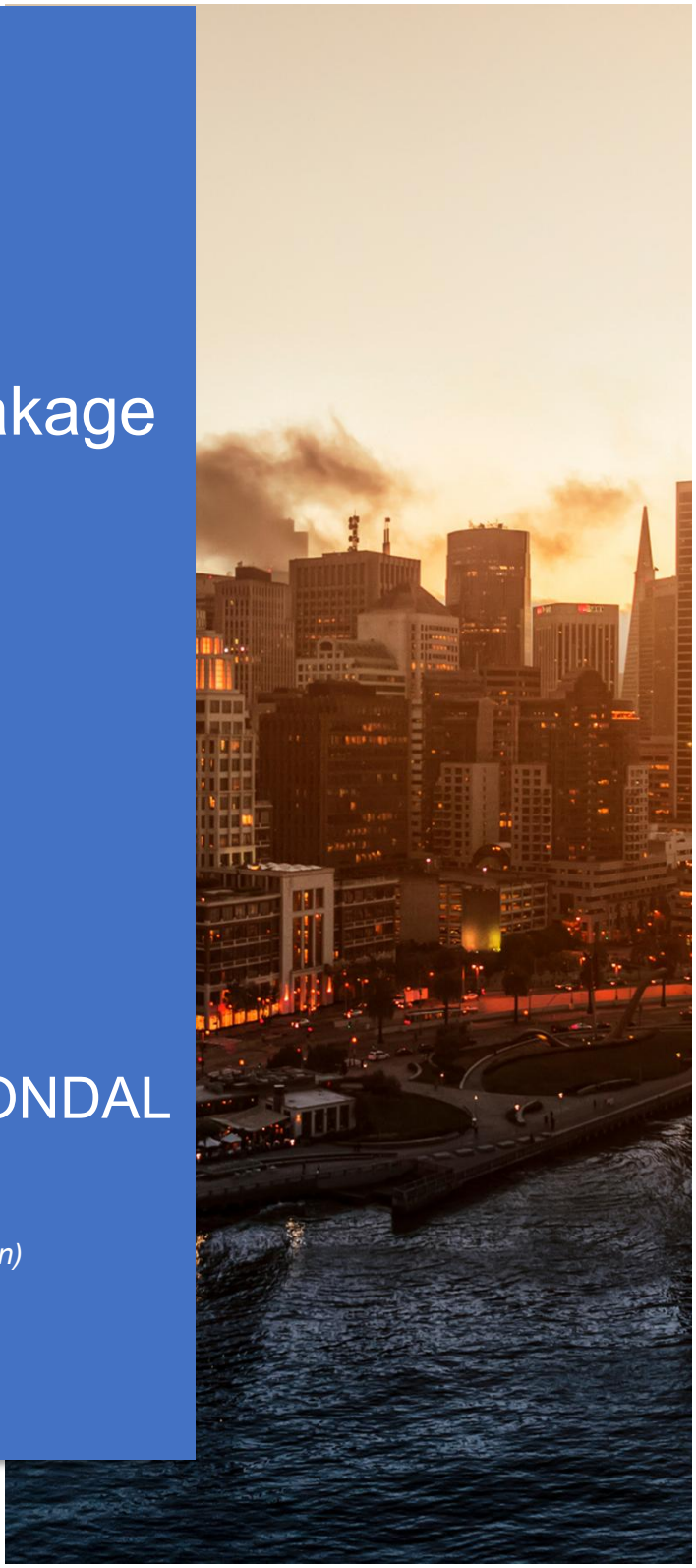
Project title

Optimizing Revenue Leakage & Profitability in the Hospitality Sector

(*Consulting and Analytics club, IIT Guwahati, Summer Project'2025*)



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Date: 25th June 2025 *(date of submission)*

☛ Follow this drive link to get access of all dataset and notebook

Visit my profile

Also get the whole project on github:

Introduction

The competitive and dynamic hospitality industry often faces challenges such as revenue leakage, fluctuating occupancy, and underutilized services. These inefficiencies may arise from issues in pricing strategies, inconsistent guest targeting, seasonal imbalances, or unoptimized service offerings. Despite collecting rich booking and guest data, many hotel chains lack structured analytics to convert this data into actionable insights. This project aims to address that gap by building a data-driven framework for revenue optimization.

Objective

The primary objective of this project is to develop a structured approach to identify key drivers of revenue leakage and underperformance in hotel services. It includes:

- Analyzing booking trends and revenue patterns.
- Understanding guest behavior and cancellations.
- Recommending data-backed pricing, bundling, and operational strategies.
- Justifying decisions through business KPIs (like RevPAR, ADR, occupancy %) and forecasting models such as week-on-week growth.

Problem Statement

Hotels often suffer hidden losses due to inefficient room usage, high cancellation rates, last-minute discounting, and poor demand forecasting. This project aims to uncover the root causes behind revenue leakage and suggest practical, data-supported interventions. The analysis is grounded in business context, using KPIs that matter most to profitability.

Dataset Description

The project uses structured data from various sources within the hotel's ecosystem:

1. **fact_bookings.csv:**
   Detailed data at the individual booking level, including dates, status, guests, room category, platform, and revenue metrics.
2. **fact_aggregated_bookings.csv**
   Aggregated metrics per room per date, such as capacity, successful bookings, room category and check-in date.
3. **dim_hotels.csv**
   Mapping of property IDs to hotel names, categories (business/Luxury) and cities.
4. **Dim_rooms.csv:** Room category descriptions (standard, elite, premium and presidential) .

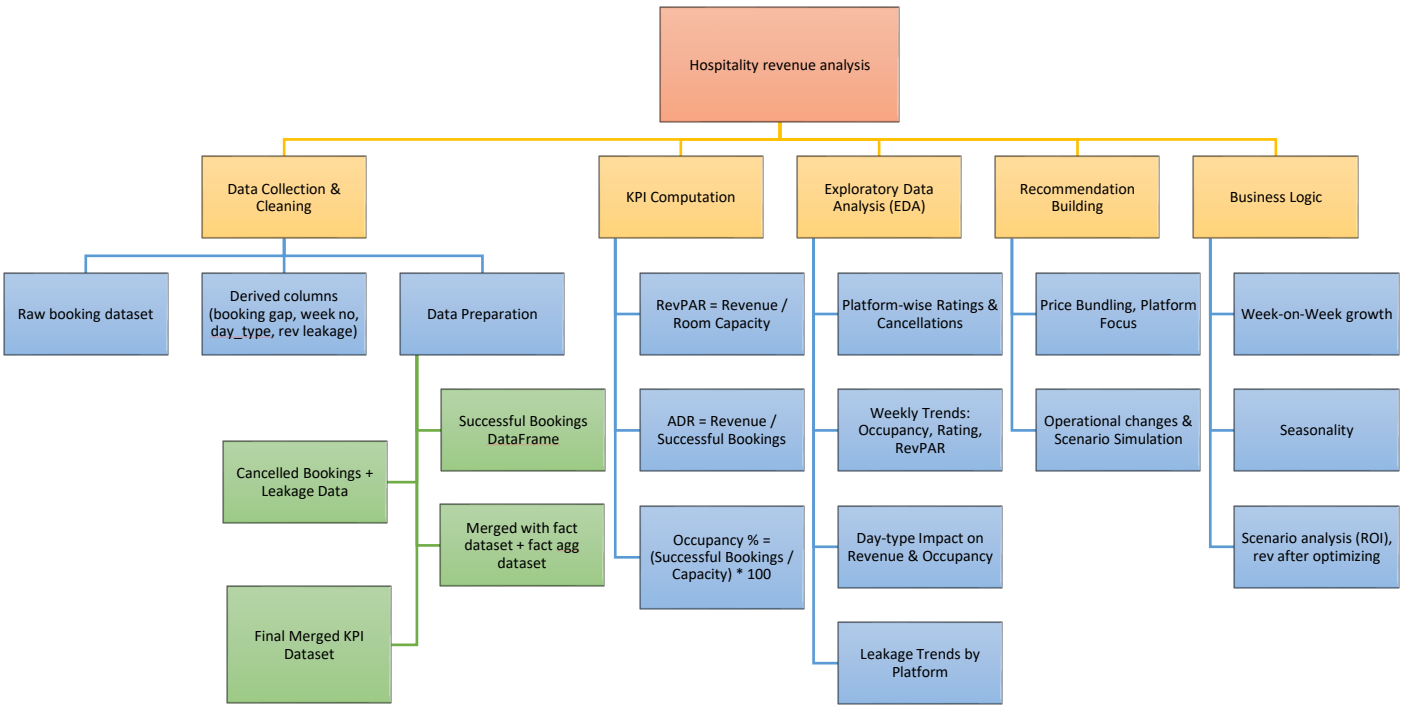
5. **dim_date.csv**
   Date-wise information including week numbers and day type (weekday/weekend).

Project Framework Overview:

