

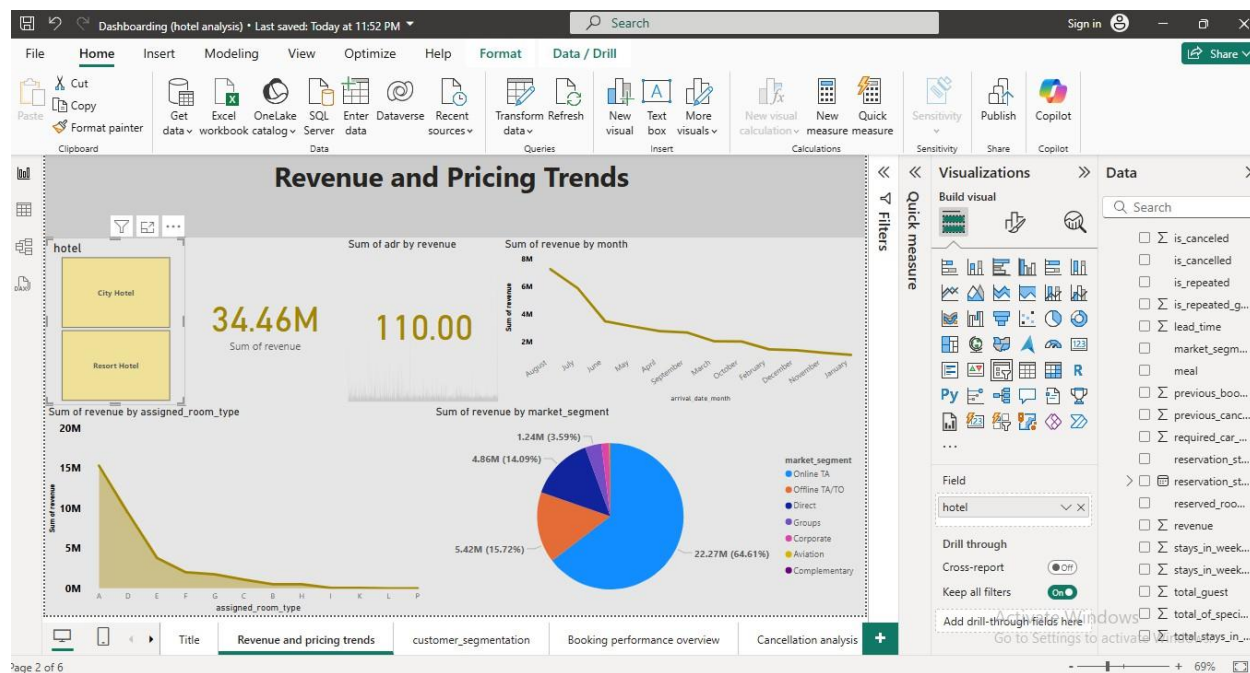
Capstone Project – GOURAV ROHIT

The Data Visualization Challenge- Transforming EDA Projects to Dashboards

In Module 2, I carried out an Exploratory Data Analysis (EDA) on a hotel booking dataset comprising two categories: Resort Hotel and City Hotel. To improve the dataset's usability and enhance user interaction, I performed feature engineering by modifying and transforming specific variables. For example, the 'Is Canceled' field was restructured into a categorical format (Yes/No) to make it more intuitive. I also separated the date into distinct components- day, month, and year- enabling time-based filtering and analysis.

To maintain data quality, I addressed missing values, eliminated duplicates, and cleaned the dataset for greater consistency and reliability. Once the data was preprocessed, I utilized Power BI to create a dynamic dashboard. The visuals, built using data imported from a Python-based analysis, were aligned with targeted objectives to deliver actionable insights. This approach supports a comprehensive understanding of booking patterns, customer preferences, and operational performance, ultimately aiding strategic, data-informed decision-making for optimizing future revenue.

