Hotel Bookings Cancellation Analysis

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 as a result, including fewer revenues and less than ideal hotel room use. Consequently, lowering cancellation rates is both hotels' primary goal 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 the report.

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 in an efficient manner.
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 we make hotel reservations cancellations better?
3. How will hotels be assisted in making pricing and promotional decisions?

Hypothesis:

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.
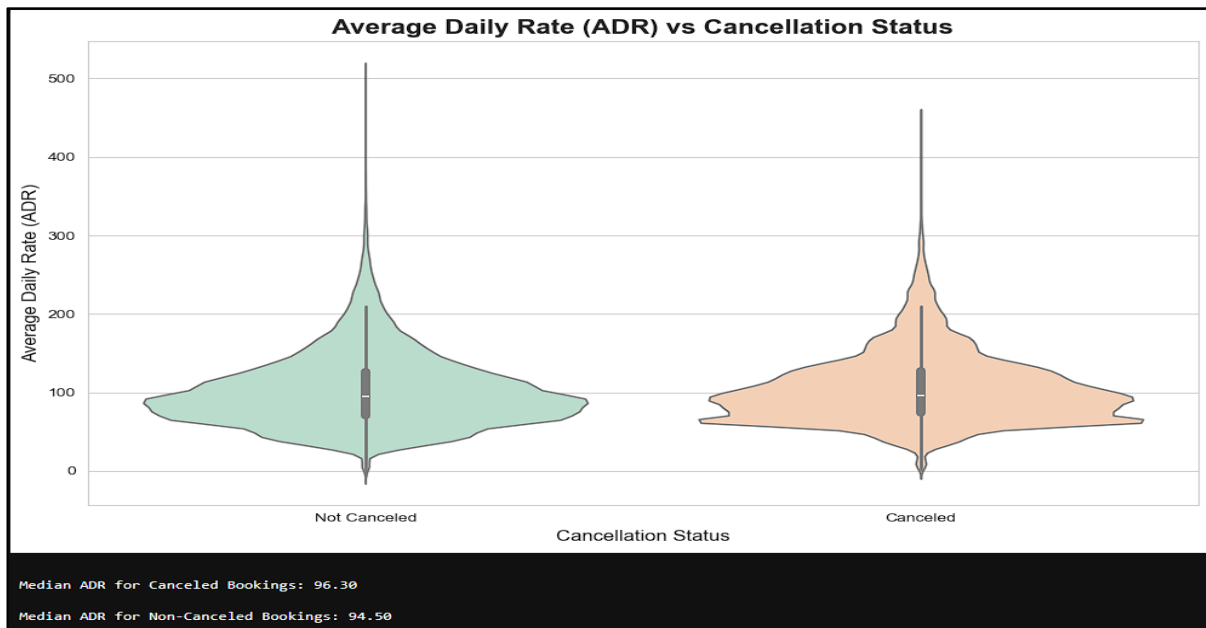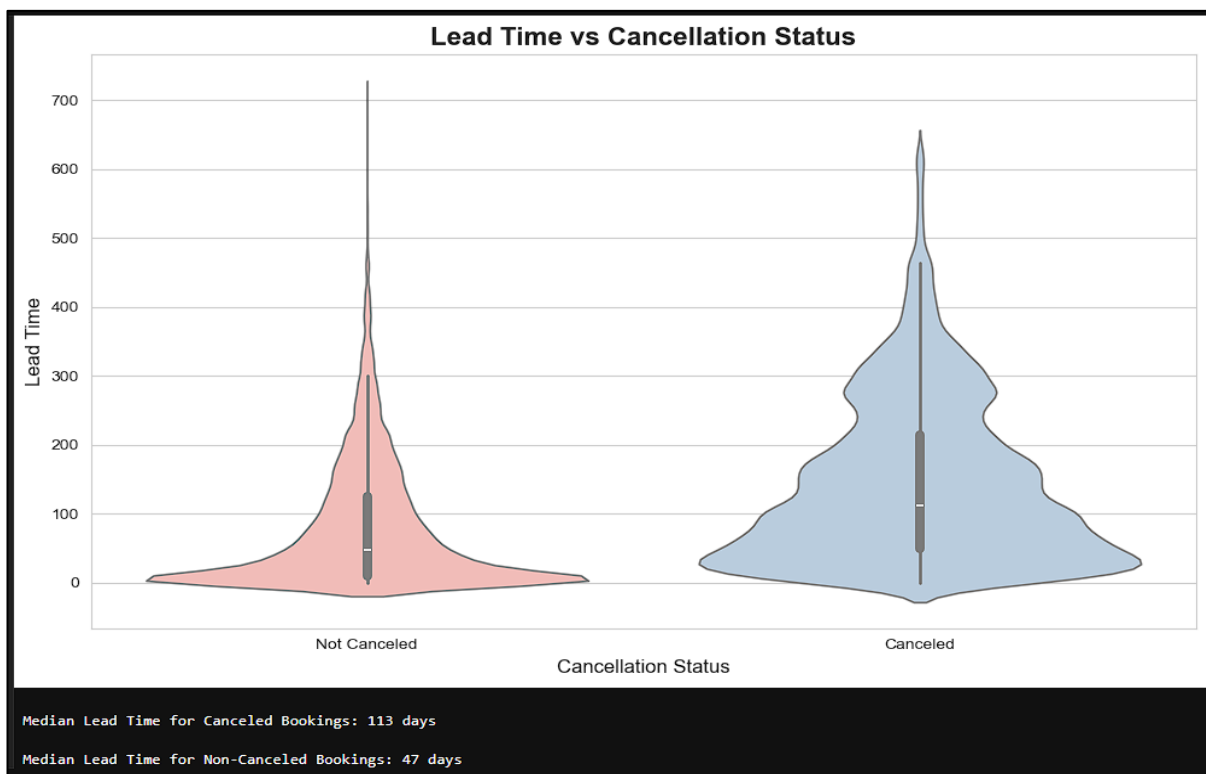
Analysis and Finding:
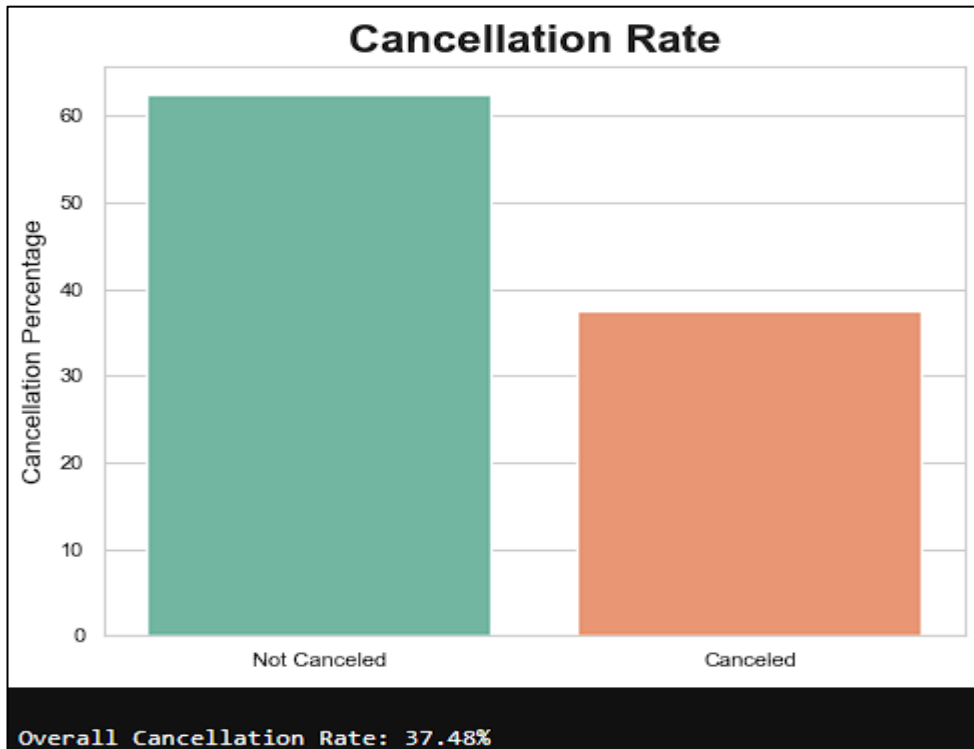
The above bar graph shows the percentage of reservation that are cancelled and those are not. It shows that there is significant amount