DATA ANALYST PROJECT

HOTEL BOOKING ANALYSIS

Business Request:

- Uncover cause of hotel reservation cancellation.
- Suggest modification to pricing structure and marketing strategies to reduce cancellations.

Business Challenge:

- A high cancellation rate results in a loss of revenue, especially when operating the hotel at the same cost.

Research Questions:

- What are the variables that are responsible for hotel cancellation.
- How to counter hotel reservation cancellation.
- How to help hotels to make pricing and promotional decisions.

Research Hypothesis:

- More cancellation occurs when customers find cheaper options at neighbouring hotels.
- Most customers book from an offline agent.

Assumptions:

- Hotel information data is current and can be used to analyse hotel reservations.
- Hotel will accept the advice without any concern.
- Currently, hotels are not already following any of the suggestions we propose.
- Biggest factor affecting the earning is cancellation.
- Hotels have no earning for the day from the room on the day of cancellation.

Dataset: https://www.kaggle.com/datasets/mojtaba142/hotel-booking

EDA Jupyter Notebook:

# Analysis & Findings

Number of Cancellations (All hotels)
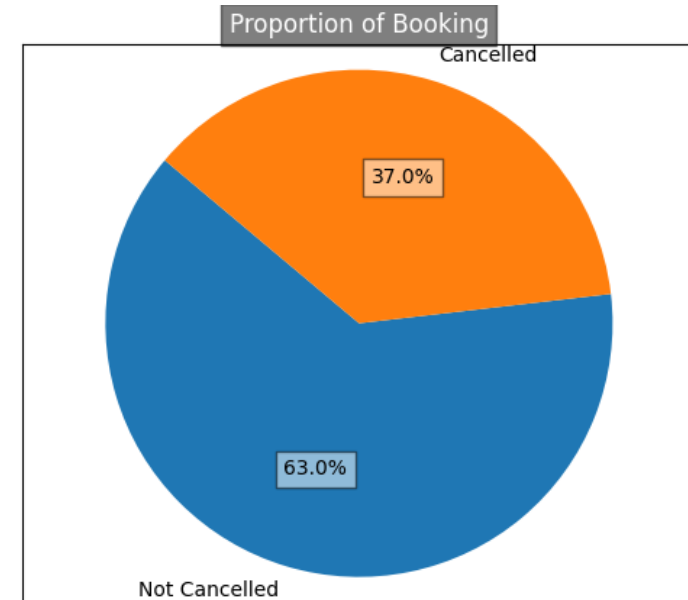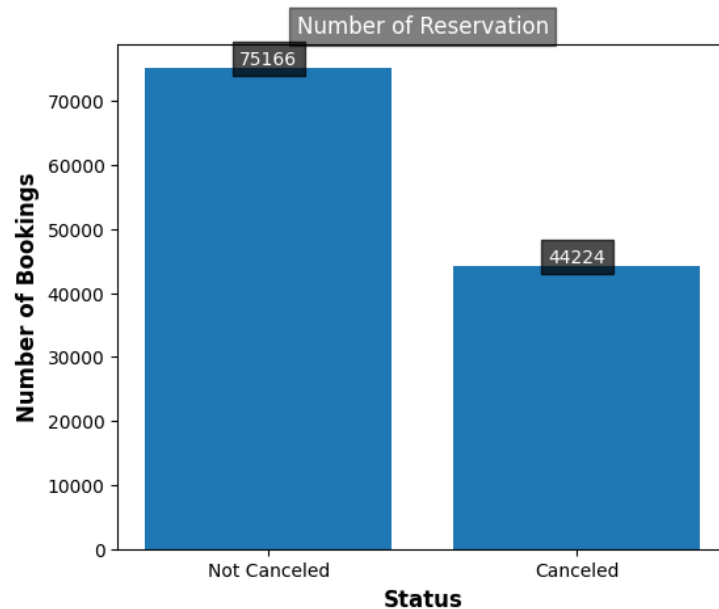
Comparing the combined **CANCELLED** and **NOT CANCELLED** reservations, we find that **37% of the reservations are CANCELLED**, which bears ahuge financial burden on hotels as overhead for the hotel remains the same.

Takeaway:
Around 40% of total bookings are cancelled. Countermeasures should be implemented to reduce cancellation rates.

Proportion of cancellation in respective hotels
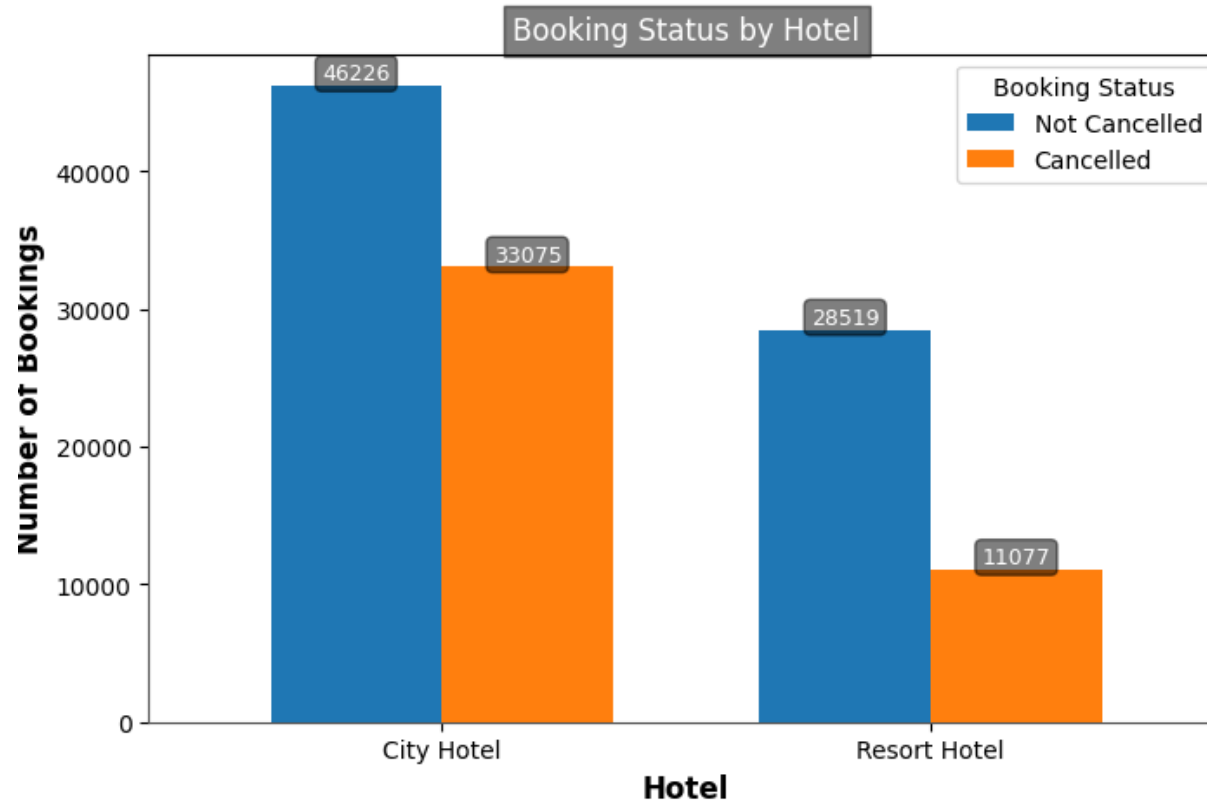
A clustered column chart, created by grouping respective hotels and their cancellation statuses, we can see the absolute numbers of **cancellations** in **City Hotels** are **more than** that of **Resort hotels**.

