

Data and Artificial Intelligence

Cyber Shujaa Program

Week 4 Assignment

Business Intelligence on Power BI

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Introduction

Records analytics has become an essential tool for supporting strategic decision-making in the modern world, where operational performance and financial sustainability are critical. This project uses Microsoft Power BI to create an interactive dashboard that captures critical financial and operational data for the hotel management.

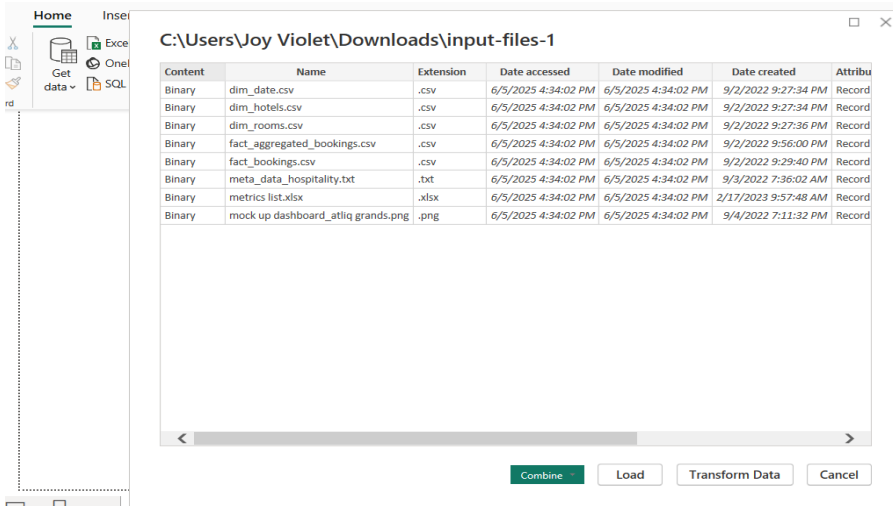
Tasks Completed

1. Understand the Hotel business and client needs

AtliQ Grands owns multiple five-star hotels across India. They have been in the hospitality industry for the past 20 years. Due to strategic moves from other competitors and ineffective decision-making in management, AtliQ Grands are losing its market share and revenue in the luxury/business hotels category. As a strategic move, the managing director of AtliQ Grands wanted to incorporate “Business and Data Intelligence” to regain their market share and revenue. However, they do not have an in-house data analytics team to provide them with these insights. Their revenue management team had decided to hire a 3rd party service provider to provide them with insights from their historical data.

2. Load Data

Data was imported from hotel records into Power BI to enable integrated analysis and real-time decision-making.



C:\Users\Joy Violet\Downloads\input-files-1

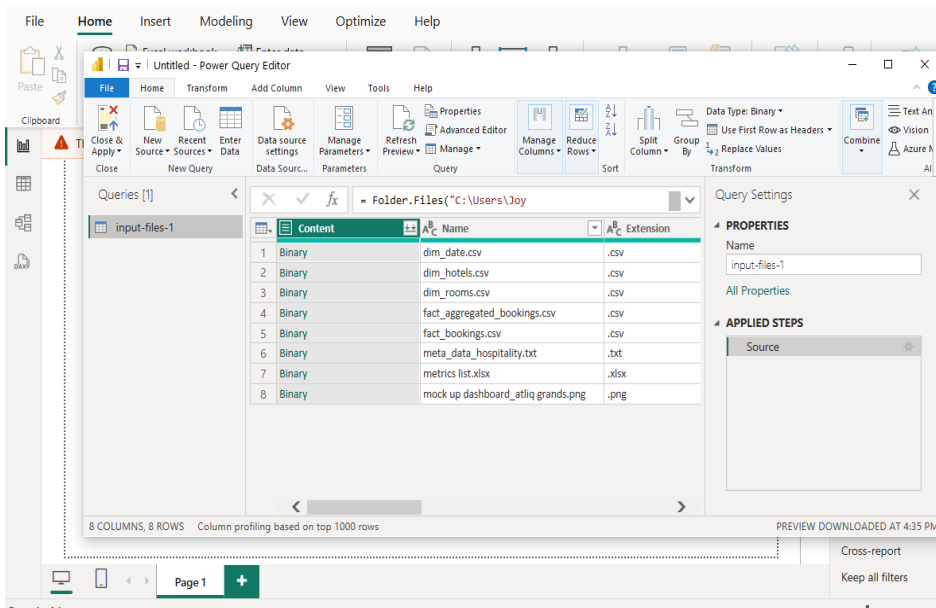
Content	Name	Extension	Date accessed	Date modified	Date created	Attribu
Binary	dim_date.csv	.csv	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	9/2/2022 9:27:34 PM	Record
Binary	dim_hotels.csv	.csv	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	9/2/2022 9:27:34 PM	Record
Binary	dim_rooms.csv	.csv	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	9/2/2022 9:27:36 PM	Record
Binary	fact_aggregated_bookings.csv	.csv	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	9/2/2022 9:56:00 PM	Record
Binary	fact_bookings.csv	.csv	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	9/2/2022 9:29:40 PM	Record
Binary	meta_data_hospitality.txt	.txt	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	9/3/2022 7:36:02 AM	Record
Binary	metrics list.xlsx	.xlsx	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	2/17/2023 9:57:48 AM	Record
Binary	mock up dashboard_atliq grands.png	.png	6/5/2025 4:34:02 PM	6/5/2025 4:34:02 PM	9/4/2022 7:11:32 PM	Record

Combine Load Transform Data Cancel

Fig 2.1;Output of loading data in power bi

3. Transform Data

One of the first steps in getting raw data ready for analysis is data transformation. Data from hotel record was cleaned, reshaped, and standardized in this project using Microsoft Power BI's Power Query Editor to make sure it was appropriate for trustworthy business intelligence reporting. Several crucial steps were involved in the transformation process



Folder.Files("C:\Users\Joy")

Content	Name	Extension
1 Binary	dim_date.csv	.csv
2 Binary	dim_hotels.csv	.csv
3 Binary	dim_rooms.csv	.csv
4 Binary	fact_aggregated_bookings.csv	.csv
5 Binary	fact_bookings.csv	.csv
6 Binary	meta_data_hospitality.txt	.txt
7 Binary	metrics list.xlsx	.xlsx
8 Binary	mock up dashboard_atliq grands.png	.png

