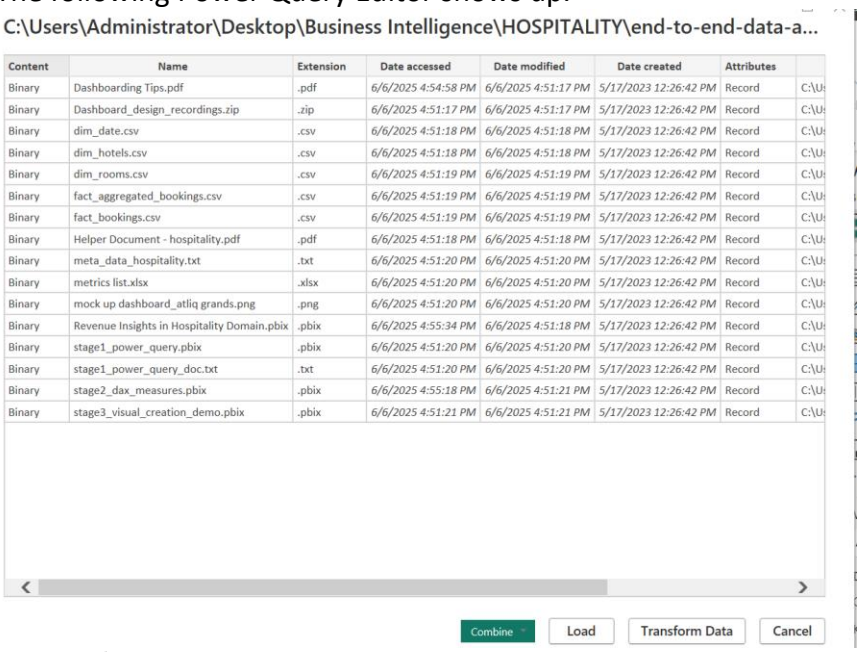


Figure 3. Power Editor Query

- The purpose of this Query editor is to **connect, transform, and clean your data** before it is loaded into the Power BI model for analysis and visualization.
- It acts as a powerful and intuitive data preparation tool, allowing you to shape raw data from various sources into a clean, structured format
- The files from the folder have been loaded.
- Duplicate the folder by right clicking on it.
- The purpose is to be able to save the files after making the necessary changes.
- See the following to expand the data.

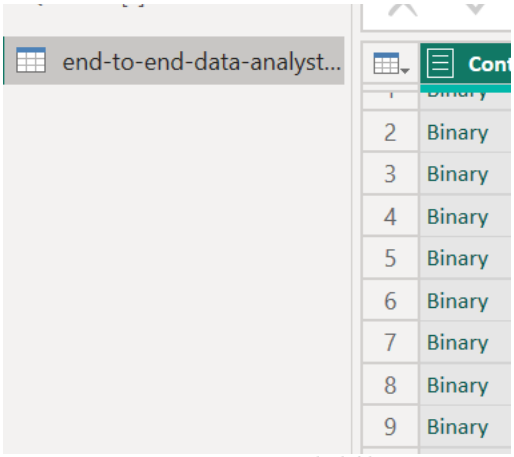
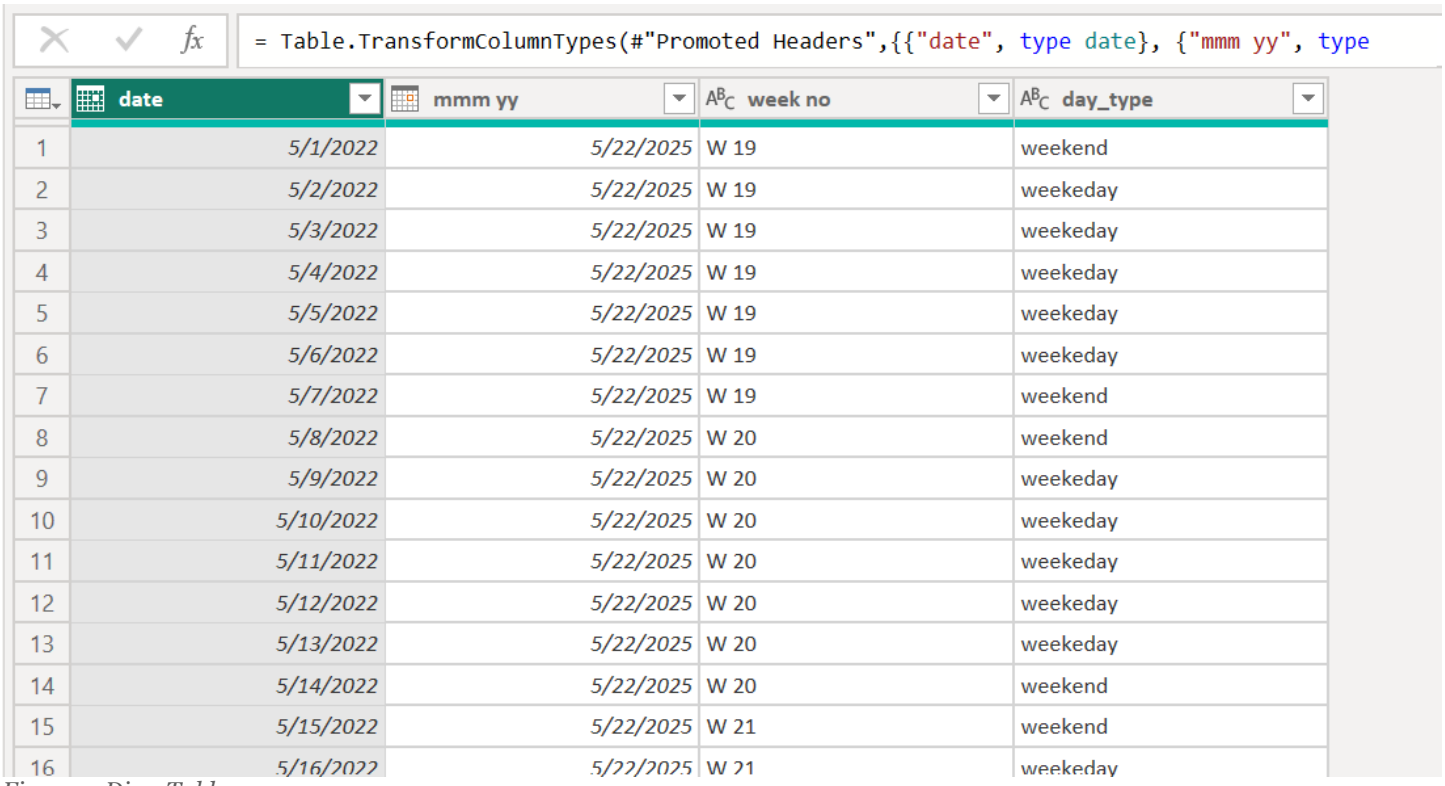