There are 33075 cancellations in **City Hotels** as compared to 11077 cancellations at **Resort Hotels.**

In percentage, **City Hotel** experiences **41.71%** of cancellation, whereas **Resort Hotel** face **27.98%** of **cancellation rate.**

Resort Hotels are fewer in number with premium pricing, while City Hotels are more in number and hence. Offer more competitive pricing leading to higher proportion of cancellations.

To verify the following hypothesis, we further analyse the pricing structure of hotels.
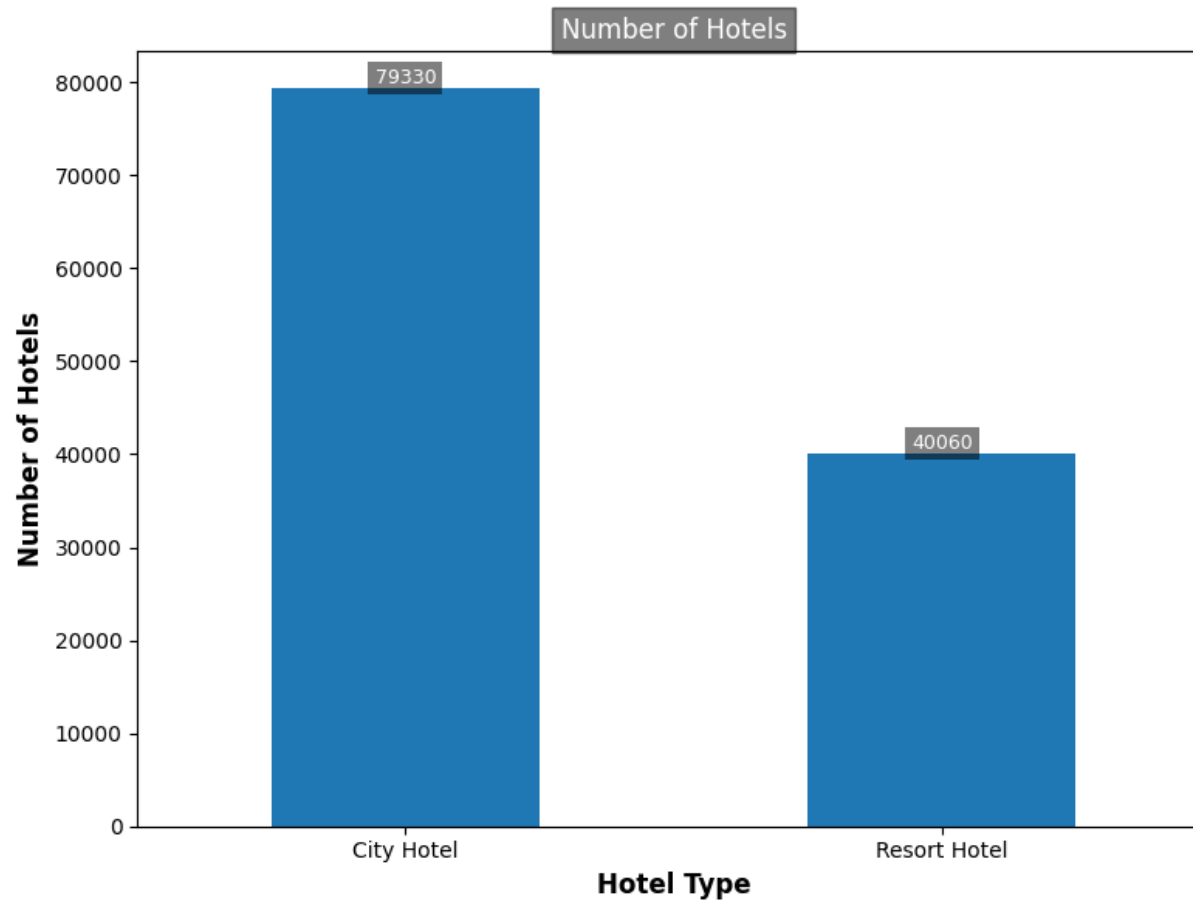

Hypothesis:

More cancellation in City because

A. More number of City Hotels than Resort Hotels.
B. Cost of City Hotel is more than resort.
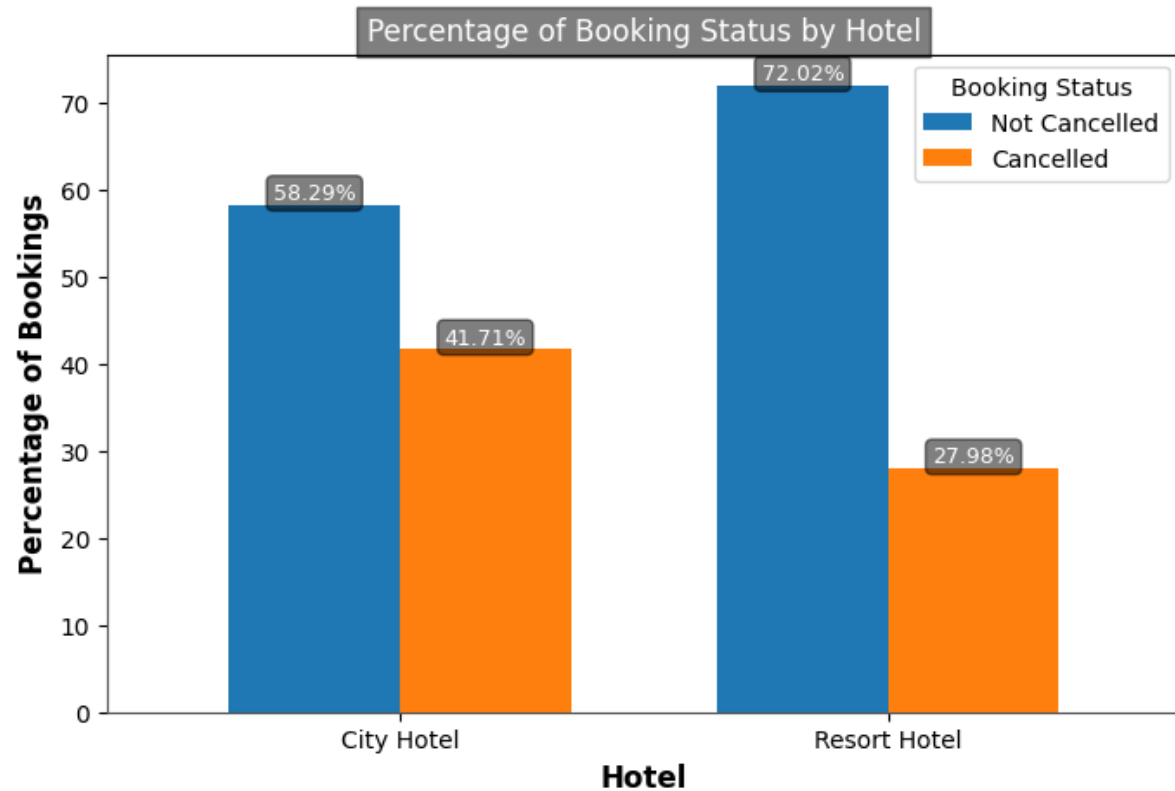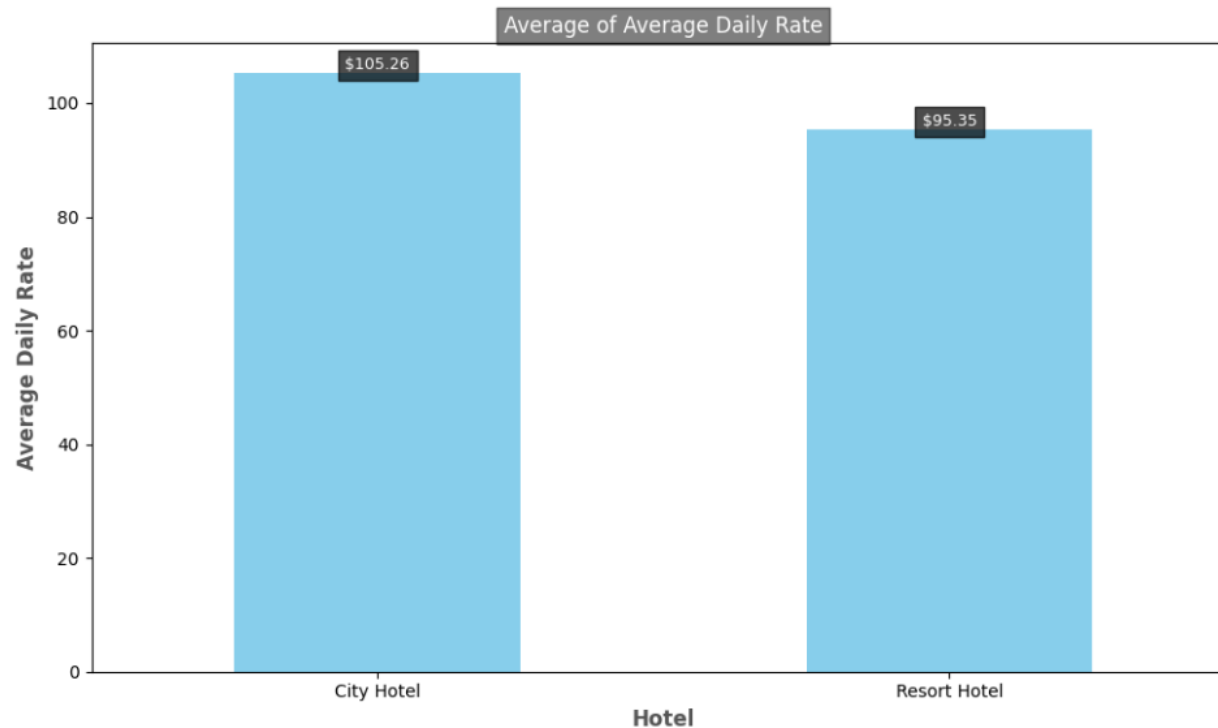
Number of hotels and Average Daily Rate

We sort all hotels by location and chart the total number of City hotels and Resort hotels.

