

Analysing Hotel Booking Cancellations

Problem Statement

Between 2015 and 2017, City Hotels and Resort Hotels experienced a significant increase in room cancellations, leading to substantial revenue losses. The objective of this analysis is to identify key factors driving cancellations, quantify the cancellation rates for each hotel type, and provide actionable insights to reduce future cancellations. This analysis aims to support stakeholders in understanding customer behaviour and implementing data-driven strategies to enhance booking retention.

Objectives

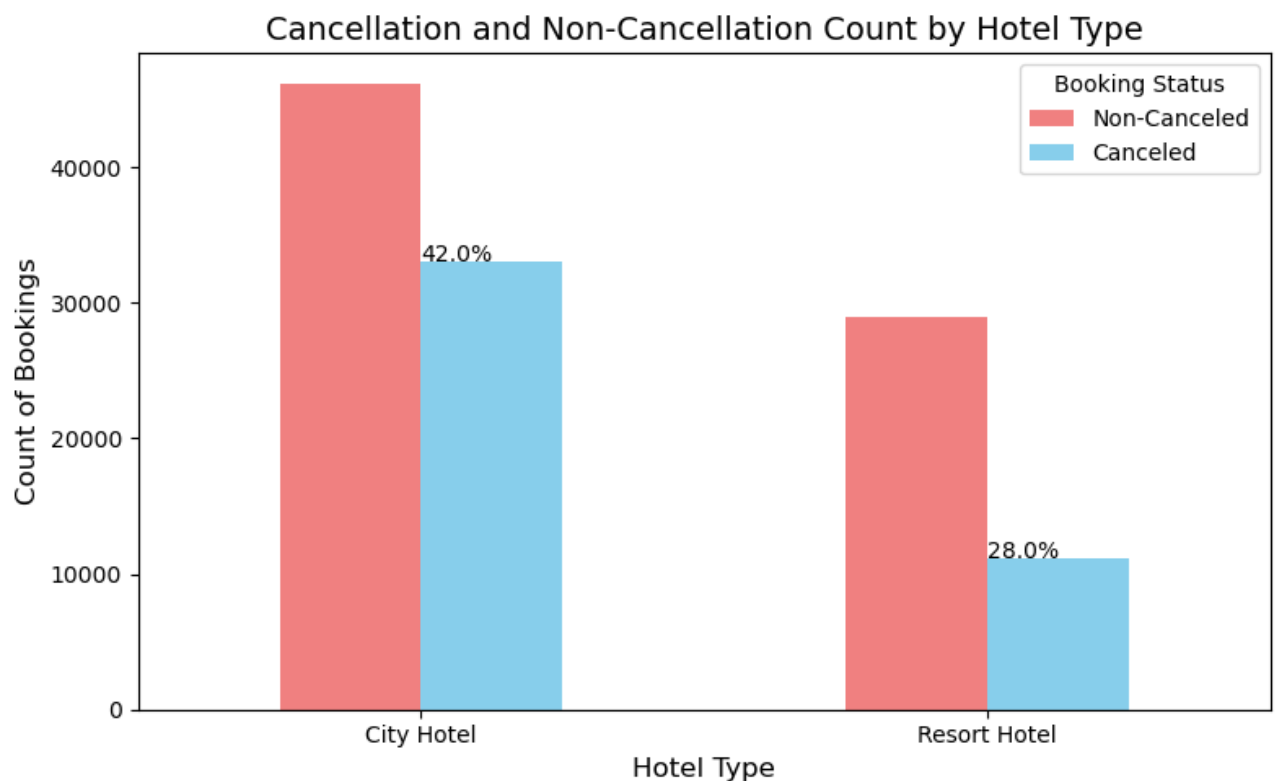
- **Cancellation Rates:** Determine and compare the cancellation rates for City Hotels and Resort Hotels.
- **Statistical Significance:** Conduct hypothesis testing to assess whether the difference in cancellation rates between the two hotel types is statistically significant.
- **Key Factors:** Analyse and identify factors contributing to cancellations.
- **Customer Segmentation:** Examine which customer groups are more likely to cancel their bookings

Hypotheses

- Customers with longer lead times (time between booking and check-in) exhibit higher cancellation rates.
- Customers whose bookings were placed on a waiting list are more likely to cancel their bookings.
- Does Higher prices Contribute to hotel cancellations

