

# Data and Artificial Intelligence

## Cyber Shujaa Program

### Week 4 Assignment

#### Business Intelligence with Power BI – Hotel Management

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# Introduction

This assignment focuses on developing **hands-on experience in Business Intelligence using Power BI** for a **Hotel Management** business scenario.

The goal was to analyze and visualize hotel booking and revenue data to gain actionable insights into **occupancy trends, customer preferences, and performance metrics** that support data-driven decisions.

The project objectives were to:

- Understand the hotel business structure and client needs.
- Load, clean, and transform datasets in Power BI.
- Build a **star schema data model** linking dimensions and fact tables.
- Create **DAX measures** for key performance indicators (KPIs).
- Develop an **interactive dashboard** to communicate insights effectively.
- Publish the report to the **Power BI Service** and include it in the project portfolio.

## Tasks Completed

### Data Loading and Transformation

#### Datasets Used:

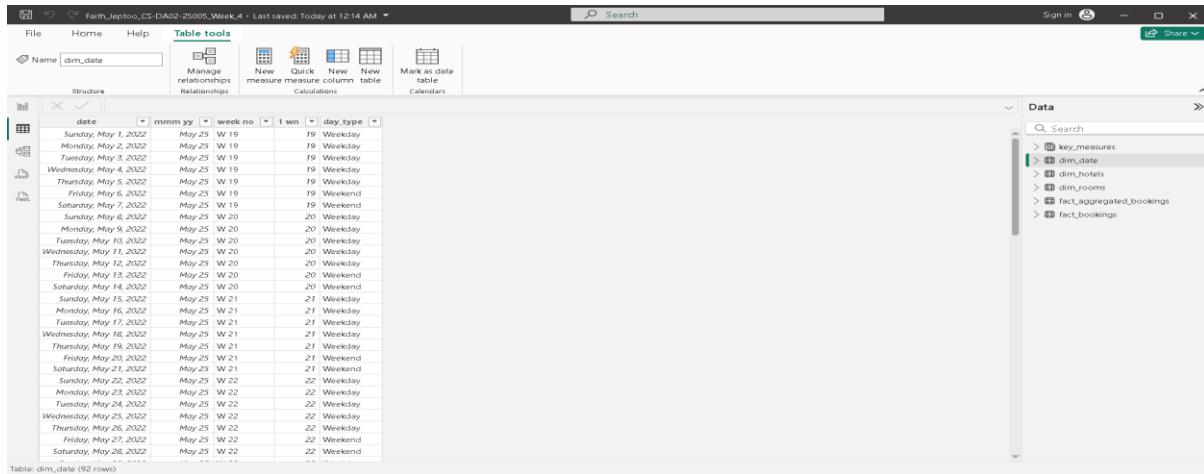
- **dim\_date.csv** – calendar data for dates and periods.
- **dim\_rooms.csv** – room categories, capacity, and pricing.
- **fact\_bookings.csv** – booking transactions, customer details, and revenue.
- **dim\_customers.csv** – customer demographics and booking sources.

#### Data Preparation Steps:

1. Imported all datasets into Power BI using **Get Data → CSV**.
2. Performed transformations in **Power Query Editor**, including:
  - Renaming columns for consistency.
  - Removing null or duplicate records.
  - Changing data types (dates, currency, integers).

- Merging datasets for additional attributes (e.g., combining bookings with room details).

### 3. Created **calculated columns** such as “Length of Stay” and “Total Revenue.”



The screenshot shows the Power BI Data Editor interface with the 'dim\_date' table selected. The table contains a list of dates from May 1, 2022, to May 28, 2022, along with calculated columns. The calculated columns are:

- mmon\_yy: May 25 W 19
- week\_no: 19
- l\_wen: Weekday
- day\_type: Weekday

The 'Data' pane on the right lists other tables in the model: key\_measures, dim\_date, dim\_hotels, dim\_rooms, fact\_aggregated\_bookings, and fact\_bookings.

## Building the Data Model (Star Schema)

A **star schema** model was designed to simplify analysis and relationships:

### Fact Table:

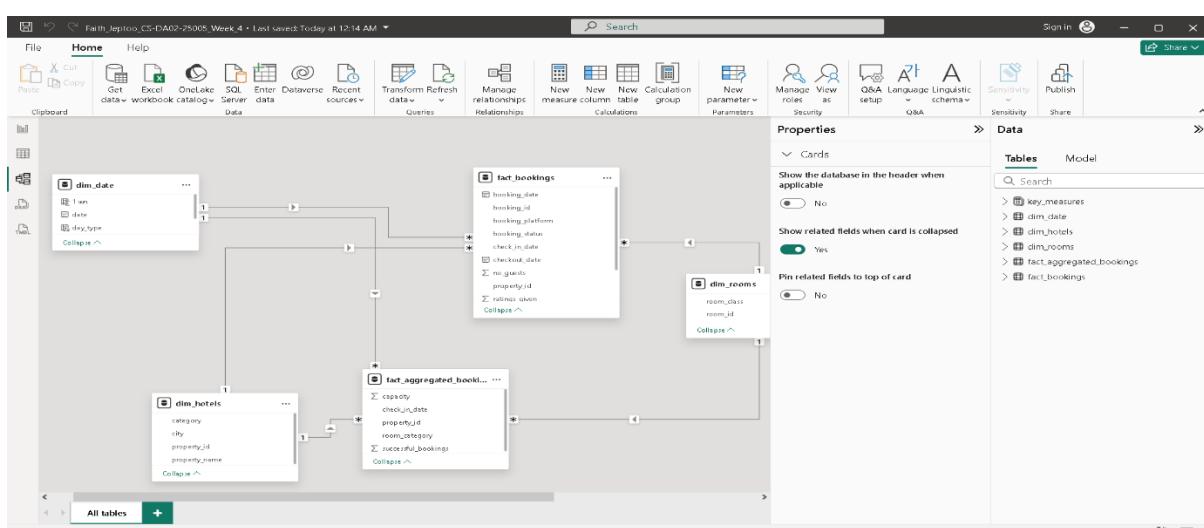
- fact\_bookings (contains transactional data like revenue, booking date, room ID, customer ID)

### Dimension Tables:

- dim\_date → linked via BookingDate
- dim\_rooms → linked via RoomID
- dim\_customers → linked via CustomerID

### Relationships:

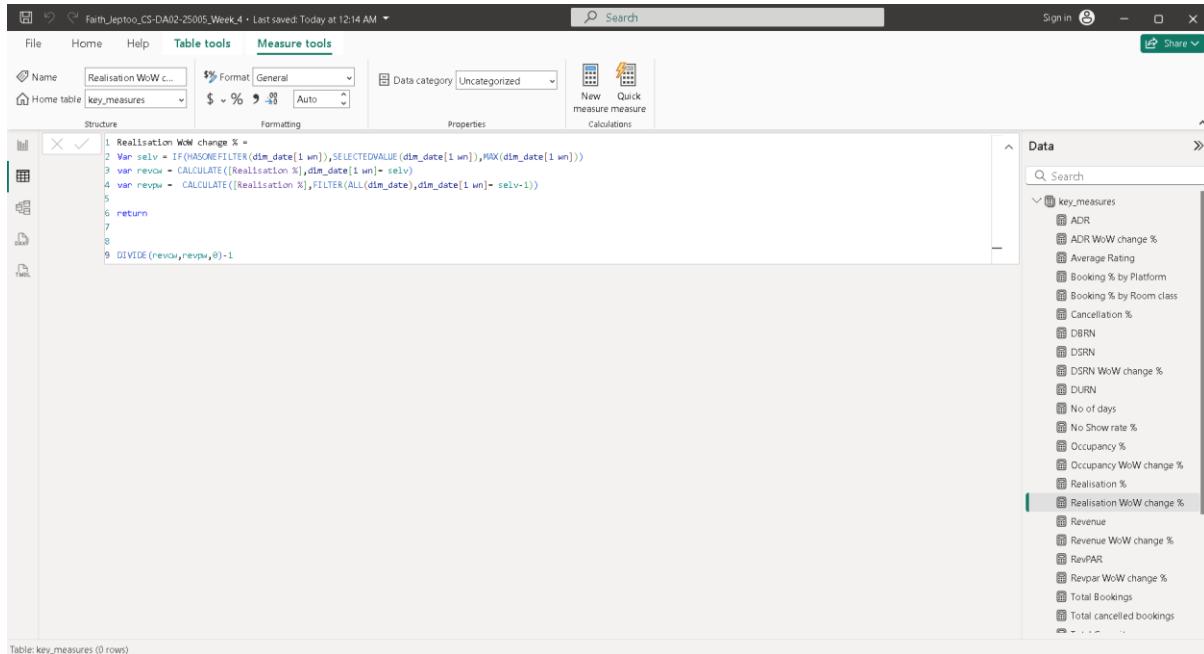
- One-to-Many relationships between dimensions and fact tables.
- Referential integrity enforced to ensure accurate joins.



## Creating DAX Calculations

Several **DAX measures** were created to analyze performance metrics.