of reservation are not cancelled. There is still 37% of customer who cancelled their reservation, which can impact the revenue generation of hotels.
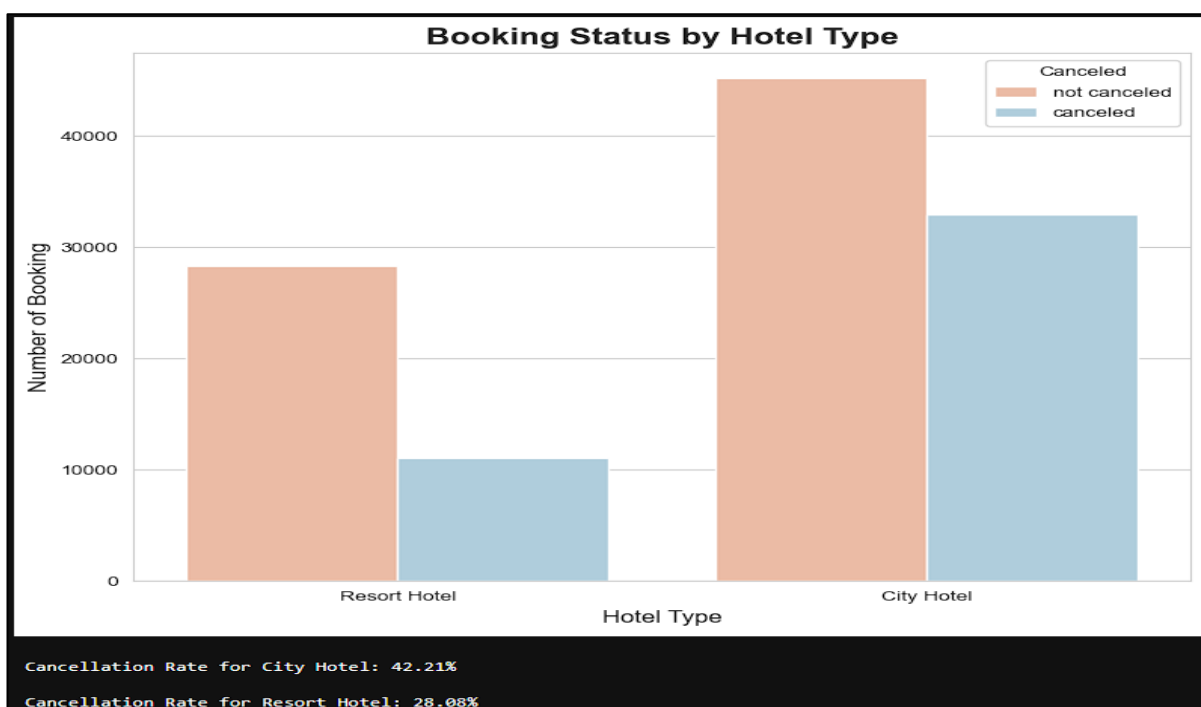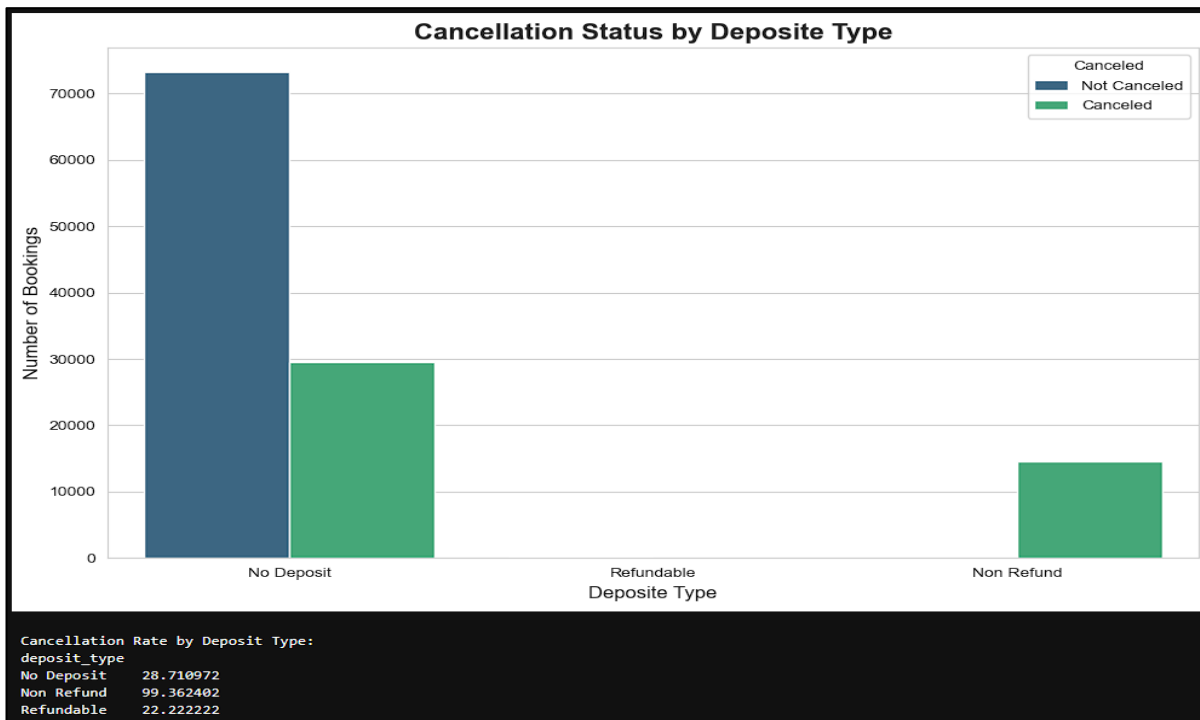
The above bar graph shows the customer booking status for different hotel types. It clearly shows that bookings are mostly done on city hotels other than resort hotel. But the cancellation rate is much higher for city hotel.