Number of **City Hotel** are almost **Twice as that of Resort Hotel.**

Hence the price might be more competitive which might result in last minute cancellation, if user finds better prices with same amenities in different city hotels.
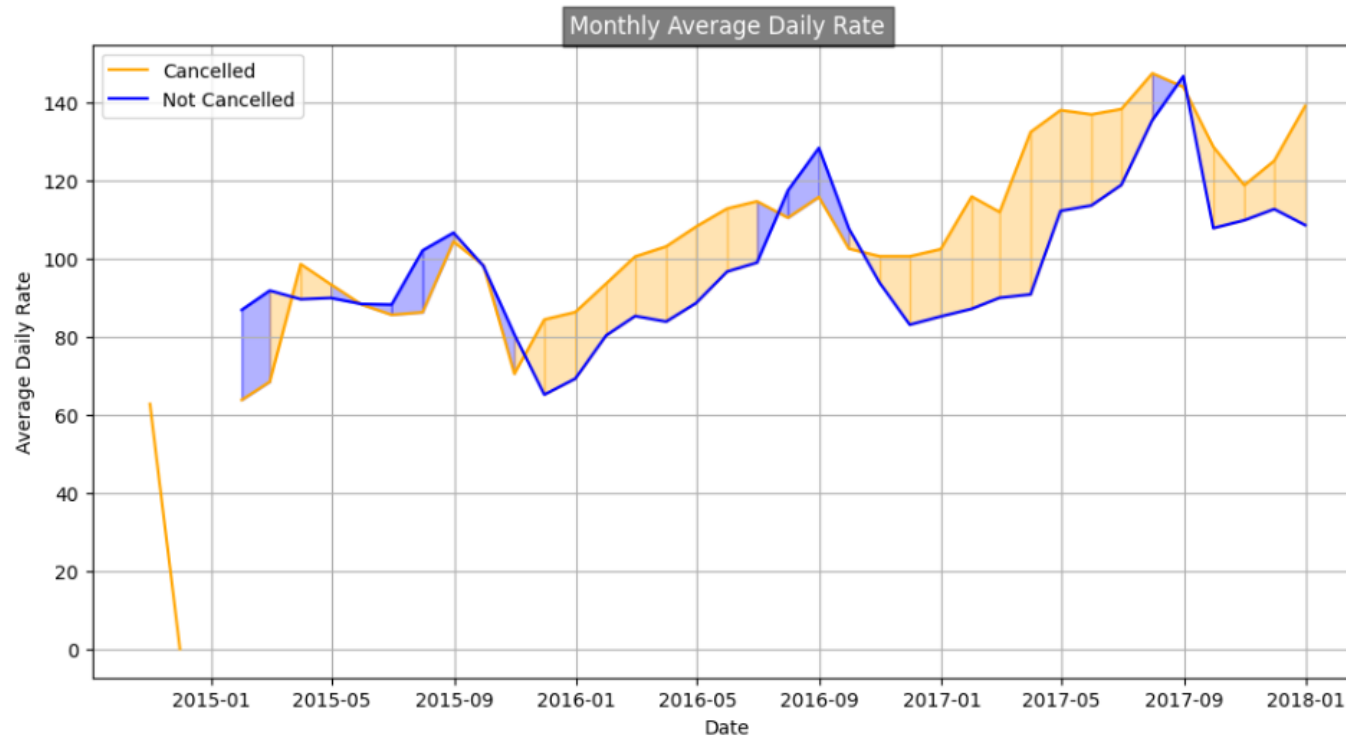
Average of Average Daily Rate (ADR)

Visualisation of average of average daily rate (ADR) conclusively proves that average daily rate of **City Hotels** is more than **Resort hotels**.

Coupled that with higher number of **City Hotels,** city hotels are bound to offer competitive pricing.

Takeaway:

More cancellation in city hotels is on the account of greater number of hotels in the area resulting in competitive pricing, and higher rate. In comparison, Resort hotels are fewer in number, and have lower Average Daily Rate for their rooms. Hence face lower cancellations.

# Monthly Average – Average Daily Rate (ADR)

By plotting the monthly average of average daily rate for **cancelled** and **non-cancelled** reservations, we can clearly see that line area of **Cancelled reservation (Yellow)** is more than **non cancelled (Blue)**. This means cancellations booking have a higher Average Daily Rate.

Takeaway:

Higher prices of hotels is associated with more cancellations.
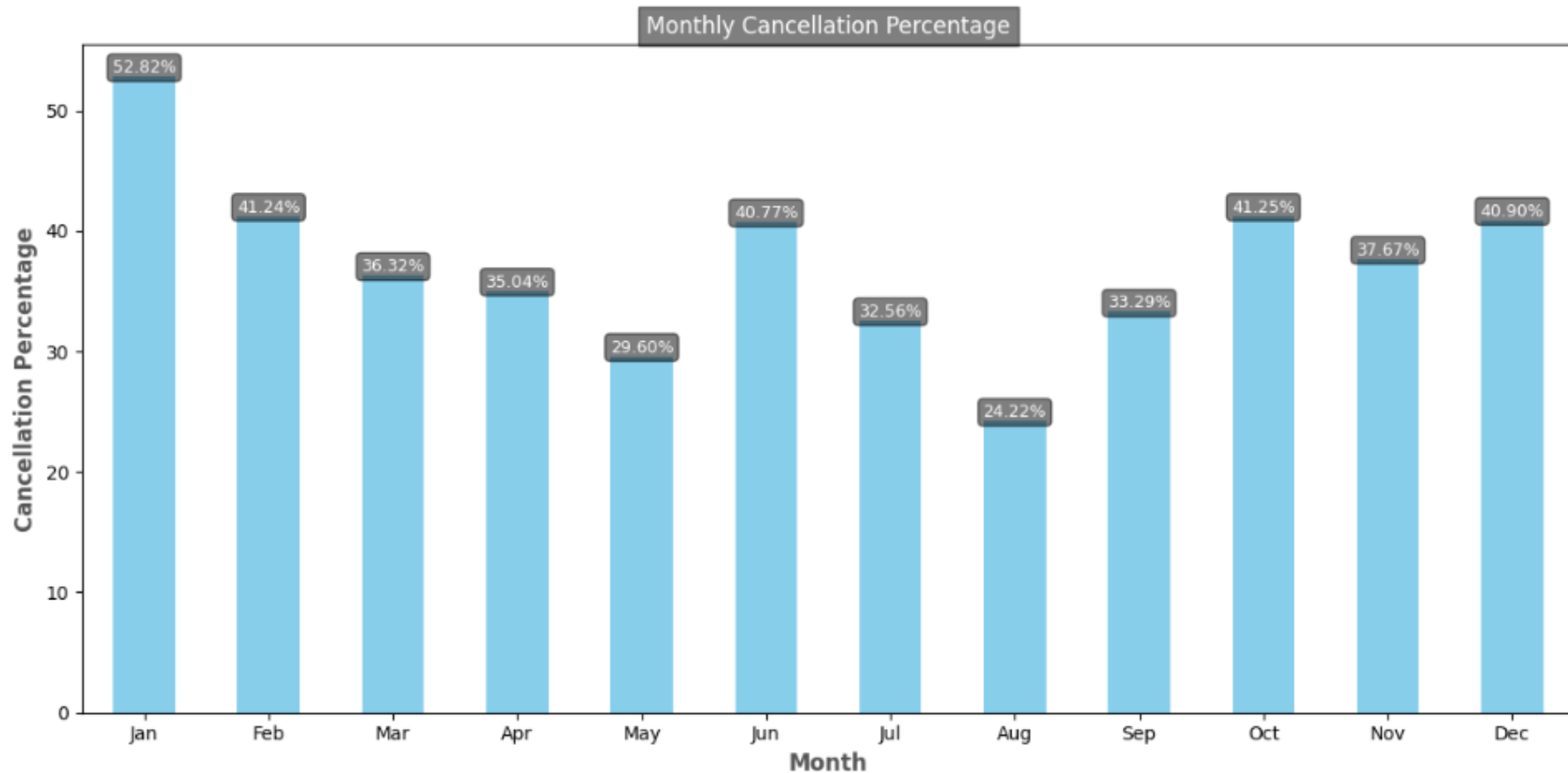
Months with highest Cancellations

Monthly Total Reservations
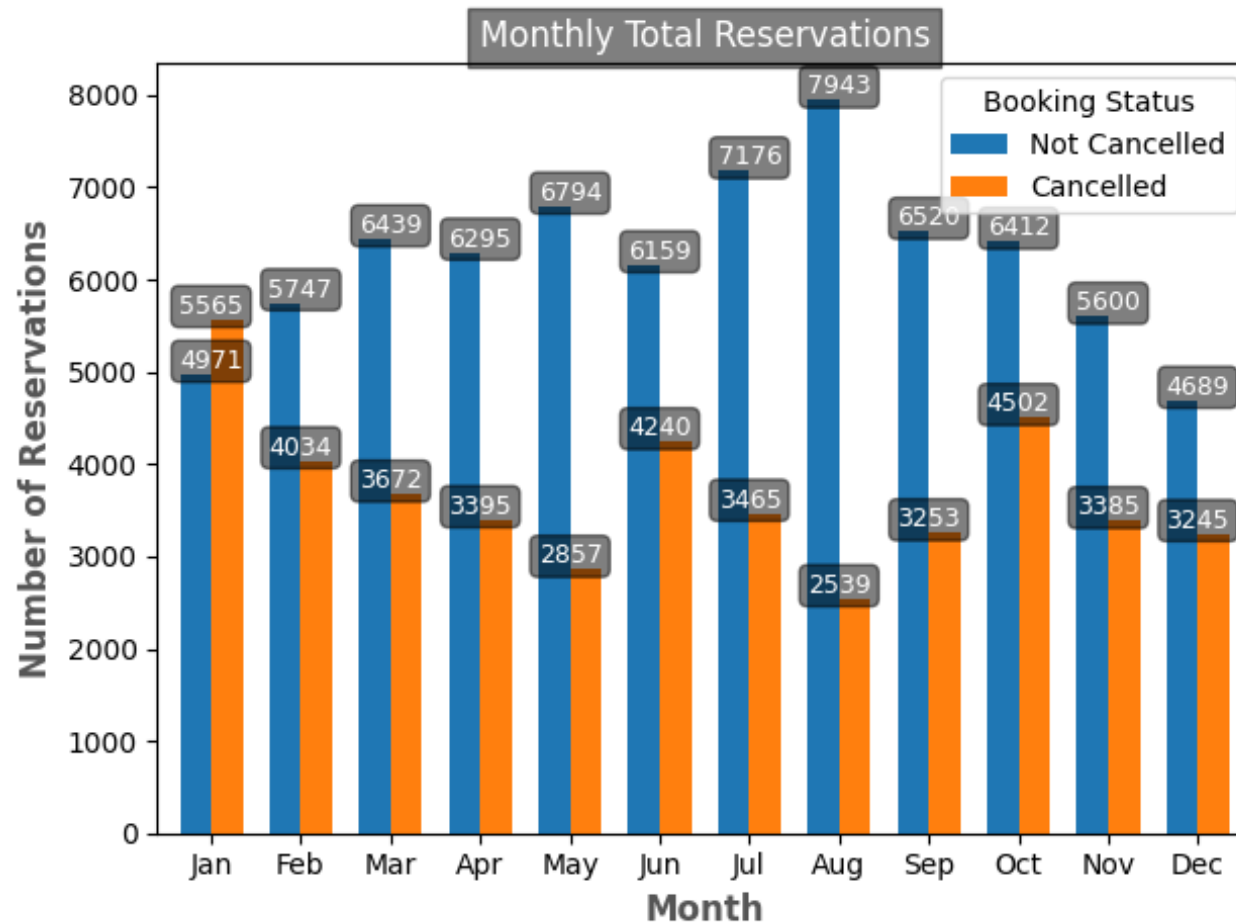
Total **cancellations** are highest in the month of **January** followed by **October** and **June**.

