

# ITC Hotels Revenue Optimization and Performance Analytics Dashboard.

*Live Dashboard*

## Project Title / Overview

- **Objective:** To design and implement a dynamic, multi-page Power BI dashboard to optimize revenue generation, minimize cancellations, and enhance customer satisfaction by providing key insights into financial performance, occupancy, and booking behavior.
- **Business Context:** ITC Hotels, as a luxury hotel chain operating multiple properties with diverse room categories, requires sophisticated data analysis to move beyond descriptive reporting and drive strategic revenue management decisions.
- **Scope & Solution:** The final solution is a four-page interactive dashboard providing stakeholders with a unified view across Financial Performance, Occupancy, Room Category Contribution, and Cancellation Risk, addressing a critical lack of centralized data visibility.
- **Tools & Technical Focus:** The project involved complex data modeling (Star Schema) and the development of advanced DAX measures (e.g., RevPAR, MoM/WoW Growth) to transform raw transactional data into actionable KPIs. Power BI was used for visualization, supported by Power Query for ETL operations.

## Problem Statement

ITC Hotels, a luxury hotel chain operating multiple properties and diverse room categories, is currently hindered by a lack of centralized and dynamic reporting across its key operational metrics. Decision-makers are forced to rely on fragmented or static reports, limiting their ability to respond swiftly to market changes and optimize financial performance.

**The business faces several critical challenges that necessitate a data-driven solution:**

- **Absence of a Unified Financial View:** The company lacks clear visibility into its financial performance indicators, making it difficult to analyze overall revenue growth (MoM/WoW), track the effectiveness of pricing through Average Daily Rate (ADR), and benchmark efficiency using Revenue per Available Room (RevPAR) across different hotels and room categories.
- **Inconsistent Occupancy Management:** There is limited insight into how hotel capacity is truly utilized. Specifically, management struggles to quantify how occupancy rates fluctuate seasonally or over specific periods (e.g., weekends vs. weekdays) and how these fluctuations directly correlate with overall revenue.
- **Unclear Room Category Profitability:** While a large number of room categories are sold, the company cannot easily identify which specific room types are the major contributors to total revenue, or how different booking patterns (like Average Length of Stay - ALOS, and booking lead time) impact both revenue and occupancy.
- **Mitigating Lost Revenue from Cancellations:** The financial impact of cancellations is not fully understood. There is an urgent need to calculate the Lost Revenue due to Cancellations and identify specific patterns in cancellation rates (by room type, time of year, or lead time) to develop targeted strategies for risk mitigation.

## Project Process Brief

### 1. Data Collection & Preparation

- Gathered raw transactional data related to historical bookings, property details, and room capacity.
- Cleaned and standardized the data using Power Query to resolve minimal inconsistencies, format date columns, and ensure a unified, analysis-ready dataset.
- Merged multiple data sources (e.g., bookings and property capacity) to establish the necessary foundational structure.

### 2. Dashboard Development

- Designed four dedicated, interactive dashboards focused on key business priorities:
  - **Financial Overview:** Tracking Revenue, ADR, RevPAR, and growth trends.
  - **Occupancy & Capacity:** Analyzing utilization by day type and property breakdown.
  - **Room Category Performance:** Focusing on revenue contribution and booking behavior (Lead Time, ALOS).
  - **Cancellations & Lost Revenue:** Quantifying financial risk and identifying high-risk room types.

### 3. DAX Calculations

- Developed complex DAX measures crucial for calculating hospitality KPIs and growth trends:
  - Total Revenue
  - Average Daily Rate (ADR)
  - Revenue Per Available Room (RevPAR)
  - Occupancy %
  - MoM / WoW Growth % (for Revenue and Cancellations)
  - Cumulative Revenue

