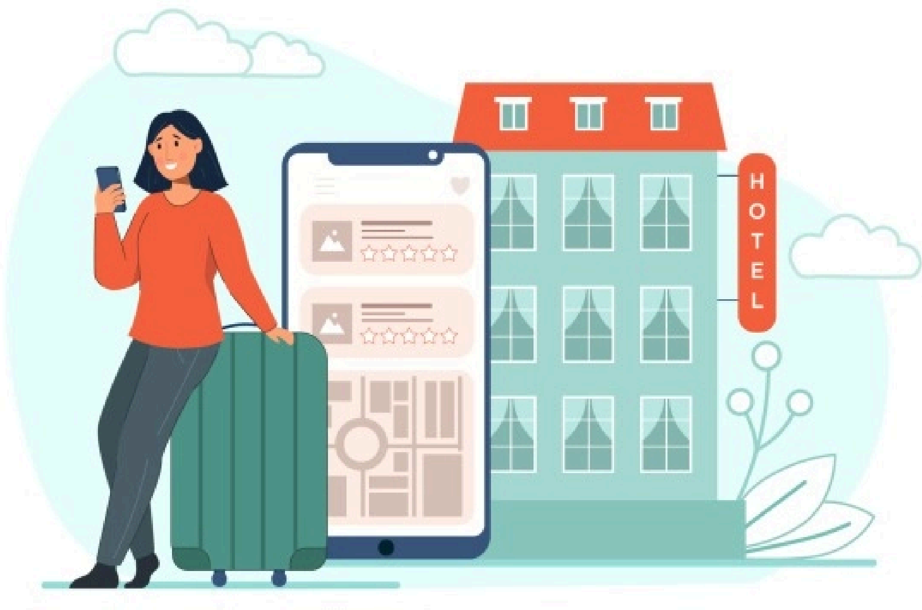
BUSINESS PROBLEM

Context: In recent years, both City Hotel and Resort Hotel have experienced high cancellation rates, creating a volatile booking environment.
The Problem: High cancellations are leading to significant revenue leakage and suboptimal room utilization (occupancy rates). The unpredictability of these cancellations creates operational inefficiencies and complicates inventory management.
The Objective: The primary goal of this analysis is to lower cancellation rates to improve revenue efficiency.

This analysis will investigate the relationship between booking cancellations and key revenue drivers. By identifying the root causes of cancellations, we aim to provide thorough, data-driven business advice and actionable strategies to stabilize revenue generation.



Assumptions

1- Booking cancellations are assumed to be independent events across customers.

2- Higher ADR bookings generally reflect premium customer segments.

3- Seasonal trends and demand fluctuations are consistent year-over-year.

4- External disruptions (e.g., weather, strikes) have minimal impact on overall trends.

5- Historical booking and cancellation patterns are indicative of future behavior.

Research Questions

1 - What are the variables that affect Hotel Reservation cancellations?
2 - How can we make hotel reservations' cancellation rate lower?
3 - How will hotels be assisted in making pricing and promotional decisions?

Hypothesies

1- More cancellations occur when prices are higher.
2- When there is a longer waiting list, customers tend to cancel more frequently.
3- The majority of clients are coming from offline travel agents to make their reservations.