1. Revenue and Pricing Insights

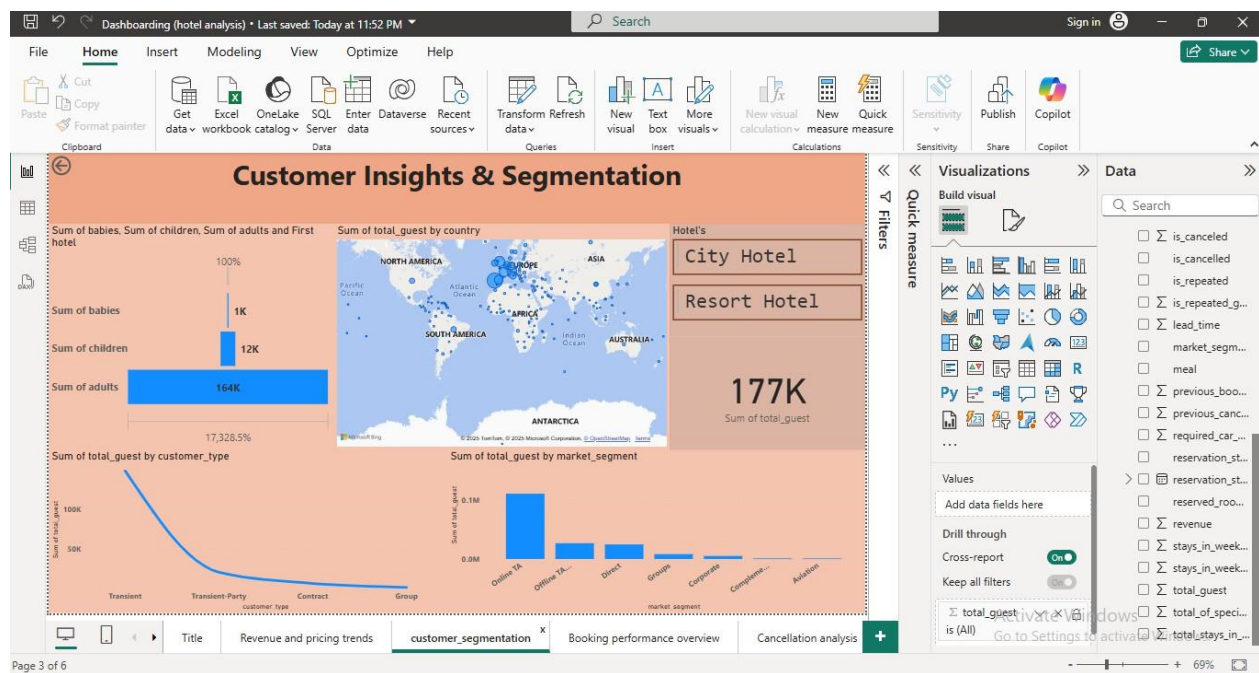


The Revenue and Pricing Insights dashboard offers a comprehensive overview of how revenue and pricing evolve over time. To make the analysis more interactive, a drill-down feature is incorporated, enabling users to explore data based on the type of hotel- either Resort Hotel or City Hotel. A card visual displays the overall revenue, while a KPI element monitors the total Average Daily Rate (ADR) in relation to revenue.

A line chart depicts the progression of revenue across multiple years, highlighting that peak earnings occur during June, July, and August, whereas January records the lowest figures. An area chart breaks down revenue by room types assigned, providing clarity on guest preferences regarding accommodations. Another area chart maps revenue distribution across various market segments, revealing that bookings through Online Travel Agencies (TA), Offline Travel Agents/Tour Operators (TA/TO), and Direct channels together account for over 80% of the overall income.

For enhanced interactivity, slicers are included, allowing users to filter data based on multiple criteria. This dashboard serves as a valuable tool for identifying seasonal trends, customer booking behavior, and the most lucrative sales channels—contributing to smarter pricing strategies and more effective revenue management.