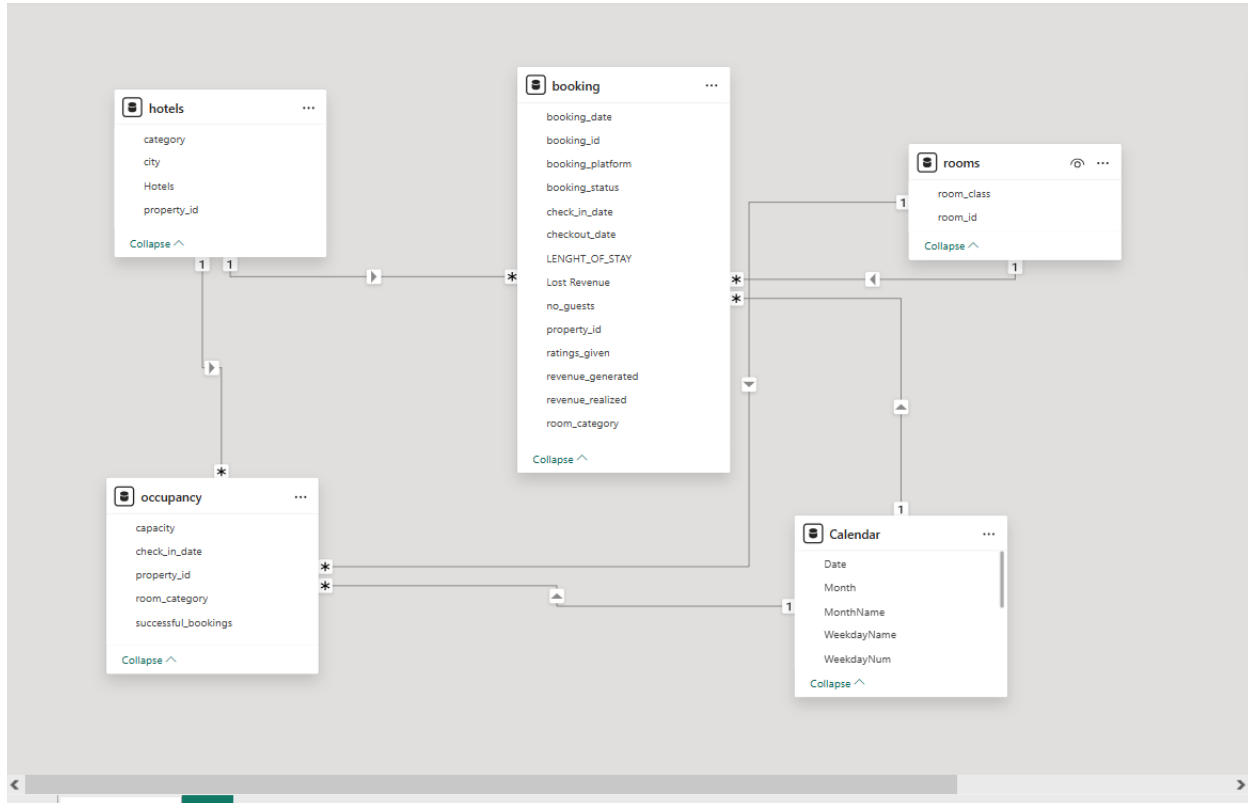
### 4. Review & Optimization

- Validated all DAX logic and visual results against expected business outcomes (e.g., confirming the 25% cancellation rate).
- Optimized the data model and measures for faster refresh speed and dashboard responsiveness.
- Ensured slicers, filters, and cross-page interactions worked seamlessly and that all dashboards were visually consistent.

## 5. Data Modeling

The analytical structure relies on a robust dimensional model to enable efficient query performance and accurate cross-filtering across the four dashboards.

- **Model Structure:** A Star Schema approach was implemented, linking the central transactional booking data (Fact Table) to clean lookup tables (Dimensions) for Date, Property, and Room details.
- **Defined Hierarchies:** Defined hierarchies (Year, Quarter, Month) and established one-to-many lookup relationships (e.g., Calendar to Booking) to enable accurate time intelligence calculations and seamless aggregation.
- **Capacity Modeling:** Incorporated a dedicated occupancy table to accurately model room capacity over time. This table acts as a crucial bridge for calculating the Occupancy % and RevPAR, as it cleanly links available inventory supply with specific dates and properties.



## Dashboard & Insights:

### 1. Financial Overview Dashboard

#### Overview:

This dashboard provides stakeholders with a direct snapshot of the hotel chain's overall financial performance, tracking pricing efficiency, inventory value, and short-term revenue growth trends across all properties.

#### Key Metrics:

- **Total Revenue** : 1.71 Billion
- **Average Daily Rate (ADR)** : 14.92k(Indicate strong pricing power)
- **Revenue Per Available Room(RevPAR)** : 7.35k(Lower than ADR, suggesting room for occupancy improvement).
- **Month-over-Month (MoM) Growth**: High volatility observed.
- **Revenue Concentration**: Top-tier categories (Elite/Premium) account for the highest share of total revenue.