Average Daily Rate (ADR) vs Cancellation Status

Median ADR for Canceled Bookings: 96.30
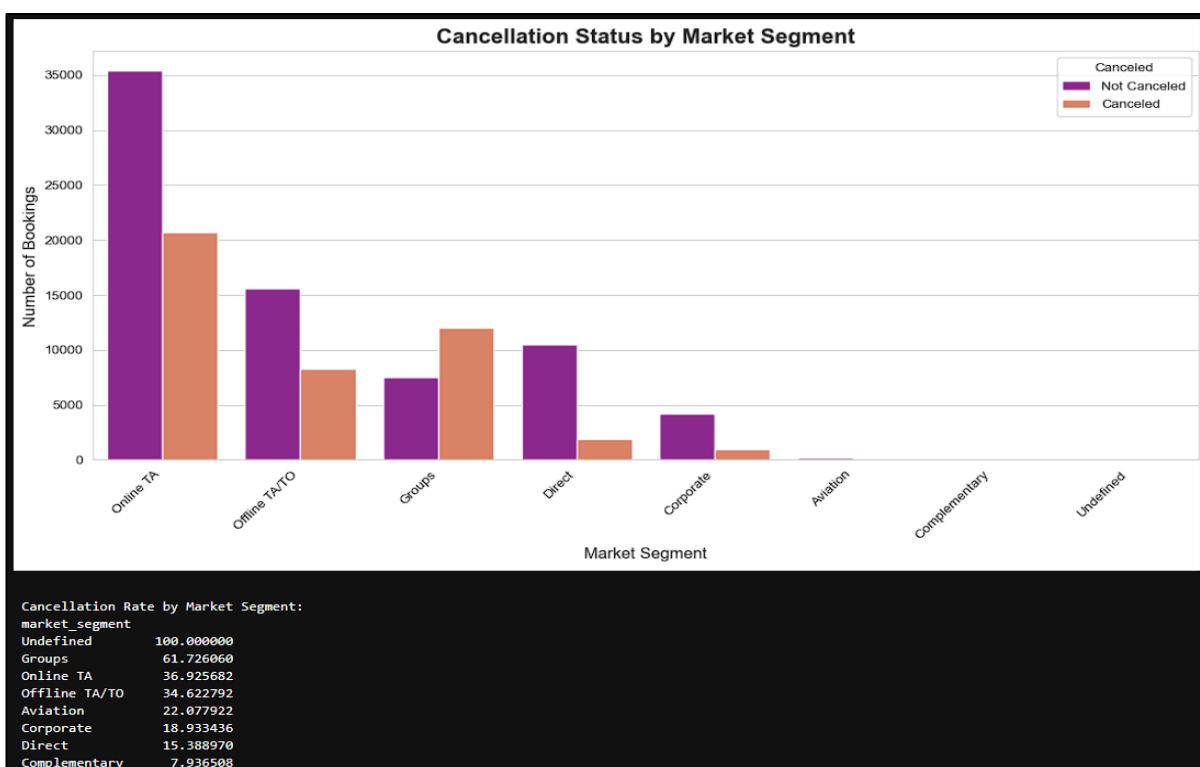Median ADR for Non-Canceled Bookings: 94.50

From the above violin graph it shows the average daily rate and cancellation status. The distribution for cancelled bookings appears to be slightly higher values compared to non-cancelled bookings. This suggest guest are more sensitive to price, where slightly higher price can increase the likelihood of cancellation.