2. Customer's Insights and Segmentation.

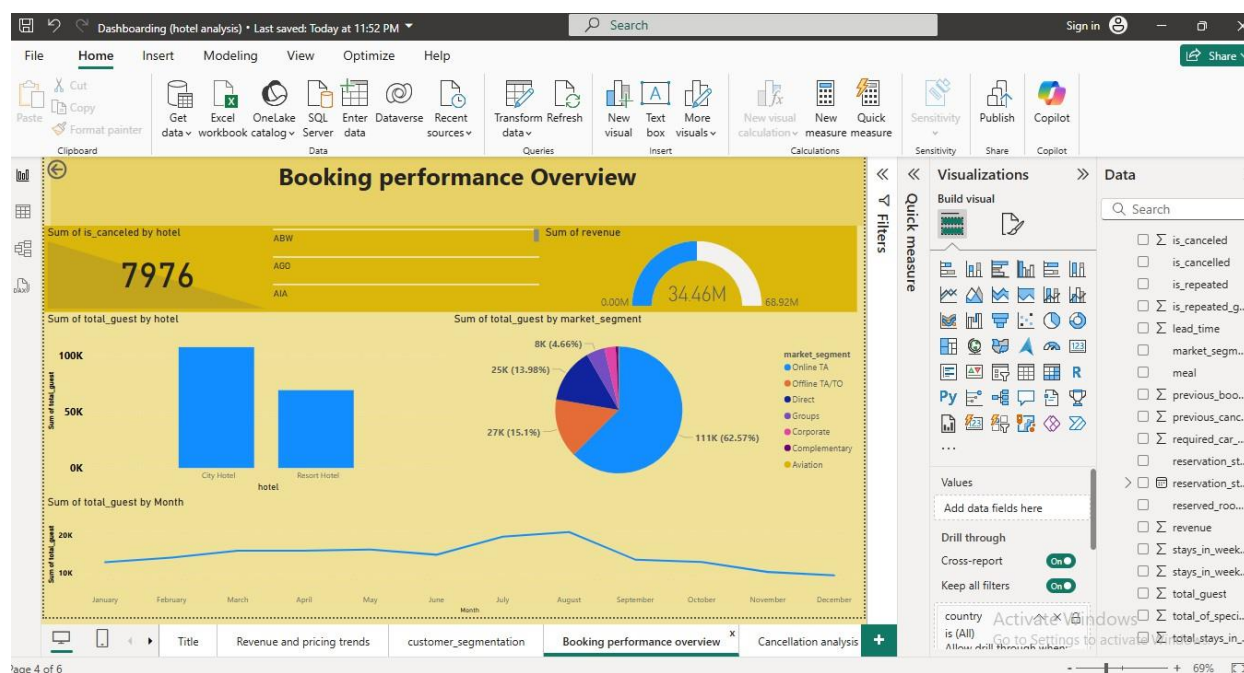


The Customer Insights and Segmentation dashboard offers a comprehensive view of various customer groups and their respective distributions. A funnel chart is used at the outset to display the overall customer breakdown, categorizing them into segments such as babies, adults, and couples.

To understand visitor demographics, a geographical map highlights the countries or regions from which most guests originate. A card visual is integrated to allow filtering by hotel type—Resort Hotel or City Hotel—enabling a more focused examination. A smooth line chart presents the booking frequency of different customer types, helping to identify which group contributes most significantly to reservations.

Additionally, a bar chart illustrates how different market segments are associated with total guest volume, identifying the most influential segments in driving bookings. This dashboard delivers meaningful insights into customer behavior and demographics, supporting targeted marketing, personalized service offerings, and data-backed strategic planning.