Analysis :-

Q1) What is the total cancellation rates and compare the cancellation rates for city and resort hotels



- The total cancellation rate for both resort and city hotel combined is **37%** which reasonably a high number.
 - City Hotels exhibit significantly higher cancellation rates (42%) compared to Resort Hotels (22%). Would like to investigate further what factors contribute to high cancellations for city hotels and resort hotels.
 - I would also conduct a hypotheses test to verify that the difference in cancellation rates is statistically significant and the difference is not by chance.
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Q2) What percentage of the total cancellations originated from City Hotels versus Resort Hotels?

- City Hotel: Out of total cancellations 74.84% cancellations were of City Hotel.
- Resort Hotel: Out of total cancellations 25.16% cancellations were of Resort Hotel.

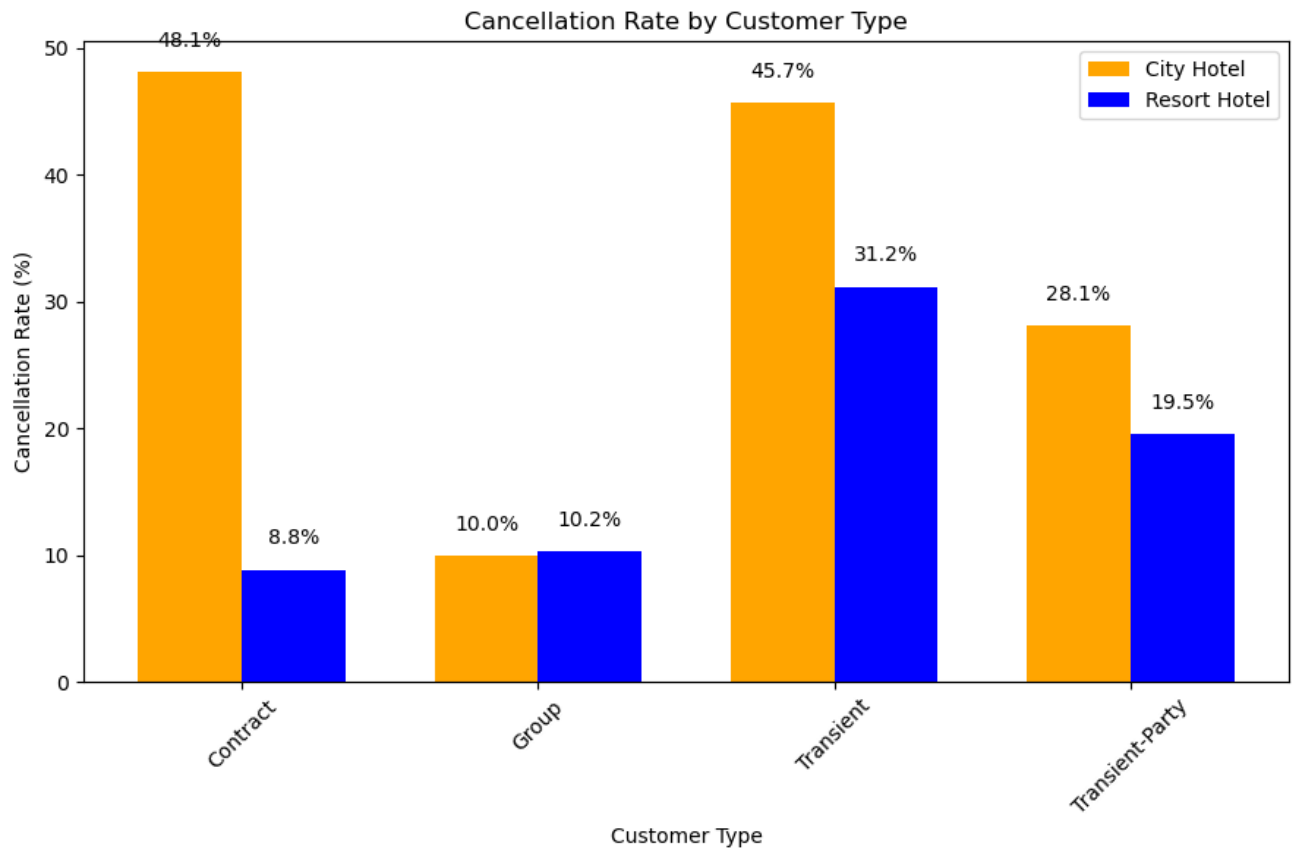
Out of total cancellation majority were for city hotels

