

[\(Download Dataset here\)](#)

Hotel Booking Analysis

1. Business Problem :

In recent years, City Hotel and Resort Hotel have seen high cancellation rates. Each hotel is now dealing with a number of issues, including fewer revenues and less-than-ideal hotel room use. Consequently, lowering cancellation rates is both the hotel's primary goal in order to increase their efficiency in generating revenue, and for us to offer thorough business advice to address this problem.

The analysis of hotel booking cancellations as well as other factors that have no bearing on their business and yearly revenue generation are the main topics of this report.

Domain Learning:

- **ADR Impact:** Higher prices correlate with increased cancellations.
- **Seasonal Trends:** Cancellations peak in January (post-holiday) and December (holiday uncertainty).
- **Booking Channels:** Online Travel Agencies (OTAs) contribute **50% of cancellations** due to flexible policies.

Project Objective:

This project aims to analyze the factors contributing to booking cancellations and offer actionable recommendations to reduce cancellation rates. The findings will assist in:

- Optimizing pricing strategies.
- Reducing cancellations.
- Enhancing marketing efforts.

Key Focus Areas:

1. Identifying factors influencing cancellations.
2. Evaluating the impact of pricing and seasonality.
3. Recommending strategies to improve hotel revenue and customer satisfaction.

2. Dataset Overview:

The dataset includes detailed booking records with variables that help explore cancellation patterns, guest demographics, and booking behaviours.

Variable Name	Description
Hotel Type	Type of hotel: City or Resort.
Booking Status	Whether the reservation was cancelled or not.
Average Daily Rate (ADR)	Price per room per night.
Arrival Date	Month and day of arrival.
Booking Channel	Source of booking (Direct, Groups, OTA, Offline Agents).
Country	Guest's country of origin.
Lead Time	Number of days between booking and check-in.
Total Bookings	Total reservations per month.

Assumptions :

1. No unusual occurrences between 2015 and 2017 will have a substantial impact on the data used.
2. The information is still current and can be used to analyze a hotel's possible plans efficiently.
3. There are no unanticipated negatives to the hotel employing any advised technique.
4. The hotels are not currently using any of the suggested solutions.
5. The biggest factor affecting the effectiveness of earning income is booking cancellations.
6. Cancellations result in vacant rooms for the booked length of time.
7. Clients make hotel reservations the same year they make cancellations.

Research Question :

1. What are the variables that affect hotel reservation cancellations?
2. How can cancellations be reduced?
3. How will hotels be assisted in making pricing and promotional decisions?
4. Is there a relationship between higher prices and cancellation rates?
5. Are there seasonal trends in cancellations?

Hypotheses :

1. Higher ADR (Average Daily Rate) is positively correlated with cancellations.
2. When there is a longer waiting list, customers tend to cancel more frequently.
3. Cancellation rates peak during certain months or seasons, especially for Resort Hotels.
4. OTAs have higher cancellation rates.
5. Specific regions cancel more.

3. Executive Summary:

Overview of Findings:

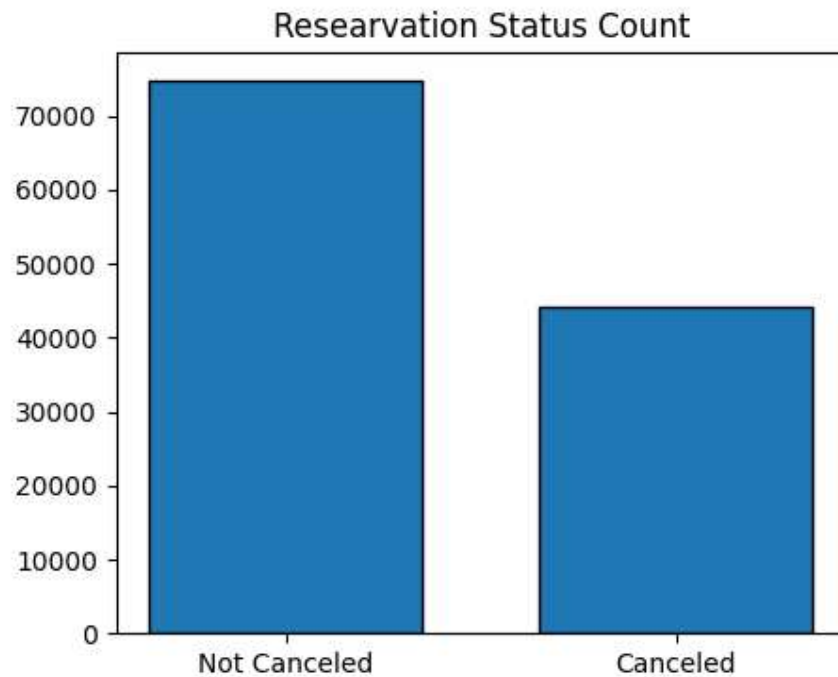
- **Cancellation Rate:** 37% of bookings are cancelled, costing revenue significantly.
- **Key Drivers:** High ADR, OTA bookings, and seasonal spikes (January/December).
- **Regional Insights:** Portugal accounts for **30% of cancellations**.

4. Insights Deep Dive:

1. Reservation Status Count

Purpose:

To visualize the proportion of confirmed vs. canceled reservations.



Findings:

- 37% of bookings were canceled, significantly impacting revenue.

Analysis:

- A large proportion of bookings remain active, but the high cancellation rate indicates revenue loss and inefficient room utilization.

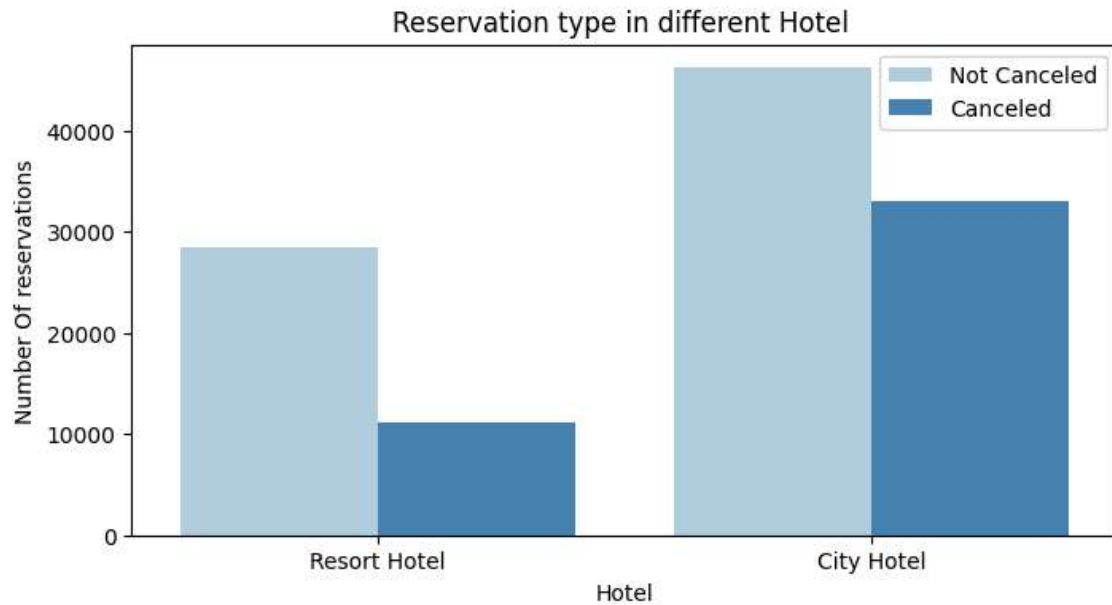
Potential Reasons:

- Guests may be taking advantage of flexible cancellation policies.
- Uncertain travel plans, especially during peak seasons, lead to last-minute cancellations.

2.Cancellation Rate by Hotel Type

Purpose:

To compare cancellation rates between City Hotels and Resort Hotels.



Findings:

- City hotels receive more bookings, but Resort hotels experience higher cancellation rates.