3. Booking Performance Overview.



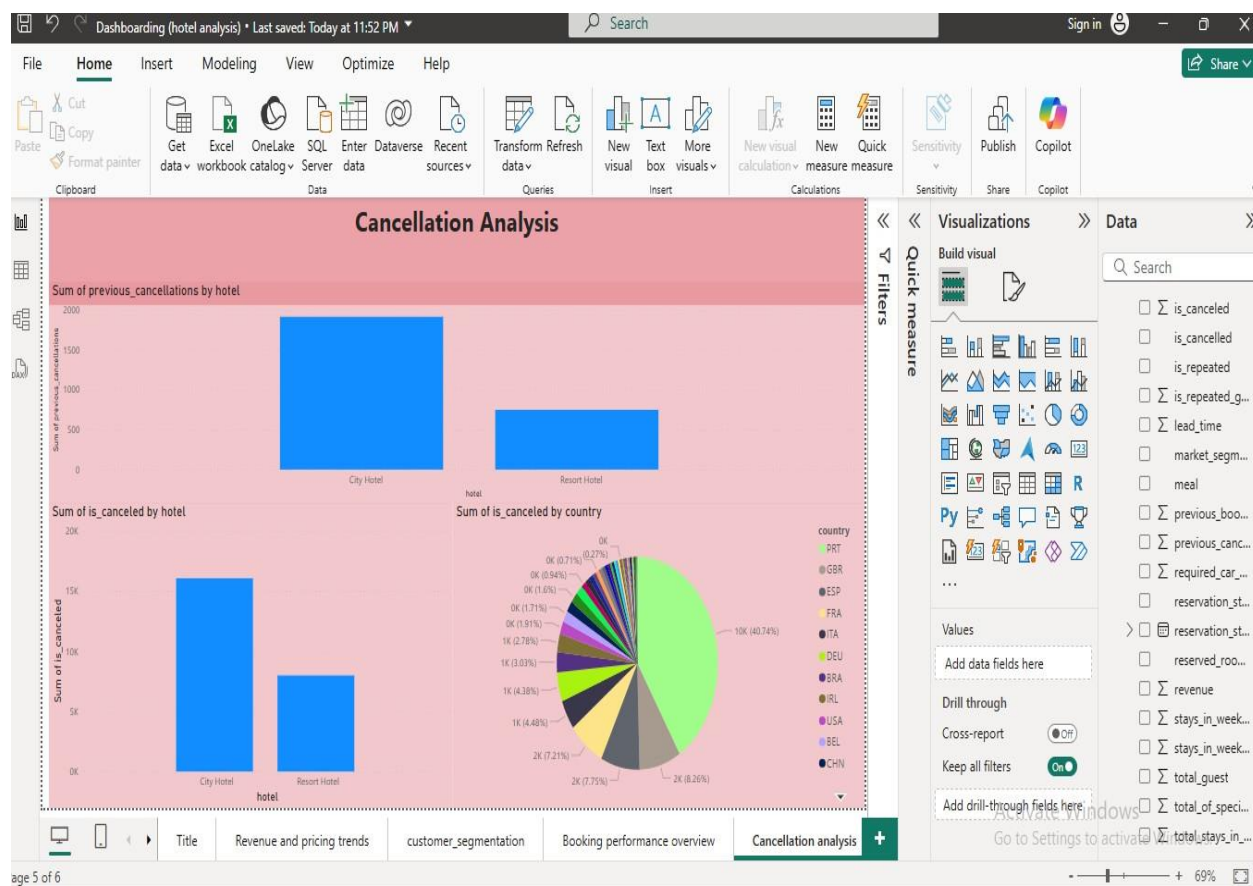
The Booking Performance Overview dashboard delivers meaningful insights into reservation trends and cancellation behavior, supporting the identification of key areas for strategic enhancement. A card visual presents the total number of cancellations, broken down by hotel type, offering a clearer picture of cancellation patterns and enabling further investigation into possible causes to inform targeted improvements.

A drill-down feature on the country field allows for a deeper dive into the geographical origins of guests and their booking tendencies. To visualize overall financial performance, a gauge chart is used to display total revenue, even though no specific benchmark has been set.

To analyze guest distribution, a bar chart compares the number of guests between resort and city hotels, while a pie chart segments total guests by market channels—revealing the contribution of each segment to hotel occupancy. A line chart tracks the monthly flow of guests, helping to identify seasonal peaks and off-peak periods.

This dashboard provides a clear overview of booking performance, guest dynamics, and patterns in cancellations—serving as a foundation for optimizing occupancy rates and improving revenue strategies.