Q3) Hypothesis Testing: Assessing the Statistical Significance of Cancellation Rate Differences Between City Hotels and Resort Hotels

Conduct a two-proportion Z-test to compare the cancellation rates of City Hotels and Resort Hotels. Since we are comparing two proportions, this test will determine whether the observed difference in cancellation rates is statistically significant.

Result: The hypothesis test confirmed a statistically significant difference between the cancellation rates of the two hotel types, with City Hotels experiencing a higher cancellation rate than Resort Hotels.

Q4) How do the cancellation rates differ by customer type for City Hotels and Resort Hotels?



City Hotels :-

- **Contract (48.1%) and Transient (45.7%) customers** have the highest cancellation rates, indicating that these customer types are significantly more likely to cancel their bookings.
- The high cancellations among **contract customers** could suggest that their contracts expired during this period or were influenced by changes in the hotel's terms and conditions.

Resort Hotels :-

- **Transient customers (31.2%)** account for the majority of cancellations at resort hotels.
 - The consistently high cancellations among transient customers for both city and resort hotels could be attributed to last-minute changes in their plans. As Transient customers typically include walk-in guests, last-minute bookers, or those requiring short-term stays, making their bookings more prone to cancellations.
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Q5) What percentage of the total cancellations is contributed by each customer type for City Hotels and Resort Hotels?

Percentage of Total Cancellations by Customer Type for City Hotel:

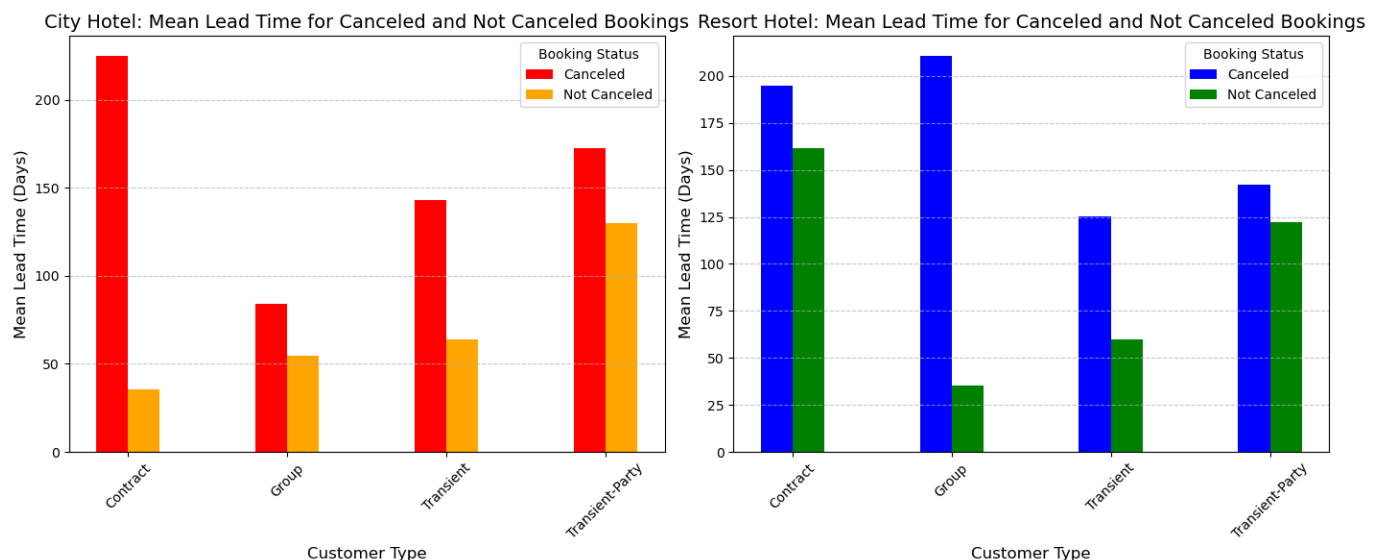
```
customer_type
Transient          81.87
Transient-Party    14.70
Contract           3.34
Group              0.09
Name: proportion, dtype: float64
```