Analysis and Findings

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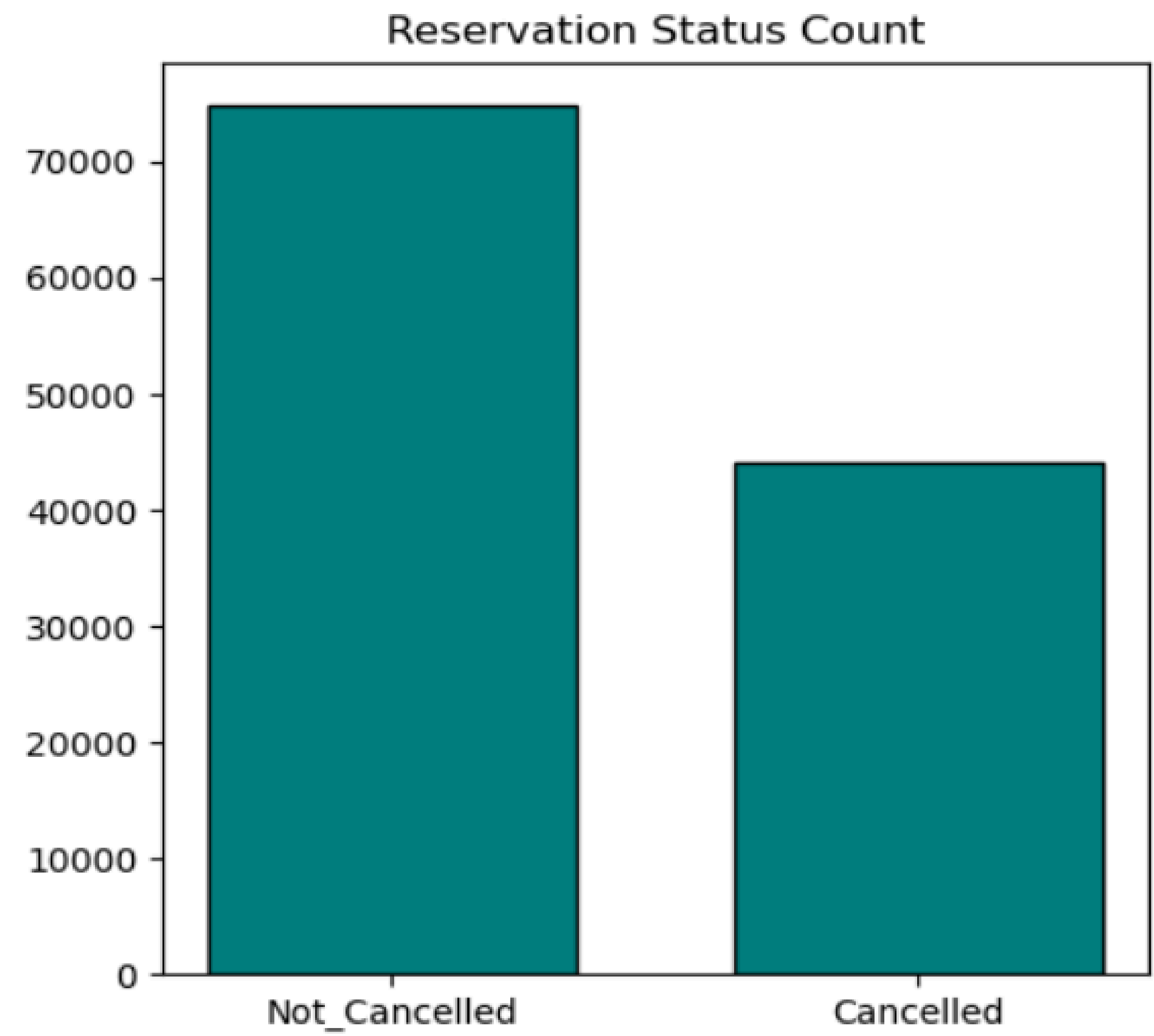

This bar graph shows the percentage of reservations that are cancelled and those that are not. It is obvious that there are still a significant number of reservations that have not been cancelled. There are still 37% of clients who cancelled their reservations, which has a significant impact on the hotel's earnings.