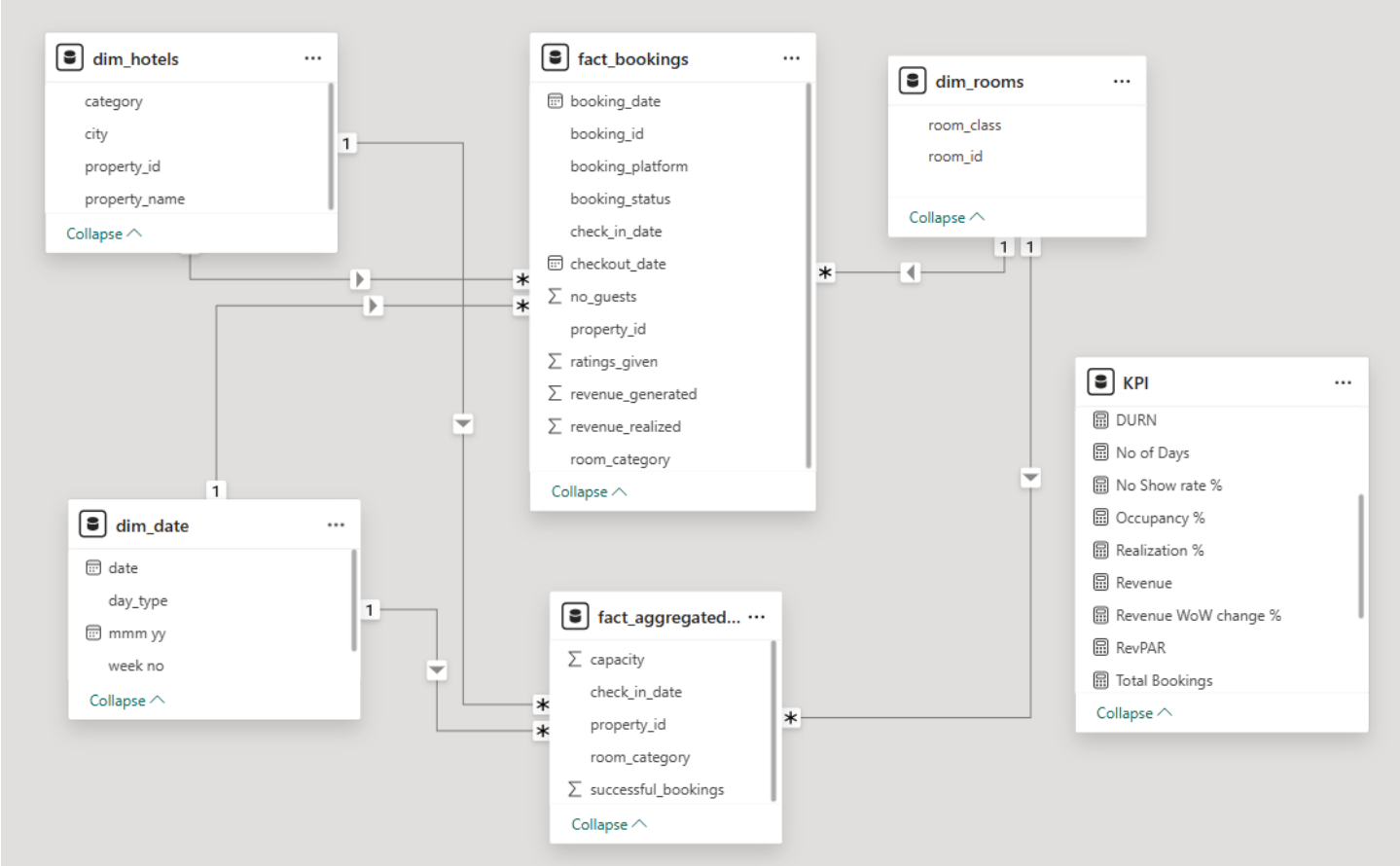
Project workflow:

Data analytics frameworks provide a structured approach for making sense of data. They bring order to complex information environments, so companies can gain actionable insights. With the right framework, companies can collaborate and transform disconnected data into innovation and strategic planning. In today's data-driven world, analytics frameworks are essential for optimizing operations, understanding customers, and identifying opportunities. In short, they turn overwhelming data into an asset for learning, improving, and thriving. The insights derived would help me to steer strategy and operations. Data-driven decisions get incorporated into workflows.

Here's a simplified version of our project's logical workflow, which is represented as hierarchical framework image:



Data Modelling for Power BI



Interactive Dashboard Link

Analytics progress structure:

The following is a brief overview of the document's structure and what is addressed in each section.

Methodology:	An overview of the methodology applied to the project, plus summary details of each of the different stages that the project went through to get from raw datasets to completed analysis, including the transformation tasks required to get the data from raw to the required state.
Data Selection:	Provides a summary of each of the datasets used in the project, including their attributes, format of the raw dataset, and source of each dataset.
Transformation:	Details on the steps taken to transform each dataset from its raw state to the final state, ready to be used in the analysis.
Analysis:	An overview of the approaches included in analysing the data and why they were chosen. The report will also provide details on the essential features of the analysis and insights view.
Results:	Present the Interpretation and evaluation of the analysis.
Conclusions:	Describe the advantages/disadvantages, strengths and limitations of the project and its outcomes.
Recommendation	Based on insights and business logic consulting and strategic recommendation

Data Preparation Process:

fact_agg_bookings dataset:	Converted all date columns into datetime format. Mapped the room category name with it's code name {'RT1':'Standard','RT2':'Elite','RT3':'Premium','RT4':'Presidential'} Which we got from 'dim_rooms' data.Then calculated another column of 'occupancy_pct' by successful booking*100/room capacity.
fact_bookings	On this dataset we 1st converted all the date columns into it's datetime format. Again Mapped the room category name with it's code name. **we merged it with dim_dates** dataset (where **check in date from fact bookings=date in dim_dates**) and stored it into another dataframe of **df1** to get corresponding 'week no.' and "day type" into **df1.** Then this dataframe df = df1 + dim_hotels(merging 2 dataset) to get corresponding 'property_name','category' and 'city' keeping the property_id common and stored it into df. Then from df we compute another column of revenue leakage (= generated-realized). So now df is our final data frame

KPI (key Performance Indicator)	We created a KPI-level dataframe (KPI) at the room-category and date level by:
	• Group by with ["property_id",'check_in_date','room_category'] of df and take total revenue.
	• Merging revenue_realized with fact_aggregated_bookings
	• Adding metrics like:
	  ○ **RevPAR (Revenue per Available Room)** = revenue_realized / capacity
	  ○ **ADR (Average Daily Rate)** = revenue_realized / successful_bookings
	  ○ **occupancy_pct** = successful_bookings / capacity * 100
	This formed the base for trend analysis like **week-on-week** performance, weekday/weekend comparison, and forecasting opportunities.

Customer Segment Data	We segmented customers by grouping with booking platform, property and city of df (only successful bookings): • Booking platform • Spend type (Low, Medium, High → via quantile bins) • Visit type (Rare, Occasional, Frequent → frequency logic) Used for: • Platform-wise revenue pie charts • Spend-based behaviour on platform and property • High-spending segment identification (90th percentile and above)
Cancellation-Dataset	Filtered dataset with 'booking_status == Cancelled' Added columns: • booking_gap (numeric) • booking_gap_stts (Late vs Early) • Grouped by room type, day type, and platform to analyze average revenue leakage • Used in last-minute cancellation impact and non-refundable policy simulation • It will help us too calculate root cause analysis of revenue leakage and what are the necessary steps we can take.

Our Final Dataset (df) Attributes Review

After merging and cleaning the data, the following columns were used for analysis:

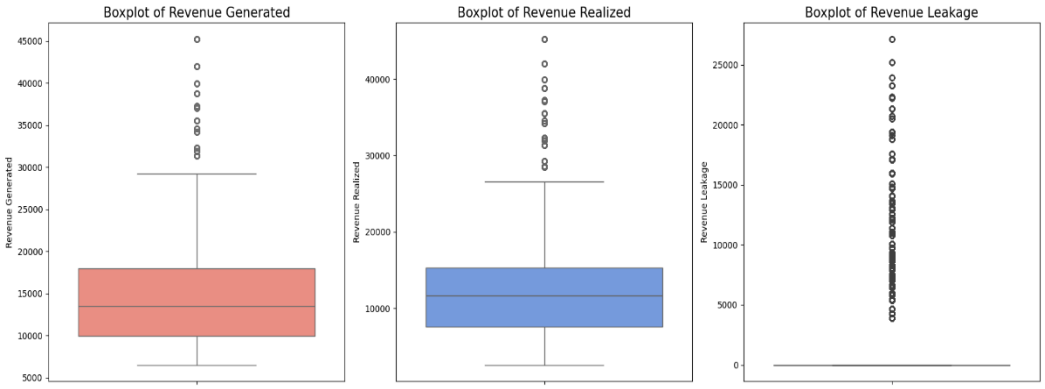
property_id, booking_id:	Unique identifier for the property and booking of customer respectively.
booking_date, check in date, checkout_date	Important timeline columns for booking analysis.
room_category	Type of room booked.
booking_platform:	Source of booking (e.g., Journey, Direct Online).
booking_status:	Final outcome (Checked Out, Cancelled, No Show).
no_guests:	Total number of guests in the booking
revenue_generated:	Expected revenue if the booking is completed.
revenue_realized	Revenue actually earned. (influenced by booking status if cancelled)
revenue_leakage:	Difference between generated and realized revenue.
leakage_pct:	Percentage of revenue lost
day_type:	Whether the booking falls on a weekday or weekend
property_name, category, city:	Descriptive fields for segmentation . for e.g. Atliq Exotica, category business, city: delhi)
ratings_given:	Customer feedback (optional in some rows).
booking_gap:	Number of days between booking and check-in.
week no:	Used for seasonal and time-based trend analysis and WoW growth

Exploratory Data Analysis (EDA)

The exploratory data analysis (EDA) will allow me to glimpse the general characteristics of the dataset, which can be attained by generating descriptive statistics and data visualisations. The EDA phase focused on understanding patterns in hotel bookings, platform performance, customer behaviour, revenue trends, and potential areas of loss. Various visualizations and aggregations were used to uncover hidden insights related to cancellation, occupancy, rating, and platform dynamics.

Box plot of Revenue generated vs realized vs Leakage:

This figure presents three side-by-side boxplots displaying the distribution of **Revenue Generated**, **Revenue Realized**, and **Revenue Leakage** for all bookings in the dataset. Each boxplot provides a visual summary of the spread, central tendency, and presence of outliers in each variable.



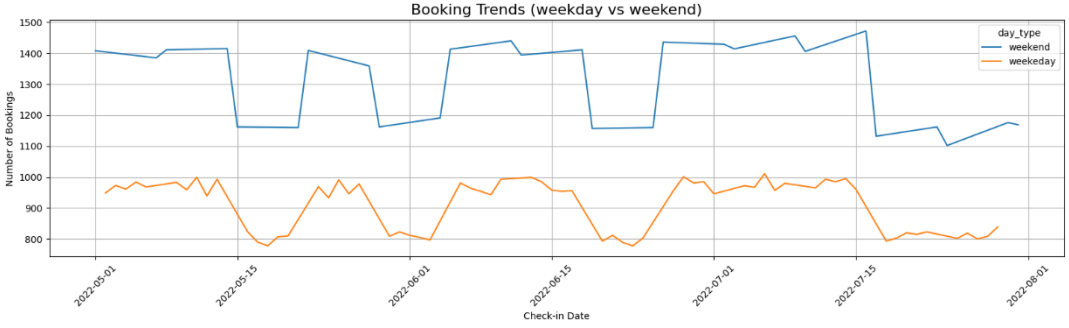
Insights:

- The **Revenue Generated** and **Revenue Realized** plots show a similar distribution, with medians around ₹13,000 and ₹12,000 respectively. Both exhibit a wide interquartile range and a considerable number of high-value outliers, indicating a long-tailed distribution.
- The **Revenue Leakage** boxplot reveals a highly skewed distribution with the majority of leakage values clustered near zero, but again with a significant number of extreme outliers. This suggests that although leakage is usually low, a few cases account for very high losses.

The presence of heavy outliers in all three revenue components highlights significant variation in booking behaviour and pricing. Revenue leakage is generally minimal but spikes in certain cases, which may warrant investigation into cancellation patterns, high-risk platforms, or customer segments. The outliers in realized revenue indicate that a few high-value bookings might be disproportionately impacting profitability and should be analysed further.