Percentage of Total Cancellations by Customer Type for Resort Hotel:

```
customer_type
Transient          84.67
Transient-Party    13.66
Contract           1.41
Group              0.26
Name: proportion, dtype: float64
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- We notice that out of total cancellations made **82.57% for city Hotels** and **84.67% for Resort Hotels** came from **Transient** customers. Indicating that Transient Customers are more Likely to cancelled their bookings.

Q6) Determine if there is any difference in lead time (difference between arrival time and booking time) between cancelled and not cancelled booking for city and resort hotels



- After comparing the average lead time for both hotels canceled and not canceled bookings by each customer type then we can notice that :-

City Hotels

- The mean lead time for Contract customers with canceled bookings is 225 days (median: 279 days), while for not canceled bookings, it is significantly lower at 35 days (median: 16 days).
- Transient customers, who also account for high cancellation rates, show a mean lead time of 143 days (median: 111 days) for canceled bookings, compared to 63 days (median: 39 days) for not canceled bookings.
- The significant differences in lead times between canceled and not canceled bookings suggest that Contract and Transient customers with lead times greater than 100 days (over 3.5 months) are more likely to cancel their bookings.

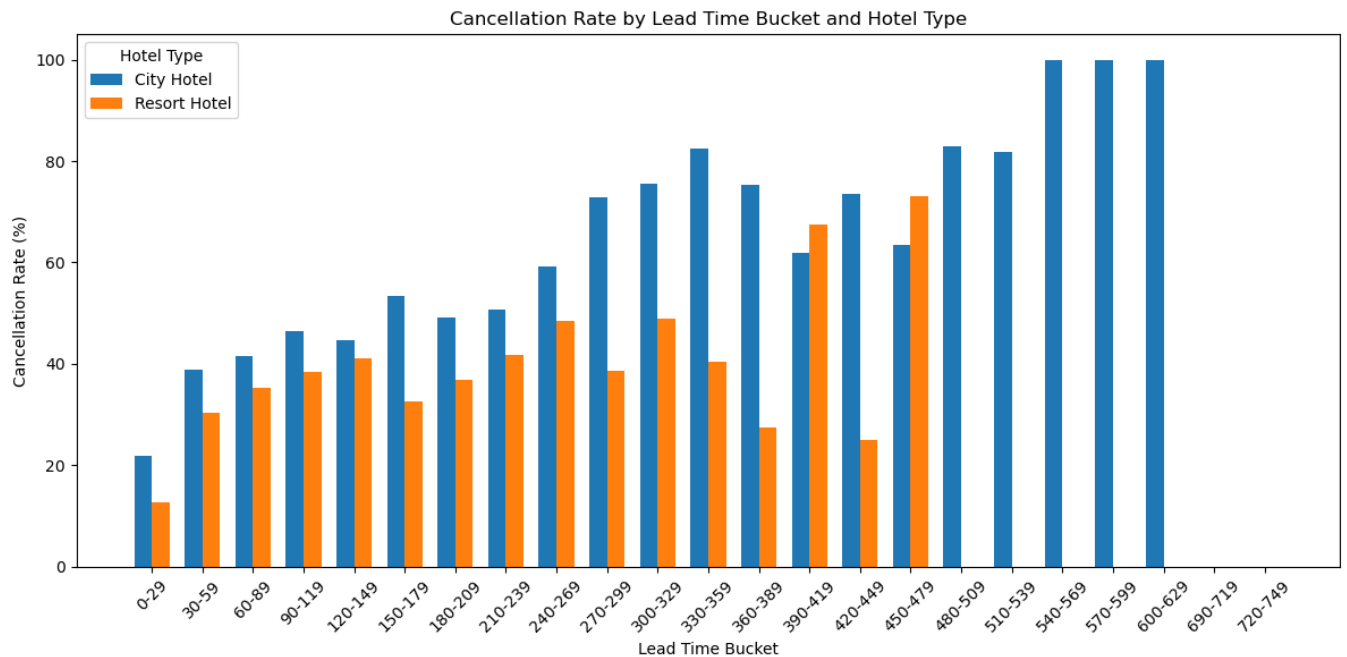
Resort Hotels

- Transient customers, the primary contributors to cancellations, have a mean lead time of 125 days (median: 106 days) for canceled bookings, compared to 60 days (median: 25 days) for not canceled bookings.