Below is an example of Realisation WoW Change %:

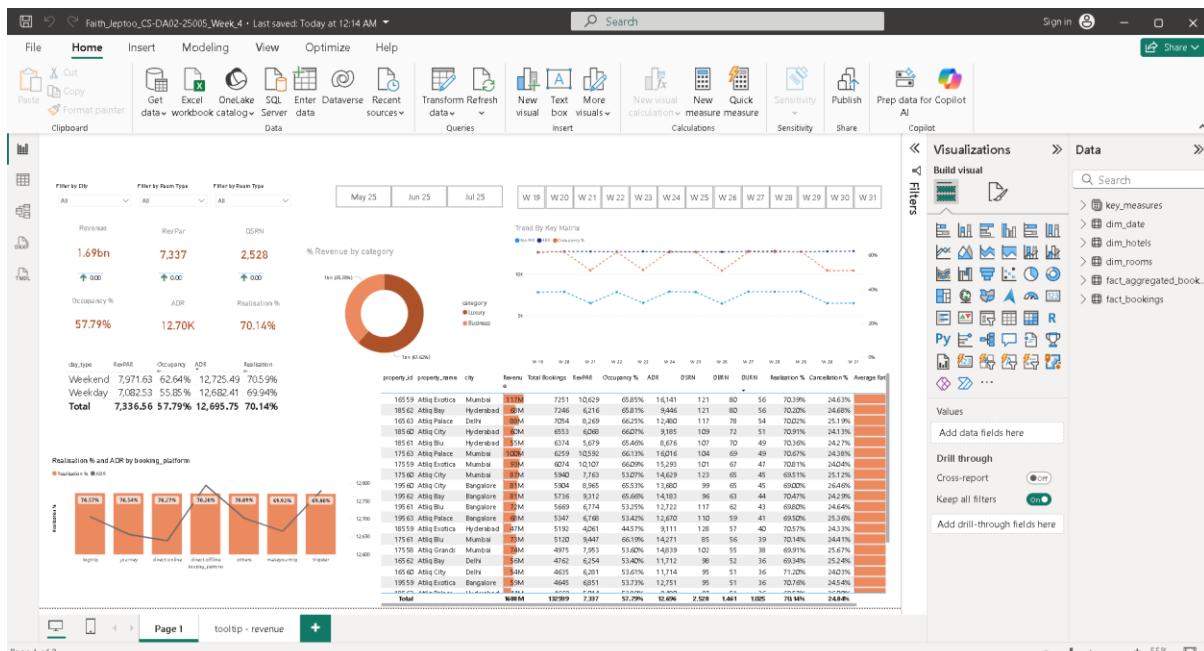


```

1 Realisation WoW change %
2 Var selv = IF(NOTISFILTER(dim_date[1 w], SELECTEDVALUE(dim_date[1 w]), MAX(dim_date[1 w])))
3 var revov = CALCULATE([Realisation %], dim_date[1 w]- selv)
4 var revpw = CALCULATE([Realisation %], FILTER(ALL(dim_date), dim_date[1 w]- selv-1))
5
6 return
7
8
9 DIVIDE(revov,revpw,0)-1

```

## Dashboard Design and Visualization



Day Type	RevM	Occupancy %	ADR	Realisation %
Weekend	7,971.63	62.64%	12,725.49	70.59%
Weekday	7,082.53	55.85%	12,682.41	69.94%
<b>Total</b>	<b>7,336.56</b>	<b>57.79%</b>	<b>12,695.75</b>	<b>70.14%</b>

Category	Revenue	Occupancy %	ADR	Realisation %
Business	1.69bn	57.79%	7.337	70.14%
Leisure	2.528	57.79%	0.00	0.00%

Day Type	RevM	Occupancy %	ADR	Realisation %
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Booking Platform	Revenue	Occupancy %	ADR	Realisation %
lego	16.27%	76.54%	7.337	70.14%
jsmmy	26.27%	76.27%	0.00	0.00%
direct online	37.48%	76.27%	0.00	0.00%
direct offline	17.48%	76.27%	0.00	0.00%
others	8.83%	76.27%	0.00	0.00%
marketing	8.83%	76.27%	0.00	0.00%
implan	4.34%	76.27%	0.00	0.00%

## Conclusion

This project demonstrated the complete **Business Intelligence workflow** using Power BI — from data ingestion and modeling to interactive visualization.

The final dashboard provides hotel managers with valuable insights into:

- **Revenue and occupancy performance.**
- **Customer behavior and booking patterns.**
- **Trends that influence profitability.**

Power BI proved to be a powerful tool for **data-driven decision-making** in the hospitality industry.

## Link To Notebook

<https://drive.google.com/file/d/1Z8R9eZqT08Yxk37UkoJzFCfmDInBH1G9/view?usp=sharing>