#### Insights:

- Pricing Efficiency: The high ADR confirms successful positioning within the luxury market; however, the lower RevPAR indicates that the chain is not maximizing the occupancy needed to fully capitalize on its high prices.
- Volatile Growth: The MoM/WoW trend analysis shows significant spikes and dips, suggesting that revenue is being generated unevenly and requires strategic intervention to stabilize monthly earnings.
- Strategic Focus: Revenue is primarily driven by the Luxury/Business category, confirming that pricing and operational focus must remain on the high-yield room classes.

## 2. Occupancy & Capacity Analysis Dashboard

### Overview:

This dashboard provides crucial operational insights into inventory utilization, showing occupancy rates, total capacity, and the influence of day type (Weekend/Weekday) on booking performance.

### Key Metrics:

- **Occupancy Rate:** 43.5% (Indicates the percentage of available rooms utilized).
- **Total Capacity:** Measured in Total Available Rooms (inventory supply).
- **Weekend Occupancy:** Rate often shows a clear variance compared to weekday rates.

### Insights:

- Utilization Gap: The Occupancy Rate highlights the gap between maximum potential revenue (Capacity) and realized revenue (Bookings).
- Targeted Intervention: The Occupancy Heatmap (Matrix visual) immediately identifies low-performing hotel-room combinations (e.g., occupancy under 40%), signaling where operational review and marketing efforts are most urgently needed.
- Pattern Confirmation: The day-type analysis validates behavioral trends, showing whether the property performs best as a Business Hotel (high weekday occupancy) or a Leisure Hotel (high weekend occupancy).

## Financial Overview & Revenue Performance

**1.71bn**  
Revenue

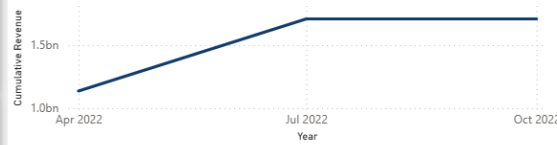
**14.92K**  
ADR

**7.35K**  
RevPAR

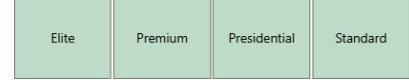
**50.4%**  
MoM Growth %

**1389%**  
WOW%growth

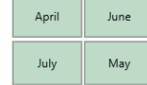
Cumulative Revenue by Year and Quarter



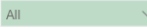
room\_class



MonthName



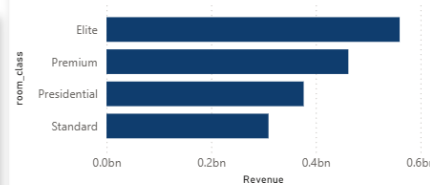
Date



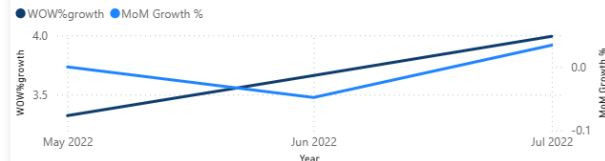
Revenue by category and Hotels



Revenue by room\_class



WOW%growth and MoM Growth % by Year, Quarter and Month



## Occupancy & Capacity Analysis

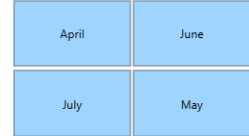
**43.50%**  
Occupancy %

**6.49K**  
RevPAR\_occupancy

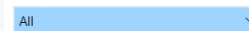
**13.14%**  
WOW%\_occupancy

**-0.12%**  
MOM%\_occupancy

MonthName



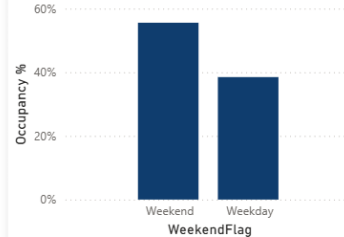
City



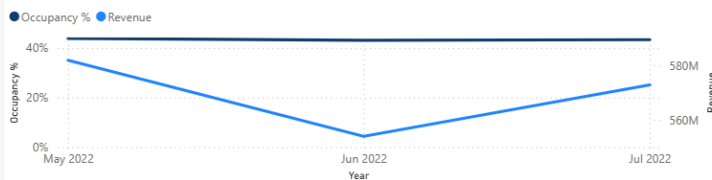
property\_id Hotels category city Occupancy %