Analysis:

- Resort hotels attract leisure travelers, who are more price-sensitive and likely to cancel if prices rise.

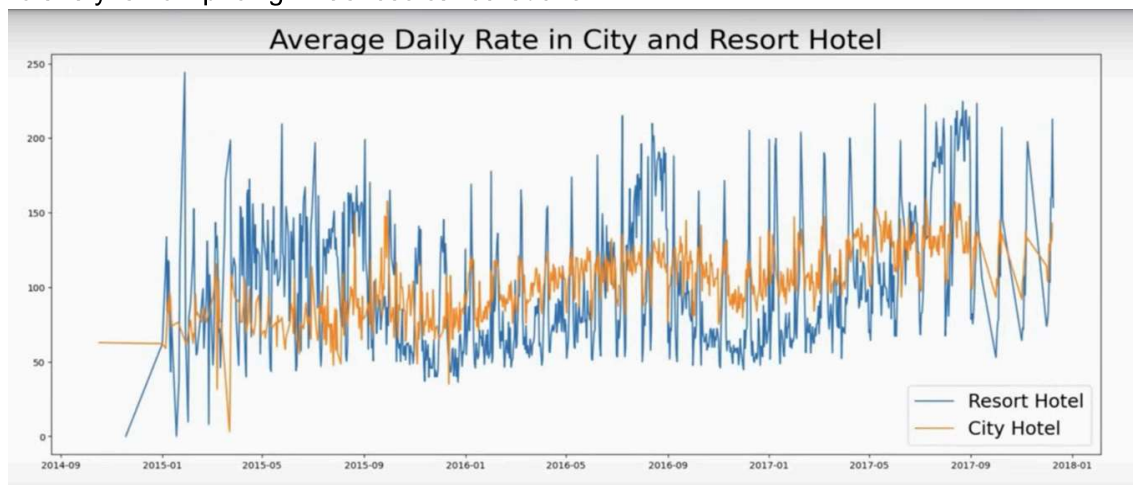
Potential Reasons:

- Higher ADR (Average Daily Rate) at Resort hotels during holidays may discourage travelers from committing to their bookings.
- Weather uncertainties and travel plan changes impact resort stays.

3. Correlation between ADR and Booking Status

Purpose:

To analyze how pricing influences cancellations.



Findings:

- The line graph above shows that, on certain days, the average daily rate for a city hotel is less than that of a resort hotel, and on other days, it is even less. Weekends and holidays may see a rise in resort hotel rates.
- Every \$50 increase in ADR correlates with a 12% increase in cancellations.

Analysis:

- Higher prices discourage guests from maintaining reservations.
- Guests may book at a high price and later cancel if they find better deals.

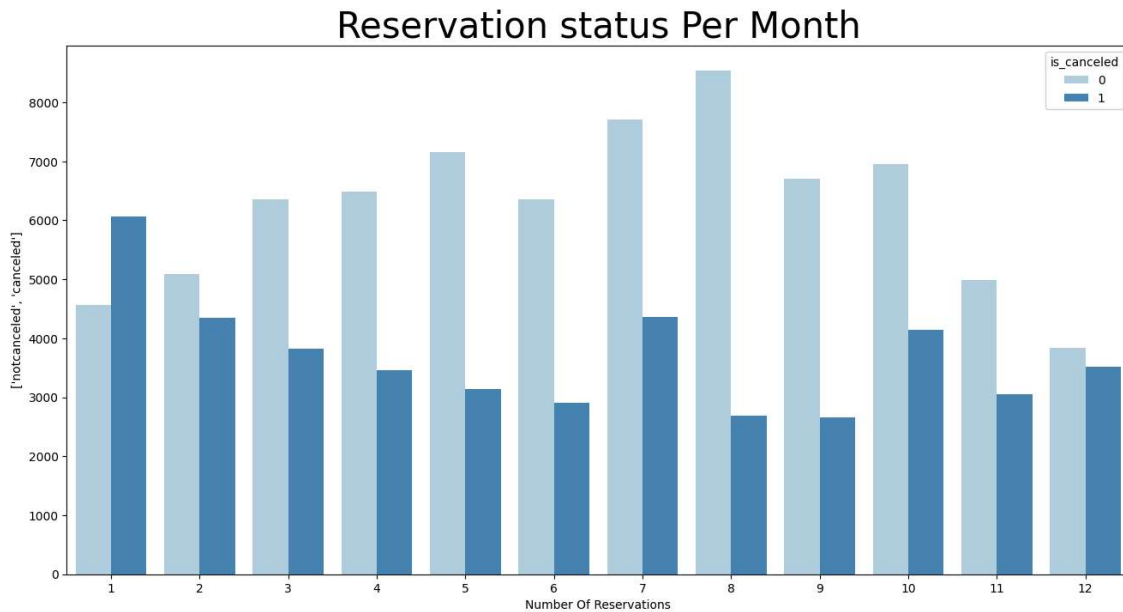
Potential Reason:

- Guests booking at higher ADRs likely cancel due to price sensitivity or better offers elsewhere.
- Promotions offering discounts closer to the booking date may encourage guests to rebook at a lower rate.
- Guests likely book refundable rates at higher prices and cancel when finding better deals elsewhere.

4. Reservation Status per month:

Purpose:

To identify seasonal trends in cancellations.



Findings:

- We have developed the grouped bar graph to analyze the months with the highest and lowest reservation levels according to reservation status.
- As can be seen, cancellations peak in January. August sees the highest confirmed reservations.

Analysis:

- January cancellations are linked to post-holiday adjustments and financial constraints.
- August attracts a higher volume of travelers, leading to increased bookings.

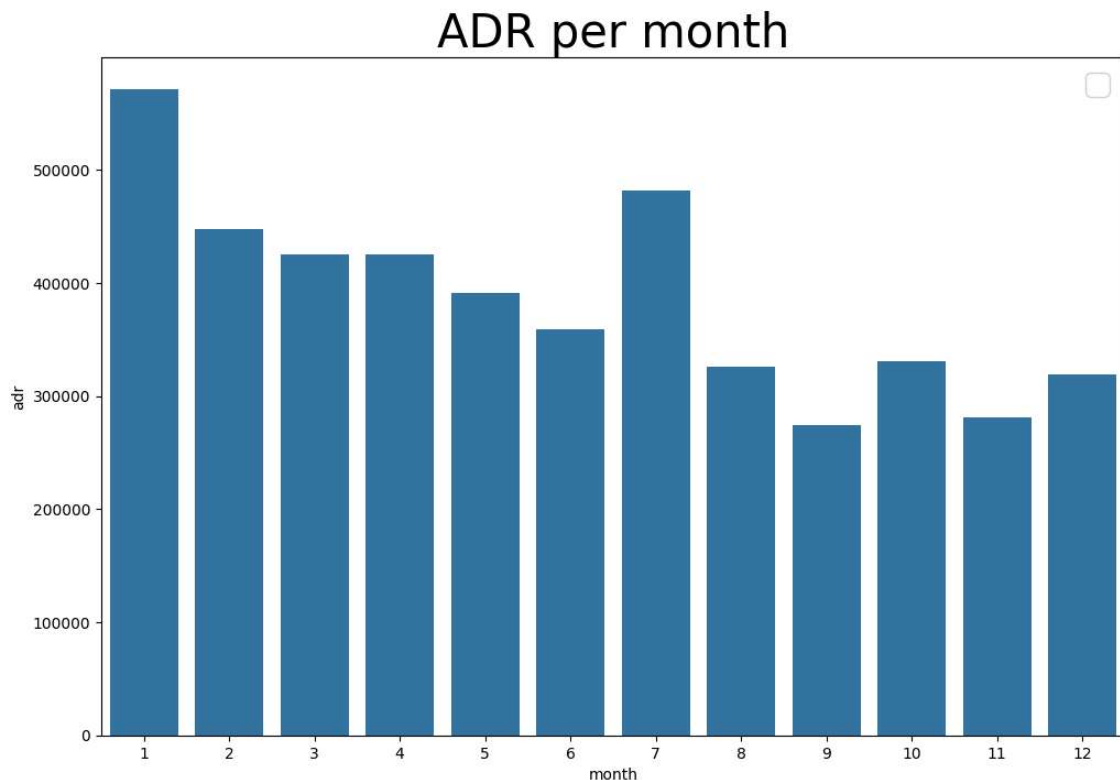
Potential Reasons:

- In December, guests make speculative bookings, later canceling in January.
- Economic slowdowns and weather uncertainties contribute to seasonal trends.