- Transient customers with lead times greater than 120 days (4 months) are more prone to cancelling their bookings.

Suggestions

- Targeted Policies: For bookings with high lead times, consider implementing stricter cancellation policies or incentivizing commitment through discounts or non-refundable rates. Proactive Customer Engagement: Reach out to customers with long lead times closer to their check-in date to confirm their plans or provide offers to retain the booking.

Q7) What is the Cancellation Rate by Lead Time Bucket and Hotel Type?



Observations: High Cancellation Rates for Long Lead Times:

- City Hotels consistently show higher cancellation rates compared to Resort Hotels across most lead time buckets.
- Cancellation rates generally increase with longer lead times for both hotel types, though there are some fluctuations in specific buckets.

Q8) Do canceled bookings have a longer waiting time on the waiting list compared to bookings that were not canceled?

Average days_in_waiting_list for Each Customer Type for City Hotel (Canceled Bookings):

	mean	median
customer_type		
Contract	0.00	0.0
Group	0.00	0.0
Transient	0.44	0.0
Transient-Party	0.39	0.0

Average days_in_waiting_list for Each Customer Type for Resort Hotel (Canceled Bookings):

	mean	median
customer_type		
Contract	0.00	0.0
Group	0.00	0.0
Transient	0.00	0.0
Transient-Party	0.04	0.0

- Based on the data for the average days_in_waiting_list for both canceled and not canceled bookings for City and Resort Hotels:-

