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Data and Artificial Intelligence

Cyber Shujaa Program

Week 3 Assignment
Business Intelligence on Power BI

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Introduction

This week's assignment centered on developing a personalized Business Intelligence (BI) report using Power BI, with a focus on analyzing hotel bookings data. The primary goal was to gain hands-on experience with the entire data analysis workflow—starting from understanding the hotel business and client needs, through data loading and transformation, all the way to building insightful dashboards that support strategic decision-making.
Working with datasets such as fact_bookings, fact_aggregated_bookings, and dim_hotels, I applied best practices in data modeling using a star schema, created calculated columns and measures using DAX, and built a professional, interactive dashboard. This process provided practical exposure to Power BI features including Power Query, data modeling, DAX functions, slicers, visuals, and storytelling through dashboards. The completed dashboard was then published and shared as part of my growing data portfolio.

The Objectives:

1. Understand the hotel business context and the key performance indicators relevant to stakeholders.
2. Load and transform various datasets (e.g., dim_date, dim_rooms) using Power Query for proper formatting and consistency.
3. Build a star schema-based data model by creating relationships between fact and dimension tables.
4. Create new calculated columns and measures using DAX to enrich the analysis and enhance reporting capabilities.
5. Design a compelling and interactive dashboard to present insights that align with business goals and support data-driven decisions.
6. Publish and share the final dashboard via Power BI service, capturing it as part of a professional portfolio for future reference.

Tasks Completed

Step 1: Data Loading and Transformation

I imported the primary datasets—fact_bookings.csv, fact_aggregated_bookings.csv, along with dimension tables dim_hotels.csv, dim_date.csv, and dim_rooms.csv—into Power BI using Power Query Editor. During the transformation process, I cleaned and prepared the data by renaming columns for clarity, adjusting data types (such as date and numeric fields), removing duplicates and null values, and creating new date-related columns like Year, Month, and Weekday to enable effective time-based analysis.

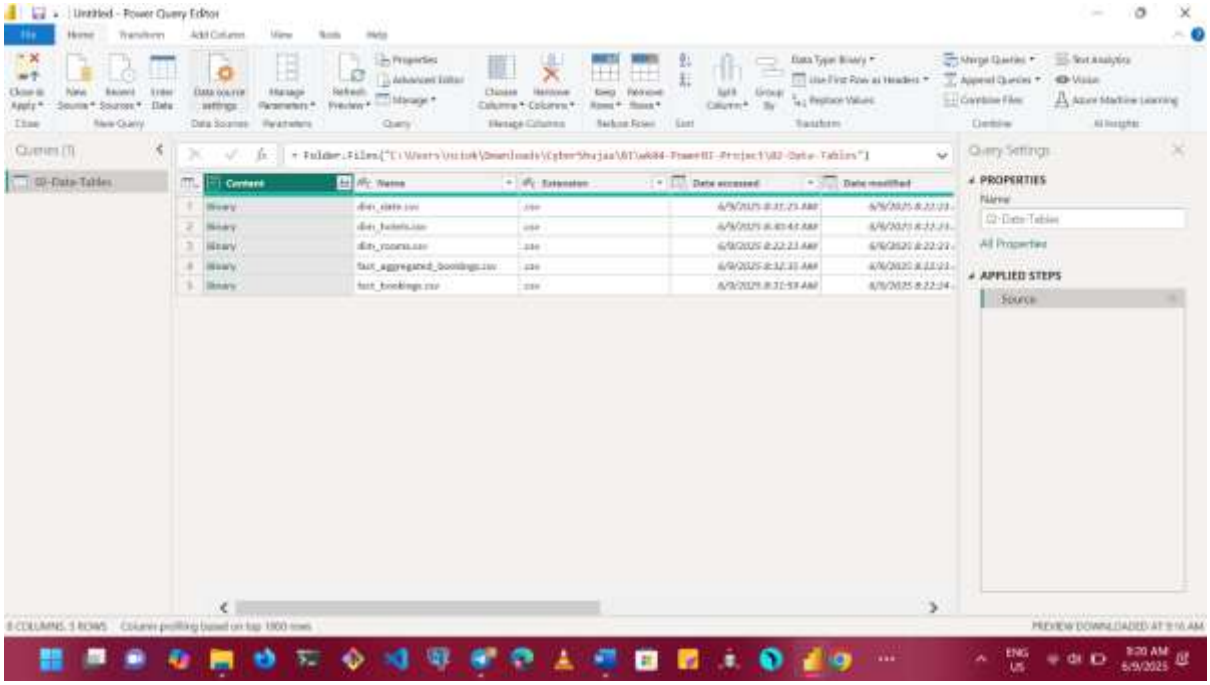


Figure 1: Loading Data

Step 2: Data Model Construction (Star Schema)

I designed and implemented a star schema to optimize the data model for efficient reporting and analysis. This involved establishing key relationships between fact and dimension tables: fact_bookings was linked to dim_date via date_id, both fact_bookings and fact_aggregated_bookings were connected to dim_hotels via hotel_id, and fact_bookings was joined with dim_rooms using room_id. All relationships were configured with the correct cardinality and cross-filter direction to ensure accurate and reliable reporting.