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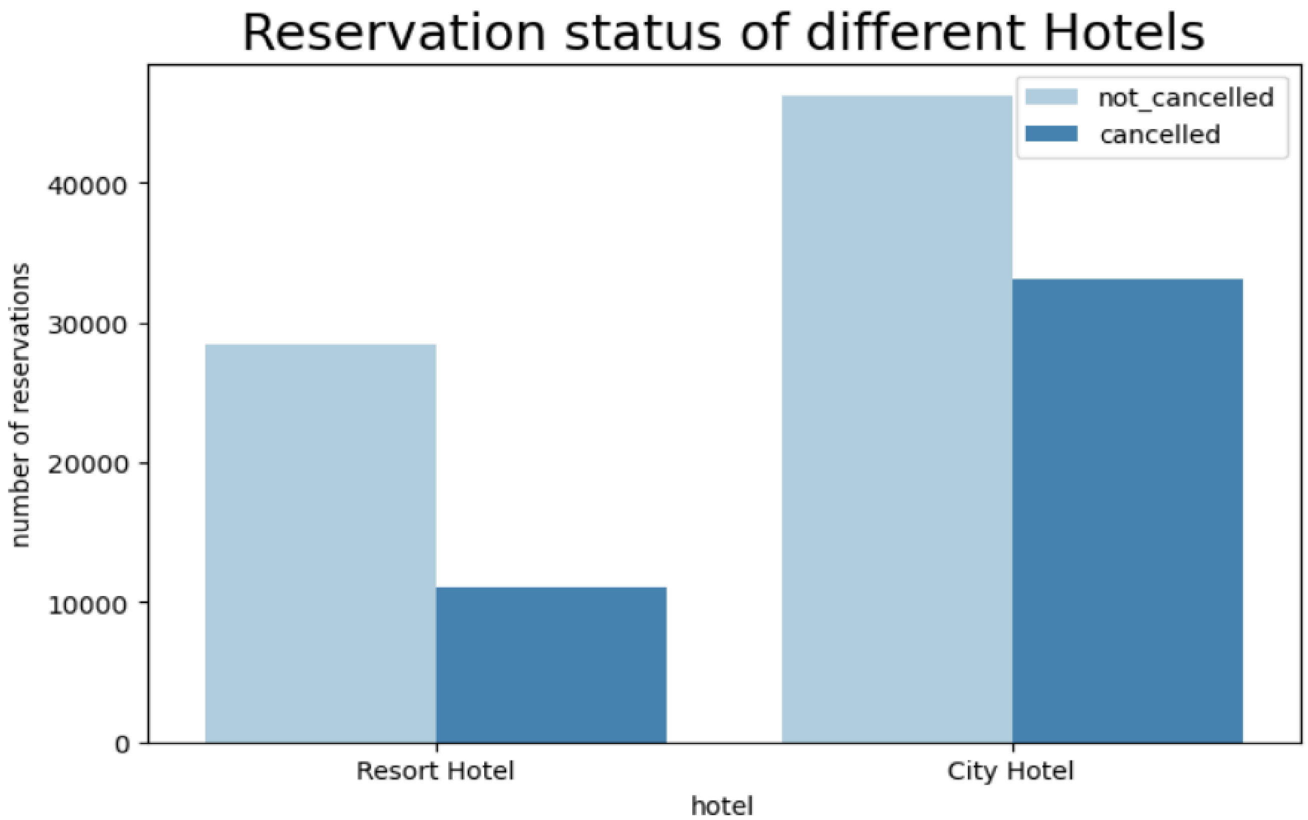

Volume Disparity: The **City Hotel** handles a significantly higher volume of bookings overall compared to the **Resort Hotel**. The total bar height (cancelled + not cancelled) for the City Hotel is nearly double that of the Resort Hotel.