- Across both City and Resort Hotels, the mean days_in_waiting_list for all customer types is close to zero, indicating that the majority of bookings were confirmed within 24 hours, regardless of whether they were eventually canceled or not.
- This disproves the hypothesis that bookings with a higher number of days in the waiting list are more likely to be canceled. The data shows that days_in_waiting_list is not a significant factor contributing to cancellation

Q9) By Comparing the cancelled and not cancelled bookings for city hotels find out the months with high cancellations?

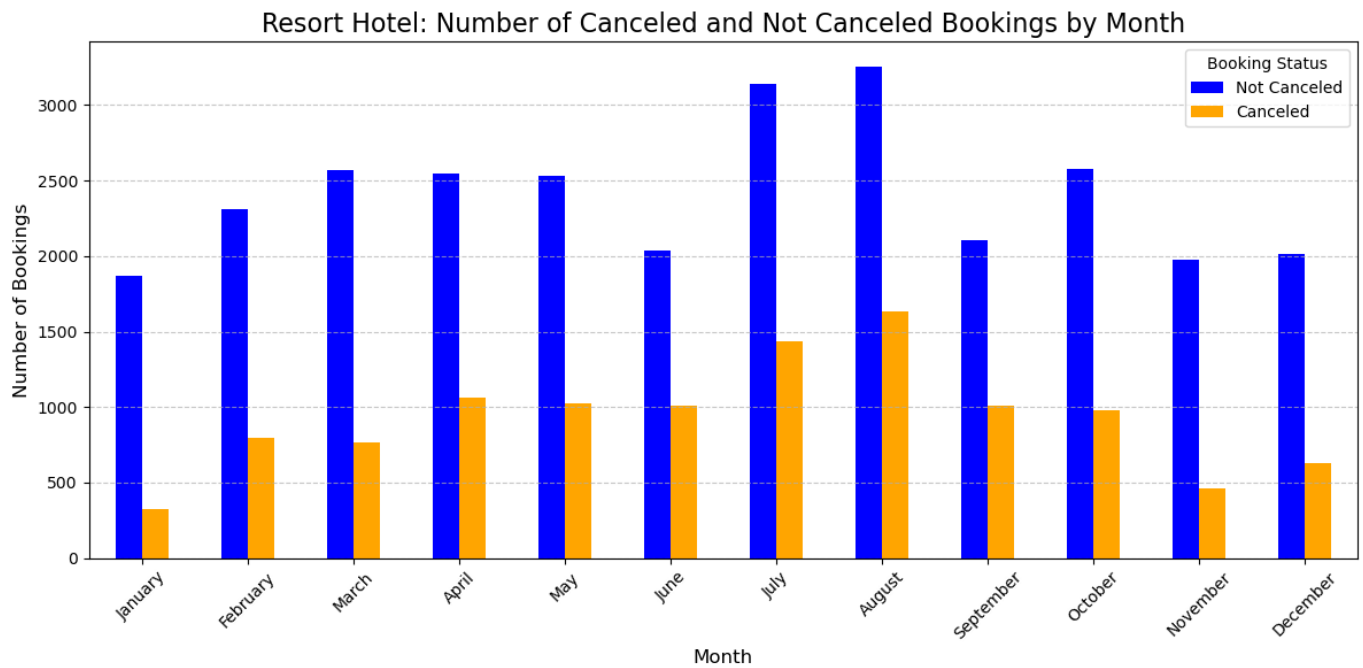
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City Hotels

- The month of August had the most cancellations
- The cancellations were higher for months from April till October these months also had higher bookings

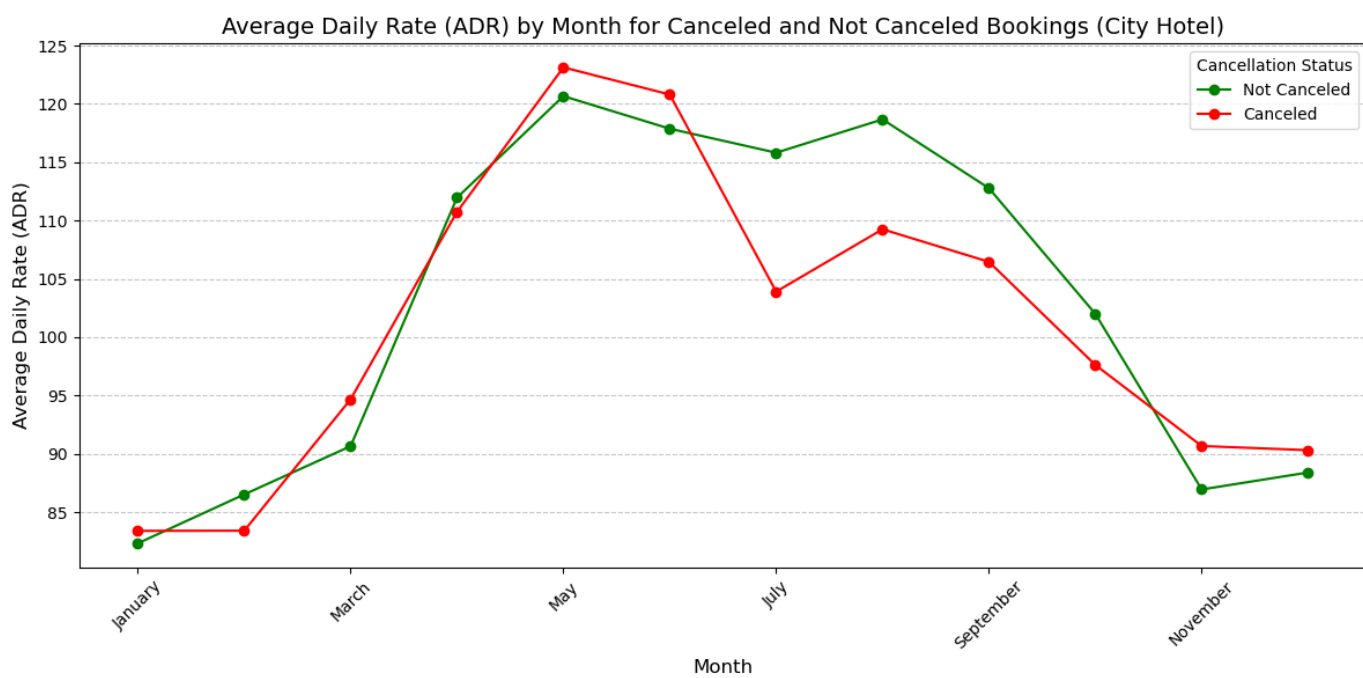
Q10) By Comparing the cancelled and not cancelled bookings for resort hotels find out the months with high cancellations?



Resort Hotels

- The month of August had highest cancellations
- Cancellations are higher during the months of July, August

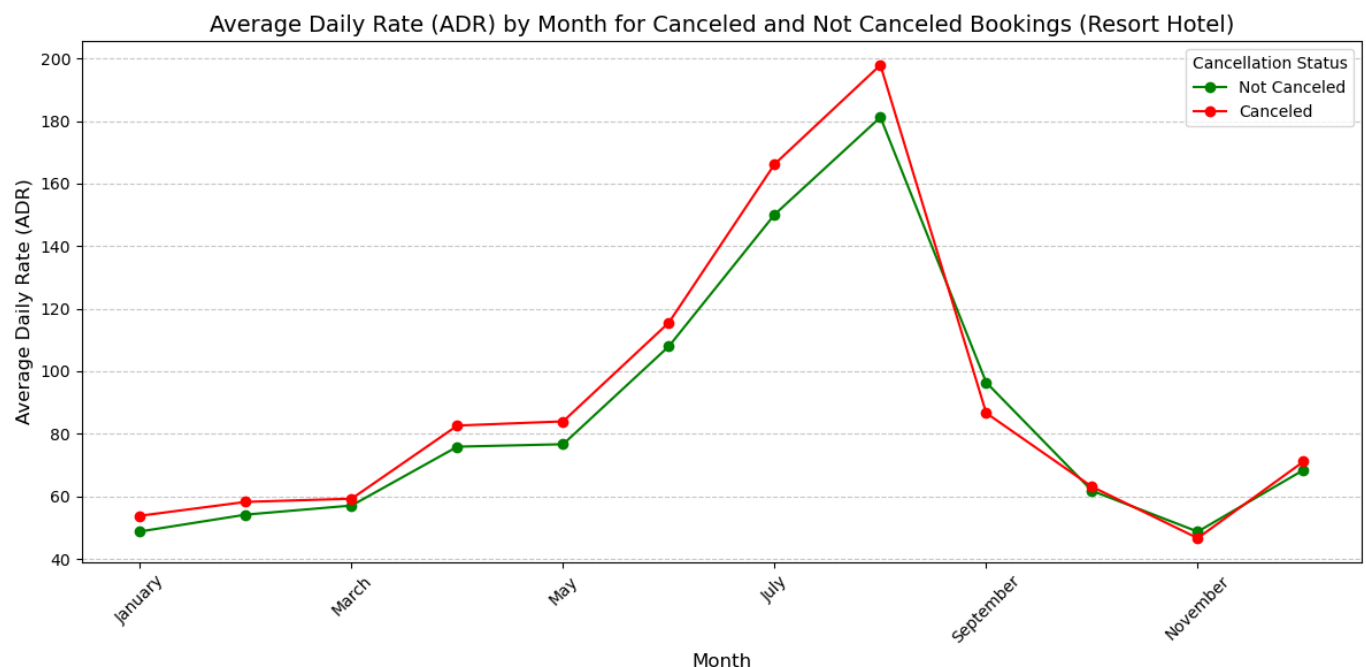
Q11) what is average ADR for cancelled and not cancelled bookings for city hotels?



- City Hotels

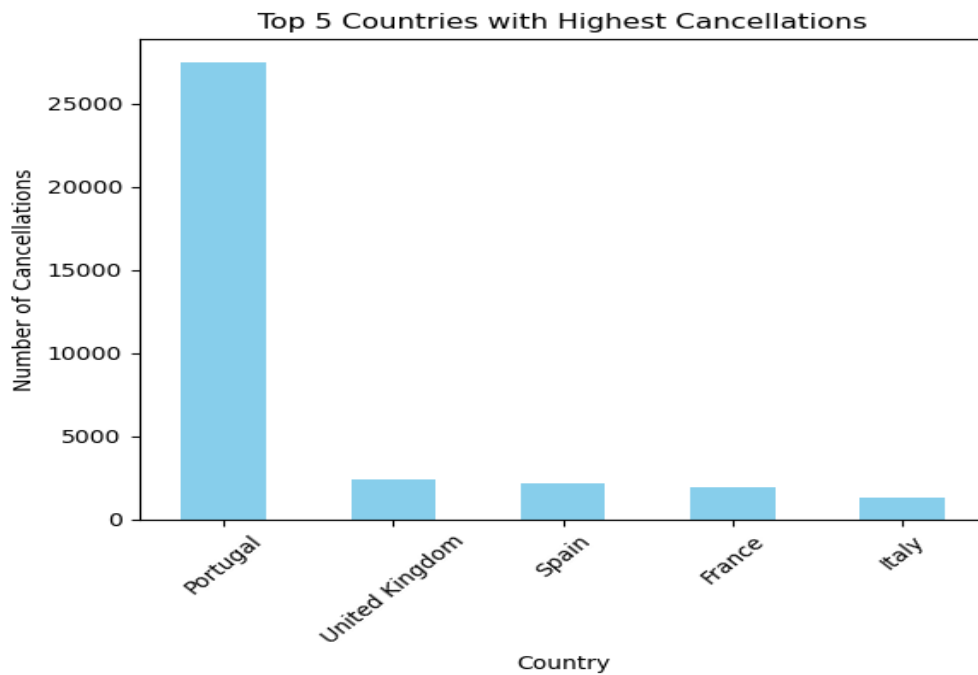
- While cancellations sometimes occur for higher-priced bookings (April, May, July ,August), the trend is not consistent across all months.
- This suggests that while ADR may influence cancellations in certain months, it is not the sole driver of cancellations.
- The lack of a consistent pattern where canceled ADR is always higher than not canceled ADR suggests that other factors—such as customer type, booking lead time, or external conditions—might also play a role in cancellations.