Lead Time vs Cancellation Status

Median Lead Time for Canceled Bookings: 113 days
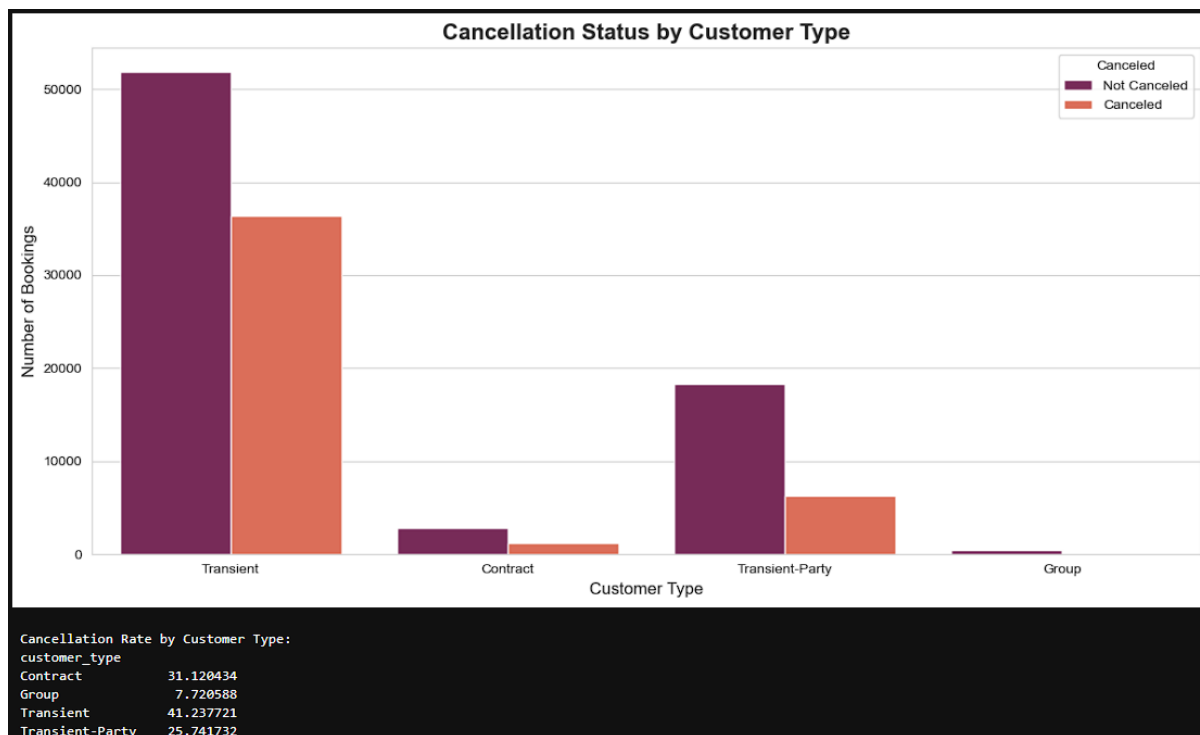Median Lead Time for Non-Canceled Bookings: 47 days

The above violin graph shows the distribution of lead time (days between booking date and arrival date) for both cancelled and non-cancelled booking. The median lead time for cancelled bookings is 113 days, which is longer than 47 days median lead time for non-cancelled bookings.