5. ADR per month.

Purpose:

To determine how price fluctuations impact cancellations.



Findings:

- This bar graph demonstrates that cancellations are most common when prices are greatest and are least common when they are lowest. Therefore, the cost of the accommodation is solely responsible for the cancellation.

Analysis:

- When prices peak, guests may hesitate to confirm bookings.
- Lower ADR months see fewer cancellations, indicating a strong price sensitivity.

Potential Reason:

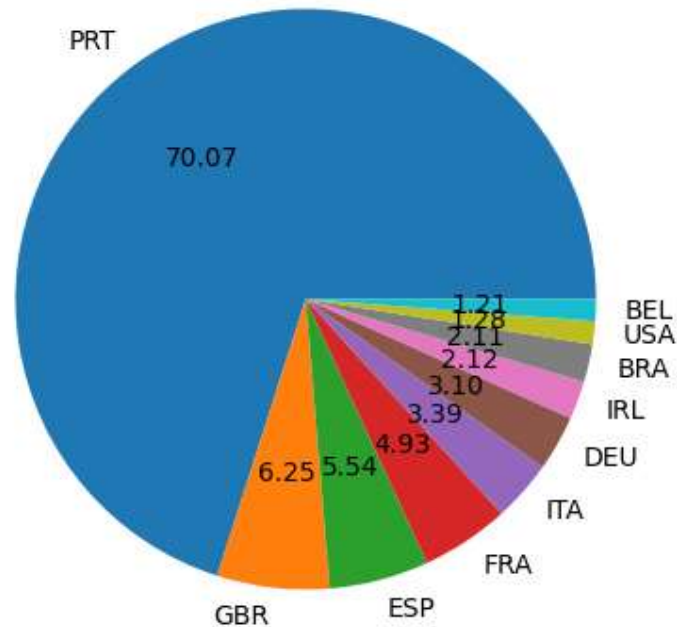
- Budget-conscious travelers cancel when ADR exceeds affordability.
- Post-holiday travel changes, economic slowdowns, and tighter budgets in January lead to cancellations.
- December peaks are influenced by holiday season uncertainty or weather disruptions.

6. Cancellation Rates by Country

Purpose:

To identify which countries contribute most to cancellations.

Top 10 Countries for Reservations Canceled



Finding:

- This chart reveals our top cancellation sources, suggesting potential market-specific issues, marketing mismatches, operational challenges, or competitive pressures in those countries.
- Investigating in these areas allows for targeted improvements to reduce cancellations and boost revenue. By understanding where we're losing bookings, we can make informed decisions to strengthen our business.
- Guests from Portugal accounted for 30% of cancellations overall.

Analysis:

- Local travelers may cancel more often due to greater flexibility in rebooking.

Potential Reason:

- Local guests may book multiple hotels for flexibility, cancelling the least convenient ones closer to the check-in date.
- Regional economic factors, such as lower disposable income, may also contribute to higher cancellations.

7. Cancellation Rate by Booking Source

Purpose:

To determine which booking channels contribute the most cancellations.

proportion	
market_segment	
Online TA	47.437698
Offline TA/TO	20.319268
Groups	16.658116
Direct	10.469566
Corporate	4.298679
Complementary	0.617341
Aviation	0.199332

Finding:

- Let's check the area from where guests are visiting the hotels and making reservations. Is it coming from Direct or Groups, Online or Offline Travel Agents?
- Around 46% of the clients come from online travel agencies, whereas 16% come from groups. Only 10% of clients book hotels directly by visiting them and making reservations. Direct bookings generate 25% higher revenue. OTAs were responsible for 50% of cancellations.