Booking Trends Over Time – Weekday vs. Weekend:

This line chart illustrates the number of bookings made over a period of time, categorized by **day type** — weekdays and weekends — using the check-in date as the timeline.



The blue line represents **weekend bookings**, while the orange line represents **weekday bookings**. Throughout the period

shown, weekend bookings consistently remain higher than weekday bookings.

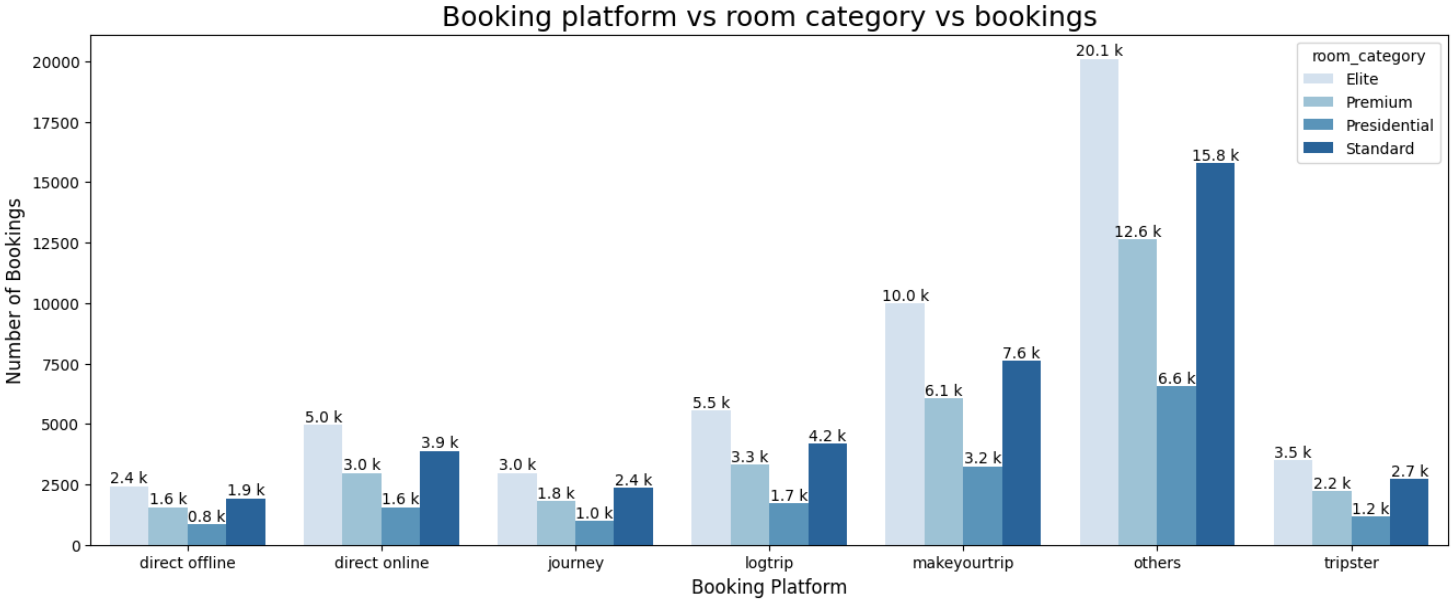
Insight:

- **Weekend bookings** are consistently **higher than weekday bookings** across most of the timeline.
- There are some drops in both weekday and weekend bookings regularly, possibly in mid months.
- The pattern suggests that guests **prefer weekend stays**, likely for leisure travel.
- Business opportunities: **weekends are stronger performers**, so **weekday upsell strategies** may help balance the load.
- Hotels can try special offers for weekdays to attract more guests

So it is highlighting a clear preference among customers for leisure travel or short stays during weekends. This consistent trend suggests that promotional efforts or higher pricing strategies could be targeted on weekends, while weekday occupancy might benefit from discounts or business travel packages to improve utilization.

Room Category Bookings Across Different Booking Platforms

This grouped bar chart shows the distribution of successful bookings for different room categories (Elite, Premium, Presidential, Standard) across multiple booking platforms. These platforms include both direct channels (online and offline) and third-party aggregators like makeyourtrip, journey, tripster, etc.



From the chart, we observe that the **"others"** booking platform segment dominates in all room categories, especially in **Elite** (20.1k bookings) and **Standard** rooms (15.8k bookings). Notably, **makeyourtrip** also contributes significantly to bookings in each category, particularly Elite (10k) and Premium (6.1k).

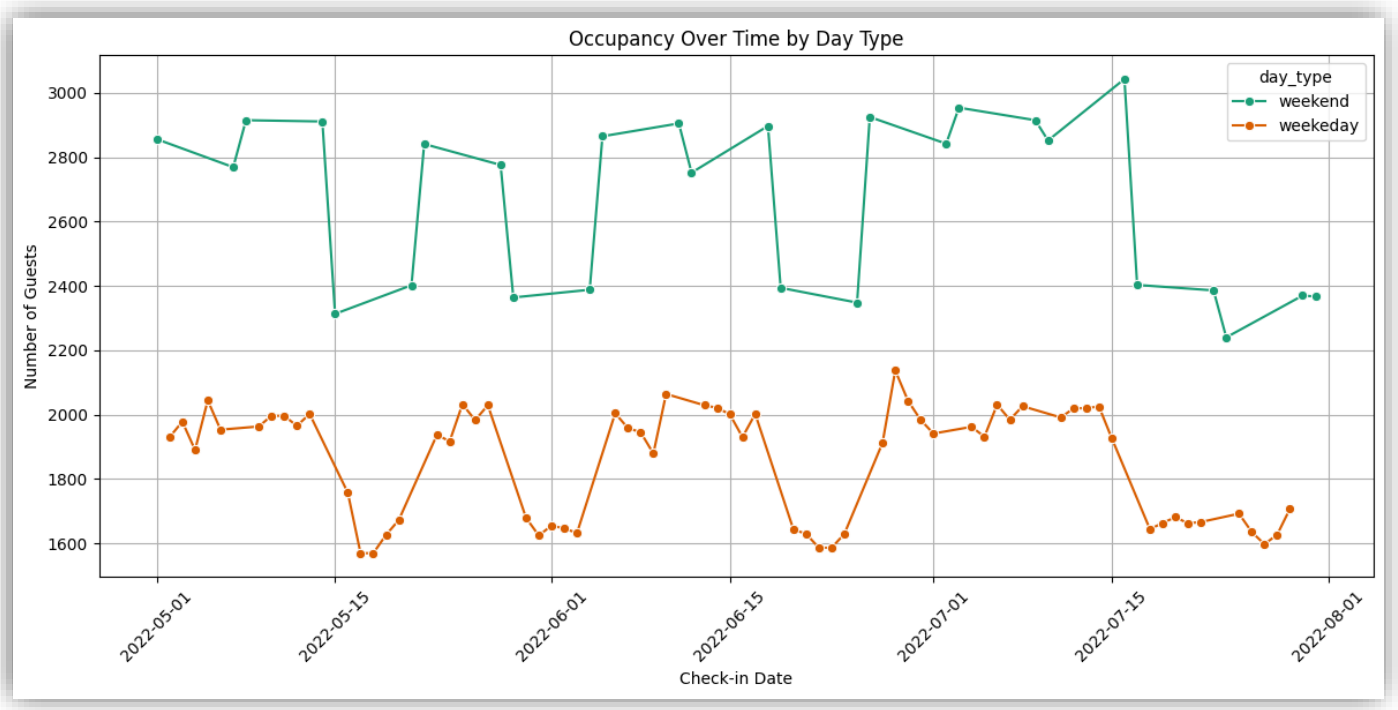
Conversely, platforms like **tripster** and **journey** have lower booking counts across categories, particularly for high-end rooms like **Presidential**.

Insight:

Different platforms show varying preferences for room types. Third-party platforms like "others" and "makemyourtrip" perform strongly, possibly due to broader reach or attractive deals. Presidential rooms consistently have the lowest bookings, indicating niche demand. Direct booking channels may require promotional strategies to boost conversions, especially for high-value rooms. This analysis indicates that high-end rooms (like Presidential) see less atraction across platforms and may need targeted marketing or to improve utilization.

Occupancy Over Time by Day Type

This line chart illustrates the total number of guests staying at the properties over time, segmented by **day_type** (weekday vs weekend). The x-axis represents the check-in dates over the three-month period, while the y-axis



shows the total number of guests.

From the visualization, it's evident that **weekends consistently attract higher occupancy** compared to weekdays. Weekend guest counts regularly approach or exceed the 2800 mark, whereas weekday guest numbers mostly remain below 2100. The pattern also shows periodic dips around mid-month, possibly indicating off-peak behaviour or gaps between high-demand cycles.
There are observable cycles in both curves, which reflect natural demand shifts based on weekly travel patterns—people tend to travel or book getaways on weekends more than weekdays.

Insights:

- Occupancy is clearly **higher on weekends**, showing strong consumer preference for leisure or short-break stays.
- Weekday occupancy is relatively stable but significantly lower, suggesting untapped potential or underutilized capacity during the week.

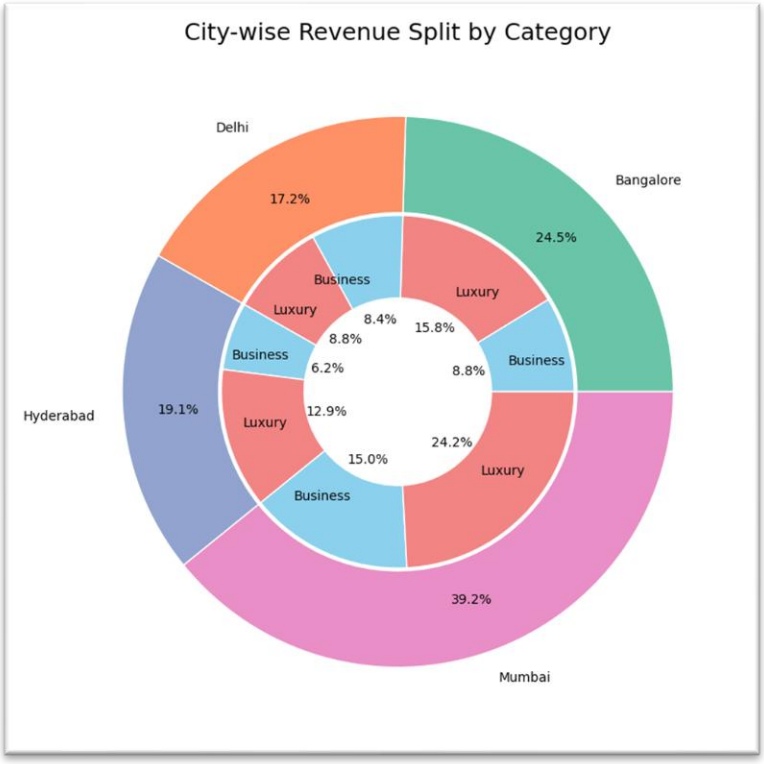
Consulting Recommendations:

- ✓ Hotels can introduce weekday-specific offers, such as corporate **packages, couple packages, co-working + stay bundles**, or early check-in and late checkout deals, to attract business travellers.
- ✓ Dynamic pricing can be optimized based on this trend—higher rates on weekends and discounts or incentives on weekdays to increase occupancy maintaining average daily revenue.
- ✓ Running targeted ads during weekdays on platforms used by working professionals may improve engagement and midweek booking rates.