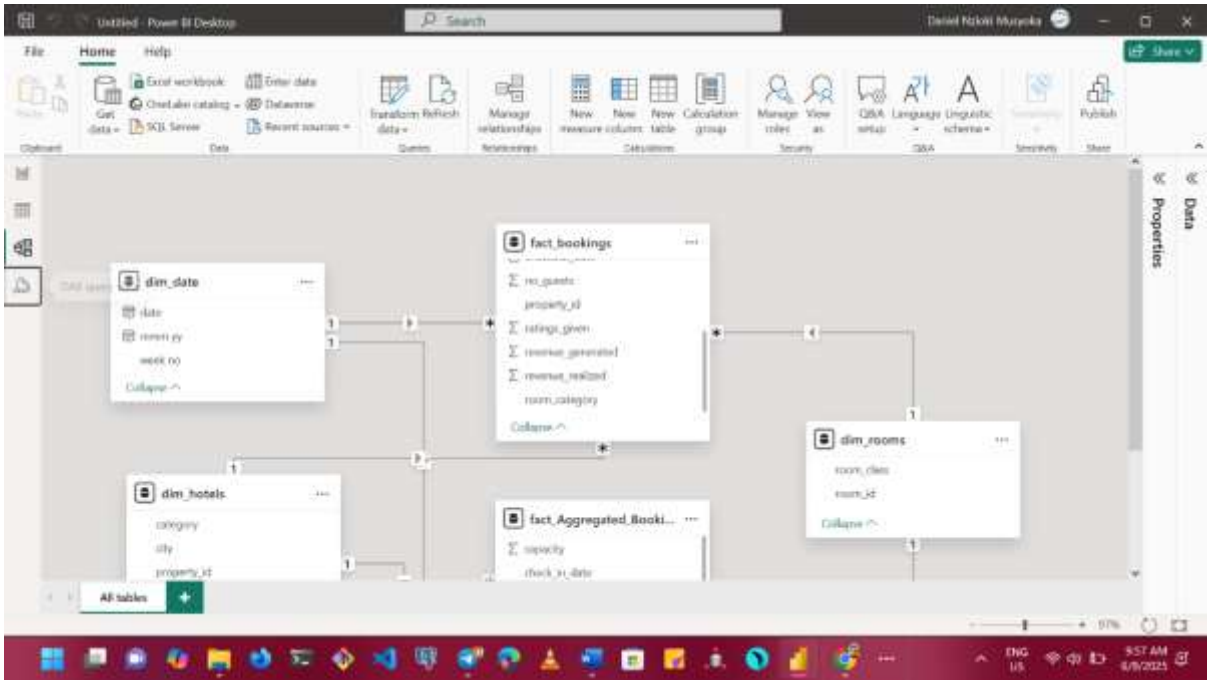
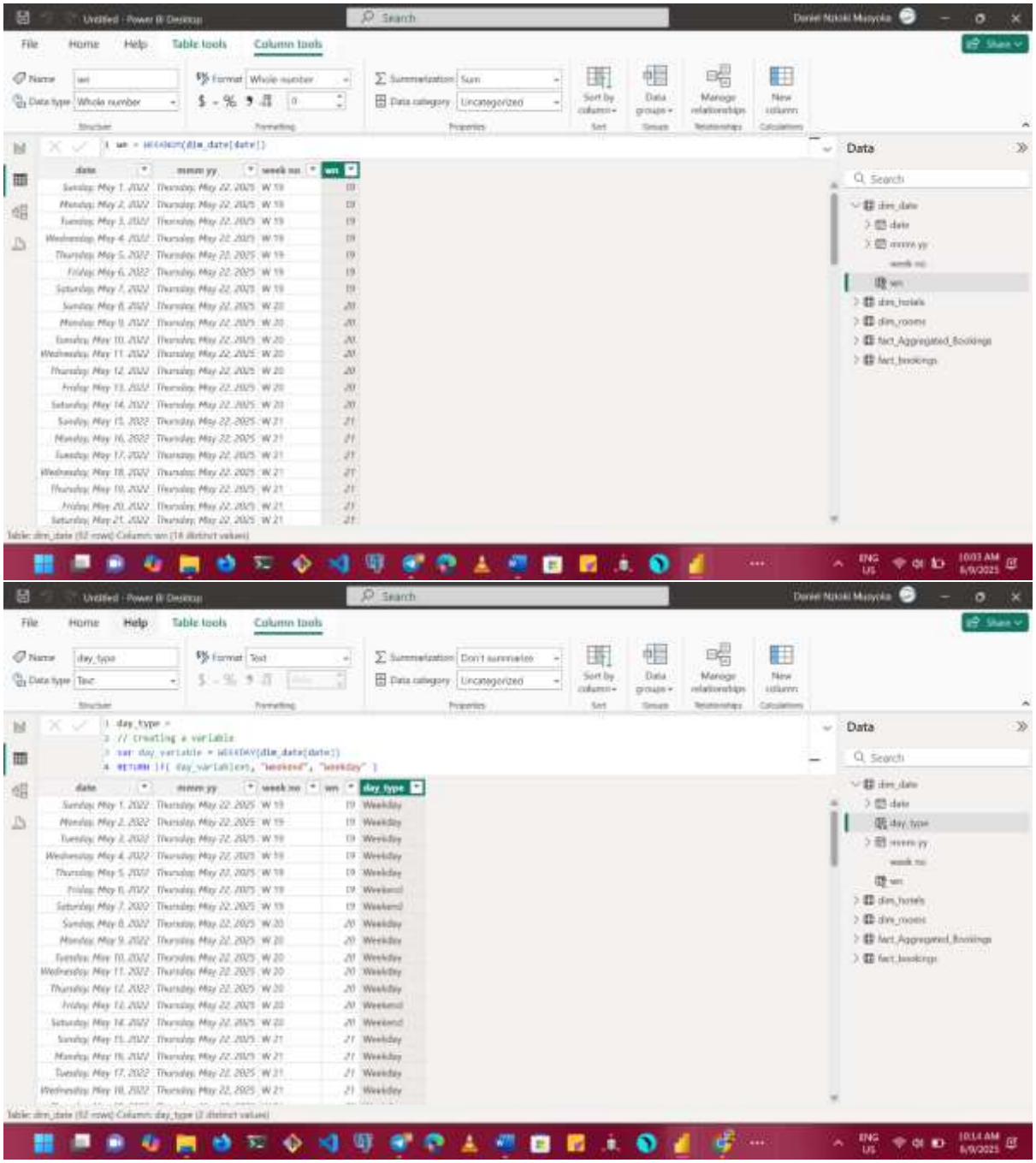