19561	ITC Blu	Luxury	Pune	40.2%
19560	ITC City	Business	Pune	48.3%
17562	ITC Bay	Luxury	Mumbai	33.4%
17560	ITC City	Business	Mumbai	39.8%
17559	ITC Exotica	Luxury	Mumbai	50.2%
17558	ITC Grands	Luxury	Mumbai	39.9%
17563	ITC Palace	Business	Mumbai	50.1%
17564	ITC Seasons	Business	Mumbai	33.6%
18560	ITC City	Business	Hyderabad	50.3%
18559	ITC Exotica	Luxury	Hyderabad	33.8%
Total				43.5%

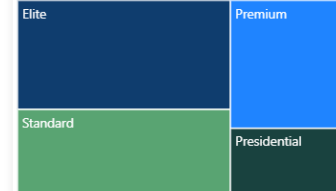
Occupancy % by WeekendFlag



Occupancy % and Revenue by Year, Quarter and Month



Sum of capacity by room\_class





### 3. Room Category Performance & Bookings Dashboard

#### Overview:

This dashboard focuses on room-level granular insights, evaluating revenue contribution, booking patterns, and length of stay to understand the performance and profitability of specific room categories.

#### Key Metrics:

- **Average Length of Stay (ALOS):** (2.37 days, approximately).
- **Average Booking Lead Time:** (3.71 days, approximately).
- **Room Revenue Contribution:** Percentage of total revenue generated by each room class (Elite, Premium, Standard, etc.).

#### Insights:

- Revenue Contribution: The analysis confirms that a small percentage of room categories (e.g., Luxury/Premium) drive the highest share of the total revenue, validating their high strategic importance.
- Booking Behavior: The visuals successfully correlate Booking Lead Time with the resulting Length of Stay, allowing management to understand how far in advance certain room types are booked and for how long.
- ALOS Variance: The ALOS metric, when segmented by room type, shows that certain categories (often high-end or entry-level) have distinct booking durations, which is vital for scheduling and capacity management.

## 4. Cancellations & Lost Revenue Analysis Dashboard

### Overview:

This dashboard is critical for risk mitigation. Its primary focus is to quantify the financial impact of cancellations, analyze cancellation trends over time, and identify high-risk room categories and properties.

### Key Metrics:

- **Overall Cancellation Rate:** (24.83%, based on total bookings).
- **Total Lost Revenue:** (The total value of revenue forfeited due to cancelled reservations).
- **Cancellation Growth (MoM/WoW):** Metrics showing the percentage change in cancellations, highlighting volatile periods.
- **Cancellation Patterns:** Breakdown of cancellation volume by property and room class.

### Insights:

- Financial Impact: The total Lost Revenue figure serves as the immediate benchmark for the financial risk associated with the current cancellation volume.
- Targeted Mitigation: The analysis successfully identifies specific Elite and Premium room categories that contribute disproportionately to the Lost Revenue, mandating targeted policy intervention (e.g., stricter prepayment requirements).
- Trend Monitoring: The time-series trend analysis allows management to proactively monitor cancellation volume and identify specific months or seasons where risk historically increases.

## Room Category Performance

3.71

Lead Time (Days)

43.5%

Occupancy %

2.37

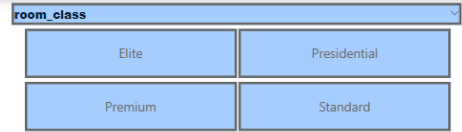
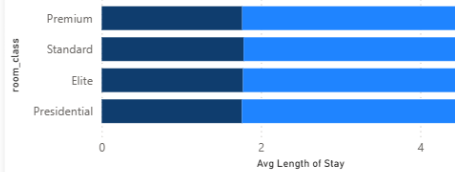
Avg Length of Stay

135K

Total\_rooms\_booked

"Average Length of Stay by Room Class"

category ● Business ● Luxury



check\_in\_date

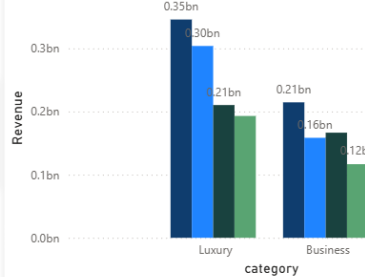
All

city

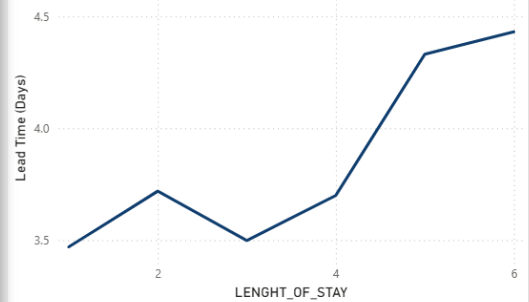
All

"Revenue by Category & Room Class"

room\_class ● Elite ● Premium ● Presidential ● Standard



"Lead Time vs Length of Stay"