8 COLUMNS, 8 ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED AT 4:35 PM

Page 1

Fig 3.1;Output of transforming data

We duplicate the csv files in order to be able to rename them respectively e.g dim_date

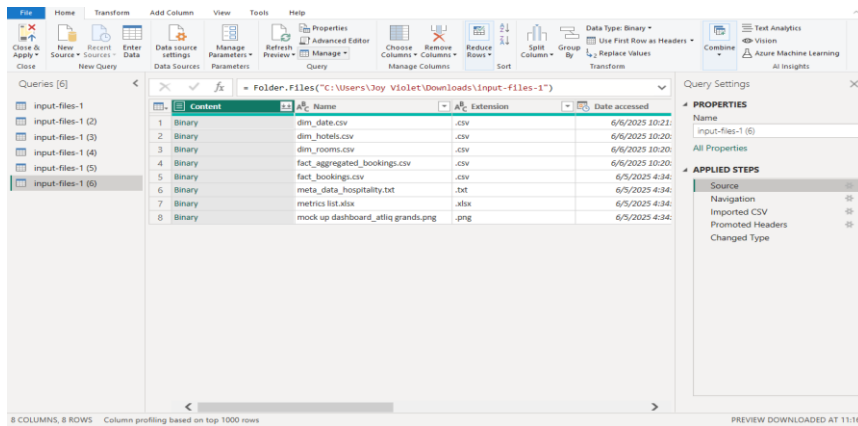


Figure 3.2 shows the output of duplicating the inserted input-files. The screenshot displays the Power BI Desktop interface with the 'Queries' pane on the left showing 'input-files-1 (6)' selected. The main view shows a table with 8 columns: Content, Name, Extension, and Date accessed. The table lists various input files like dim_date.csv, dim_hotels.csv, dim_rooms.csv, fact_aggregated_bookings.csv, fact_bookings.csv, meta_data_hospitality.txt, metrics_list.xlsx, and mock_up_dashboard_atliq_grands.png.

Fig 3.2;Output of duplicating the inserted input-files

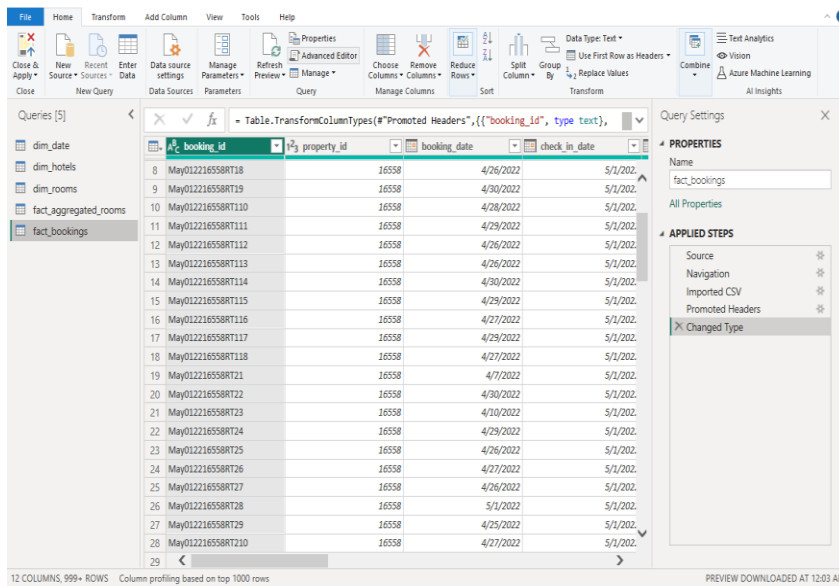


Figure 3.3 shows the output of all the tables. The screenshot displays the Power BI Desktop interface with the 'Queries' pane on the left showing 'fact_bookings' selected. The main view shows a table with 5 columns: booking_id, property_id, booking_date, check_in_date, and check_out_date. The table lists various booking records with dates ranging from May 2021 to May 2022.

Fig 3.3;Output of all the tables

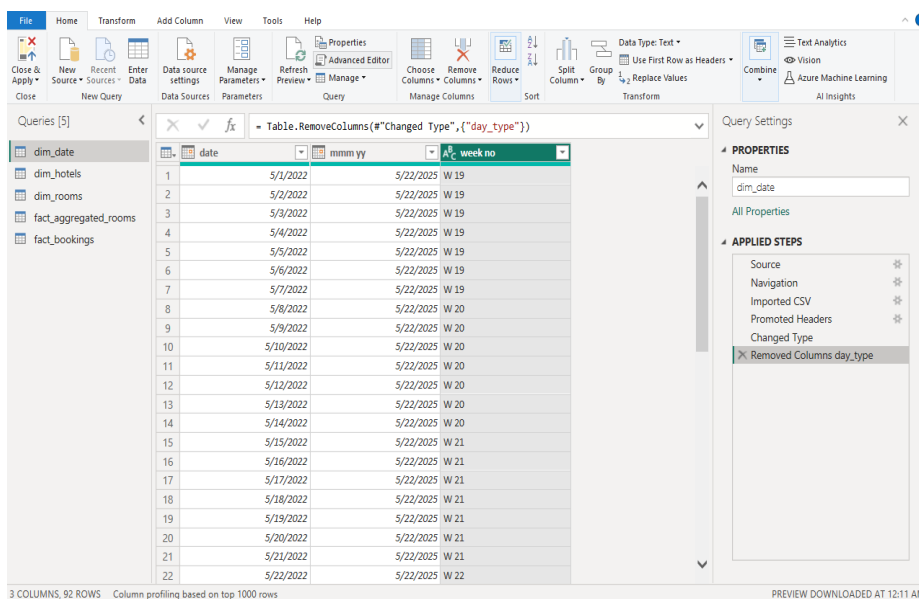


Figure 3.4 shows the output of all the tables. The screenshot displays the Power BI Desktop interface with the 'Queries' pane on the left showing 'dim_date' selected. The main view shows a table with 3 columns: date, mmm yy, and week no. The table lists various dates from 5/1/2022 to 5/22/2022.