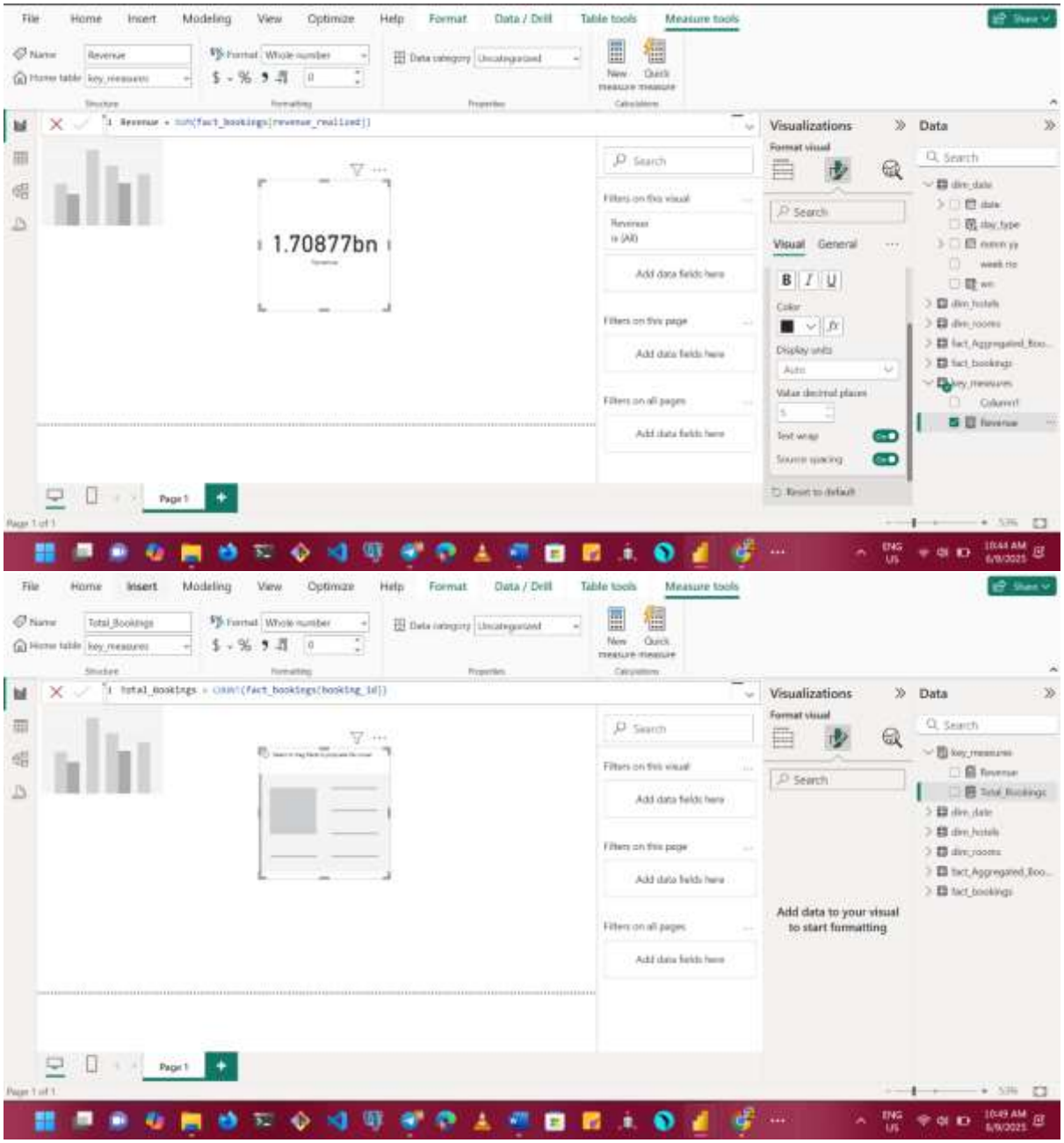