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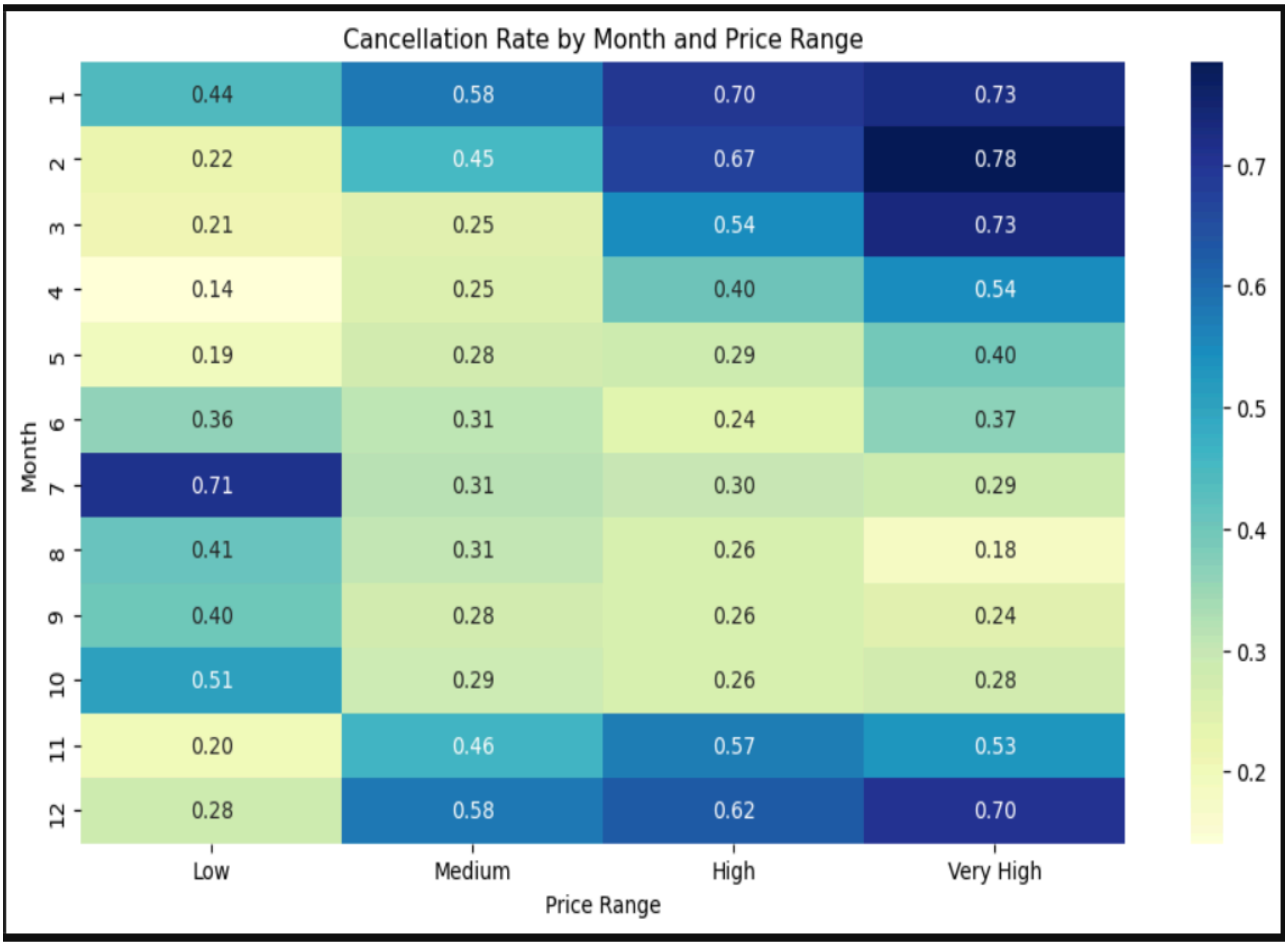
Ratio Observation: While the City Hotel has more successful bookings ("not_cancelled"), the gap between its confirmed and cancelled bookings is narrower than that of the Resort Hotel. This visually suggests that the **City Hotel likely has a higher cancellation rate (percentage)** than the Resort Hotel.

3 -



The graph shows a strong correlation where **cancellation rates generally increase as the price range goes up** (shifting from Low to Very High). Additionally, there is a seasonal trend where cancellations are highest at the **beginning and end of the year (Months 1-3 and 11-12)**, especially for the more expensive rooms

In short, guests who book more expensive rooms are much more likely to cancel than those booking cheaper options.