Month with **Not cancelled** is **August** and lowest is **December**.

Months with highest Cancellations (Percentage)


January month has highest proportion of cancellation at **52%** followed by **October** at **41%** and **June** at **40%**.

Months of **August** which has Lowest cancellation rate of **24%** has the highest number of bookings at almost **7943**.

Investigating the reason for this disparity in number of cancellations, we look at the Average Daily Rate of each month.

Average Daily Rate (each month)

ADR per month
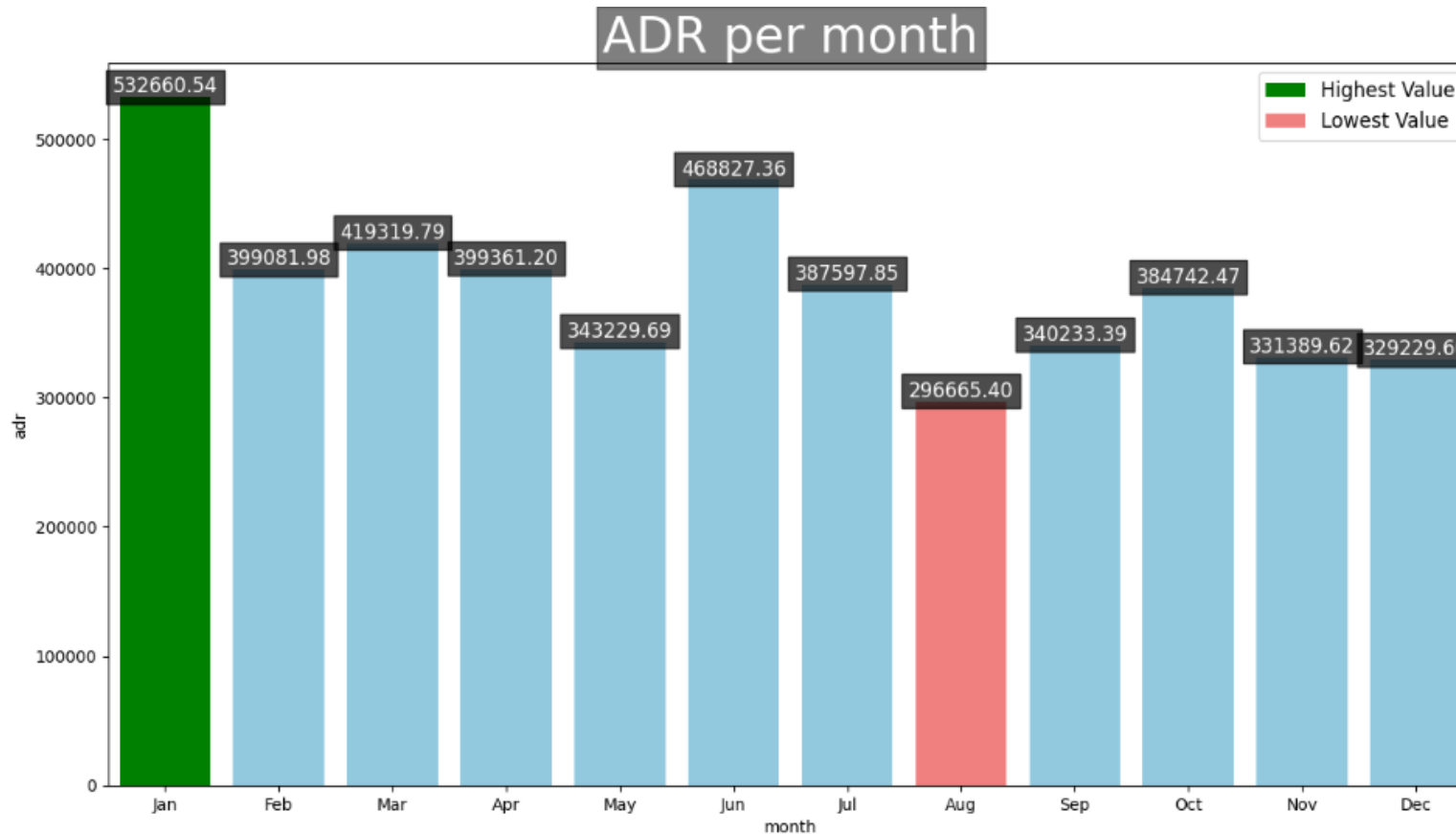
January has the **highest Average Daily Rate**, while **August** has the **lowest Average Daily Rate.**

Hence strengthening our proof that higher price is a deciding factor for booking cancellations.

Bar chart values by month:
- Jan: 532660.54 (Highest Value)
- Feb: 399081.98
- Mar: 419319.79
- Apr: 399361.20
- May: 343229.69
- Jun: 468827.36
- Jul: 387597.85
- Aug: 296665.40 (Lowest Value)
- Sep: 340233.39
- Oct: 384742.47
- Nov: 331389.62
- Dec: 329229.60

Takeaway:
Lower Average Daily Rate for hotel rooms are responsible for far lower cancellations than the one higher ADR.