City-wise Revenue Split by Category

This nested donut chart displays the revenue contribution by city (outer ring) and further breaks it down by customer category—Business and Luxury—within each city (inner ring).

From the visualization, we observe the following:



Mumbai stands out significantly, contributing the largest share of revenue at **39.2%**, making it the leading city in terms of performance.

Bangalore (24.5%) and **Hyderabad** (19.1%) follow as the next major contributors.

Delhi contributes a smaller share at **17.2%**, indicating a relatively lower revenue footprint.

Looking deeper into the **category-wise composition**:

Luxury segments dominate in all cities, especially in Mumbai (24.2%) and Bangalore (15.8%), suggesting that these cities attract high-end travellers.

Business segment plays a relatively stronger role in Delhi compared to the rest, implying a more balanced demand structure in these cities.

Delhi has the **lowest combined revenue share** and also a relatively smaller Business contribution, pointing to either underperformance or price-sensitive market behaviour.

Insights:

- Mumbai is the top-performing city with the highest reliance on luxury bookings, indicating premium customer presence.
- Bangalore and Hyderabad also show decent revenue shares, driven by both segments.
- Delhi is underperforming in both Luxury and overall contribution, suggesting a need for deeper market activation or repositioning.

Consulting Recommendations:

- ✓ **Increase strength on Mumbai and Bangalore** by enhancing premium offerings (e.g., luxury services, spa packages, personalized experiences) as these cities are yielding the highest value.
- ✓ In **Hyderabad**, invest in improving service differentiation for both segments—targeting mid-range upgrades and flexible pricing to unlock more value.

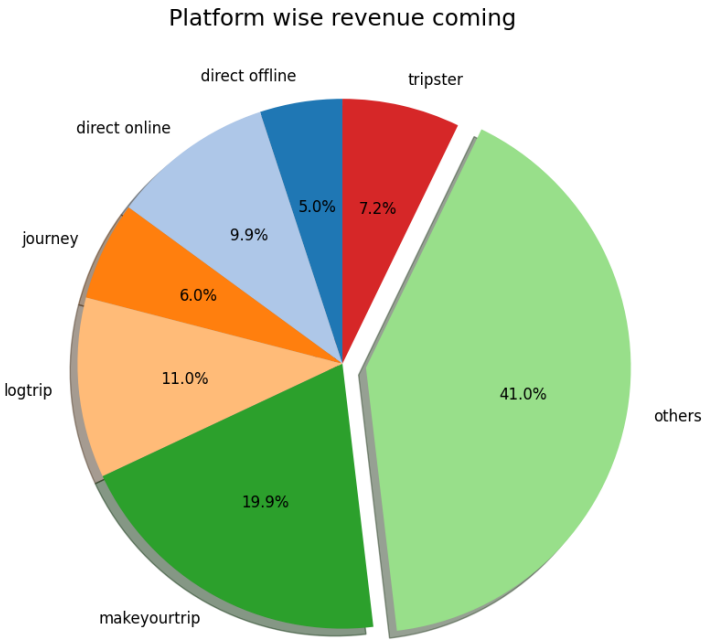
- ✓ For **Delhi**, conduct a deeper analysis into competitive pricing, customer reviews, and local demand patterns. Consider repositioning the offerings, introducing seasonal promotions, or partnering with local eventplanners to attract both luxury and business travellers.
- ✓ Introduce **geo-targeted campaigns** focusing on high-revenue cities to optimize marketing ROI.

Revenue Distribution by Booking Platform

This pie chart shows the **platform-wise revenue contribution** across all booking sources. The chart segments total revenue generated by each booking platform and visually identifies which channels contribute most significantly to overall business earnings.

Key observations from the chart includes:

- The **"others" category dominates** the chart with **41 %** of the total revenue, indicating a large volume of bookings is coming from miscellaneous or less trackable platforms.
- **Makeyourtrip** is the second-largest revenue generator with **19.9%**, showing strong performance among branded booking partners.
- **Logtrip** follows at **11.0%**, and **direct online** channels account for **9.9%**, suggesting good adoption of the company's own online booking portals.
- **Tripster**, **Journey**, and **Direct Offline** together make up a smaller portion of the pie (each contributing between 5%–7%), reflecting lower monetization potential by these platforms.



Insights:

- ➢ The heavy dependency on the "others" segment presents both an opportunity and a risk — it reflects lack of tracking and transparency in source categorization.
- ➢ Aggregators like Makeyourtrip and Logtrip are contributing substantially, highlighting the growing customer preference for third-party booking tools.
- ➢ Direct channels (online + offline) collectively account for less than 15%, which is relatively low considering they have the potential for better margin control

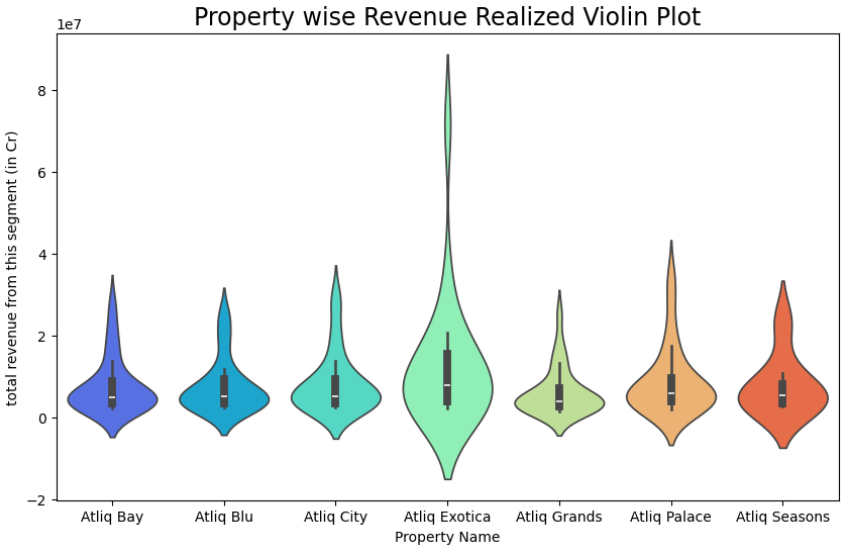
Consulting Recommendations:

- ✓ **Enhance Direct Online Presence**: Since direct online contributes just 9.9%, there's a clear need to **boost** user experience, and incentives on owned platforms. This would reduce dependency on external aggregators and improve profit margins. Make the online platform **more attractive by** improving the design, making it easier to use, and maybe offering some **discounts or loyalty points** to users who book directly.

- ✓ **Understand the "Others" Group Better**: A large part of revenue is coming from "others" (about 41%), but we don't know exactly which platforms are included there. We should try to **analyze and break down this group**, so that we can find out which platforms are actually performing well and can be promoted more clearly. Then promote those platforms.
- ✓ Partner More with Top Aggregators: Platforms like Makeyourtrip and Logtrip are doing well in terms of revenue. We can build stronger partnerships with them, such as running special offers or visibility campaigns during peak seasons, which can increase our bookings from those platforms even more.
- ✓ We can give discount or No transaction fee & GST, No booking charge in the lowest share platform, after observing 1 month if still it is not worthy then Reduce Focus on Weak Channels, some platforms like "direct offline" bring very little revenue. We can slowly **shutting down this channels and shift our efforts** away from these low-performing channels, and instead try to move more people to book online, which is faster, easier, and cheaper to manage.

Property-wise Revenue Realized (Violin Plot)

This plot is generated through customer segment data.The violin plot shows the distribution of **total revenue earned** (revenue realized) across different **Atliq hotel properties**. Each shape represents how the revenue is spread over time for that property.



From the plot, we can see that:

Insights :

- **Atliq Exotica** shows a very **wide and tall distribution**, meaning sometimes it earns very high revenue, even going over 8 crores in some weeks. This suggests it's the **top performer** among all properties.
- Other properties like Atliq Blu, City, Palace have **medium and consistent revenue**, with most values staying in a moderate range.
- **Atliq Seasons and Grands** show **narrower shapes**, which means their revenue is mostly lower and consistent, with fewer spikes.

Overall, this visualization helps in identifying **which properties are high-performing**, **which are consistent**, and which may require further support or strategy changes to improve their revenue performance.

Consulting Recommendations:

- ✓ We should **focus on Atliq Exotica** as a **high-value property**. If possible, we can invest more in marketing this property or increasing prices slightly, as it has the capacity to generate big revenue.

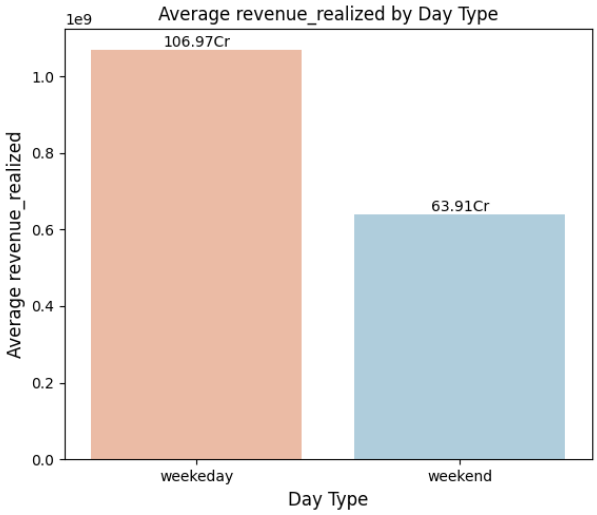
- ✓ For properties like **Atliq Seasons or Grands**, we may consider offering special deals or events to boost their revenue. These hotels may need better customer targeting or **promotional offers** to perform better.
- ✓ Since some hotels have similar patterns, we can also do **replicate**—compare what's working at Exotica and apply it to weaker ones.

Plot Analysis Description (weekend vs weekday) :

This set of bar charts compares hotel performance metrics between weekdays and weekends using four different KPIs — **Revenue Realized**, **RevPAR (Revenue per Available Room)**, **ADR (Average Daily Rate)**, and **Occupancy Percentage**.