Fig 3.4; Output of removing column day_type

4. Data modelling

One of the most important steps in creating a solid and expandable Power BI solution is data modeling. Here we establish the relationship between tables. We use the star schema where all the facts table are placed in the middle and surround them with dimensional tables

To guarantee clarity and enhance performance, the star schema modeling technique was used. This required separating dimension tables (like dim_date, dim_hotels, dim_rooms) from fact tables (fact_aggregated_bookings, fact_bookings).

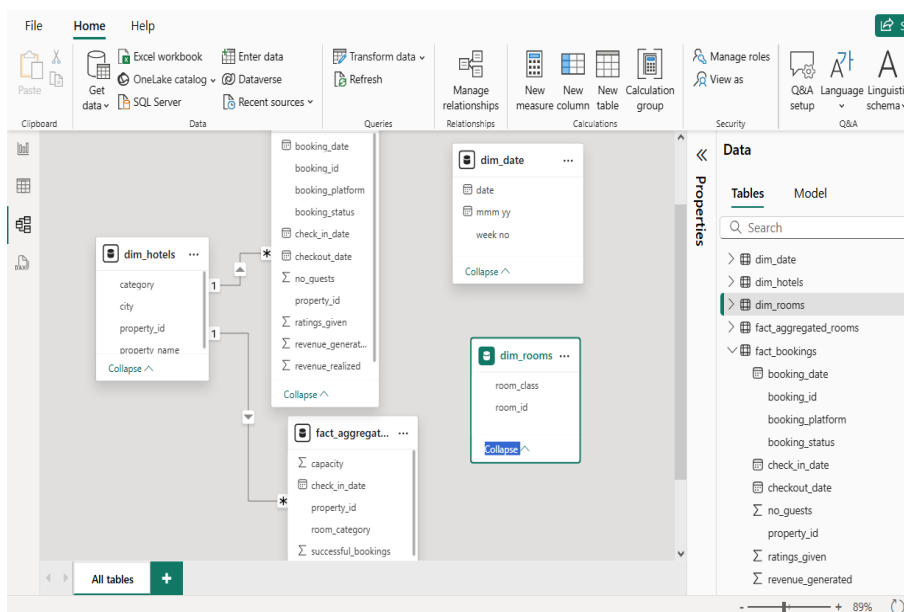


Fig 4.1; Output of the star schema

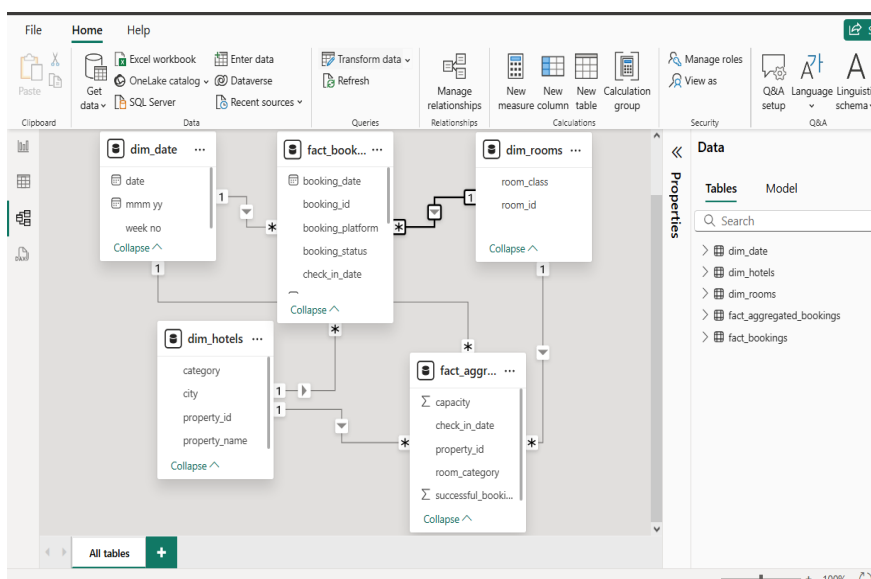
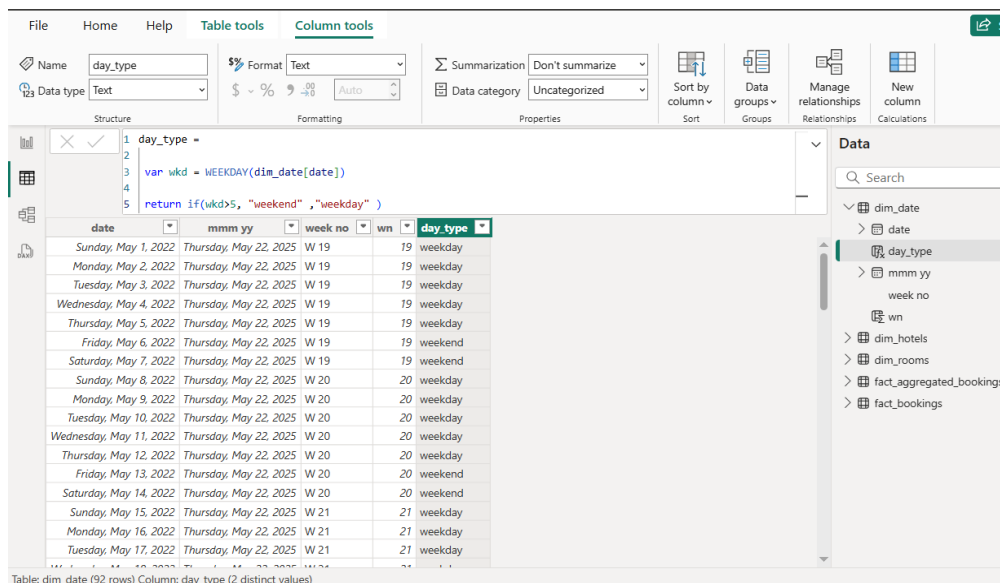


Fig 4.2; Output of the star schema with all the relationships established

5. Building on DAX schema

The use of DAX (Data Analysis Expressions), a potent formula language intended to carry out dynamic computations and aggregations on data, was crucial to the development of the analytical model in Power BI. The dashboard's analytical capabilities are powered by calculated columns and meaningful measures that were built using the DAX schema as a foundation. All things considered, DAX was essential to the Power BI model's ability to support scenario analysis, advanced analytics, and performance benchmarking