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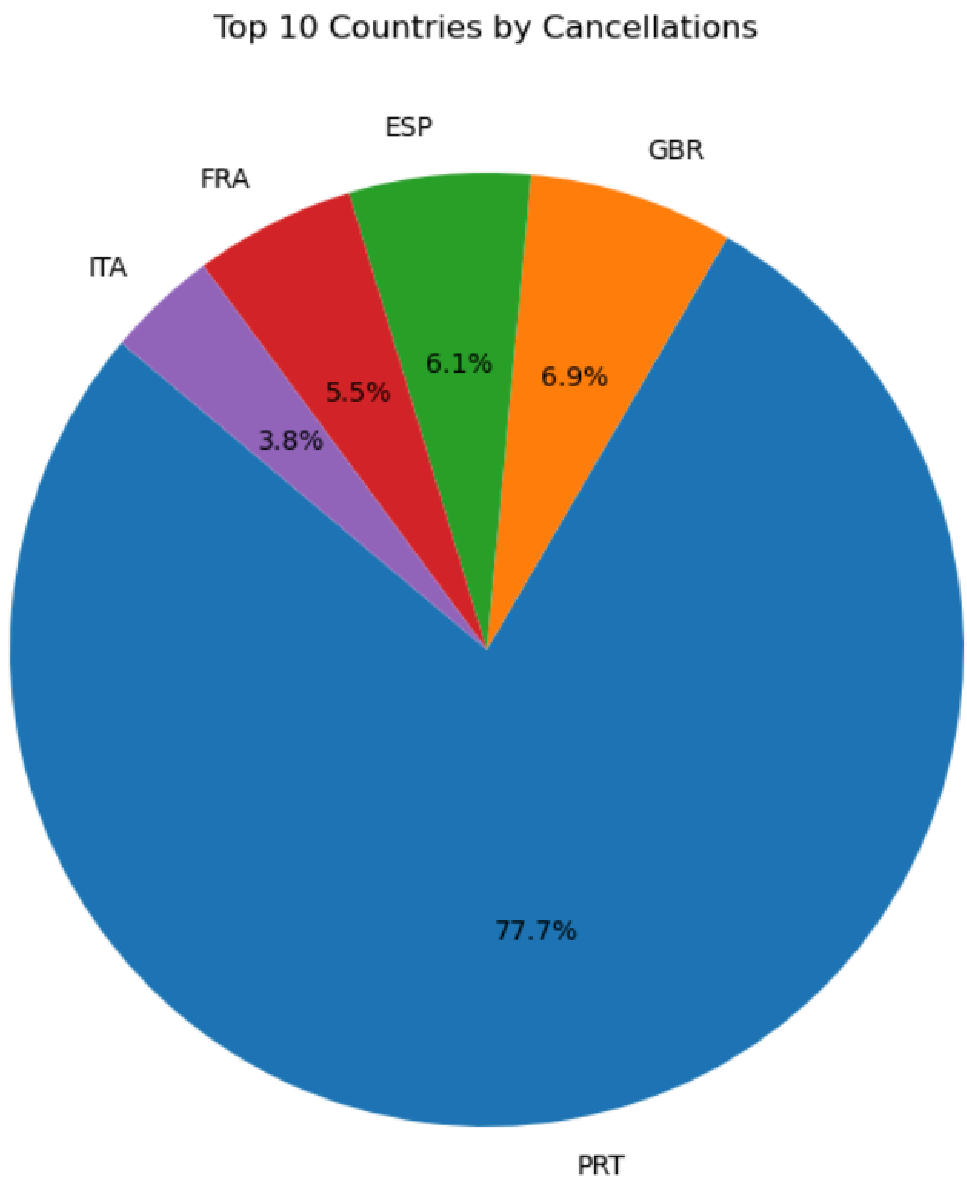

This graph illustrates that **Portugal (PRT)** is responsible for the overwhelming majority of cancellations , significantly exceeding the combined total of the next top countries (Great Britain, Spain, France, and Italy).