(see fig on rightside)

day_type	revenue_realized	RevPAR	ADR	occupancy_pct
weekday	1069703782	7635.32	14669.01	51.81
weekend	639067447	10908.78	14756.29	73.96

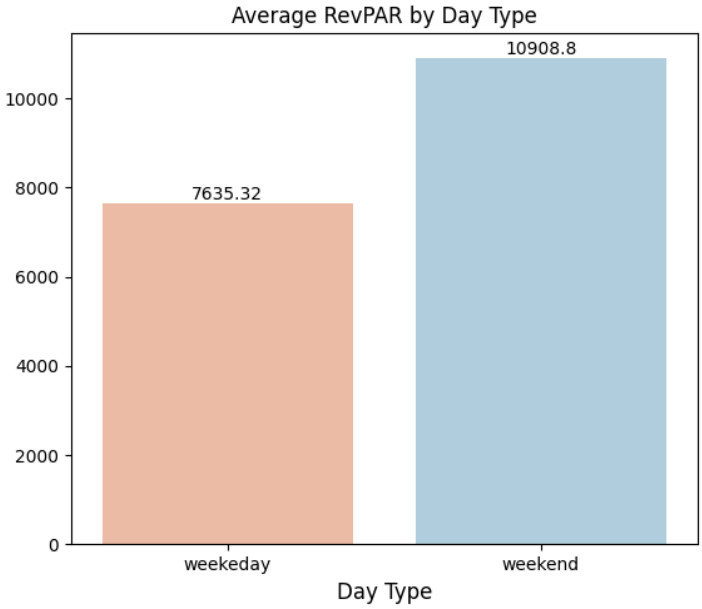


1. **Revenue Realized:**
Weekdays show a higher total revenue (~107 Cr) than weekends (~64 Cr). This is likely because there are more weekdays in the dataset and more bookings happen during the week overall.

2. **RevPAR (Revenue per Available Room):**
Despite total revenue being lower on weekends, the RevPAR is significantly higher on weekends (~10,909) compared to weekdays (~7,635). This means hotels earn more revenue **per room available** during weekends.

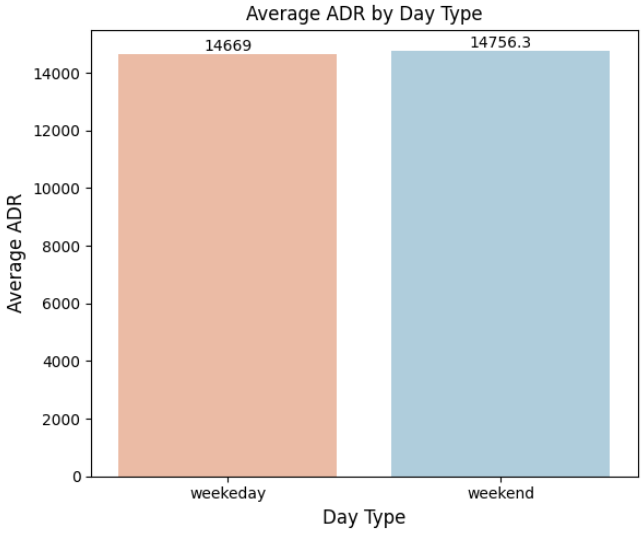
3. **ADR (Average Daily Rate):**
The average price charged per sold room is almost the same, slightly higher on weekends (~14.7k vs. ~14.6k). This shows that pricing doesn't change drastically, but revenue varies based on how many rooms are booked.

4. **Occupancy % (Room usage):**
Weekends have a much higher occupancy (~74%) than weekdays (~52%), meaning hotels are more filled during weekends. People likely travel or plan stays more on weekends than weekdays.



Insight:

- **Hotels are more occupied during weekends**, which leads to higher revenue per room (RevPAR), even though the total revenue is less than weekdays.

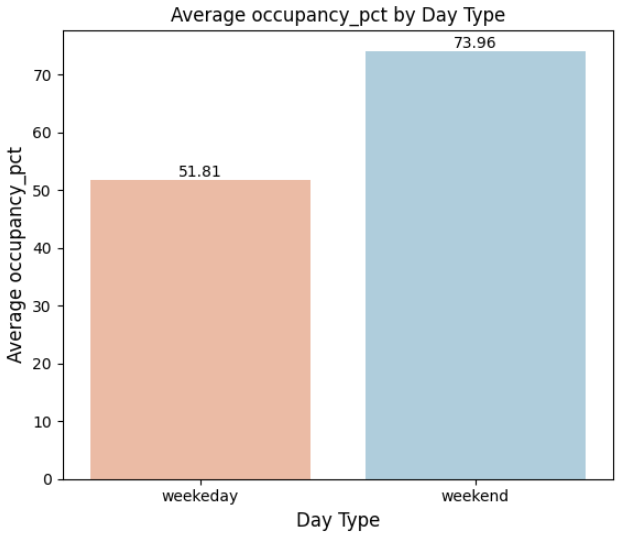


- The high RevPAR and occupancy during weekends indicate strong demand.
- Pricing (ADR) is almost constant, but weekends utilize room inventory better.

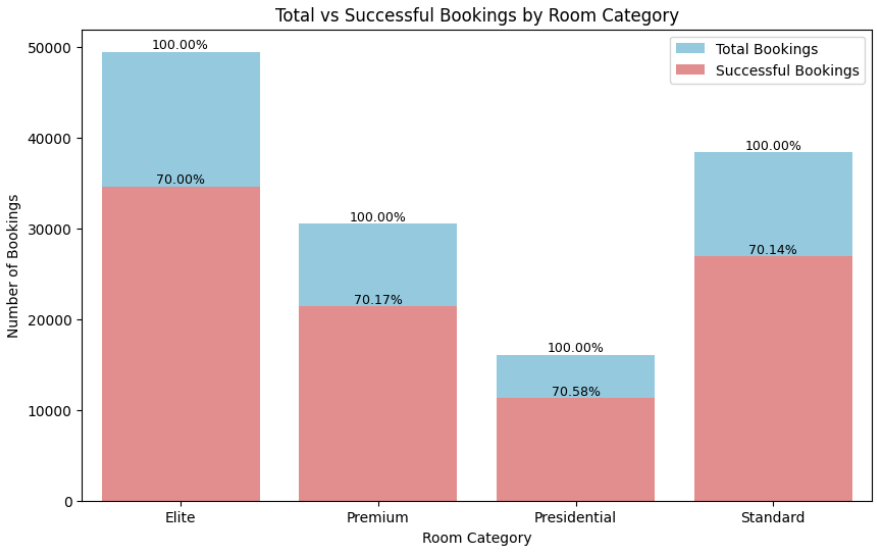
Consulting Recommendations:

- **Increase** room prices slightly on **weekends** since demand is naturally higher and occupancy is good. This can improve revenue without affecting bookings much.
- On **weekdays**, consider offering **deals or packages** to boost occupancy, as many rooms remain unsold.

- **Improve** marketing strategies for weekdays to attract business travelers or long-stay guests.
- Hotels could explore **offering weekday discounts** to companies or remote workers to increase room usage without lowering ADR too much.



Analysis of Room Category Performance



1. Total vs Successful Bookings by Room Category:

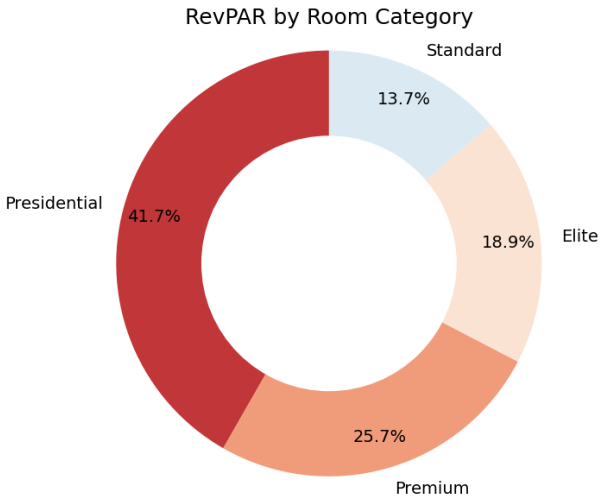
This bar chart shows the comparison between total bookings and successful bookings (those where customers actually checked out) across different room categories. The successful bookings are shown in a stacked format on top of the total bookings, and percentage values are annotated on the bars to show the proportion.
From the chart:

- All room categories—Elite, Premium, Presidential, and Standard—have a consistent success rate of around **70%**.

This means that almost **30%** of the bookings in each room type either got cancelled or were not checked in. This consistency hints that cancellation or no-show behavior is evenly distributed across room types.

2. RevPAR (Revenue per Available Room) by Room Category

- This donut chart shows the share of average RevPAR contribution from each room category. RevPAR is calculated by dividing the revenue realized by the number of available rooms (capacity), giving a clearer picture of how much money is earned per room available, not just per room sold.



From the chart:

- **Presidential rooms** contribute the **highest RevPAR** share (41.7%), even though they had the lowest number of total bookings.
- Premium rooms follow with around 25.7%, and Elite contributes 18.9%.
- Standard rooms contribute the least with 13.7%, despite having a high number of bookings.

Insights

- Even though Presidential rooms are booked less often, they bring in maximum revenue per available room. This shows their high earning potential.
- Standard and Elite rooms get more bookings, but their RevPAR is much lower, meaning they're not as profitable per room.

Consulting Recommendations:

- ✓ Hotels should **promote Presidential rooms** smartly by offering **special packages or upgrades** to increase their booking rate while maintaining profitability.
- ✓ For **Standard rooms**, consider small price adjustments or bundle offers to increase RevPAR.
- ✓ Try **dynamic pricing** for rooms that are booked frequently but earn less revenue per room.

This approach can help balance the volume with profitability across all room types.

Root Cause Analysis & Revenue Leakage Assessment

This section, we aim to understand the **underlying reasons behind revenue loss** in the hotel business. Just knowing that revenue is leaking is not enough—we need to dig deeper to find out *why* it's happening, *where* it's happening, and *how* we can reduce it.

This process is known as **Root Cause Analysis (RCA)**. It helps identify the main factors that are directly affecting hotel profits—like cancellations, no-shows, discounts, late bookings or underperforming rooms.

We also assess **Revenue Leakage**, which means the expected revenue that was not realized. For example, if a room was booked but later cancelled or was given at a deep discount, the hotel loses potential income. By measuring and analyzing this leakage, we can figure out the **weak points** in the current system.