I created calculated columns which is wn and datatype



The screenshot shows the Power BI Desktop interface. The 'Table tools' ribbon is active, and the 'Column tools' tab is selected. The 'Name' field is set to 'day_type' and the 'Data type' is 'Text'. The DAX formula bar contains the following code:

```
1 day_type =
2
3 var wk = WEEKDAY(dim_date[date])
4
5 return if(wk>5, "weekend", "weekday")
```

The data table below shows the output of this formula:

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
Wednesday, May 4, 2022	Thursday, May 22, 2025	W 19	19	weekday
Thursday, May 5, 2022	Thursday, May 22, 2025	W 19	19	weekday
Friday, May 6, 2022	Thursday, May 22, 2025	W 19	19	weekend
Saturday, May 7, 2022	Thursday, May 22, 2025	W 19	19	weekend
Sunday, May 8, 2022	Thursday, May 22, 2025	W 20	20	weekday
Monday, May 9, 2022	Thursday, May 22, 2025	W 20	20	weekday
Tuesday, May 10, 2022	Thursday, May 22, 2025	W 20	20	weekday
Wednesday, May 11, 2022	Thursday, May 22, 2025	W 20	20	weekday
Thursday, May 12, 2022	Thursday, May 22, 2025	W 20	20	weekday
Friday, May 13, 2022	Thursday, May 22, 2025	W 20	20	weekend
Saturday, May 14, 2022	Thursday, May 22, 2025	W 20	20	weekend
Sunday, May 15, 2022	Thursday, May 22, 2025	W 21	21	weekday
Monday, May 16, 2022	Thursday, May 22, 2025	W 21	21	weekday
Tuesday, May 17, 2022	Thursday, May 22, 2025	W 21	21	weekday

Table: dim_date (92 rows) Column: day_type (2 distinct values)