Figure 4. Expanded file

- Click on the binary to expand the data in each file.
- For instance the dim_table.
- It has the following data as shown in the image below:



	date	mmm yy	week no	day_type
1	5/1/2022	5/22/2025	W 19	weekend
2	5/2/2022	5/22/2025	W 19	weekeday
3	5/3/2022	5/22/2025	W 19	weekeday
4	5/4/2022	5/22/2025	W 19	weekeday
5	5/5/2022	5/22/2025	W 19	weekeday
6	5/6/2022	5/22/2025	W 19	weekeday
7	5/7/2022	5/22/2025	W 19	weekend
8	5/8/2022	5/22/2025	W 20	weekend
9	5/9/2022	5/22/2025	W 20	weekeday
10	5/10/2022	5/22/2025	W 20	weekeday
11	5/11/2022	5/22/2025	W 20	weekeday
12	5/12/2022	5/22/2025	W 20	weekeday
13	5/13/2022	5/22/2025	W 20	weekeday
14	5/14/2022	5/22/2025	W 20	weekend
15	5/15/2022	5/22/2025	W 21	weekend
16	5/16/2022	5/22/2025	W 21	weekeday

Figure 5. Dim_Table

- To the right, there is properties of the file displayed.
- That is the source, Navigation, Imported CSV, promoted Headers and Changed Type.
- Save the changes by renaming the file i.e. “dim_table”

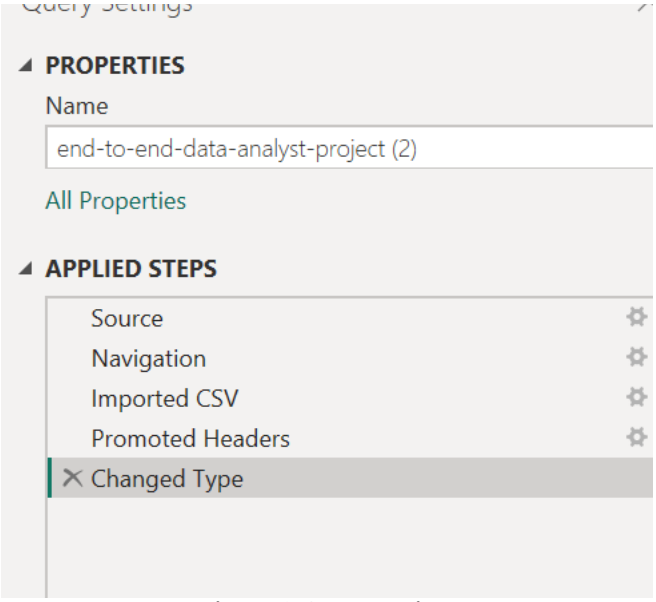


Figure 6. Query settings

- Repeat the same for the other tables that you want to work with.
- See in the image below.

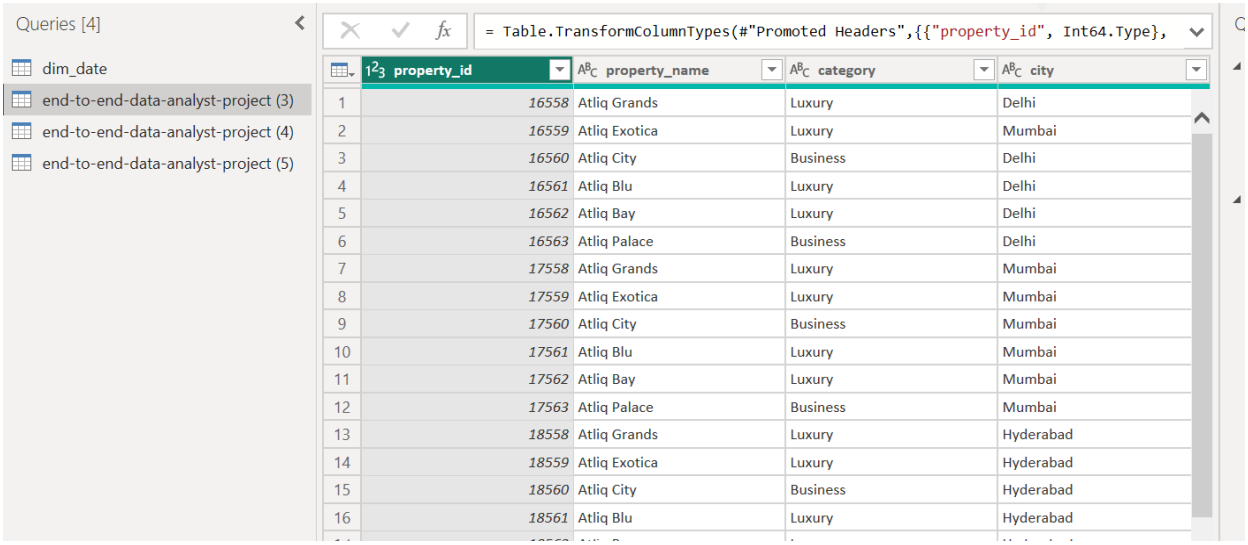


Figure 7. Query Tables

- See the “dim_room” Table below:

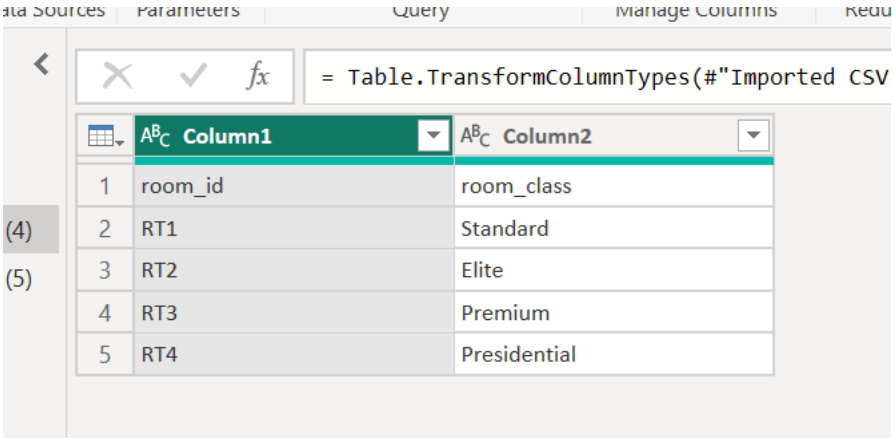


Figure 8. Transform dim_room

- Notice how the table heads are not promoted.
- Make the necessary changes by “use the first row as header”

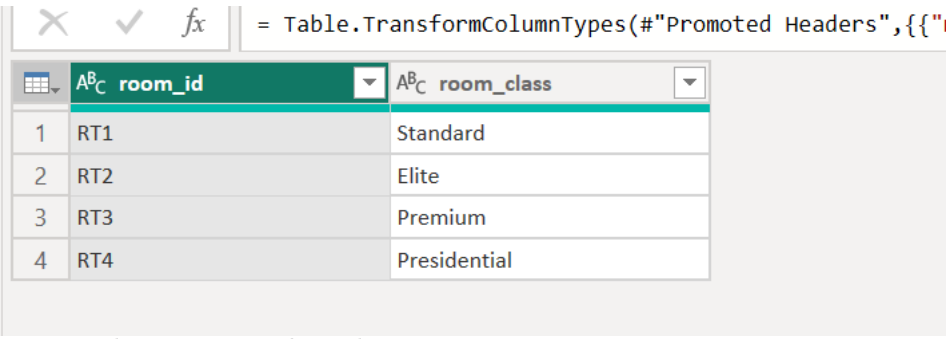


Figure 9. dim_room transformed

- Note that the following steps should apply as shown in the right:

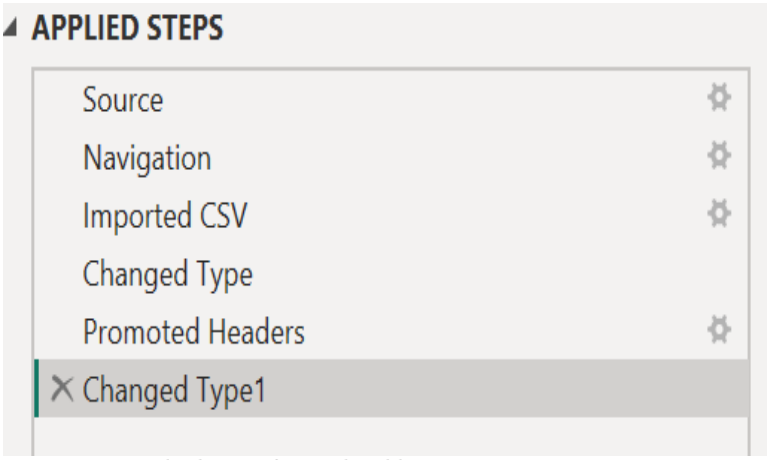


Figure 10. Applied steps for each table

- The queries are as follows:

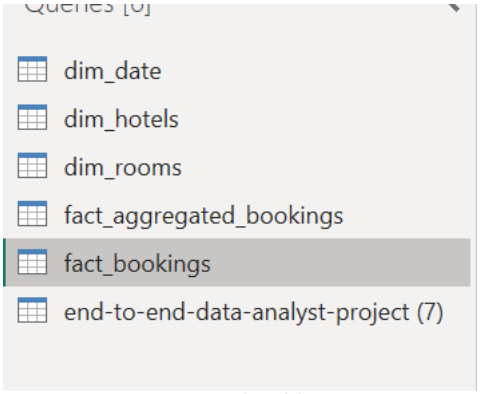


Figure 11. Final Table Queries

- Go through the data and see if there are any changes that should be made i.e. the row heads should all be in place.
- Do the necessary transformations according to your data.
- Have a look on the "dim_date" table :

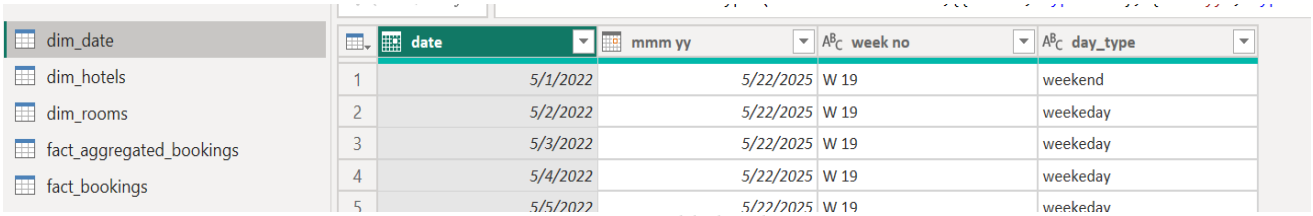


Figure 12. table heads

- In the hotel industry, Friday and Saturday are considered weekend, however in the table its just Saturday and Sunday, there for, delete the column but note that we will later recreate it.

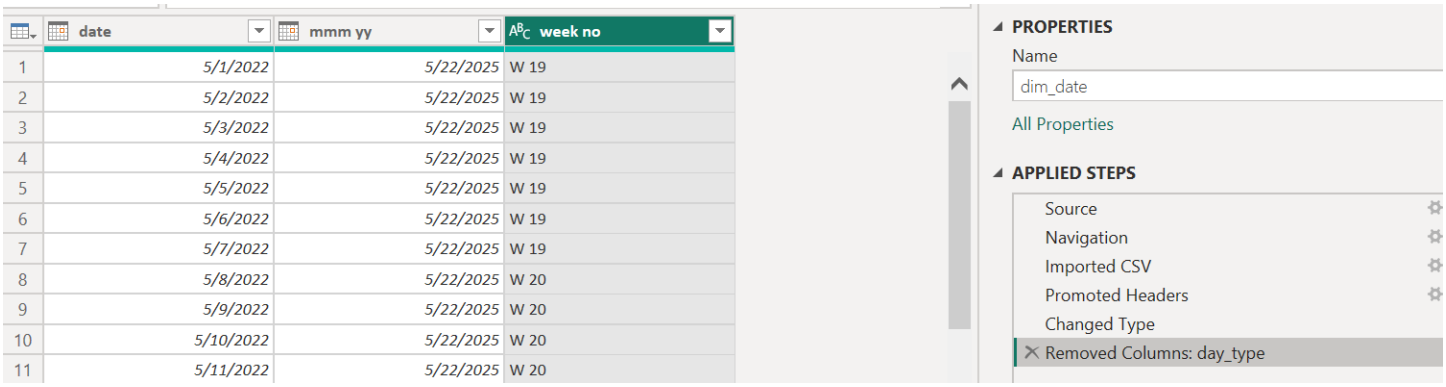


Figure 13. Removed day_type

- The above image shows the removed column.
- After the necessary changes and transformations have been made, "Close $Apply".

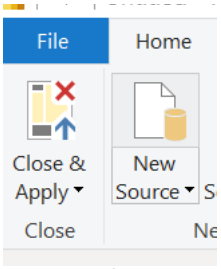


Figure 14. Close & Apply

- The data is now loaded into the PowerBi.
- See in the image below:

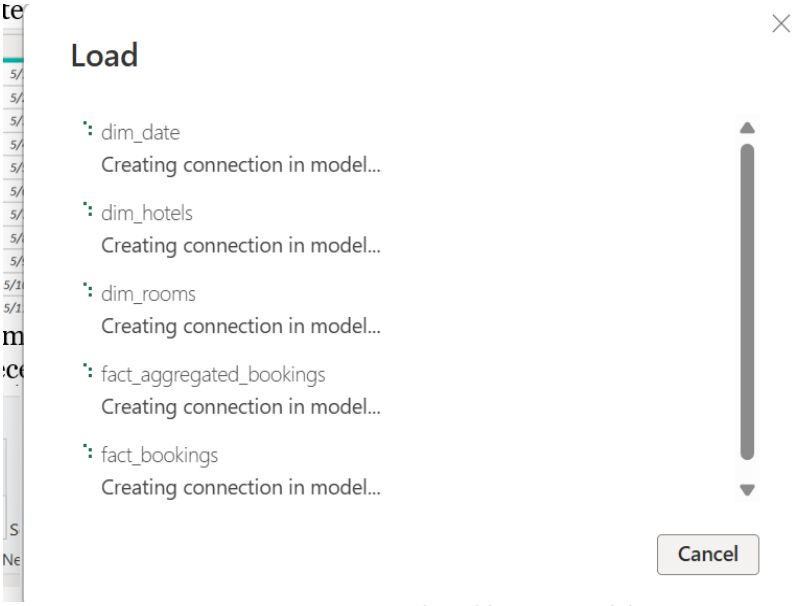


Figure 15. Connecting the tables in a model

STEP 2: BUILD THE DATA MODEL

- In the Power BI UI, notice the data in the far right of the window:

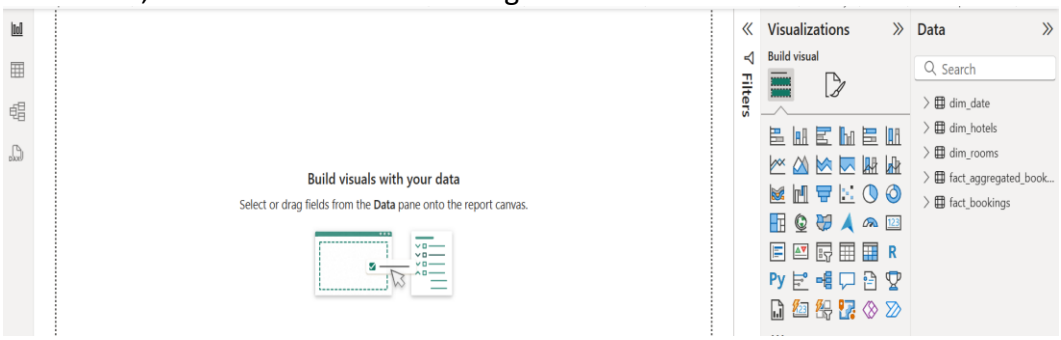


Figure 16. Power Bi UI

- This step involves Data modeling.
- In this step you establish different relationships for the different tables.

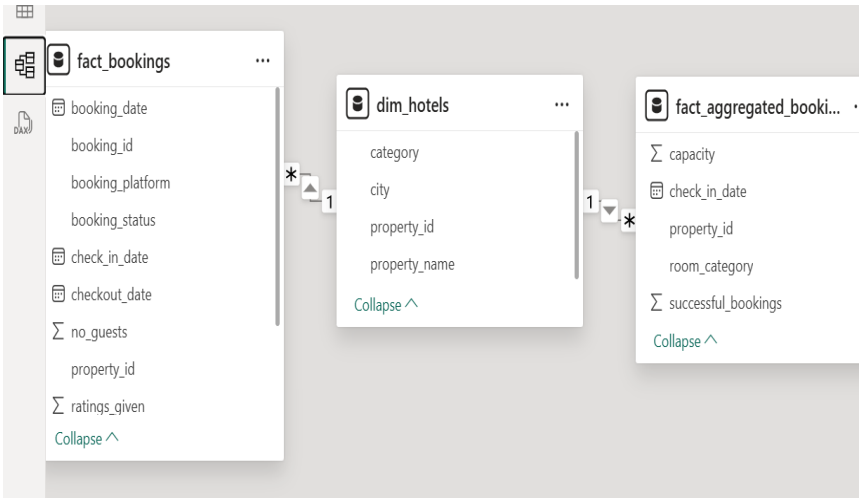


Figure 17. Establish Relationship

- Using a star schema, place the fact table in the middle
- See in the image below:

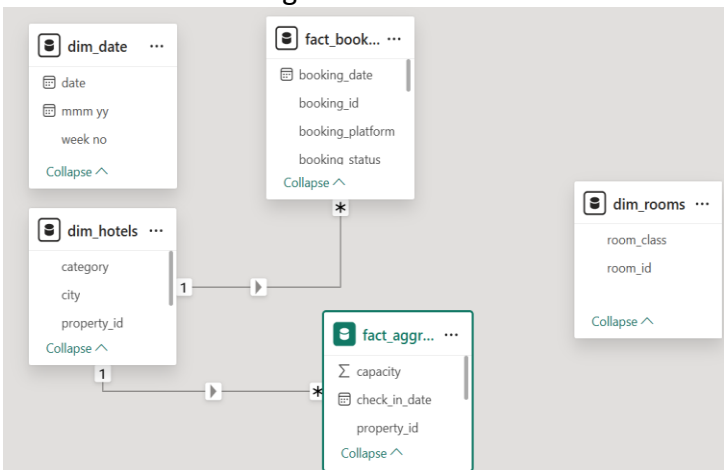


Figure 18. Star Schema Applied

- Notice that some of the relationships are automatically established based on the name of the column.
- To establish new relationships, “Manage Relationships”.
- The “date” column in “dim_date” has similar characteristics to the “checking_date” of the “fact_bookings” table.
- Therefore, establish a relationship there via drag and drop.
- See in the image below:

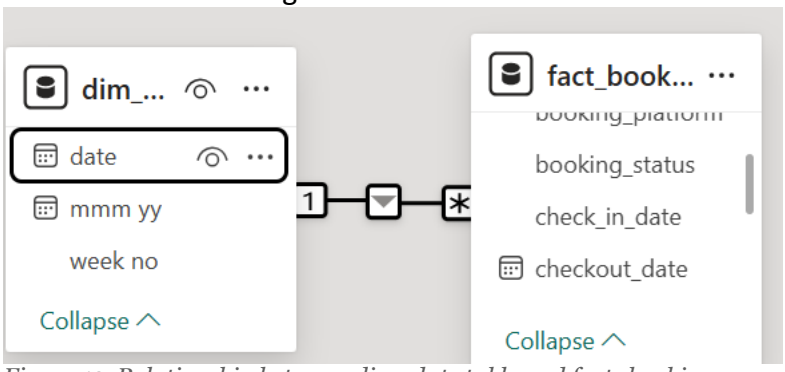


Figure 19. Relationship between dim_date table and fact_booking

- The same applies for the “fact_aggregated_bookings”
- See in the image below:

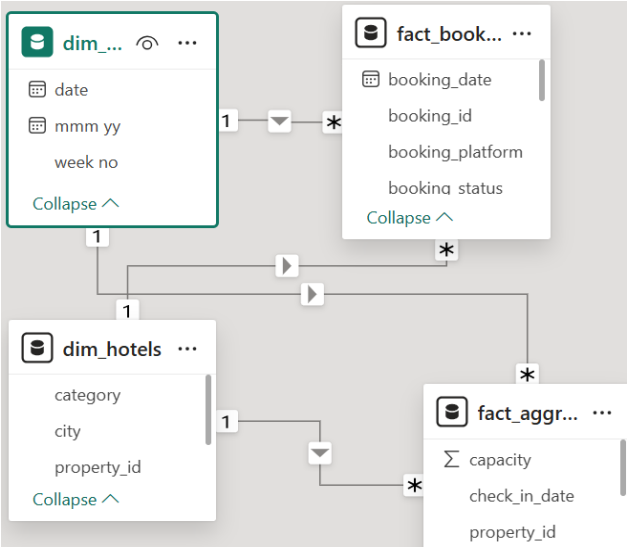


Figure 20. Relationship with fact_aggregated bookings table

- Established other relationships form the “dim_room” table.

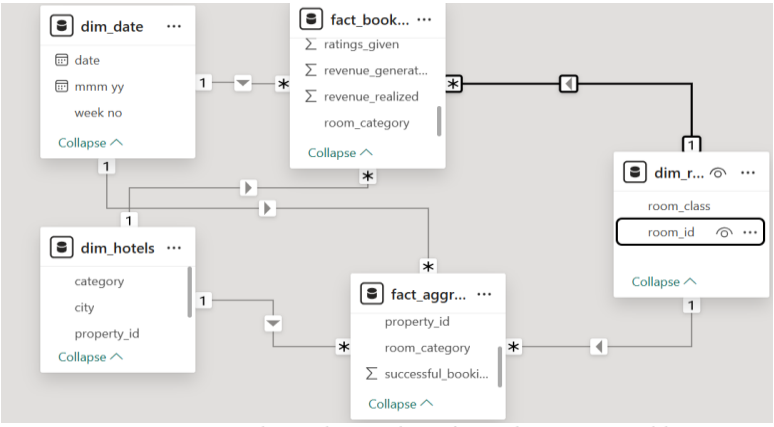


Figure 21. Further relationships from dim_room table

- Confirm that the relationships are established properly.