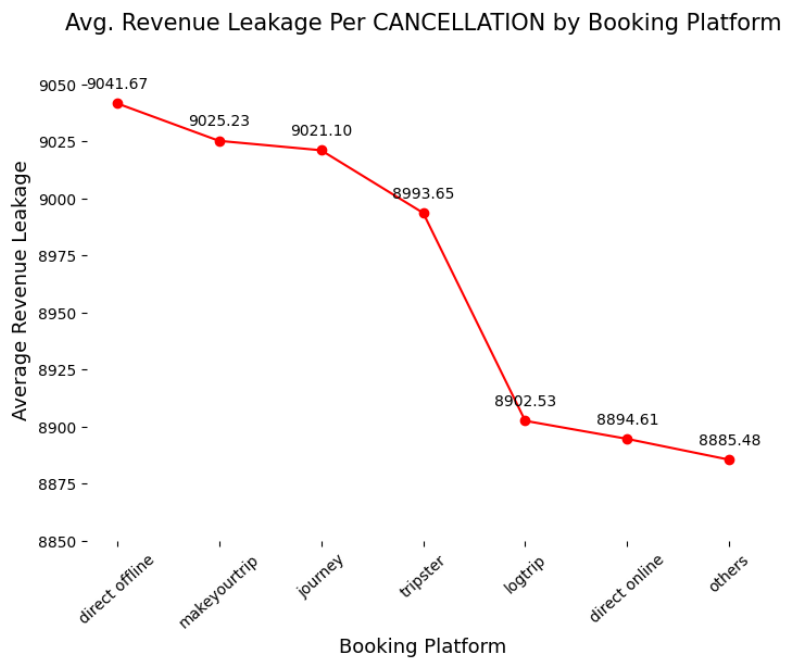
Objective:

- To **find patterns** in cancelled or failed bookings.
- To analyse **which factors** (like customer reviews or pricing) are contributing most to revenue leakage.
- To explore **high-risk** booking behavior, like last-minute cancellations.
- To recommend **policies and actions** that can help recover lost revenue and prevent future leakage.

This root cause study is a crucial step before we move toward **optimizing pricing strategies, policy changes**, for prediction.

Chart: Avg. Revenue Leakage Per Cancellation by Booking Platform

This line chart shows the **average revenue loss per cancelled booking** across different booking platforms. It helps us understand which platforms are causing more damage when cancellations happen.



What it shows:

•On **direct offline** bookings, each cancellation costs the hotel around ₹9,041 on average — the highest among all platforms.

•**Makeyourtrip** and **journey** also show high leakage per cancellation (~₹9,025 and ₹9,021).

•On the other side, platforms like **logtrip**, **direct online**, and especially **others** have a lower average loss, with "others" around ₹8,885.

Insight:

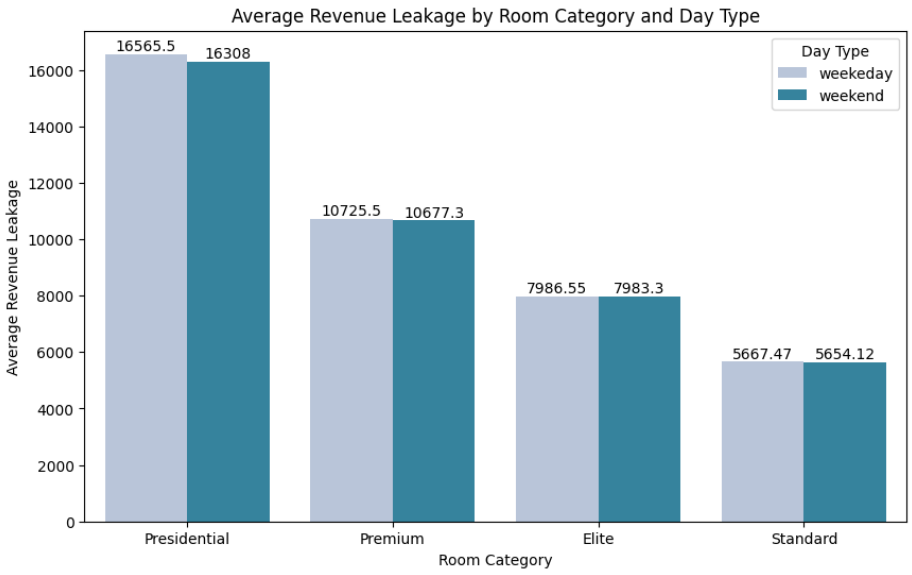
- **Offline channels** and big OTAs (like **makeyourtrip**) may have **less strict cancellation policies** or may attract more last-minute, high-value bookings, which lead to more leakage.
- Digital platforms like **logtrip and direct online** possibly handle more planned and prepaid bookings, hence they **leak less when cancelled.**

Consulting Recommendations:

- ✓ **Revise cancellation policies** on high-leakage platforms like **offline and makeyourtrip**. Introduce stricter refund rules or cancellation charges.
- ✓ For **low-leakage platforms**, continue promoting them or **offer more incentives** to drive traffic there.
- ✓ Consider adding a **non-refundable booking** option **(**which we have **done later)** for deals listed on high-leakage platforms:
    - offer **non-refundable** deals if the cancellation happens within 72 hours before check-in.
    - If the booking is cancelled between 6 days and 72 hours before check-in, then only 50% refund will be given.
    - In all other cases, some cancellation charges will still apply, especially for bookings made through high-risk platforms.

Analysis: Revenue Leakage and Cancellations by Room Category

What the Plots Show:



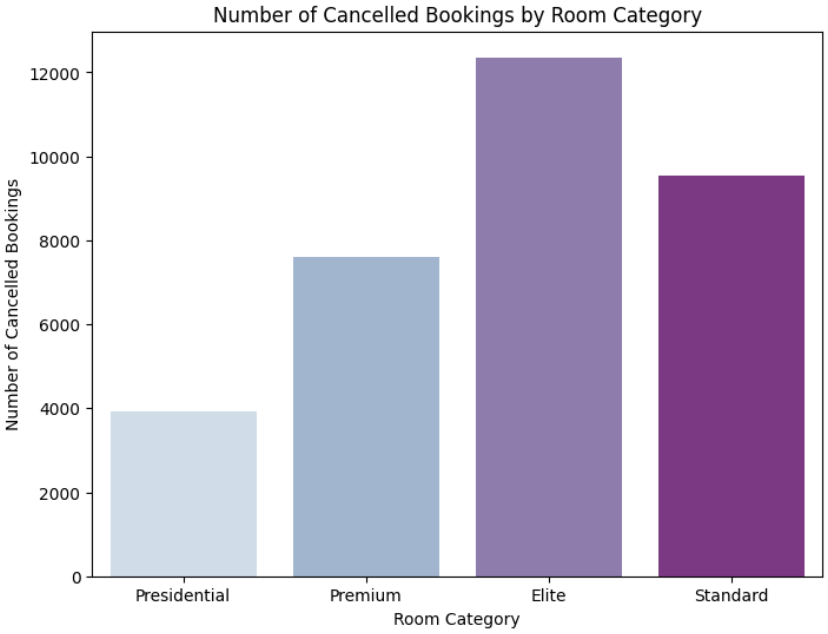
The first bar chart compares the **average revenue leakage** across different **room categories**, split by day type (weekday and weekend). The **highest leakage** is seen in the **Presidential rooms**, with averages above ₹16,000 for both weekdays and weekends. On the other hand, Standard rooms have the lowest leakage, around ₹5,600–₹5,700.

The second chart shows the **number of cancelled bookings** for each room category. Interestingly, Elite rooms have the highest number of cancellations, followed by Standard and Premium, while **Presidential rooms** have the **lowest** cancellations overall

Insights:

- Even though **Presidential rooms** have the **least number of cancellations**, their **revenue leakage is the highest**. This suggests that even a few cancellations in these high-priced rooms cause big revenue losses.

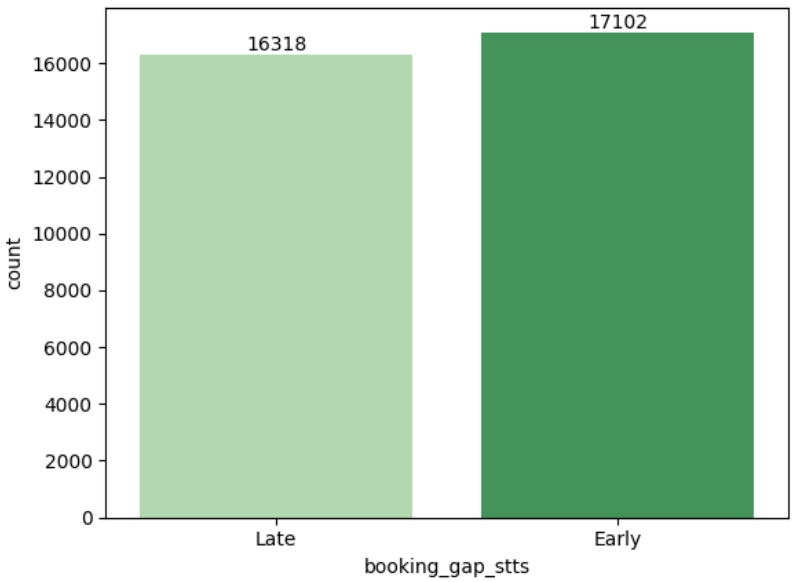
- **Elite rooms** face the **maximum cancellations**, but the revenue leakage from each one is relatively lower. This could be due to their mid-tier pricing, meaning even though many are cancelled, the loss per booking is smaller.
- The leakage pattern remains similar across weekdays and weekends for all room types, with only slight differences. This indicates that the issue is not about day type, but about room category pricing and policies.



Consulting Recommendations:

- ✓ For **Presidential rooms**, hotels should **review the cancellation policy** and consider making it **stricter or partially non-refundable** to prevent high financial losses. Since these are premium rooms, customers are high value so they might still book even with tighter policies.
- ✓ For **Elite and Standard rooms**, focus should be on understanding **why customers cancel** so frequently — maybe through post-cancellation **feedback and review**. Offering small discounts for confirmed bookings in these categories could reduce cancellation rates.
- ✓ Also, a **dynamic penalty policy** can be introduced based on room category. Higher category rooms should carry **higher penalties** on cancellation to protect revenue.