Fig 5.1; Output on creating new columns on table dim_date

Now we create new measures but we group them

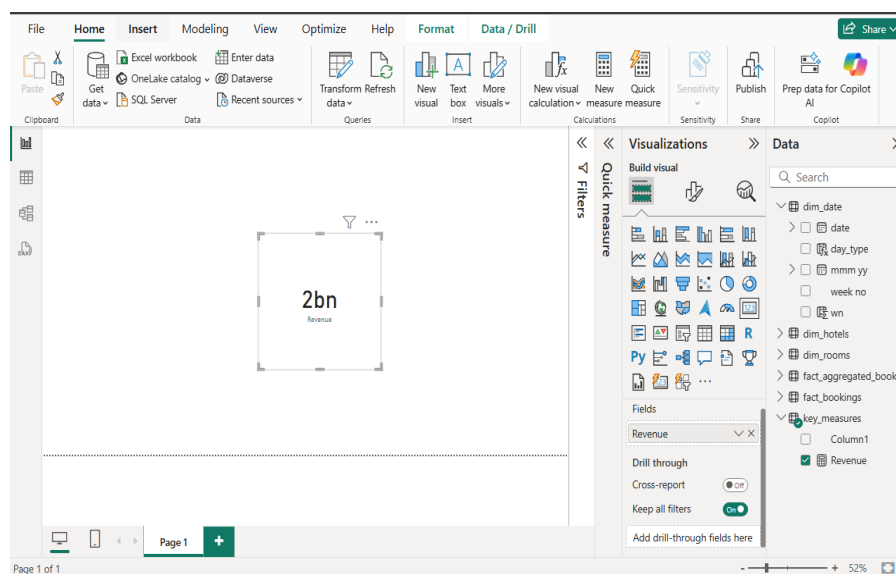


Fig5.2; Output of new measure revenue

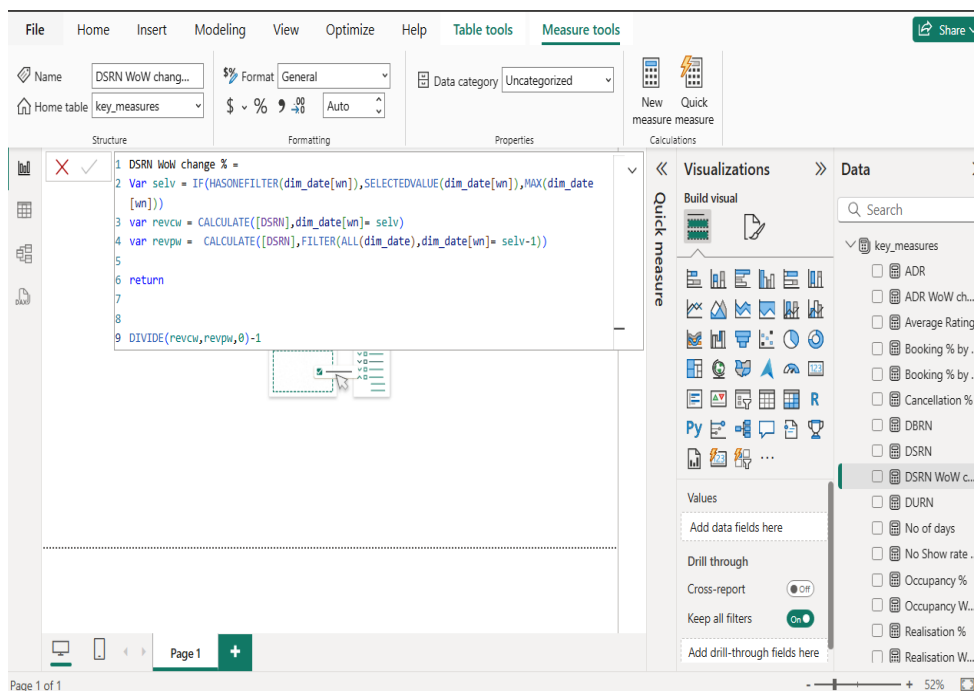


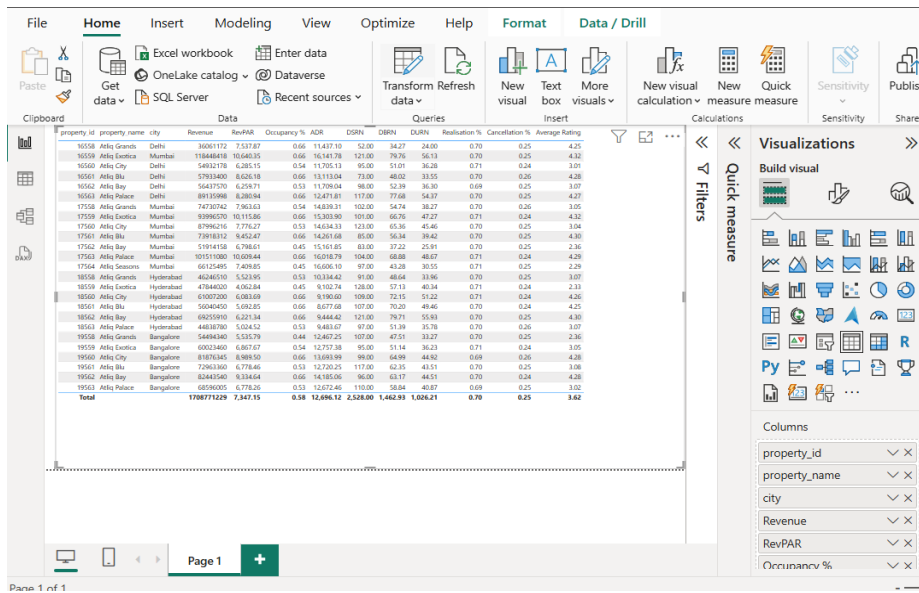
Fig5.3; Output of all the key measures added

6. Building the visuals and dashboards in power bi

Using Microsoft Power BI, the visual and dashboard development phase entailed turning cleaned and organized data into insightful and engaging visual representations. Calculated measures were developed to support dynamic visualizations using DAX (Data Analysis Expressions) and Power BI's user-friendly drag-and-drop interface. These steps permitted real-time interaction while guaranteeing uniformity among visual components. A variety of visuals were used, such as:

- ❖ To compare revenue across hotels and class, use bar and column charts.
- ❖ Line graphs to display trends over time (e.g., revenue).
- ❖ Pie charts and doughnut charts are used to illustrate how much money each class of hotel contributes
- ❖ Tables and a matrix provide in-depth, drill-down views of operational and financial metrics
- ❖ Slicers and filters enable users to interactively explore data by date, month, week

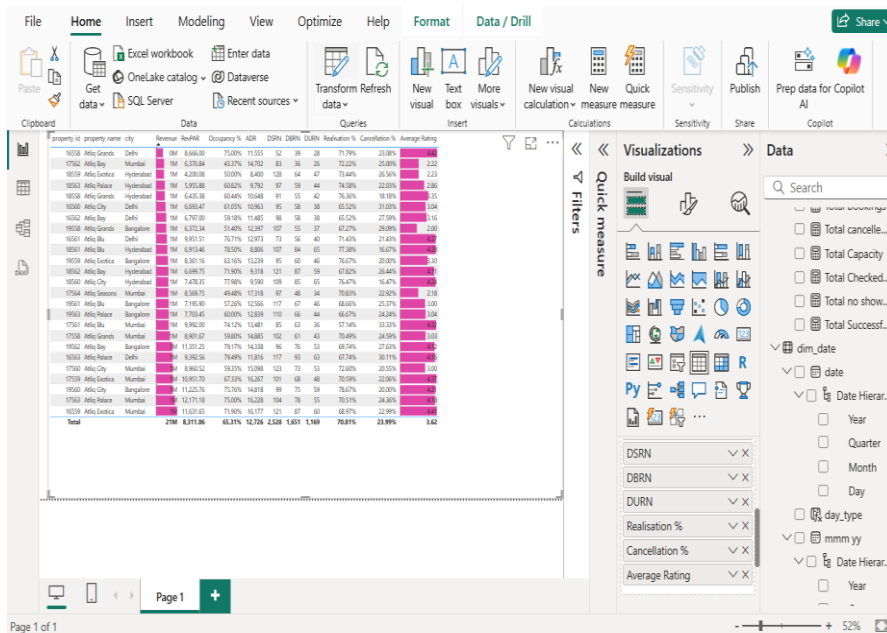
The finished dashboard supported data-driven planning in hotel management and gave decision-makers rapid insights.