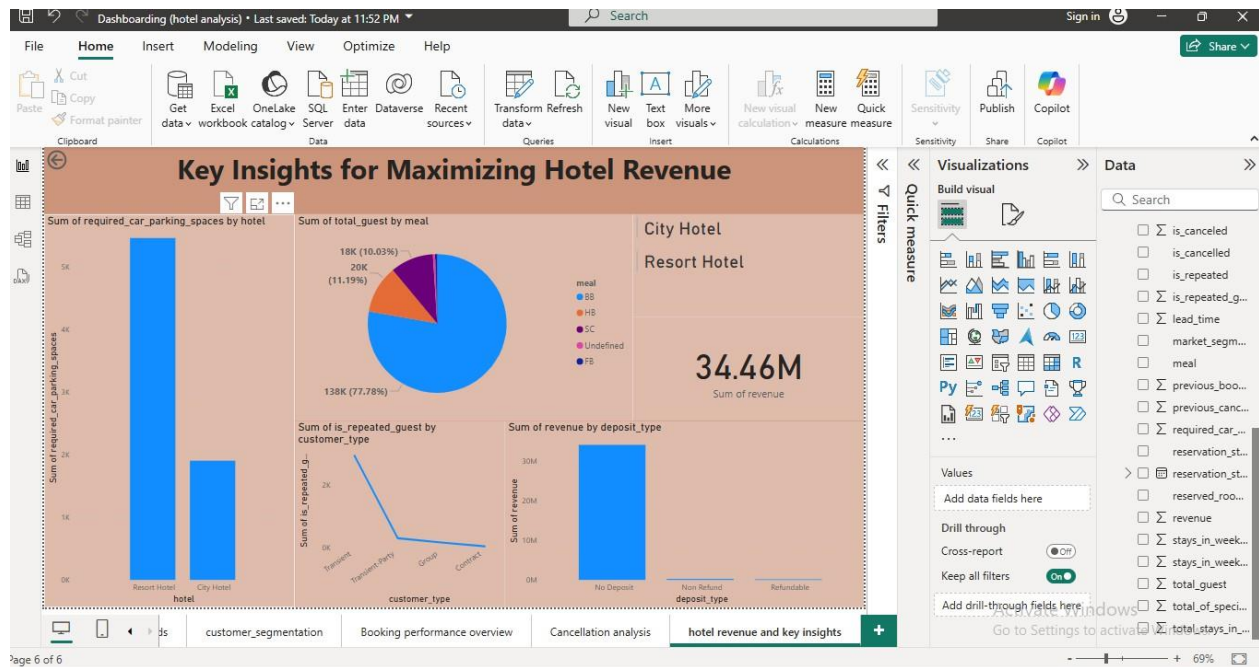
4. Cancellation Analysis.



The Cancellation Analysis dashboard offers a focused view of booking cancellations, segmented by hotel type. A bar chart is used to represent the number of cancellations made by customers, clearly distinguishing between Resort Hotels and City Hotels. Another bar chart visualizes the cumulative count of previous cancellations, providing a historical perspective on cancellation trends for each hotel category.

To incorporate a geographical dimension, a pie chart showcases the distribution of cancellations by country, helping to pinpoint regions with higher cancellation rates. This visualization aids in uncovering potential causes behind cancellations such as guest preferences, location convenience, or other contributing factors enabling better understanding and targeted actions to reduce future cancellations.

5. Key Insights for Maximizing Hotel Revenue



This dashboard delivers strategic insights into the primary factors that influence hotel revenue by utilizing a mix of bar charts, pie charts, line graphs, drill-down features, and card visuals for in-depth analysis. A bar chart demonstrates the correlation between parking availability and revenue generation, helping to evaluate the financial impact of this amenity.

Customer meal preferences are visualized through a pie chart, revealing that the Bed & Breakfast (BB) plan is the most popular—offering useful direction for enhancing meal plan strategies to boost sales. A line graph analyses customer types, showing that Transient guests are the most frequent and loyal visitors, suggesting potential for targeted marketing initiatives.

Further, a bar chart depicts preferred deposit types, providing a clearer understanding of customer payment behaviours. A card visual summarizes total revenue at a glance, while a multi-row card breaks down hotel categories, simplifying comparisons between different hotel types. Overall, this dashboard acts as a vital decision-making tool, helping identify key revenue drivers and refine strategies to increase profitability and business growth.

Conclusion

The capstone project presents a thorough and insightful analysis of hotel booking data, leveraging advanced data cleaning, transformation, and visualization techniques to extract meaningful business insights. Through well-structured Power BI dashboards, the project sheds light on critical aspects such as revenue trends, customer segmentation, booking behaviour, and cancellation patterns across Resort and City Hotels.

By applying Exploratory Data Analysis and feature engineering, the dataset was transformed into an intuitive, interactive format, enhancing usability and supporting strategic decision-making. Key findings, such as the dominance of Online Travel Agencies in revenue generation, the popularity of the Bed & Breakfast meal plan, and the booking frequency of Transient customers, highlight actionable opportunities to boost profitability.

This project not only demonstrates the practical application of data analytics tools like Python and Power BI but also emphasizes the importance of data-driven approaches in optimizing revenue, understanding customer behaviour, and improving operational strategies. Overall, it equips stakeholders with the insights needed to make informed decisions, tailor marketing efforts, and drive sustained business growth in the hospitality sector.