Cancellation Status by Deposite Type

Cancellation Rate by Deposit Type:
```
deposit_type
No Deposit    28.710972
Non Refund    99.362402
Refundable    22.222222
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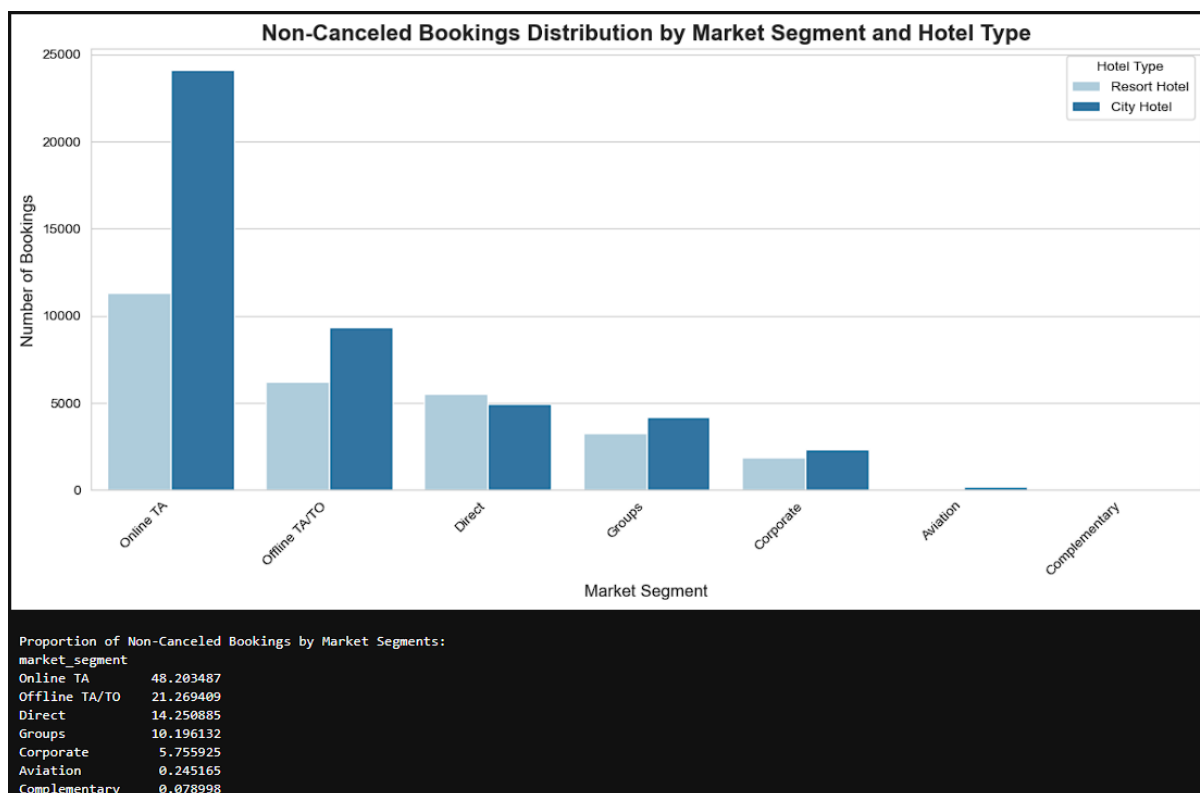
The above bar graph shows how the customers deposit type affects the cancellation behaviour. Non-Refund deposit type has the high cancellation in comparison to other which may be due to either refund polices or mass cancellation. No Deposit have moderate cancellation rate (28.38%) but heavy in volume. Refundable deposit type has the lowest cancellation rate.

Cancellation Status by Market Segment

Cancellation Rate by Market Segment:
```
market_segment
Undefined       100.000000
Groups           61.726060
Online TA        36.925682
Offline TA/TO    34.622792
Aviation         22.077922
Corporate        18.933436
Direct           15.388970
Complementary     7.936508
```

This bar graph breaks down cancelled and non-cancelled booking by market segment. Online TA and Offline TA/TO has the majority of all the booking, cancelled and non-cancelled, with a cancellation rate of 36.93% and 34.62% respectively. Groups have the high cancellation rate and Direct and Corporate has the lowest cancellation rate.

Cancellation Status by Customer Type