property_id	property_name	city	Revenue	RevPAR	Occupancy %	ADR	DSRN	DBRN	DURN	Realisation %	Cancellation %	Average Rating
10108	Atelia Grands	Delhi	36061172	7,537.87	0.66	11,437.10	52.00	34.27	24.00	0.70	0.25	4.25
10109	Atelia Eutelia	Mumbai	11844418	10,640.35	0.66	16,347.78	52.00	79.76	56.13	0.70	0.25	4.32
10100	Atelia City	Delhi	5403170	6,245.15	0.54	11,705.13	95.00	51.01	36.28	0.71	0.24	3.01
10101	Atelia Blu	Delhi	5793340	6,026.18	0.66	13,113.04	73.00	48.02	33.55	0.70	0.26	4.28
10102	Atelia Bay	Delhi	5647720	6,255.71	0.53	11,709.04	88.00	52.39	36.30	0.69	0.25	3.07
10103	Atelia Palace	Delhi	8911986	8,280.94	0.66	12,471.81	117.00	77.68	54.37	0.70	0.25	4.27
17108	Atelia Grands	Mumbai	74730742	7,963.63	0.54	14,839.31	102.00	54.74	38.27	0.70	0.26	3.05
17109	Atelia Eutelia	Mumbai	33996570	10,115.86	0.66	15,302.90	101.00	60.76	47.27	0.71	0.24	4.32
17100	Atelia City	Mumbai	8799216	7,776.27	0.53	14,834.33	123.00	65.36	45.46	0.70	0.25	3.04
17101	Atelia Blu	Mumbai	7391812	6,452.47	0.66	14,261.68	85.00	56.34	39.42	0.70	0.25	4.30
17102	Atelia Bay	Mumbai	5191418	6,788.61	0.45	15,501.85	63.00	37.22	25.51	0.70	0.25	2.36
17103	Atelia Palace	Mumbai	10151100	10,008.44	0.66	16,018.79	104.00	68.88	48.67	0.71	0.24	4.29
17104	Atelia Grands	Mumbai	6125485	7,409.85	0.45	16,006.10	87.00	43.28	30.55	0.71	0.25	2.29
18108	Atelia Eutelia	Hyderabad	40240510	5,552.95	0.53	10,338.42	91.00	48.44	33.86	0.70	0.25	3.07
18109	Atelia City	Hyderabad	4784400	4,062.84	0.45	9,102.74	128.00	57.13	40.34	0.71	0.24	2.33
18100	Atelia Blu	Hyderabad	61007200	6,003.08	0.66	9,190.00	108.00	72.15	51.22	0.71	0.24	4.26
18101	Atelia Bay	Hyderabad	5040400	5,082.85	0.66	8,077.08	107.00	70.20	49.46	0.70	0.24	4.25
18102	Atelia Palace	Hyderabad	6925910	6,221.34	0.66	9,444.42	121.00	79.71	55.83	0.70	0.25	4.30
18103	Atelia Grands	Hyderabad	4483700	5,054.52	0.53	9,443.47	87.00	51.39	35.78	0.70	0.26	3.07
19108	Atelia Eutelia	Bangalore	54484340	5,535.79	0.44	12,402.25	107.00	47.51	33.27	0.70	0.25	2.36
19109	Atelia City	Bangalore	6002340	6,867.67	0.54	12,757.38	95.00	51.14	36.23	0.71	0.24	3.05
19100	Atelia Blu	Bangalore	8101340	8,089.50	0.66	13,683.98	99.00	64.89	44.82	0.69	0.26	4.28
19101	Atelia Bay	Bangalore	7296330	6,778.46	0.53	12,702.25	117.00	62.35	43.51	0.70	0.25	3.08
19102	Atelia Palace	Bangalore	8244550	9,346.06	0.66	14,180.05	96.00	63.17	44.51	0.70	0.24	4.26
19103	Atelia Grands	Bangalore	6055005	6,778.26	0.53	12,672.46	110.00	58.54	40.87	0.69	0.25	3.02
Total			1788771229	7,347.15	0.58	12,696.12	2,528.00	1,462.51	1,026.21	0.70	0.25	3.62

Fig 6.1; Output of all the columns needed

Filter week 32 since it has only one single value confirm on dim_date table



property_id	property_name	city	Revenue	RevPAR	Occupancy %	ADR	DSRN	DBRN	DURN	Realisation %	Cancellation %	Average Rating
10108	Atelia Grands	Delhi	IM	8,660.80	75.00%	11,555	52	38	28	71.79%	23.08%	4.24
17102	Atelia Bay	Mumbai	IM	6,370.84	43.37%	14,762	83	36	26	72.22%	25.00%	2.22
10109	Atelia Eutelia	Hyderabad	IM	4,203.08	50.00%	8,400	53	47	34	74.49%	25.00%	2.23
10103	Atelia Palace	Hyderabad	IM	5,905.88	68.82%	8,702	57	59	44	74.58%	22.03%	2.86
10108	Atelia Grands	Hyderabad	IM	4,435.38	60.48%	10,548	91	55	42	76.36%	18.38%	3.35
10100	Atelia Blu	Delhi	IM	6,683.47	61.02%	10,950	95	38	38	81.52%	31.03%	3.44
10102	Atelia Bay	Delhi	IM	6,787.80	59.18%	11,485	98	58	38	85.52%	27.09%	3.16
10108	Atelia Grands	Bangalore	IM	6,352.34	51.40%	12,397	107	55	37	87.27%	29.89%	2.80
10101	Atelia Blu	Delhi	IM	8,905.51	73.71%	12,073	73	65	49	74.40%	21.43%	3.89
10103	Atelia Palace	Hyderabad	IM	6,913.45	78.02%	8,806	107	84	65	77.38%	16.07%	4.28
10109	Atelia Eutelia	Bangalore	IM	6,361.56	62.10%	13,239	95	60	46	76.67%	20.00%	3.70
18102	Atelia Bay	Hyderabad	IM	6,088.75	71.90%	8,318	101	87	58	81.82%	26.44%	3.80
18100	Atelia City	Hyderabad	IM	7,478.35	77.88%	9,590	109	85	65	76.47%	16.47%	4.23
17104	Atelia Grands	Mumbai	IM	6,588.75	49.48%	13,318	97	48	34	78.83%	22.92%	2.18
10101	Atelia Blu	Mumbai	IM	7,110.38	72.20%	12,566	117	47	46	86.60%	25.17%	4.30
19103	Atelia Palace	Bangalore	IM	7,703.45	60.00%	12,839	110	66	44	86.67%	24.24%	3.14
17101	Atelia Blu	Mumbai	IM	8,902.00	74.12%	13,881	85	63	36	87.14%	33.33%	3.88
17108	Atelia Grands	Mumbai	IM	8,861.67	58.80%	14,885	102	61	43	76.49%	24.99%	3.40
10102	Atelia Bay	Bangalore	IM	11,301.25	78.17%	14,338	96	76	53	88.74%	27.63%	4.27
10103	Atelia Palace	Delhi	IM	6,362.56	76.49%	11,816	117	83	63	87.74%	30.11%	4.35
17108	Atelia City	Mumbai	IM	8,962.52	59.55%	15,098	123	73	53	82.08%	20.51%	3.40
17109	Atelia Eutelia	Mumbai	IM	10,903.70	67.33%	16,207	101	68	48	79.59%	22.06%	3.89
17100	Atelia Blu	Bangalore	IM	11,225.75	75.70%	14,818	89	75	59	78.67%	20.00%	4.29
17102	Atelia Palace	Mumbai	IM	15,171.18	70.00%	21,628	104	78	55	81.71%	24.95%	4.28
10109	Atelia Eutelia	Mumbai	IM	11,621.05	71.90%	16,177	121	67	60	88.97%	22.99%	4.44
Total			219	8,311.06	63.31%	12,726	2,528	1,467	1,160	78.87%	23.99%	3.62