Figure 2: Data Modelling Star Schema.

Step 3: Data Analysis Expressions (DAX)

I developed calculated columns and measures using DAX to enhance the analytical depth of the model. Key measures included Total Bookings, Total Revenue, Occupancy Rate, Average Stay Duration, and time-based booking trends by Month and Year. These DAX expressions enabled dynamic filtering, time intelligence, and deeper insight generation to support effective business analysis.

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Revenue = SUM(fact_bookings[revenue_realised])
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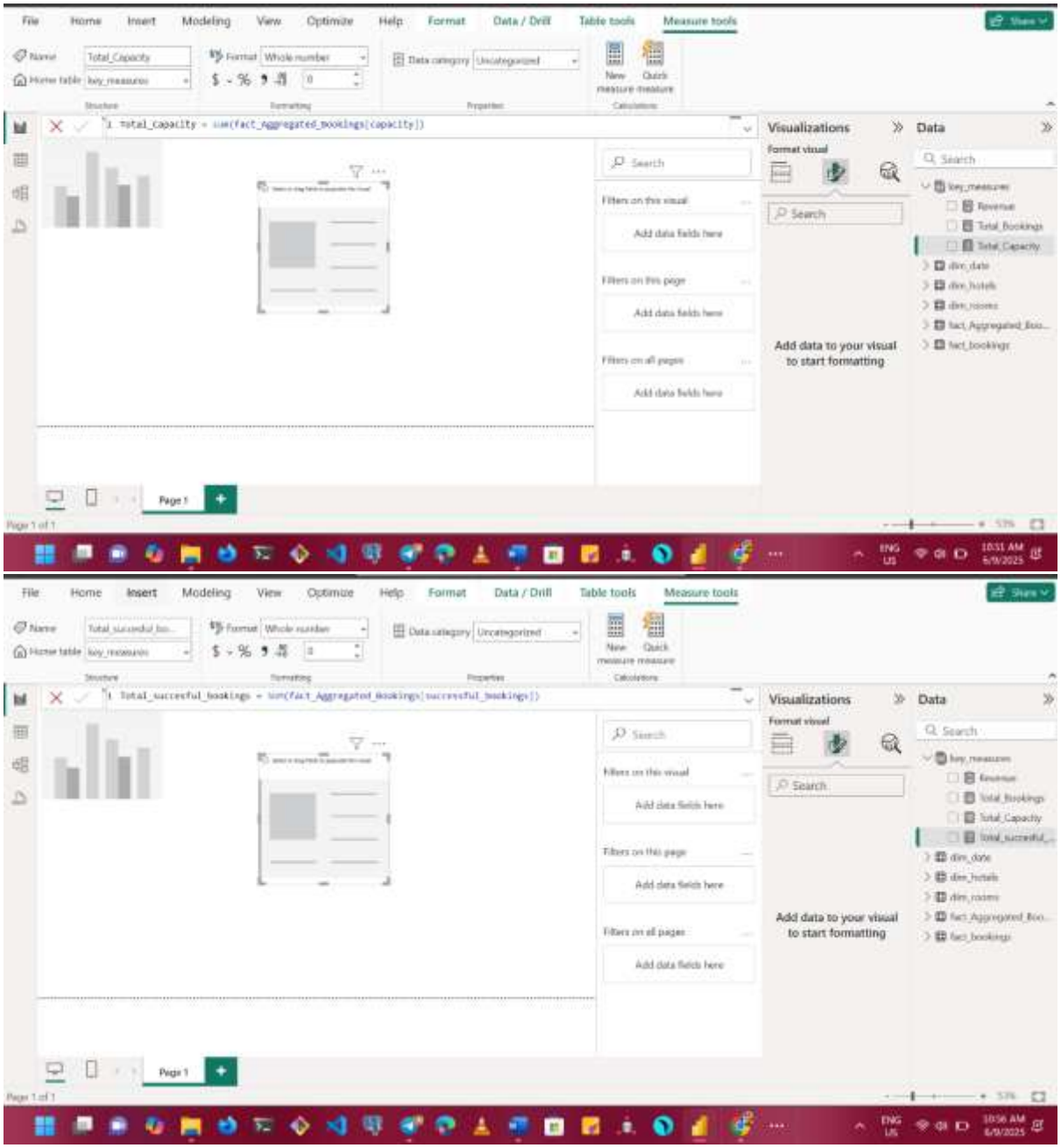
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1 Total_Capacity = sum(fact_Aggregated_Bookings[capacity])
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1 Total_succesful_bookings = sum(fact_Aggregated_Bookings[successful_bookings])