Countries with highest cancellations
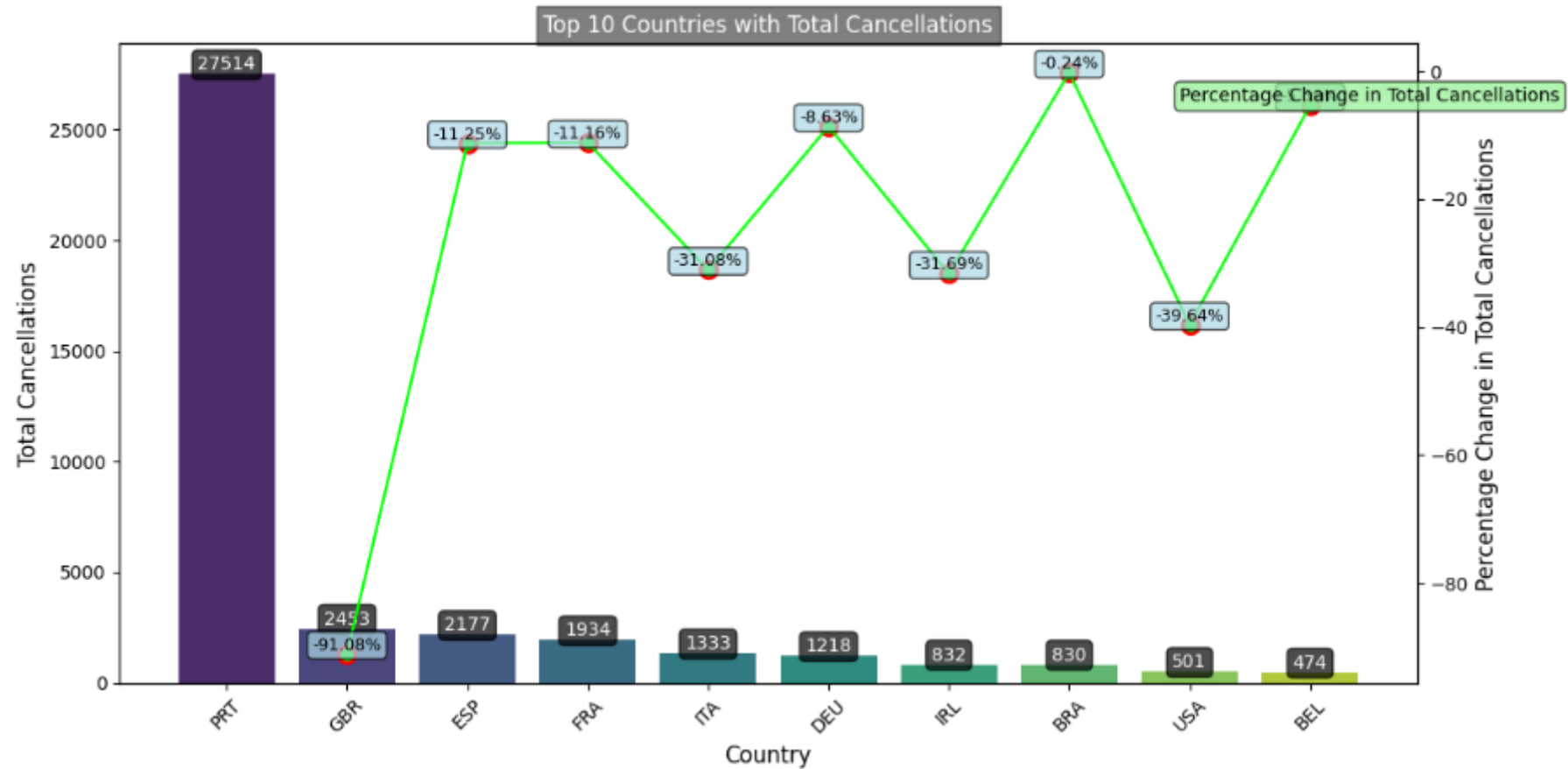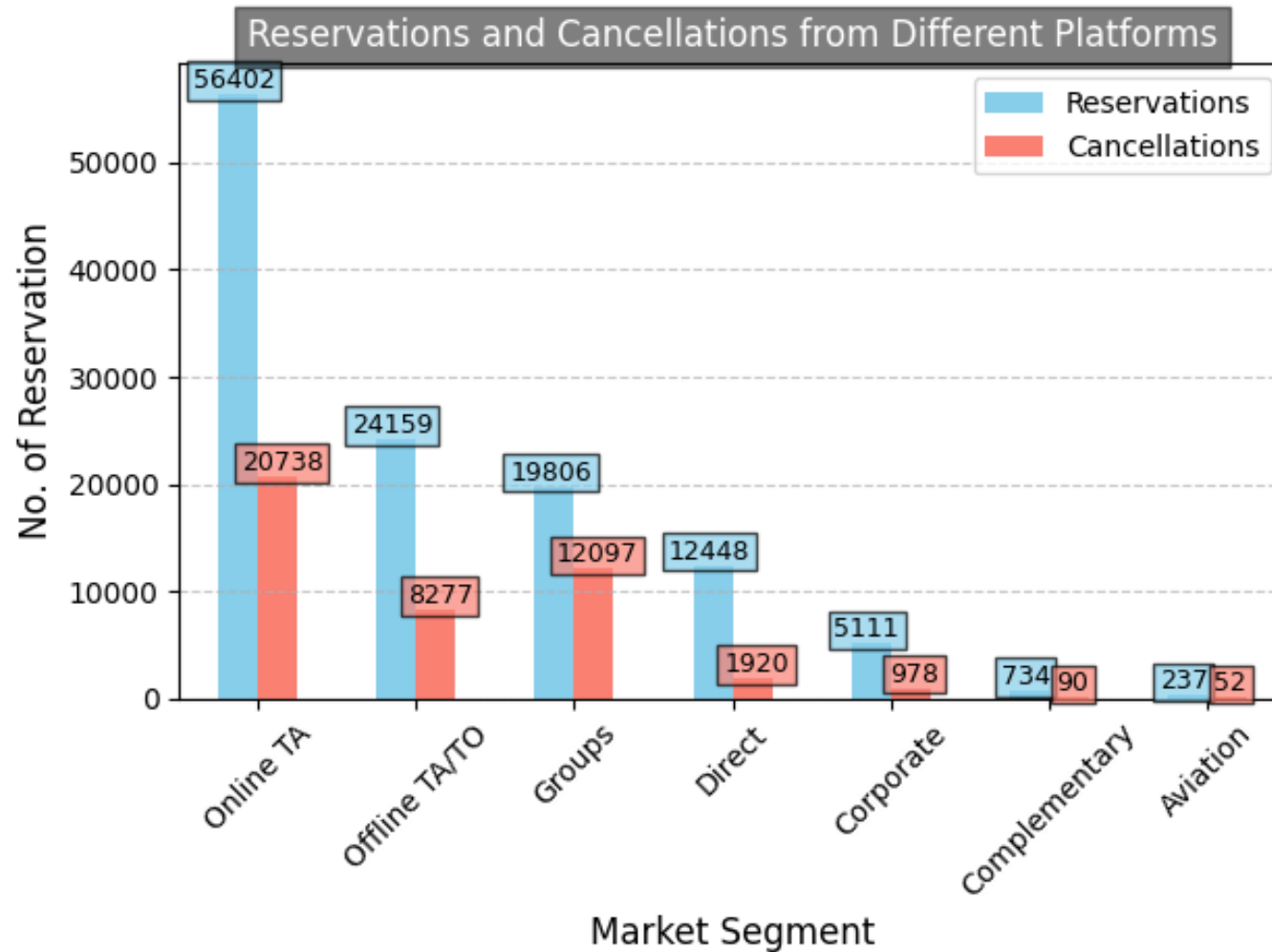