Fig 6.2; Output of visual presentation of revenue and average ratings

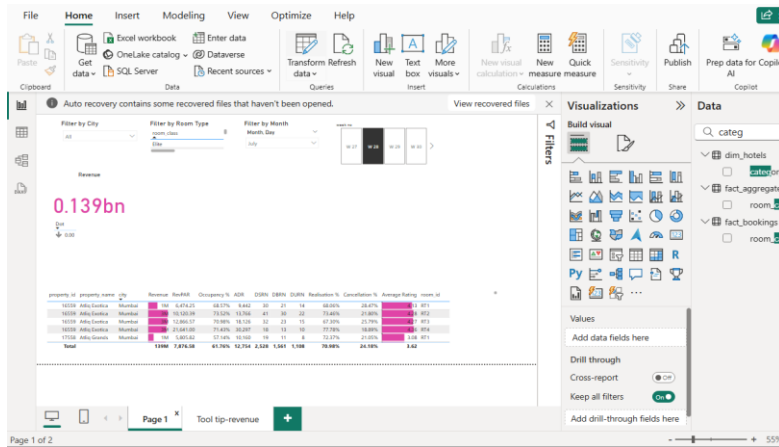


Fig 6.3; Output of revenue

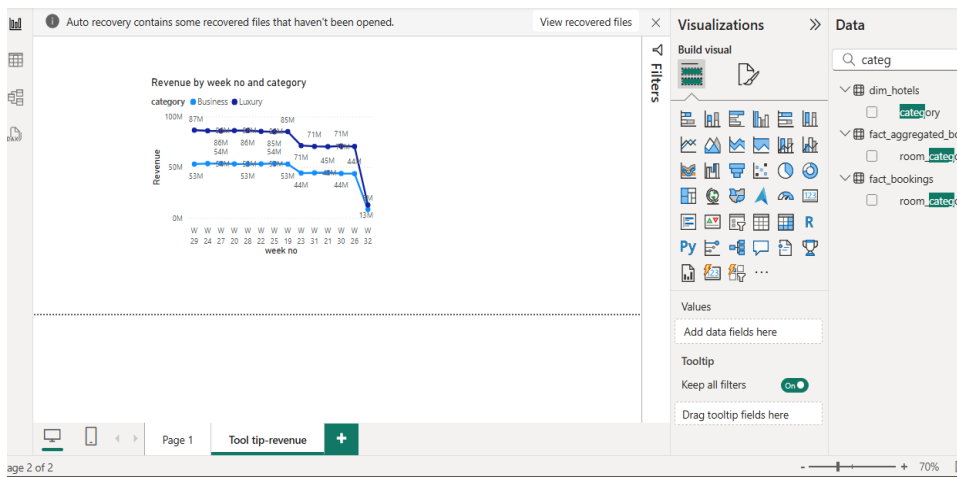


Fig 6.4; Output of tool tip_revenue

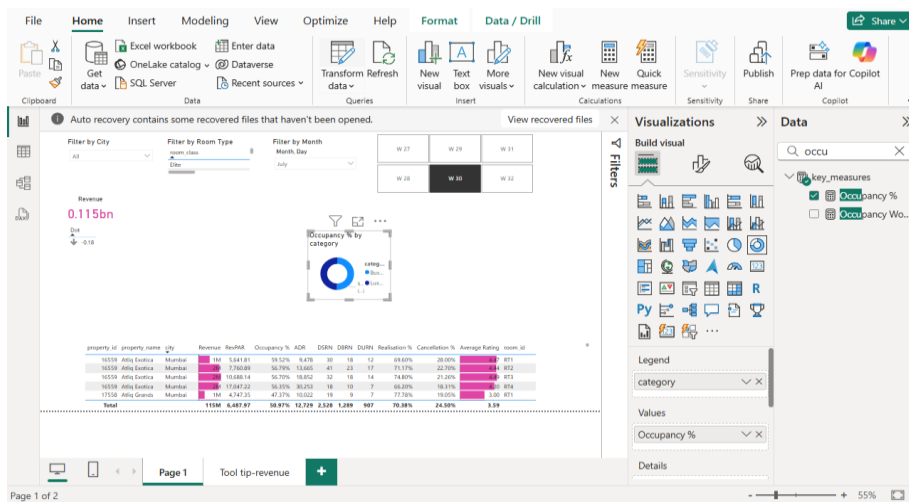


Fig 6.5; Output of occupancy by category

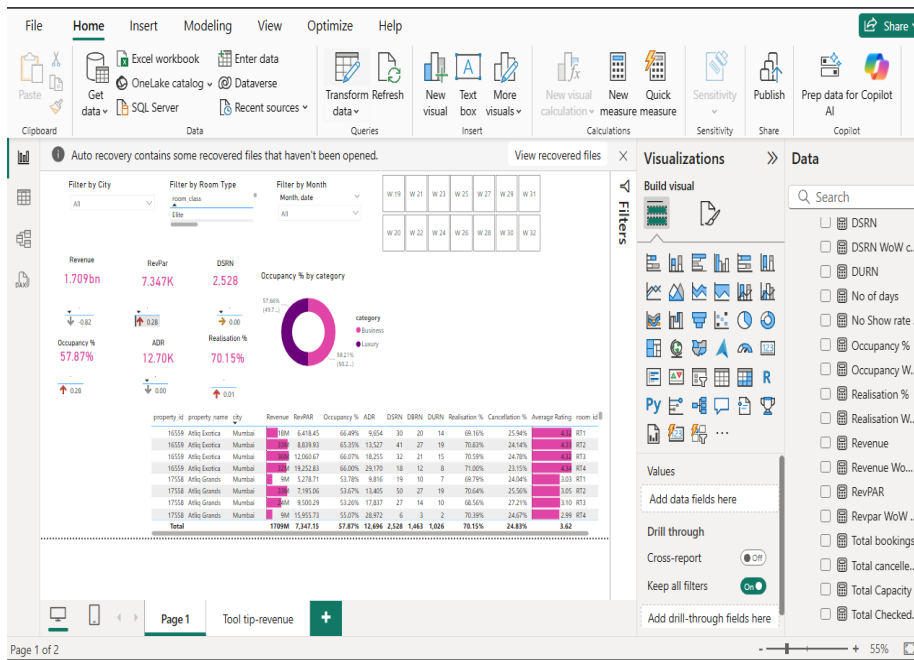


Fig 6.6; Output of revenue, rev par, occupancy, ADR, DSRN, realisation

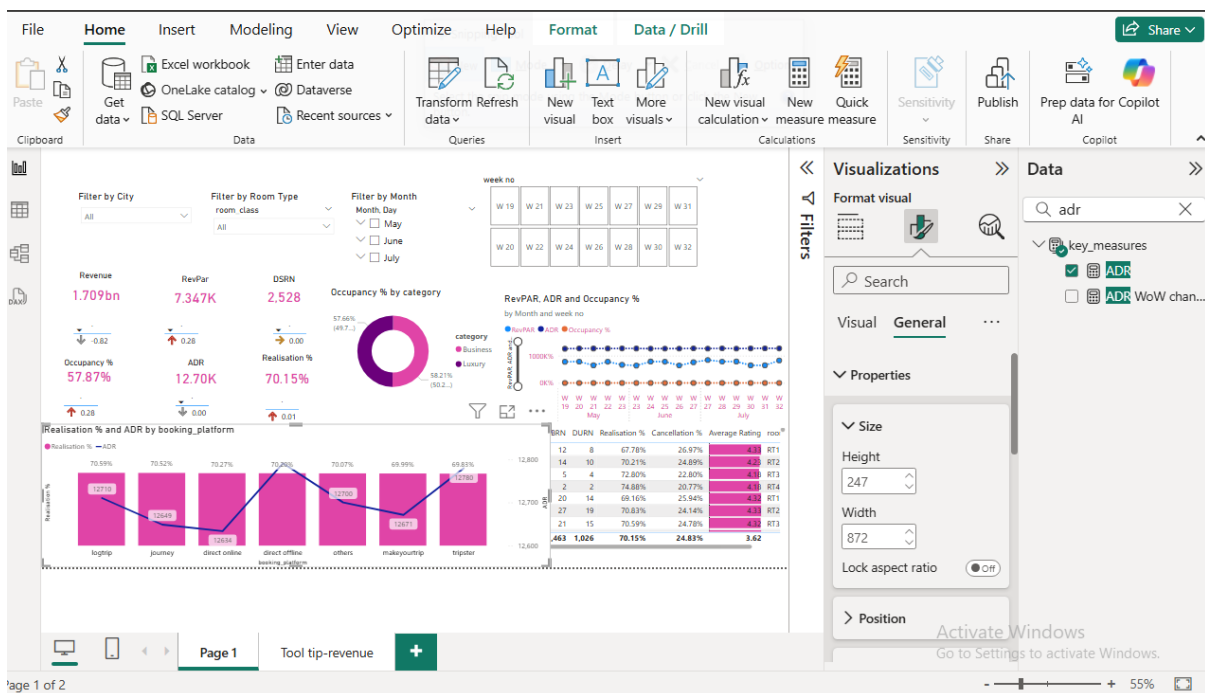
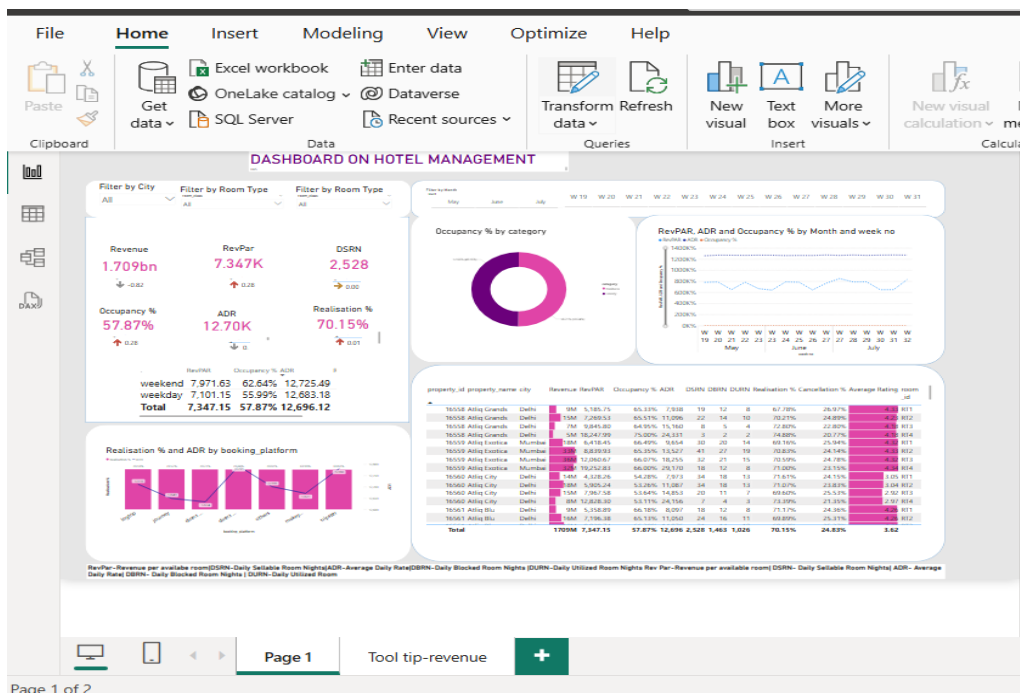


Fig 6.7; Output of realisation and ADR against booking_platform



This study demonstrates the effective application of business intelligence in the hotel industry specifically in relation to hotel management. Microsoft Power BI was used to transform large and complex datasets into interactive dashboards that provide insightful data about financial and operational performance. With the aid of the created

visualizations, important data such as total revenue, occupancy rates can all be monitored in real time.

Through the use of complex DAX functions and the modeling of relationships between datasets, the dashboard assists hotel managers in identifying trends, identifying inefficiencies, and making data-driven decisions.

Tools like Power BI are essential for connecting operational data with strategic business objectives as the sector continues to embrace digital transformation. This project lays the groundwork for upcoming improvements utilizing machine learning and predictive analytics while reaffirming the significance of data literacy and business intelligence abilities in contemporary hotel management.