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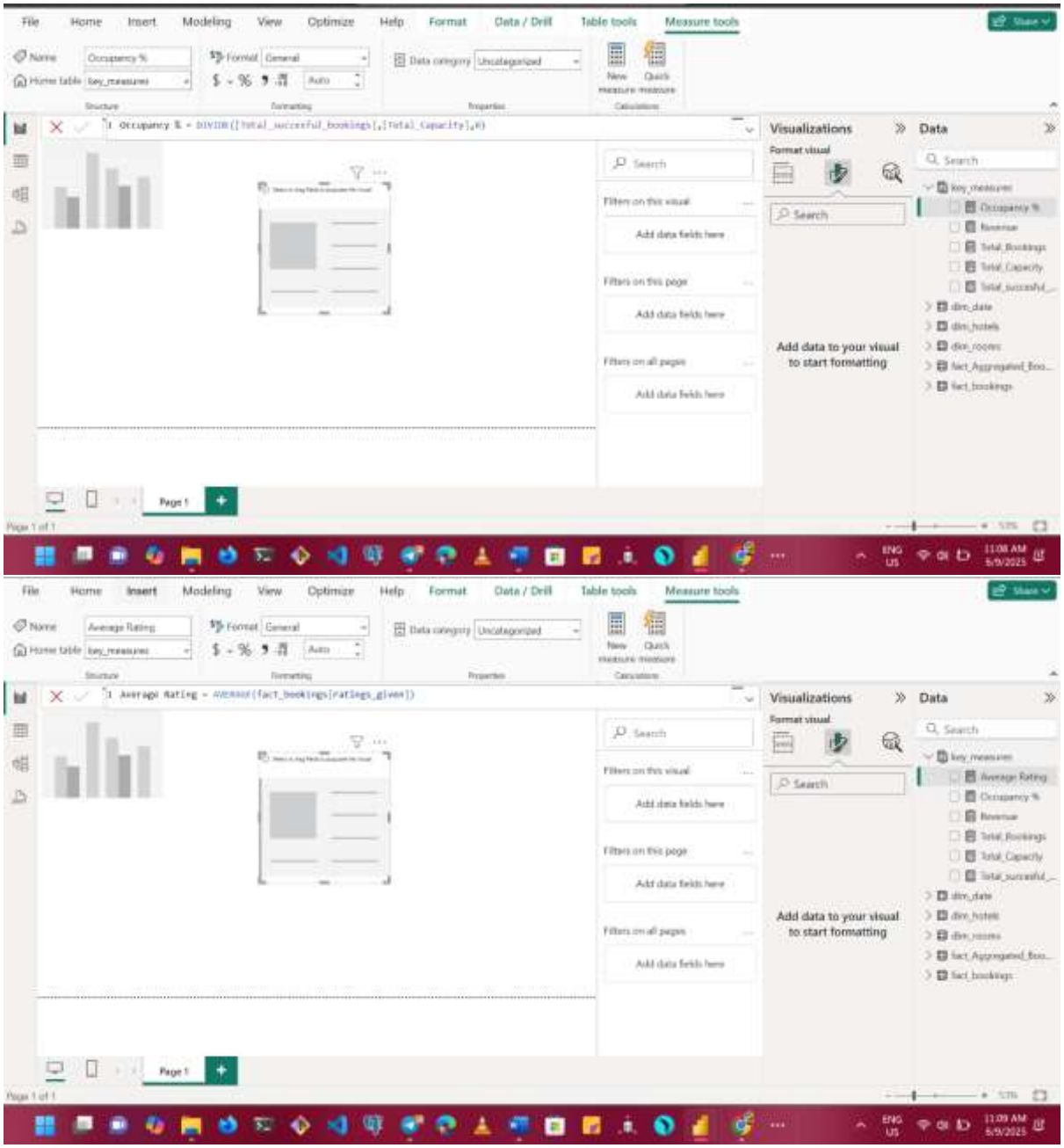
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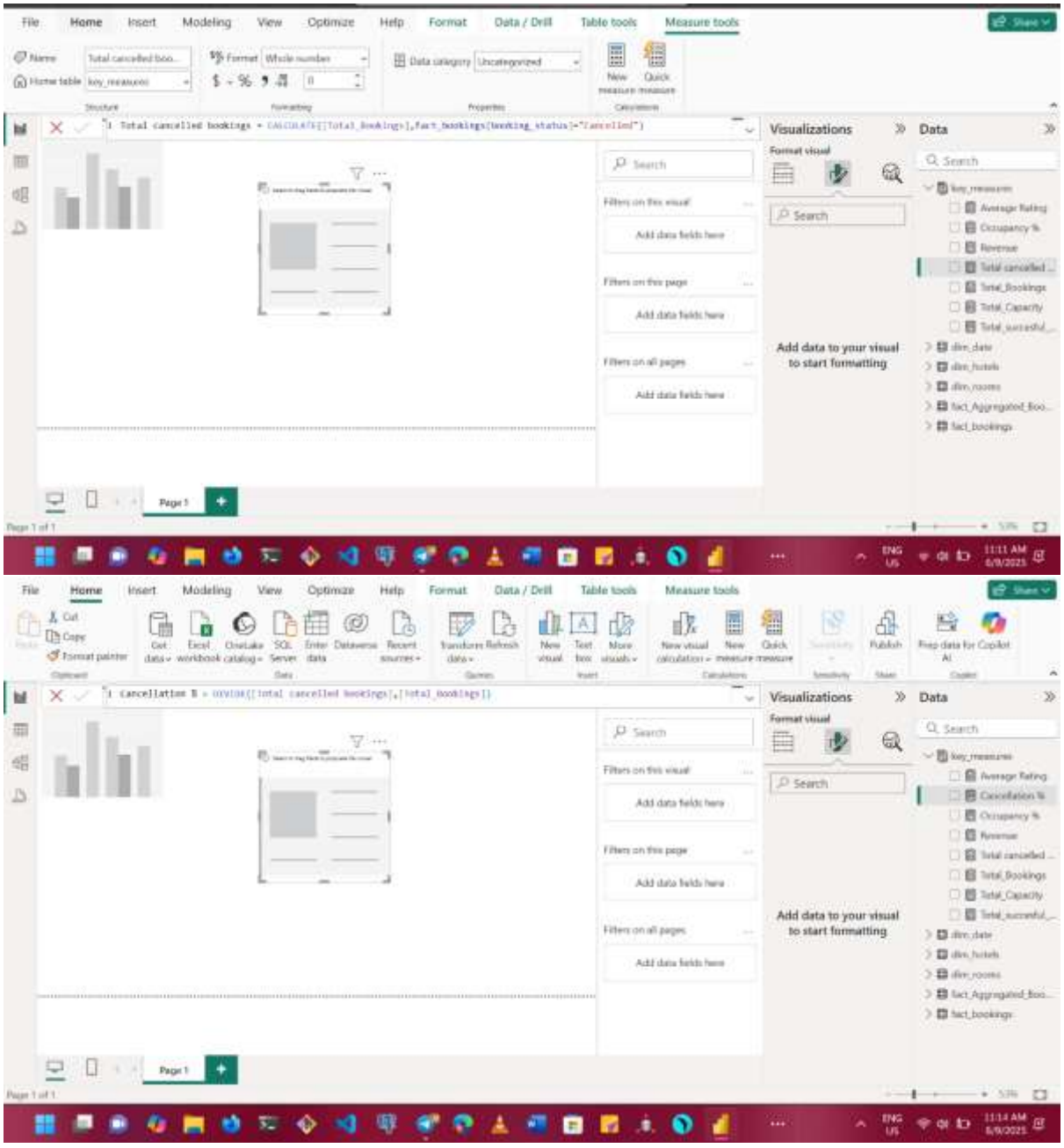
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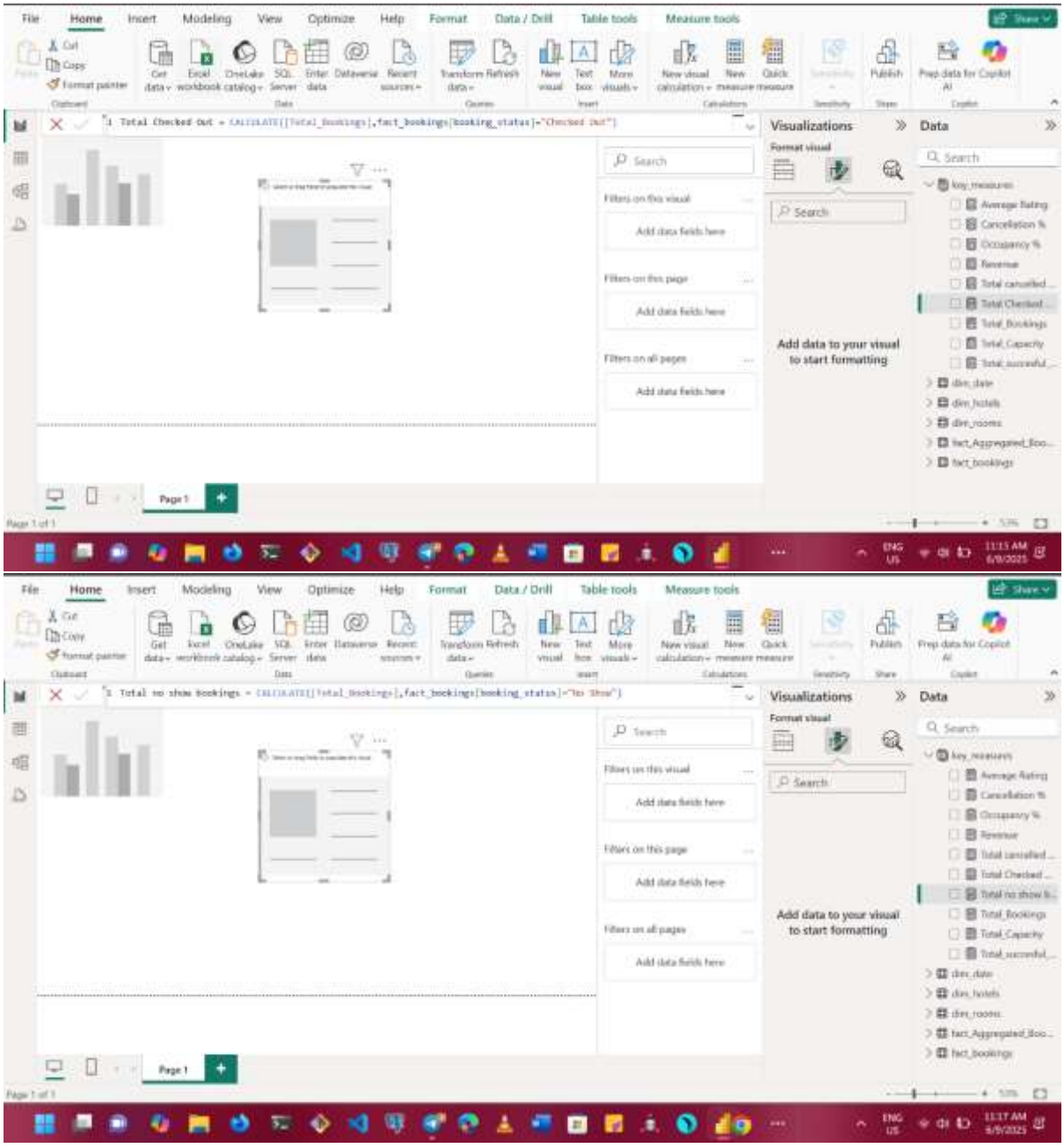