## Cancellations & Lost Revenue Analysis

298.8M

Lost\_revenue

33K

Total Cancellations

24.83%

Cancellation Rate

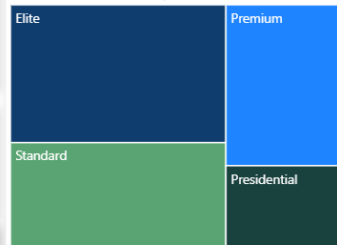
-0.7%

MOM%\_cancellations

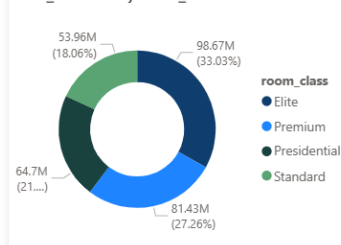
1.45%

WOW%\_cancellations

Total Cancellations by room\_class



Lost\_revenue by room\_class



city

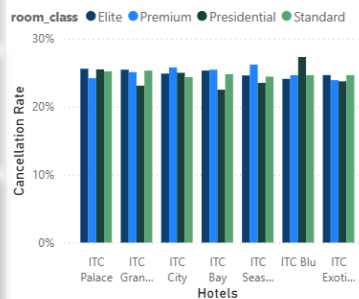
All

MonthName

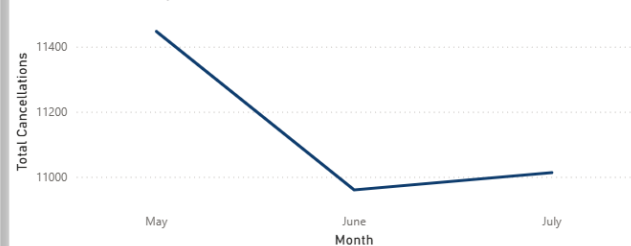
April June

July May

Cancellation Rate by Hotels and room\_class



Total Cancellations by Month



## Project Outcome

Delivered a set of four comprehensive, interactive dashboards tailored for the hospitality industry.

### Enabled the business team to:

- **Track Revenue Leakage:** Quantify and monitor financial losses due to cancellations (25%).
- **Monitor Operational Efficiency:** Benchmark performance using core metrics like ADR and RevPAR.
- **Optimize Capacity Management:** Identify specific low-performing Hotel-Room combinations via the Occupancy Heatmap.
- **Identify Strategic Trends:** Isolate seasonal trends and periods of high revenue volatility.

### Problems Faced

- **Initial Performance Issues:** Difficulty achieving fast load times with the large transactional dataset, resolved by optimizing complex DAX measures and streamlining the data model.
- **Time Intelligence Complexity:** Challenge in calculating accurate MoM/WoW Growth metrics for both Revenue and Cancellations across varying time periods.
- **Data Structure:** Requirement for a custom Occupancy table to accurately model available room capacity (supply) against bookings (demand).

## Learnings

- ***Hands-on Experience:*** Gained proficiency in designing professional, high-impact financial dashboards.
- ***Improved DAX Mastery:*** Developed expertise in creating complex hospitality-specific measures (e.g., RevPAR, Cumulative Revenue, Cancellation Rate).
- ***Advanced Modeling:*** Learned to structure the data model to support multi-faceted analysis (Finance, Operations, and Risk) from a single transaction fact table.

## Future Scope

- ***Implement Predictive Model:*** Integrate outputs from a machine learning model to forecast cancellation risk probability for new bookings.
- ***Dynamic Pricing Integration:*** Develop connections to feed occupancy and RevPAR trends into an operational system to inform real-time pricing adjustments.
- ***Enhance Customer Analysis:*** Add profitability analysis and segmentation by Booking Channel (Corporate vs. OTA) to guide marketing spend.
- ***Integrate Real-time Data:*** Establish connections to a live data source (e.g., Azure SQL) for immediate dashboard updates.

# **ThankYou!**

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