Late vs Early Bookings in Cancelled Data

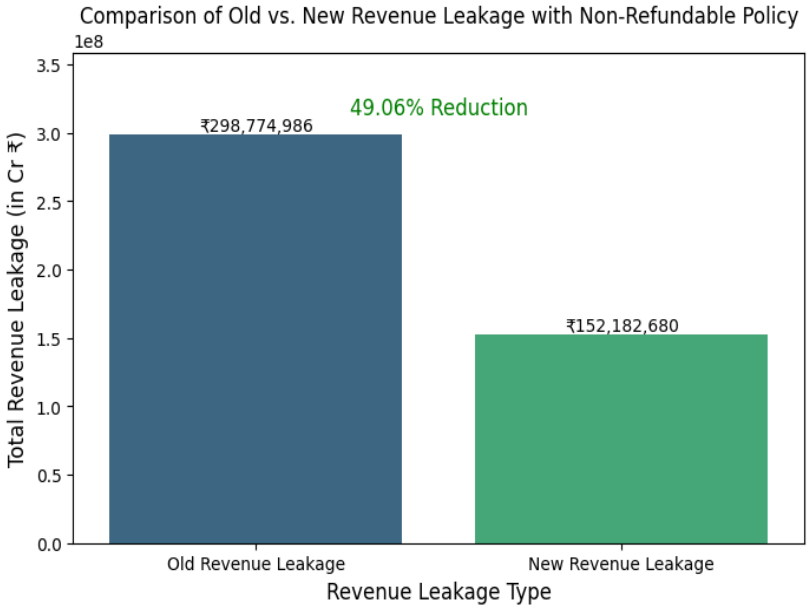


The first bar chart shows how many of the cancelled bookings were made **late (just before the check-in date)** and how many were made **early (well in advance**). The classification was done using the **booking gap**, where bookings made with a gap of 2 days or less were considered as **late**, and those made with more than 2 days' gap were considered as **early**.

From the plot, we can clearly see that a significant portion of cancellations are late bookings. While early cancellations are slightly higher (17,102), the number of **late cancellations** is also very close (16,318), which is a serious concern for hotel revenue.

Revenue Leakage Reduction by Applying Non-Refundable Policy

In the second bar chart, we compare the total revenue leakage **before** and **after** applying a proposed **non-refundable policy** for late bookings that get cancelled. In this strategy, if a customer cancels their booking within 2 days of check-in, they are not eligible for a refund. So, we assume **zero revenue leakage** for these late cancellations. The results show a huge improvement. The revenue leakage dropped from ₹29.87 Cr to ₹15.22 Cr, which is **a 49.06% reduction** This shows how one small change in the cancellation policy can save the company a big amount.



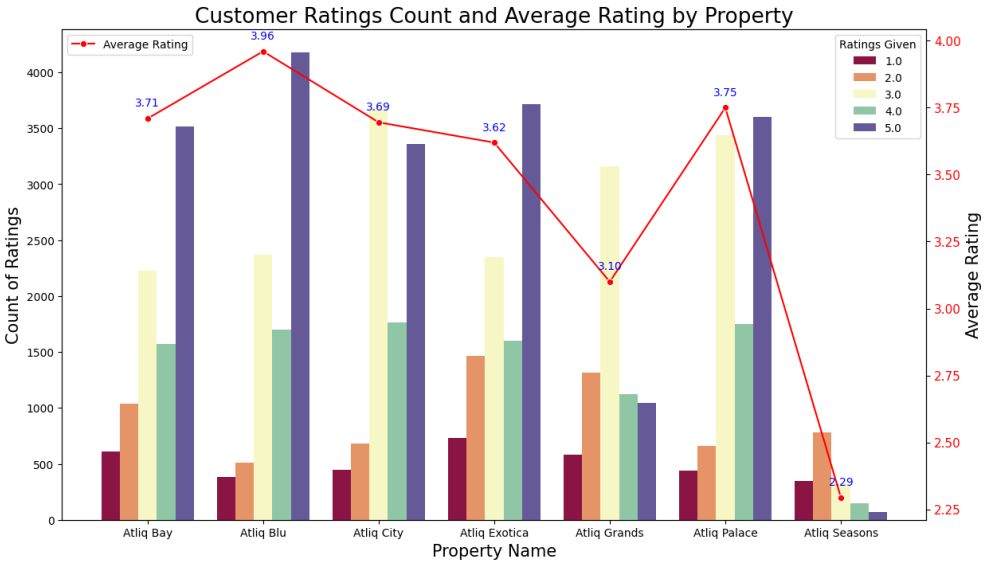
Consulting Recommendations or Operational changes:

- ✓ **Implement a Non-Refundable Policy**: For bookings made very close to the check-in date (especially within 2 days), apply a non-refundable cancellation policy. This could discourage customers from making last-minute bookings that they might cancel. That we have done and showed around 49% leakage could be saved.
- ✓ **Inform Customers Clearly**: The terms of the non-refundable policy should be highlighted during booking so that customers are aware before confirming.
- ✓ **Special Offers for Early Bookers**: Encourage early bookings by offering discounts or perks, which would also help reduce last-minute cancellations and improve planning.
- ✓ **Monitor the Policy's Impact**: After implementing the policy, track its effectiveness using metrics like number of cancellations, revenue leakage, and customer complaints.

Customer Ratings Across Properties

The above chart shows two things about customer feedback for each property:

- **Bar Graphs** show how many people gave each type of rating (from 1 to 5 stars).
- **Red Line Plot** shows the **average rating** for each property.



This helps us compare how each property is performing in terms of customer satisfaction.

Insights

- **Atliq Blu** stands out with the highest average rating of **3.96**, meaning most customers were happy with their experience there.
- **Atliq Palace** and **Atliq Bay** also performed well, with average ratings of **3.75 and 3.71** respectively.
- **Atliq Seasons** has the **lowest** average rating of **2.29**, and its 5-star and 4-star ratings are much lower compared to others. This is a clear red flag.
- **Atliq Grands** also shows weak satisfaction, with a lower average of 3.10, and more people giving lower ratings like 2 and 3.

This chart clearly shows that not all properties are offering the same level of experience. Some properties are keeping customers happy, while others are struggling to meet customer's expectations. Especially, Atliq Seasons needs urgent attention. But over-all we can say in terms of average ratings no property is doing that much good performance.

Consulting Recommendations

- ✓ **Detailed Feedback Collection**: Hotels like Atliq Seasons and Atliq Grands should collect more specific feedback to understand the exact reasons for low ratings (e.g., room cleanliness, service delay, food quality).
- ✓ **Internal Quality Audits**: A quick audit of customer service processes in the low-rated properties may help fix some operational problems.
- ✓ **Benchmarking**: (Use Atliq Blu as *Model*) Study high-rated properties (like Atliq Blu) to understand what they're doing well—then try applying those best practices in the poorly performing hotels.
- ✓ **Staff Training**: If service-related issues are found, providing customer service training to hotel staff might help increase future ratings.

Justify with Business Logic

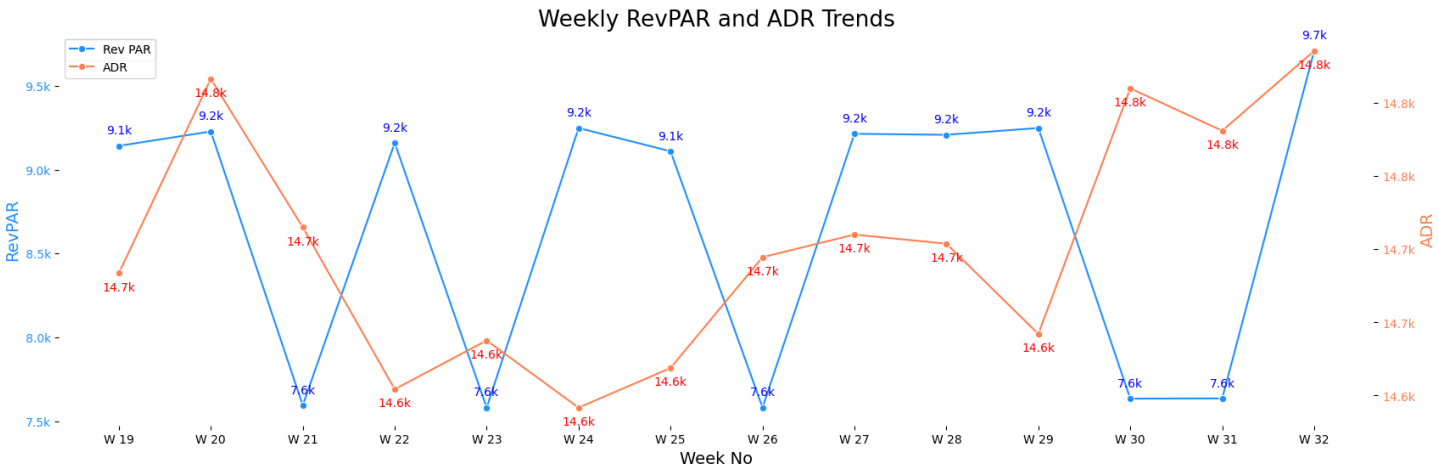
In this section, we try to support our proposed ideas and recommendations by using actual **business logic** . It helps us understand how much benefit we might get if we implement those suggestions. We used some basic forecasting and comparisons to estimate the possible outcomes.

1. Week-on-Week Growth (WoW)

We looked at weekly performance data like **RevPAR, ADR, occupancy percentage**, and **customer ratings**. Even though there are ups and downs across the weeks, the overall trend shows that some weeks perform consistently better than others.

Weekly RevPAR and ADR Trend (WoW Growth)

The below chart shows the weekly trend of RevPAR (Revenue per Available Room) and ADR (Average Daily Rate) across 14 weeks. The blue line shows RevPAR and the orange line shows ADR. Data is taken from KPI aggregated by week no.



Insights

- **Fluctuation in Performance:**
  There are several **up and down patterns** in RevPAR across weeks. RevPAR dropped to around **7.6k** in Week 21, 23, 26, 30, and 31. But it rose again in Week 32 to **9.7k**, the highest among all.

- **ADR is More Stable:**
  While ADR also fluctuates slightly, it stays more consistent between **14.6k to 14.7k**. This means that price is almost stable but occupancy or room selling efficiency is changing week by week, causing RevPAR to rise or fall.

- **Gap Between ADR and RevPAR:**
  In low weeks (like Week 21, 23), RevPAR drops even though ADR is still steady. This indicates **lower occupancy** is pulling down the revenue performance.

Consulting Recommendations / Use Case

- ✓ **Improve Low Weeks:**
  Focus on **boosting bookings** in low-performing weeks like Week 21, 23, 26, and 30. Hotels can run special offers, group discounts**, or flexible cancellation policies** (weekly dynamic policy) during these periods.