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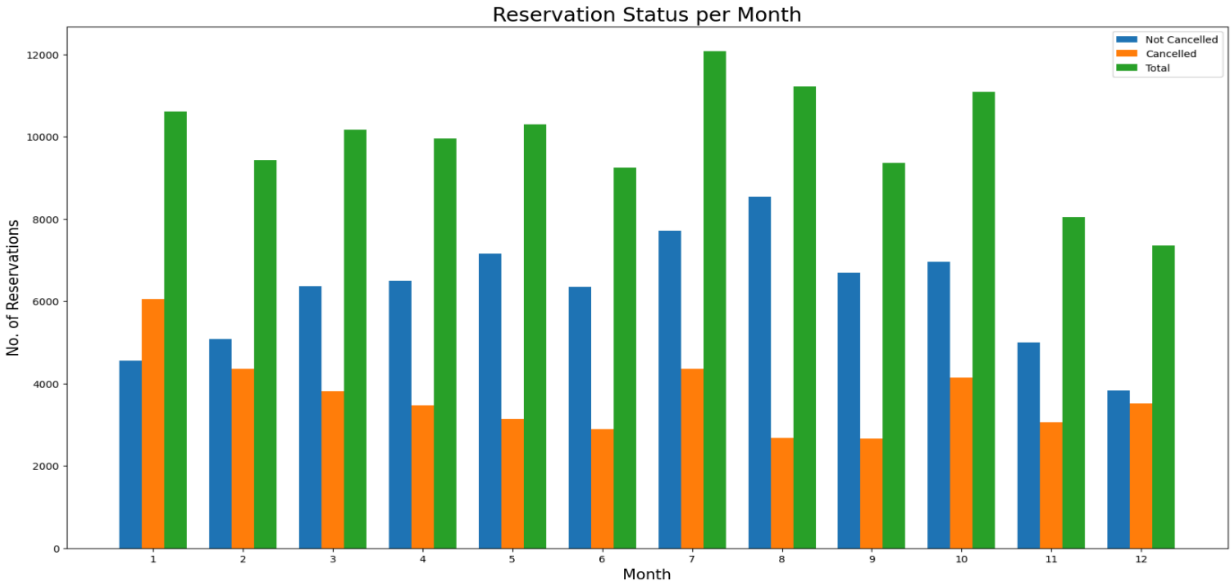

Overall, the data shows a positive trend where confirmed reservations consistently exceed cancellations for 11 out of 12 months, with **August** marking the peak for successful stays. The significant exception is **January**, which acts as a critical outlier where cancellations spike drastically, surpassing confirmed bookings for the only time in the year

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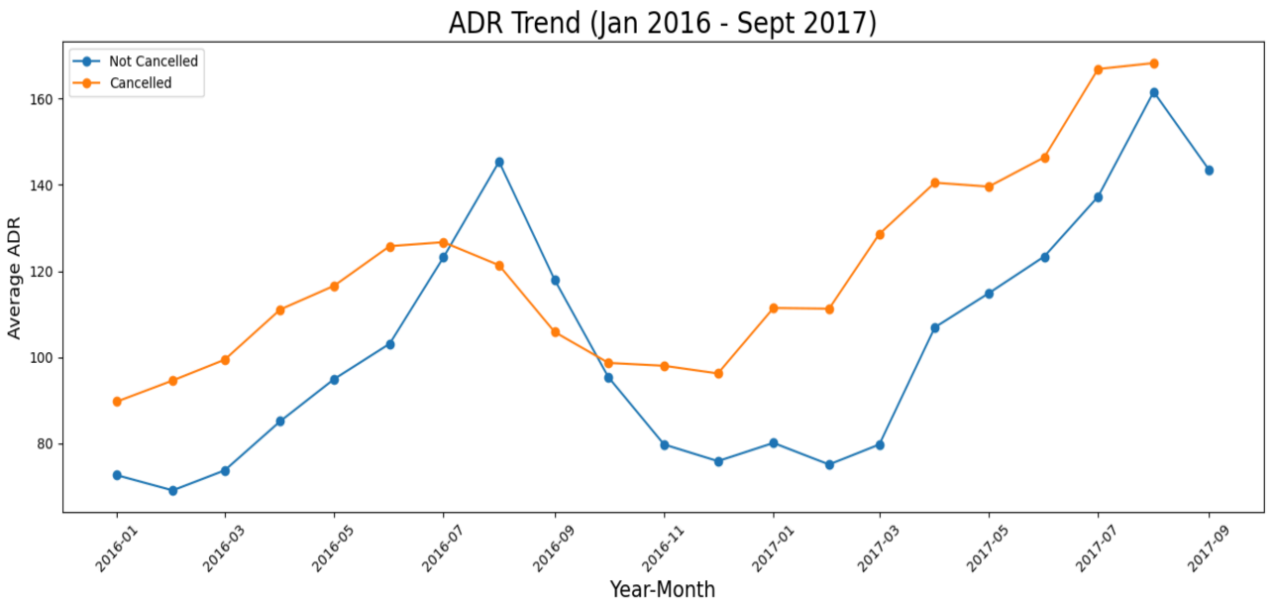