Q12) what is average ADR for cancelled and not cancelled bookings for resort hotels?



- Resort Hotels
- In Resort Hotels, higher ADR appears to be a significant factor driving cancellations, particularly in the months leading up to and during the peak season (May to August).
- Customers paying higher prices may cancel due to affordability concerns, a change in plans, or opting for alternative accommodations.

Q13) Out of total cancellations find out the top 5 countries with highest cancellations?



- countries contributing to highest cancellation is Portugal , UK ,Spain
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Key Insights

- **Cancellation Rates by Hotel Type:**
 - City Hotels had 42% cancellation rates vs. Resort Hotels at 22% (statistically significant difference).
 - 75% of total cancellations originated from City Hotels.
- **Customer Type and Cancellation Trends**
 - **City Hotels:**
 - Contract customers: Highest cancellation rate (48.1%), possibly due to expired contracts or policy changes.
 - Transient customers: High cancellation rate (45.7%), likely due to last-minute changes.
 - **Resort Hotels:**
 - Transient customers: Majority of cancellations (31.2%), likely due to short-term stay plans.
- Across both hotels, Transient customers contribute to 82.57% (City Hotels) and 84.67% (Resort Hotels) of total cancellations.

- **Lead Time Impact:**
 - **Longer lead times** (100+ days for City, 120+ days for Resort) correlated with higher cancellations.