STEP 3: BUILDING METRIX USING DAX

DATA ANALYSIS EXPRESSION (DAX)

- It is a formula language developed by Microsoft for creating custom calculations on data models.
- It involves:
  - Creating calculated columns
  - Creating Measures.

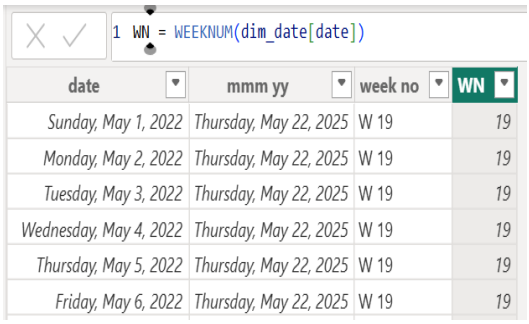
CALCULATED COLUMNS

- Notice how the week no column has the ‘W’. This can be removed.

date	mmm yy	week no
Sunday, May 1, 2022	Thursday, May 22, 2025	W 19
Monday, May 2, 2022	Thursday, May 22, 2025	W 19
Tuesday, May 3, 2022	Thursday, May 22, 2025	W 19
Wednesday, May 4, 2022	Thursday, May 22, 2025	W 19
Thursday, May 5, 2022	Thursday, May 22, 2025	W 19
Friday, May 6, 2022	Thursday, May 22, 2025	W 19
Saturday, May 7, 2022	Thursday, May 22, 2025	W 19
Sunday, May 8, 2022	Thursday, May 22, 2025	W 20
Monday, May 9, 2022	Thursday, May 22, 2025	W 20
Tuesday, May 10, 2022	Thursday, May 22, 2025	W 20

Figure 22. dim_date table rows

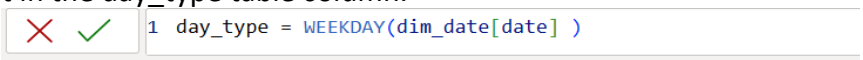
- Created a new column and named it 'wn'.
- See the image below:



date	mmm yy	week no	WN
Sunday, May 1, 2022	Thursday, May 22, 2025	W 19	19
Monday, May 2, 2022	Thursday, May 22, 2025	W 19	19
Tuesday, May 3, 2022	Thursday, May 22, 2025	W 19	19
Wednesday, May 4, 2022	Thursday, May 22, 2025	W 19	19
Thursday, May 5, 2022	Thursday, May 22, 2025	W 19	19
Friday, May 6, 2022	Thursday, May 22, 2025	W 19	19

Figure 23. New WN table column created

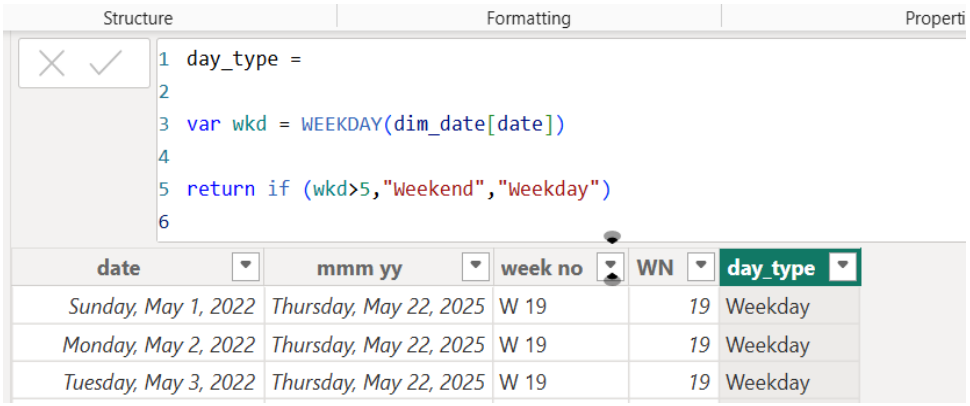
- Recall we removed a column called the weekday column.
- So I recreated it in the day_type table column.



date	mmm yy	week no	WN	day_type
Sunday, May 1, 2022	Thursday, May 22, 2025	W 19	19	1
Monday, May 2, 2022	Thursday, May 22, 2025	W 19	19	2
Tuesday, May 3, 2022	Thursday, May 22, 2025	W 19	19	3
Wednesday, May 4, 2022	Thursday, May 22, 2025	W 19	19	4
Thursday, May 5, 2022	Thursday, May 22, 2025	W 19	19	5
Friday, May 6, 2022	Thursday, May 22, 2025	W 19	19	6
Saturday, May 7, 2022	Thursday, May 22, 2025	W 19	19	7

Figure 24. day_type column

- Write a syntax for the "day_type" column that differentiates the weekdays and weekend, I this case, Friday and Saturday being the weekends.



date	mmm yy	week no	WN	day_type
Sunday, May 1, 2022	Thursday, May 22, 2025	W 19	19	Weekday
Monday, May 2, 2022	Thursday, May 22, 2025	W 19	19	Weekday
Tuesday, May 3, 2022	Thursday, May 22, 2025	W 19	19	Weekday

Figure 25. day_type syntax

CREATE MEASURES

- A measure is a formula for a calculation that is evaluated **dynamically at the time you use it** in a report. The result of a measure depends on the context of the visualization (e.g., the filters applied, the rows and columns in a table).
- In order to group them in categories, I created the "Key_Measures" from the "Enter data" icon at the top.
- See the image below:

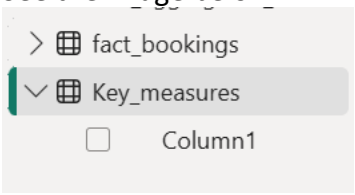


Figure 26. Key measures

Under the key Measures, create the New Measure: "Revenue"

```
1 Revenue = SUM(fact_bookings[revenue_realized])
```

Figure 27. Revenue Measures

- Click enter, then drag and drop

KEY MEASURES:

- The following image displays some of the Key measures created:

Figure 28. All Key Measures

STEP4: CREATING THE DASHBOARD

- After creating the key measures, the next step is to create a table in the report view with all the necessary columns. i.e. the “property_id”, “city” etc.
- See in the image displayed below:

property_id	property_name	city	Revenue	Total Bookings	RevPAR	Occupancy %	ADR	DSRN	DBRN	DURN	Realisation %	Cancellation
19558	Atliq Grands	Bangalore	54494340	4371	5,535.79	0.44	12,467.25	107.00	47.51	33.27	0.70	0.
19559	Atliq Exotica	Bangalore	60023460	4705	6,867.67	0.54	12,757.38	95.00	51.14	36.23	0.71	0.
19560	Atliq City	Bangalore	81876345	5979	8,989.50	0.66	13,693.99	99.00	64.99	44.92	0.69	0.
19561	Atliq Blu	Bangalore	72963360	5736	6,778.46	0.53	12,720.25	117.00	62.35	43.51	0.70	0.
19562	Atliq Bay	Bangalore	82443540	5812	9,334.64	0.66	14,185.06	96.00	63.17	44.51	0.70	0.
19563	Atliq Palace	Bangalore	68596005	5413	6,778.26	0.53	12,672.46	110.00	58.84	40.87	0.69	0.
16558	Atliq Grands	Delhi	36061172	3153	7,537.87	0.66	11,437.10	52.00	34.27	24.00	0.70	0.
16560	Atliq City	Delhi	54932178	4693	6,285.15	0.54	11,705.13	95.00	51.01	36.28	0.71	0.
16561	Atliq Blu	Delhi	57933400	4418	8,626.18	0.66	13,113.04	73.00	48.02	33.55	0.70	0.
16562	Atliq Bay	Delhi	56437570	4820	6,259.71	0.53	11,709.04	98.00	52.39	36.30	0.69	0.
16563	Atliq Palace	Delhi	89135998	7147	8,280.94	0.66	12,471.81	117.00	77.68	54.37	0.70	0.
18558	Atliq Grands	Hyderabad	46246510	4475	5,523.95	0.53	10,334.42	91.00	48.64	33.96	0.70	0.
Total			**1708771229**	**134590**	**7,347.15**	**0.58**	**12,696.12**	**2,528.00**	**1,462.93**	**1,026.21**	**0.70**	**0.**

Figure 29. Major key measures in a table in the report view

- Notice in “dim_table”, week number column, week 32 has only one day.
- Therefore, there is need to filter it out since it has only one day.
- To do this, I place the ‘week_no’ column in the filter box.

Figure 30. Filter week no 32

- See in the image below:

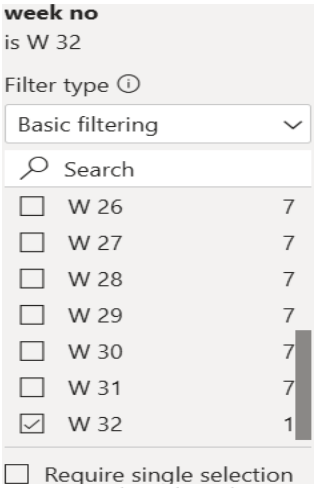
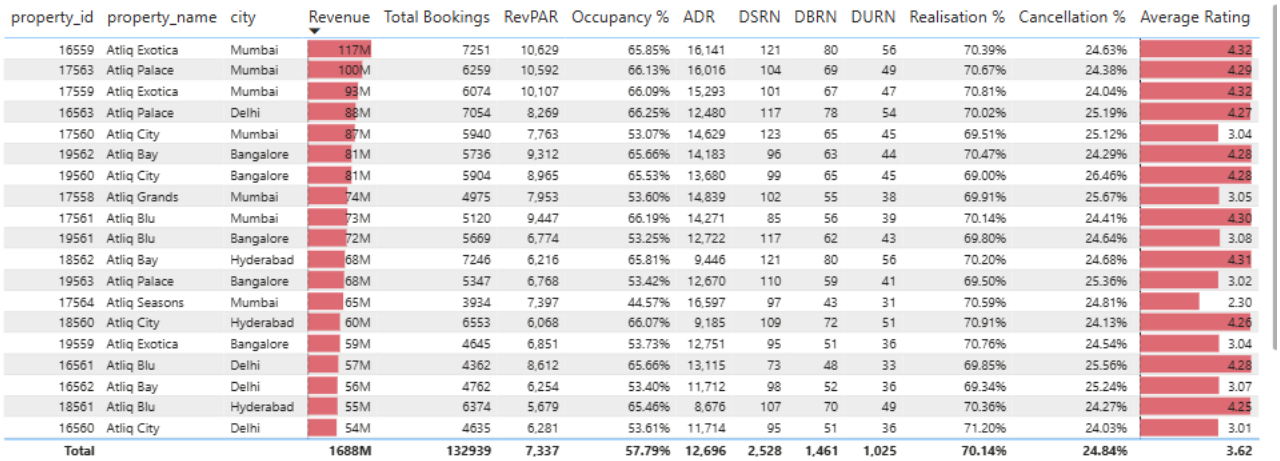


Figure 31. Filtered week

- Format the Revenue column to be in millions and have 0 decimal places
- See in the image below:

Figure 32. Formatted Revenue Column

- Format all the columns to the desired visualization
- See the final visualization of this table:



property_id	property_name	city	Revenue	Total Bookings	RevPAR	Occupancy %	ADR	DSRN	DBRN	DURN	Realisation %	Cancellation %	Average Rating
16559	Atliq Exotica	Mumbai	117M	7251	10,629	65.85%	16,141	121	80	56	70.39%	24.63%	4.32
17563	Atliq Palace	Mumbai	100M	6259	10,592	66.13%	16,016	104	69	49	70.67%	24.38%	4.29
17559	Atliq Exotica	Mumbai	93M	6074	10,107	66.09%	15,293	101	67	47	70.81%	24.04%	4.32
16563	Atliq Palace	Delhi	88M	7054	8,269	66.25%	12,480	117	78	54	70.02%	25.19%	4.27
17560	Atliq City	Mumbai	87M	5940	7,763	53.07%	14,629	123	65	45	69.51%	25.12%	3.04
19562	Atliq Bay	Bangalore	81M	5736	9,312	65.66%	14,183	96	63	44	70.47%	24.29%	4.28
19560	Atliq City	Bangalore	81M	5904	8,965	65.53%	13,680	99	65	45	69.00%	26.46%	4.28
17558	Atliq Grands	Mumbai	74M	4975	7,953	53.60%	14,839	102	55	38	69.91%	25.67%	3.05
17561	Atliq Blu	Mumbai	73M	5120	9,447	66.19%	14,271	85	56	39	70.14%	24.41%	4.30
19561	Atliq Blu	Bangalore	72M	5669	6,774	53.25%	12,722	117	62	43	69.80%	24.64%	3.08
18562	Atliq Bay	Hyderabad	68M	7246	6,216	65.81%	9,446	121	80	56	70.20%	24.68%	4.31
19563	Atliq Palace	Bangalore	68M	5347	6,768	53.42%	12,670	110	59	41	69.50%	25.36%	3.02
17564	Atliq Seasons	Mumbai	65M	3934	7,397	44.57%	16,597	97	43	31	70.59%	24.81%	2.30
18560	Atliq City	Hyderabad	60M	6553	6,068	66.07%	9,185	109	72	51	70.91%	24.13%	4.26
19559	Atliq Exotica	Bangalore	59M	4645	6,851	53.73%	12,751	95	51	36	70.76%	24.54%	3.04
16561	Atliq Blu	Delhi	57M	4362	8,612	65.66%	13,115	73	48	33	69.85%	25.56%	4.28
16562	Atliq Bay	Delhi	56M	4762	6,254	53.40%	11,712	98	52	36	69.34%	25.24%	3.07
18561	Atliq Blu	Hyderabad	55M	6374	5,679	65.46%	8,676	107	70	49	70.36%	24.27%	4.25
16560	Atliq City	Delhi	54M	4635	6,281	53.61%	11,714	95	51	36	71.20%	24.03%	3.01
Total			**1688M**	**132939**	**7,337**	**57.79%**	**12,696**	**2,528**	**1,461**	**1,025**	**70.14%**	**24.84%**	**3.62**