The data reveals a clear correlation where **cancelled reservations (orange line) consistently have a higher Average Daily Rate (ADR)** than non-cancelled ones (blue line) throughout the entire period. While both follow the same seasonal pattern—rising in peak months and falling in off-peak times—the **price gap notably widens** during high-demand periods (especially in mid-to-late 2017). This indicates that **higher prices are a primary driver for cancellations**, as guests booking expensive stays appear much more likely to cancel compared to those with lower rates.

Conclusion

Positive Correlation: There is a general positive relationship where higher Average Daily Rates (ADR) correspond to an increased probability of cancellation.
Low-Demand Sensitivity: This trend is most pronounced during non-peak months, where customers exhibit higher price sensitivity, leading to elevated cancellation rates for expensive rooms.
Peak Season Stability: Conversely, during high-demand periods (mid-year), high-ADR bookings are significantly more stable and less prone to cancellation.
Impact of Demand: Strong market demand reduces customer price elasticity, meaning travelers are more committed to their bookings despite higher costs.
Commitment Variance: Customer commitment is strongest during peak seasons, whereas price sensitivity drives cancellations when overall demand is weak.
Seasonal Dependency: Ultimately, the risk of cancellation driven by price is not static; it is heavily moderated by the level of seasonal demand

Suggestions

Based on the analysis that higher prices drive cancellations during low demand, but not during peak demand, here are 5 suggestions to increase revenue:

1. **Implement Non-Refundable Rates for High-Value Bookings (Off-Peak):** Since high-priced rooms have a higher cancellation probability during low-demand months, introduce strict non-refundable rates or higher deposit requirements for premium rooms during these periods to secure revenue.
2. **Dynamic Pricing for Peak Seasons:** Capitalize on the lower price sensitivity during peak months (mid-year) by aggressively increasing room rates. The data shows that during high demand, higher prices do not significantly increase cancellation risk, allowing for maximized margins.
3. **Targeted Promotions for January:** To combat the unique anomaly where cancellations exceed bookings in January, offer "lock-in" discounts—lower rates for confirmed, non-cancellable bookings—to stabilize occupancy during this specific high-risk month.
4. **Flexible Cancellation Policies for "Low" Price Tiers:** Since lower-priced bookings already have lower cancellation rates, offering flexible cancellation policies for these rooms can attract budget-conscious travelers without significantly increasing risk, thereby boosting volume during off-peak times.
5. **Overbooking Strategy for High-ADR Segments (Low Season):** Use the known high cancellation rate for expensive rooms in the off-season to carefully calculate

an overbooking margin for this specific segment. This ensures that when cancellations inevitably occur, the rooms are still sold, minimizing revenue loss.