Figure 3: Calculated Columns

Step 4: Dashboard Design

I designed a comprehensive and interactive Power BI dashboard tailored to hotel business needs, offering clear insights into booking performance, customer preferences, and revenue trends. The dashboard included a variety of visualizations such as bar charts showing bookings by platform, room class, city, and day type; a donut chart illustrating booking

status; and line charts tracking monthly revenue trends. Key metrics like Total Revenue, Occupancy Rate, and Average Stay Duration were displayed using card visuals. Maps were used to highlight geographic performance, and interactive slicers enabled users to filter data by hotel name, month, and year. These features allowed hotel management to identify top-performing channels and locations, analyze seasonal patterns, and support data-driven decisions around marketing, operations, and resource allocation.

Figure 4: Dashboard Design

Step 5: Publishing And Sharing

I published the completed dashboard to Power BI Service, configured it for public access, and shared the link for viewing. Additionally, I added the project to my data portfolio and documented the process on my professional blog to showcase my business intelligence skills.

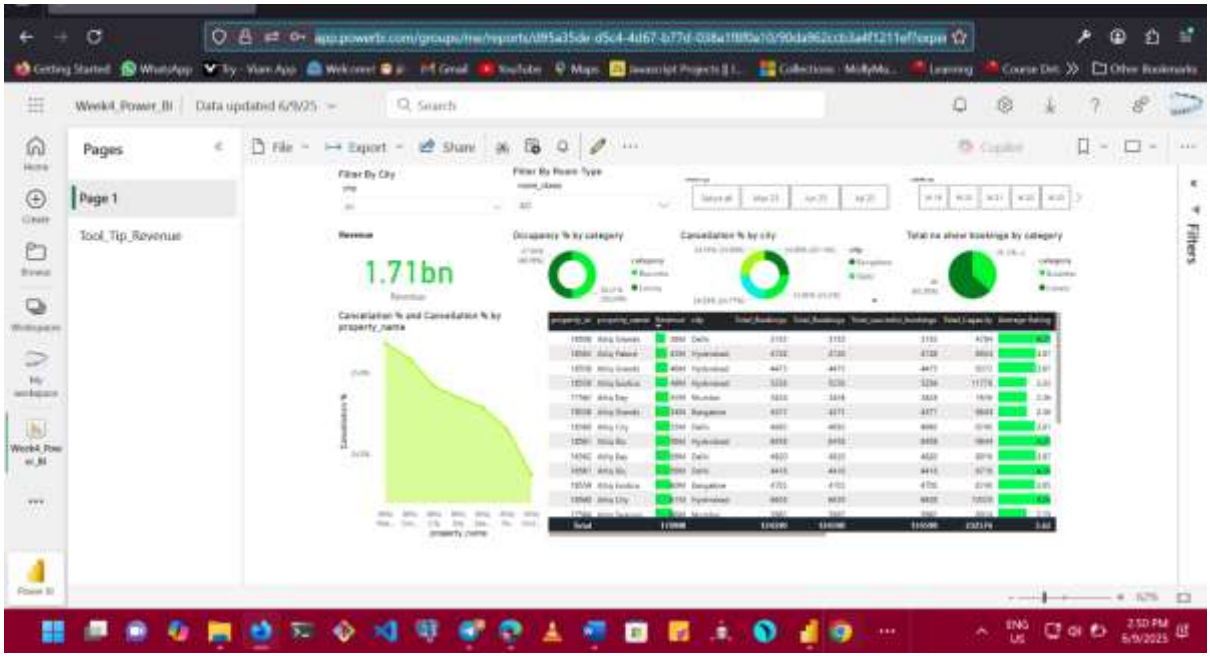

Figure 5: The Shared Dashboard.

Link to Code:

https://app.powerbi.com/groups/me/reports/d95a35de-d5c4-4d67-b77d-038a1f8f0a10/90da962ccb3a4f1211ef?experience=power-bi

Conclusion

This Power BI project allowed me to apply key data analysis and visualization techniques to the hotel bookings dataset. I designed a star schema data model, created meaningful DAX calculations, and built an interactive dashboard displaying key metrics such as Total Revenue, Occupancy Rate, and Average Stay Duration. The dashboard also provided insights into booking trends, room class performance, and geographic data, empowering hotel management to make informed decisions. By publishing the dashboard to Power BI Service and sharing it in my professional portfolio, I demonstrated my skills in data analysis and

business intelligence, enhancing my proficiency in Power BI and contributing to a strong portfolio for future career opportunities.