Figure 33. Key Metrics Visualization

- Created the required Filters.
- See in the image below:

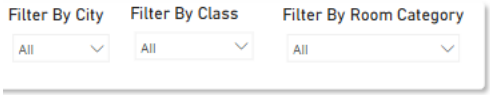


Figure 34. Filters in slicer visualization

- i.e.
  - Filter by City
  - Filter by Class
  - Filter By rom category
- See more for the months and week number:

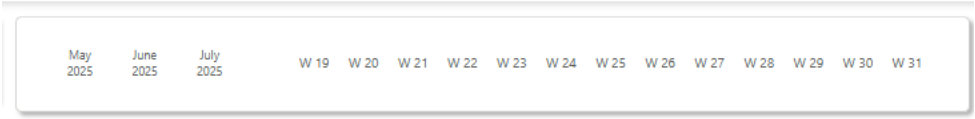


Figure 35. Tiled Filters for months and week_no

- Created a donut visualization for the Revenue by category
- See in the image below:

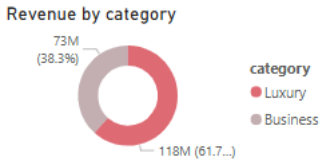


Figure 36. Donut Chart

- The next step, created a line chart that displays the trends by metrics of RevPar, ADR, Occupancy % against week number.
- See in the image displayed below:

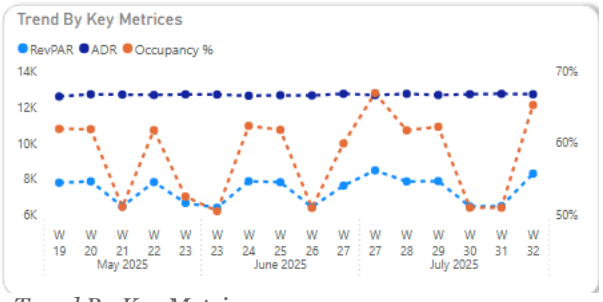


Figure 37. Trend By Key Metrices

- The next step was creating cards that visualize the Revenue, ADR, Occupancy %, RevPar, DSRN and Realisation.
- See the image below:

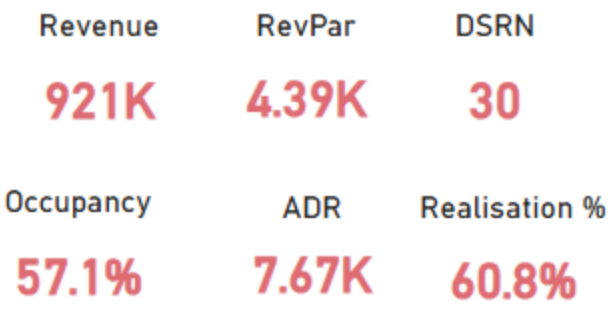


Figure 38. Card Visualizations

- To apply the concept of reduction and increase in i.e. Revenue WOW Change %, I applied some conditional settings to the cell elements.
- See in the image below:

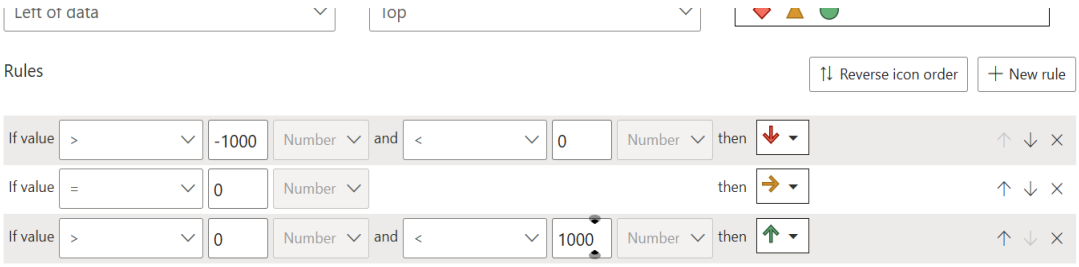


Figure 39. Increase or decrease Concept

- After the changes were made:

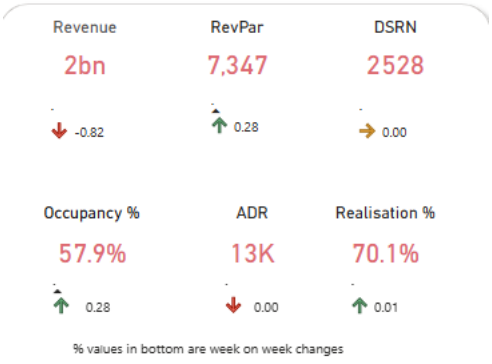


Figure 40 . Applied changes to display a change in the various cards

- For revenue Card, I set a tooltip that enables one to view a line chart for revenue and week no when hoovering on it.
- See in the chart in the image below:

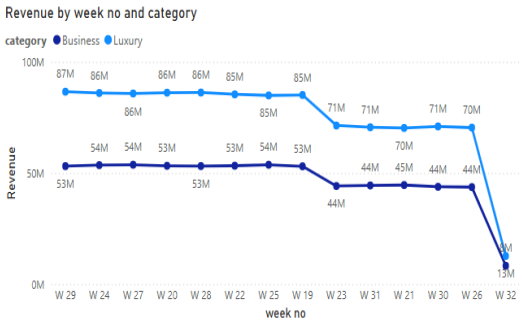


Figure 41. Revenue tooltip

- Hoover on the DSRN card, the following Line Chart of Occupancy % by week no andday_type shows:

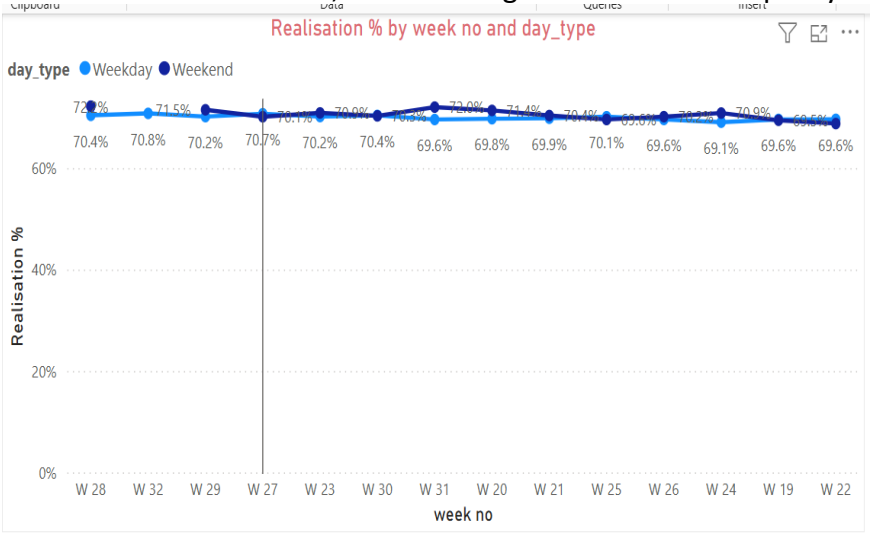


Figure 42. DSRN tooltip

- Applied the same for the Occupancy %
- See in the image below:

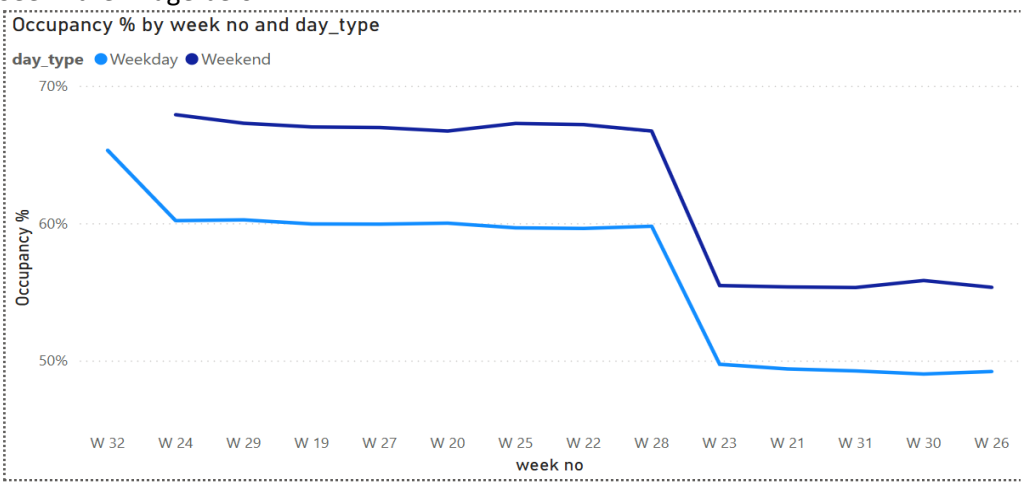


Figure 43. Occupancy% Tooltip

Line and stacked column chat for the Realisation % for every booking Platform.

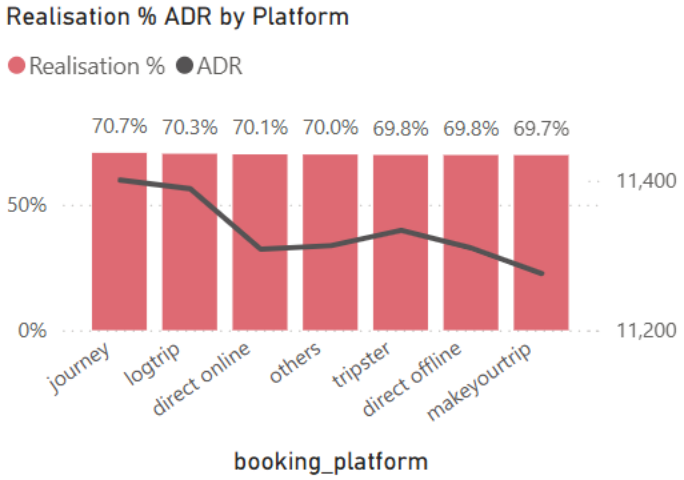


Figure 44. Line and stacked column chat: Realisation %

- Included a text for the created visualization cards and a line below it to separate the visualization elements.
- See the image below:

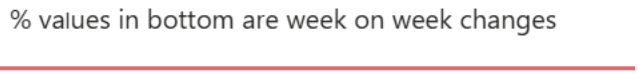


Figure 45. Text visualization

FINAL DASHBOARD

- See the following image for the final dashboard created:

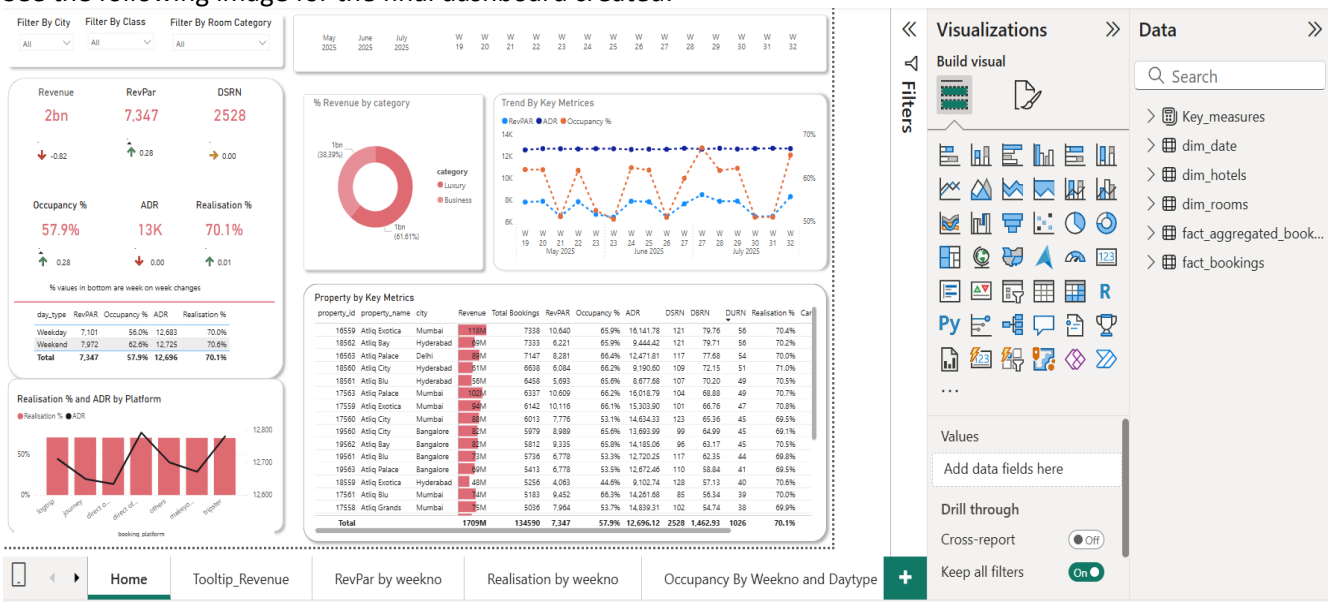


Figure 46. Final Dashboard Report

Business Recommendation

1. Identify slow-performing products or rooms for improvement.

2. Adjust pricing during low-occupancy seasons.

3. Invest in high-margin services for better profitability.

STEP 5: PUBLISH

Link to the report assignment:
https://drive.google.com/file/d/1U7hRPGJVLRrHJ1Wx5tkd4o9P5e1FIXva/view?usp=sharing

~I uploaded my work report to google drive and shared the link to it since I was unable to publish with a required account.
~The files in the link can be downloaded and viewed/reviewed.

CONCLUSION

- In conclusion, this business intelligence project successfully transformed a complex hospitality dataset into actionable insights using Microsoft Power BI.
- The journey from raw hospitality data to the interactive dashboards presented in this report highlights the transformative power of business intelligence.
- By visualizing complex metrics within Power BI, I have distilled a clear narrative from the numbers.
- The analysis brought to light crucial patterns, including the identification of the most profitable customer demographics and unexpected trends in weekend vs. weekday occupancy rates.
- These visualizations do more than just present data; they provide a foundation for strategic conversations and informed decision-making.
- The project underscores that for a hotel to thrive; it must understand its own data story.
- The resulting dashboards serve as an ongoing resource for navigating the competitive hospitality market and continuously discovering opportunities for growth and enhanced guest satisfaction.