```
Cancellation Rate by Customer Type:
customer_type
Contract        31.120434
Group            7.720588
Transient       41.237721
Transient-Party 25.741732
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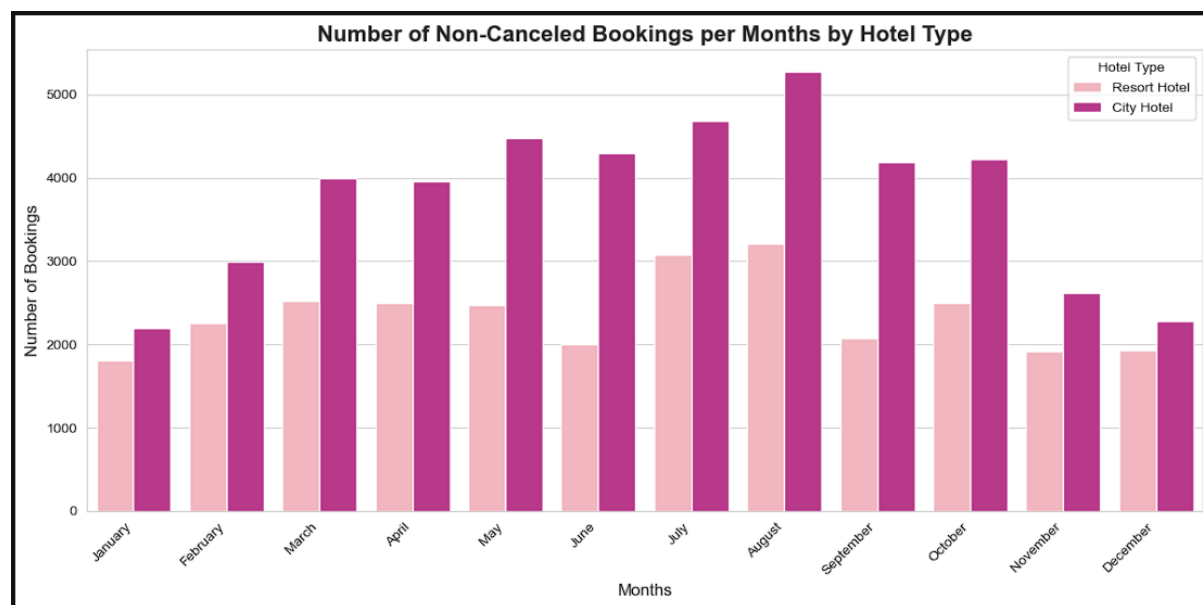
The above bar graph shows the customer types and their cancellation tendencies. Transient customer type has the highest booking as well as the highest cancellation rate of 41.25%. Contract and Transient-Party customer type has the moderate cancellation rate but high in volume. Group customer type has the lowest cancellation rate.

Non-Canceled Bookings Distribution by Market Segment and Hotel Type

```
Proportion of Non-Canceled Bookings by Market Segments:
market_segment
Online TA       48.203487
Offline TA/TO   21.269409
Direct          14.250885
Groups          10.196132
Corporate        5.755925
Aviation         0.245165
Complementary    0.078998
```

The above bar graph shows the distribution of only non-cancelled booking across different market segments which is further breaks down by hotel type. Most non-cancelled bookings are done by Online TA

and Offline TA/TO for city hotel type. For Resort hotel type most of the non-cancelled bookings are coming from Online TA, Offline TA/TO and Direct market segment.

The bar graph shows the customer booking behaviour according to different months with respect to different hotel type. City hotel has the higher non-cancelled bookings in July and August during peak summer or event time. Resort hotel has the higher non-cancelled bookings in peak summer months (July and August), in spring (March-April) and early autumn (October). Lowest non-cancelled bookings at winter months (January, February, November, December) for both city and resort hotel type.
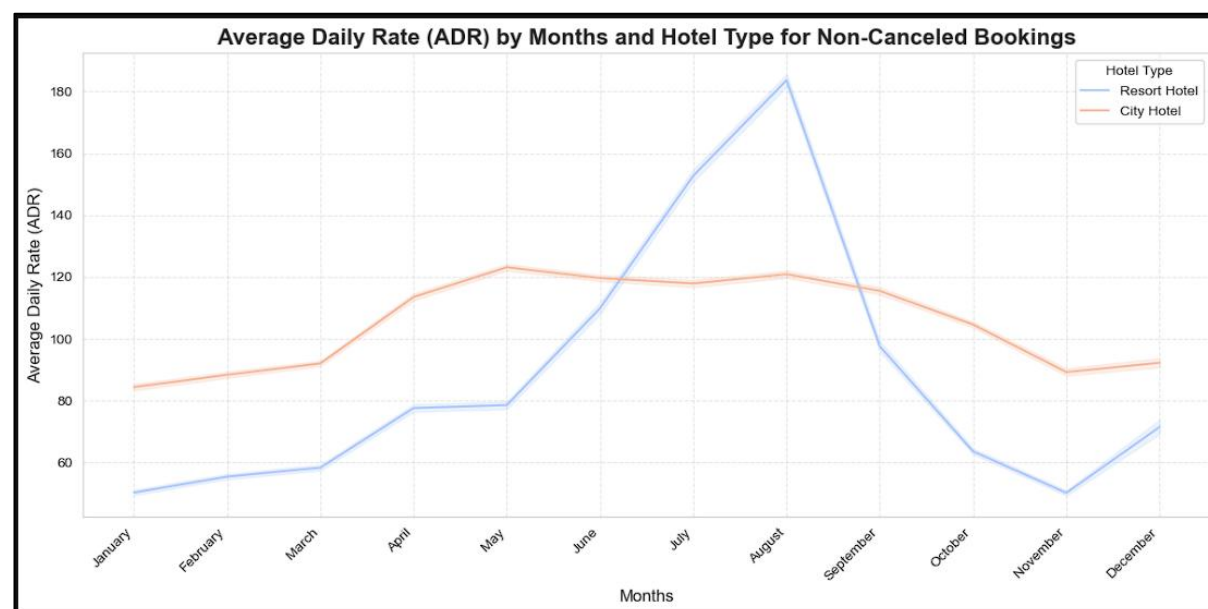
The above line graph shows the Average Daily Rate (ADR) by months and hotel type. City hotels show the nearly stable line which means it won't affect by the seasonal and maintains price consistency. Resort hotels only capitalize on the summer months.