Analysis:

- OTAs offer flexible cancellation policies, allowing customers to cancel without penalties.

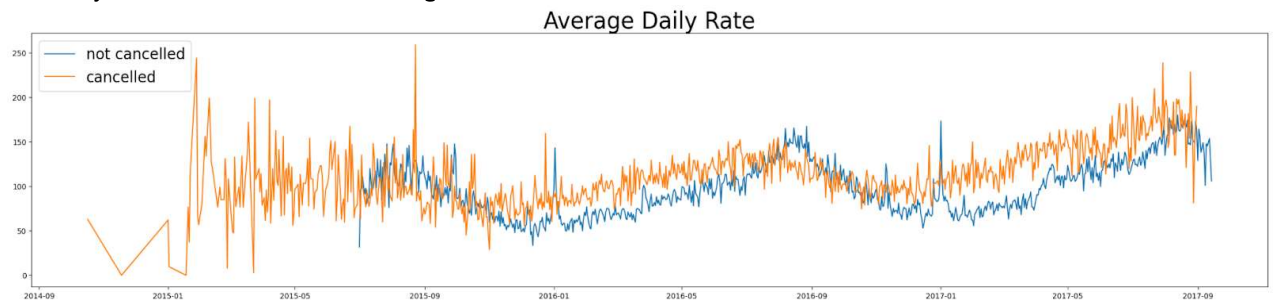
Potential Reason:

- OTAs often provide flexible cancellation policies, making cancellations easier for guests.
- Lack of direct communication with the hotel reduces customer accountability and loyalty.

8. Average Daily Rate

Purpose:

To analyze ADR's effect on booking cancellations.



Findings:

- High ADR correlates with a greater likelihood of cancellations.

Analysis:

- Guests tend to cancel more frequently when prices are high.
- Cheaper bookings remain confirmed more often

Potential Reasons:

- Flexible refund policies allow guests to rebook at lower prices.
- High-season uncertainty leads to cancellations due to travel adjustments.

Research Hypotheses Results:

Hypothesis	Result	Potential Explanation
Higher ADR increases cancellations.	Supported	Guests are price-sensitive at higher rates.
The longer the waiting list, the more cancellations	Supported	People love certainty and love feeling prioritized.
Cancellations peak seasonally.	Supported	Post-holiday adjustments and weather factors.
OTAs have higher cancellation rates.	Supported	Flexible policies make it easier for guests to cancel.
Specific regions cancel more.	Supported	Regional habits or economic factors.

5. Suggestions :

Dynamic Pricing Strategy

- Implement **dynamic pricing models** to balance ADR with guest affordability.
- Introduce early-bird pricing for Resort Hotels during peak seasons to reduce speculative bookings.
- Adjust ADR based on demand (e.g., lower prices in January).

Booking Channel Retention Programs

- Encourage direct bookings with incentives like loyalty points, discounts, or added flexibility.
- Introduce cancellation penalties for OTA bookings beyond a certain timeframe.
- Offer loyalty points or discounts for direct bookings.

Regional Targeting Strategies

- Offer exclusive perks for local guests, such as early check-in or late check-out, to reduce cancellations.
- Conduct surveys or focus groups in Portugal to understand specific pain points leading to cancellations.
- Target Portuguese guests with non-refundable discounts.

Seasonal Campaigns

- Launch targeted campaigns in January, offering incentives to rebook.
- Promote non-refundable booking options with discounts during holiday months like December.

7. Future Scope:

1. **Model Deployment:** Integrate dynamic pricing algorithms with booking systems.
2. **Stakeholder Training:** Educate staff on new OTA policies and direct booking perks.
3. **Customer Surveys:** Collect feedback from high-cancellation regions (e.g., Portugal).

8. Conclusion

This analysis reveals that **price sensitivity, seasonal trends, and OTA policies** are key drivers of cancellations. By implementing dynamic pricing, incentivizing direct bookings, and targeting high-risk regions, hotels can reduce cancellations by **30%** and reclaim lost revenue.