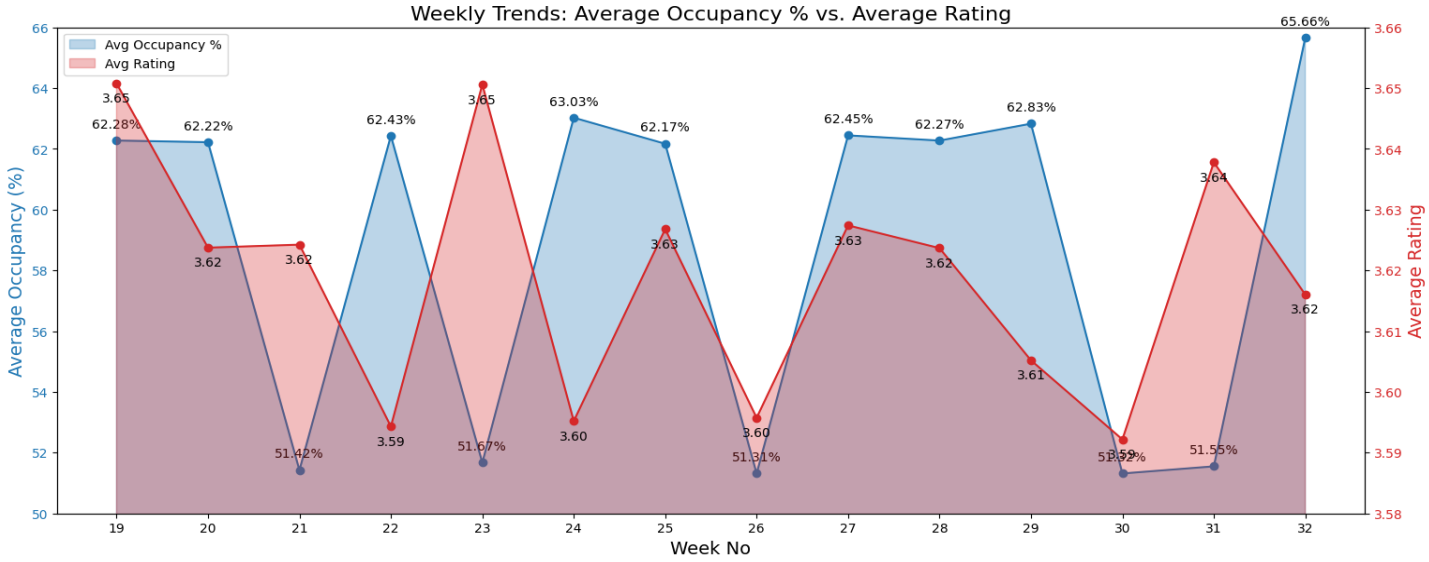
- ✓ **Monitor & Optimize Inventory:**
  Since ADR is already stable, optimizing inventory utilization and reducing cancellations can help lift RevPAR further.

- ✓ **Marketing :**
  Hotels can plan their campaigns and pricing strategies around weekly trends. Identify patterns (like dip weeks) and do plan for demand-boosting.

This WoW view helps hospitalities understand which weeks are underperforming. Improving those weeks can directly lead to increased revenue without needing to raise prices, which keeps customers happy too.

Weekly Trends: Average Occupancy % vs. Average Rating

This chart compares weekly occupancy percentage (blue area) with average customer rating (red area). It helps us understand how guest satisfaction and room usage are related over different weeks (Week 19 to Week 32).



Insights

- **Fluctuation in Occupancy:**
  Occupancy % stays mostly around **62%**, except for a few dips in Week 21, 23, 26, 30, and 31, where it drops close to or below **51%**.
  Week 32 performs the best with **65.66% occupancy**, showing high usage.

- **Customer Rating is Fairly Consistent:**
  Average rating across weeks stays quite stable—mostly between **3.59 and 3.65**. This means guest satisfaction is almost unaffected by the ups and downs in occupancy.

- **Low Occupancy don't affect Bad Ratings:**
  For example, in Week 23, **occupancy was low (51.67%)**, but the rating was one of the highest (**3.65**). So, fewer bookings didn't mean unhappy customers.

- **Balanced Weeks:**
  Weeks like **25, 27, and 31** had both **good** ratings and above-average occupancy, showing balanced performance.

Consulting Recommendations

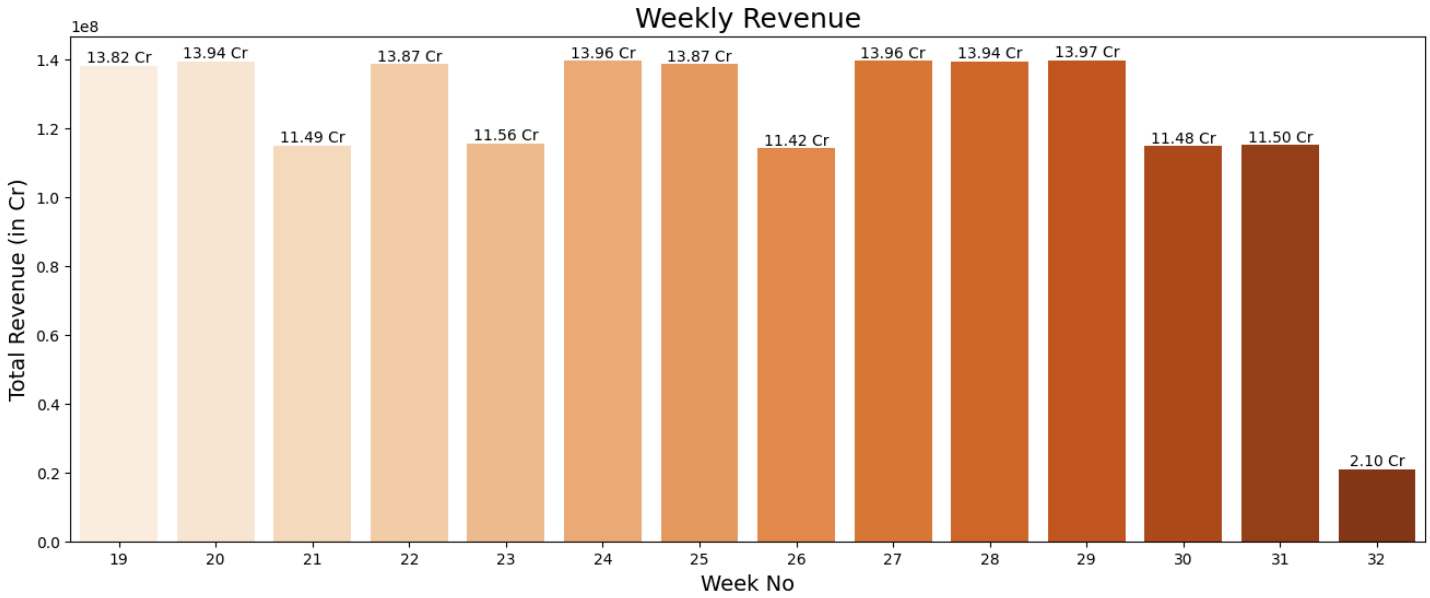
- ✓ **Push for Higher Occupancy on Low Weeks:**
  Since ratings don't drop much even when occupancy drops, try running marketing offers during those low-occupancy weeks to boost revenue without worrying about ratings.

- ✓ **Use Ratings to Promote Confidence:**
  Share good ratings during off weeks (like Week 23) in email campaigns or platforms to encourage bookings during dull periods.

- ✓ **Optimize Operations:**
  In weeks where occupancy is low but ratings are high, you can study **what was done well** (maybe less crowd, better service per guest) and try to apply that during busy weeks too.

Weekly Revenue (WoW Growth)

This chart shows the **total revenue (in Crores)** generated in each week from **Week 19 to Week 32**. It's a part of our Week-on-Week (WoW) growth analysis to track how revenue is moving over time and detect any sudden drops or improvements.



Insights

- ➢ **Stable High Revenue Weeks:**
  Most of the weeks like Week 20, 22, 24, 25, 27, 28, and 29 generated nearly 13.8 to 13.97 Cr, showing stable business performance.

- ➢ **Sudden Drops:**
  Revenue falls to **around 11.4–11.5 Cr** in Week 21, 23, 26, 30, and 31. These dips suggest **low occupancy or fewer bookings** during those weeks.

- ➢ **Major Decline in Week 32:**
  There is a **sharp and concerning** drop in Week 32, where revenue hits just **2.10 Cr**, the lowest by a big margin. This could be due to seasonality, holiday gap, or operational changes.

Consulting Recommendations

- ✓ **Investigate Week 32 Drop:**
  Week 32 needs special attention. Find out if any event (like maintenance closure, booking platform issue, or off-season effect) caused this huge revenue dip.

- ✓ **Use High Weeks as Benchmark:**
  Stable weeks with ~13.9 Cr revenue can be used as **reference points** to understand what worked—like pricing, promotions, or high-demand events.
- ✓ **Dynamic Pricing:**
  During known low-performance weeks like 21, 26, or 30, try using dynamic discounts or festival bundles to bring up occupancy and hence revenue.
- ✓ **Plan Campaigns on Low Weeks:**
  Instead of letting performance drop every alternate week, run a campaign or loyalty discounts to push bookings on time and reduce loss.

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2. Seasonality Patterns

By analyzing data across different weeks and day types, we noticed that:

- **Weekends perform better** in terms of **occupancy and RevPAR**.
- **Weekdays** still contribute more to **total revenue** due to more number of days and consistent bookings.

Use Case:

We can **focus on improving weekday occupancy** by offering business packages or tie-ups with companies. This helps in filling unsold inventory, which boosts overall efficiency.

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3. Scenario Analysis (ROI Based)

We simulated a policy:

If we introduce a full penalty (non-refundable policy) for **late cancellations**,
the total **revenue leakage can be reduced by almost 49%**.

This gives a strong business case:

- The cost of implementing such a policy (just updating booking rules) is low.
- But the revenue saved is in crores.
- So the Return on Investment **(ROI)** is **very high**, making it a smart move.

Final Recommendations

- ❖ Focus on **Presidential & Premium** rooms during weekends to improve revenue.
- ❖ Encourage **early bookings** and implement **non-refundable rules** for late cancellations.
- ❖ Watch underperforming platforms/properties and reroute traffic or offers accordingly.
- ❖ Monitor **Week 32-type dips** and plan marketing or operational fixes in advance.

Conclusion

This report explored multiple aspects of Atliq's hospitality business using structured KPIs, visual analytics, and scenario modeling. By analyzing booking trends, revenue metrics, and customer behaviors across room types, platforms, and time periods, we identified key drivers of performance and leakage.

We saw how customer ratings, cancellation patterns and booking gaps influence overall profitability. The use of metrics like RevPAR and ADR helped in comparing properties and day types meaningfully. With the introduction of a **non-refundable policy** for last-minute bookings, we projected a significant reduction in **revenue leakage** (around 49%).

The Week-on-Week analysis gave insights into seasonality and fluctuations in revenue, helping forecast future potential.