Top 10 Countries for Non-Canceled Bookings
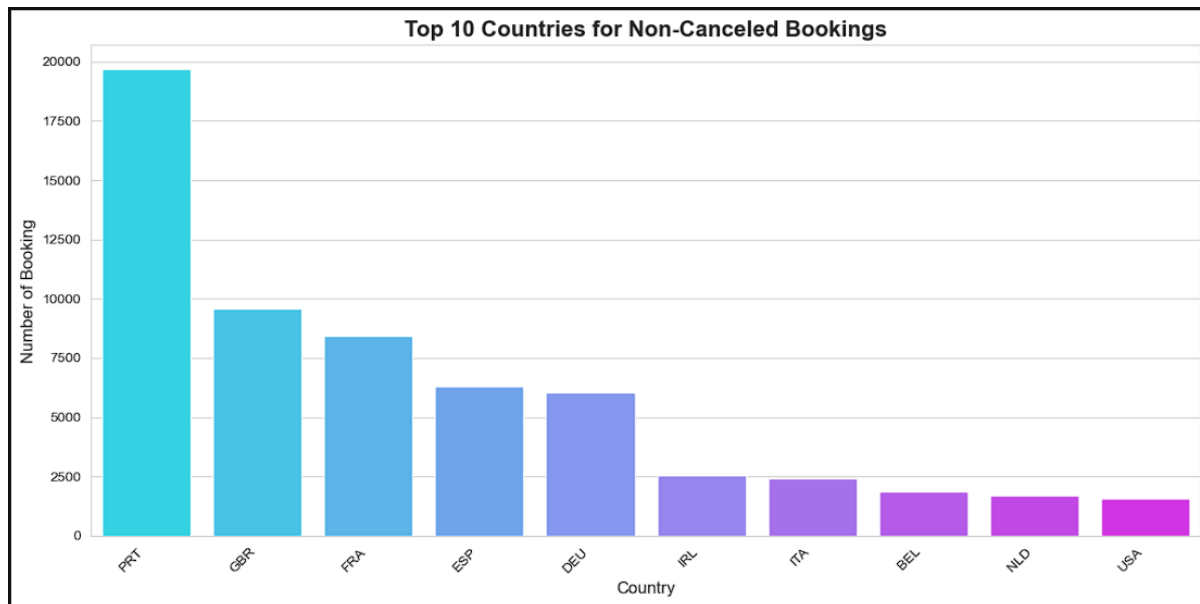
The above bar graph highlights the top 10 countries from which non-cancellation booking originates. Portugal has the most of the non-cancellation bookings than other countries. Other countries like Great Britain, France, Spain and Germany have also a decent amount of non-cancellation bookings.

Suggestions:

- **City hotels face higher cancellation risk despite being the most booked** — suggesting a need for targeted retention strategies for urban stays.
- **Price sensitivity drives cancellations** — bookings with higher ADR tend to cancel more often, highlighting the importance of dynamic pricing and value-based bundling.
- **Long lead times correlate with cancellations** — customers booking far in advance (median: 113 days) are more likely to cancel, indicating potential for flexible rebooking policies.
- **Deposit type and booking channel matter** — Non-refundable deposits and bookings via Online/Offline TA show higher cancellation rates than Direct or Corporate channels.
- **Seasonality and nationality influence stability** — July–August and spring/autumn months have more reliable bookings, especially from countries like Portugal, GRB, FRA, ESP, and DEU — ideal for geo-targeted marketing.