 - **No link to waiting lists:** Most bookings were confirmed within 24 hours, disproving waiting time as a factor.
 - **Seasonality & Pricing:**
 - **Peak cancellations in August** (both hotels) and **April–October** (City Hotels).
 - **Higher ADR (price)** drove Resort cancellations during peak months (May–August).
 - **Geographic Trends:**
 - Top cancellation countries: **Portugal, UK, Spain.**
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Recommendation

- **Introduce Cancellation Fees for Long Lead Times :-** Implement a cancellation fee policy for bookings with lead times exceeding 3.5 months. This can discourage unnecessary cancellations and ensure commitment from customers.
- **Competitive Pricing for Resort Hotels:-** Resort Hotels experience higher cancellations during peak seasons, often driven by high average daily rates (ADRs). Stakeholders should consider pricing rooms more competitively during peak months (May-August) to reduce cancellations.
- **Flexible Booking Options:-** Offer customers incentives, such as room upgrades , discounts or loyalty points, for modifying their booking dates instead of canceling outright. This flexibility can help retain bookings and build customer trust.
- Implement strategies to improve customer loyalty and reduce cancellations among Transient guests. This could include personalized offers, loyalty programs, or early check-in/late check-out benefits.
- Conduct thorough price sensitivity analysis to determine optimal pricing strategies, considering seasonality, demand, and competitive factors.
- **Collect and analyse guest feedback:** - Gather data on cancellation reasons to identify areas for improvement.

Thank You