Takeaway:

Portugal has the highest number of cancellations.
The next country, GBR, is almost 90% lower than Portugal.

Reservation and Cancellations (by platform)

Here is the clustered column chart of the total number of reservations and cancellation from different platforms like direct, online, group etc.
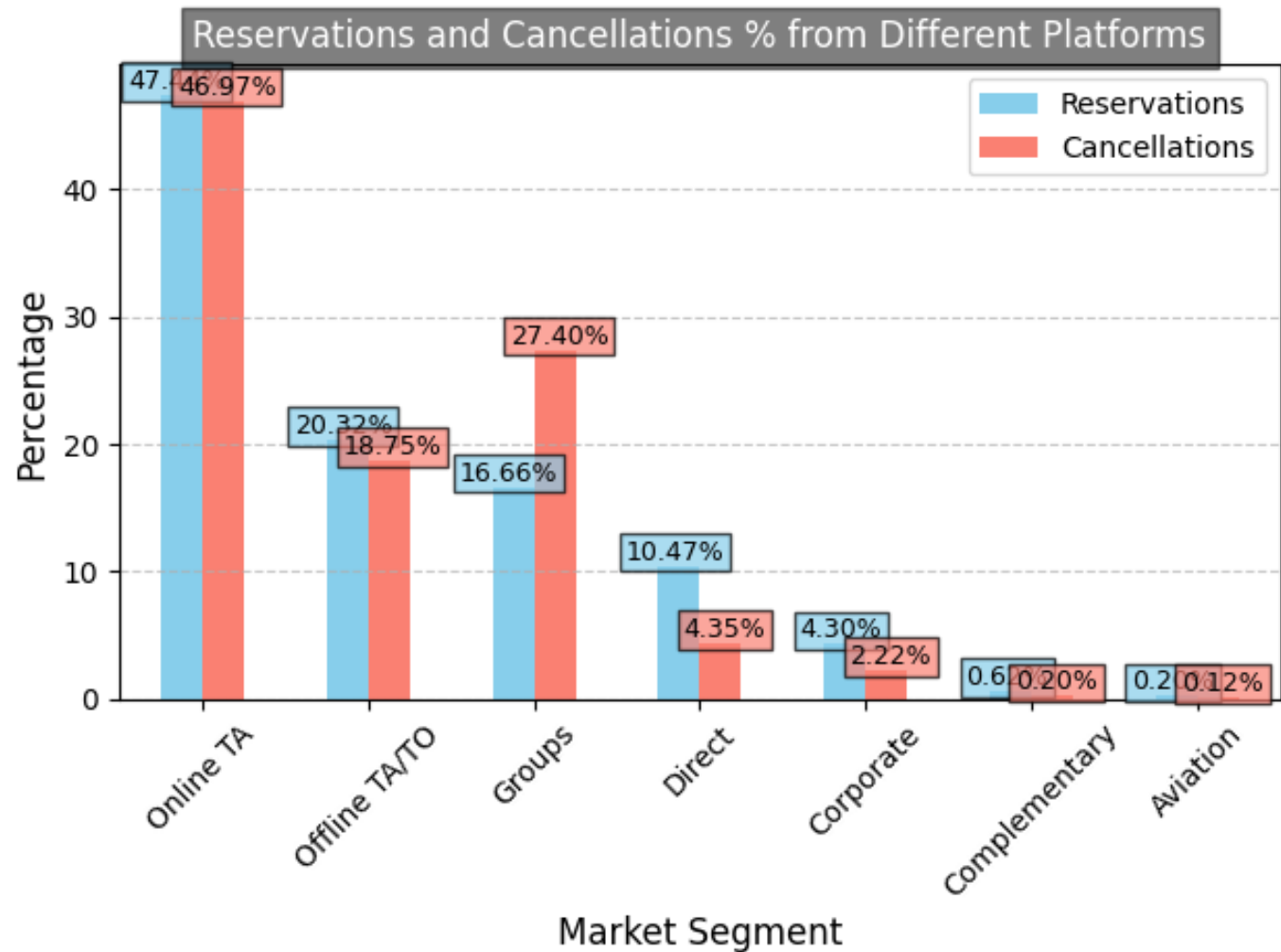
Online reservations outpace other modes of reservations by significant margin.

Reservation and Cancellations percentage (by platform)

Online travel agents make almost **47%** of the total reservations.

But, at the same, **online travel agents** also face the highest number of cancellations at **46.97%.**

We further investigate the mode of reservation with the lowest proportional cancellation.

Reservations and Cancellations % from Different Platforms

Legend: Reservations, Cancellations

- Online TA: 47.%(46.97%) / 46.97%
- Offline TA/TO: 20.32% / 18.75%
- Groups: 16.66% / 27.40%
- Direct: 10.47% / 4.35%
- Corporate: 4.30% / 2.22%
- Complementary: 0.6%(0.20%) / 0.20%
- Aviation: 0.2%(0.12%) / 0.12%

Y-axis: Percentage
X-axis: Market Segment

Direct Booking and **Complementary Booking** showcase the lowest number of cancellations, whereas **Group** and **Online** reservations see the highest number of cancellations by proportion.
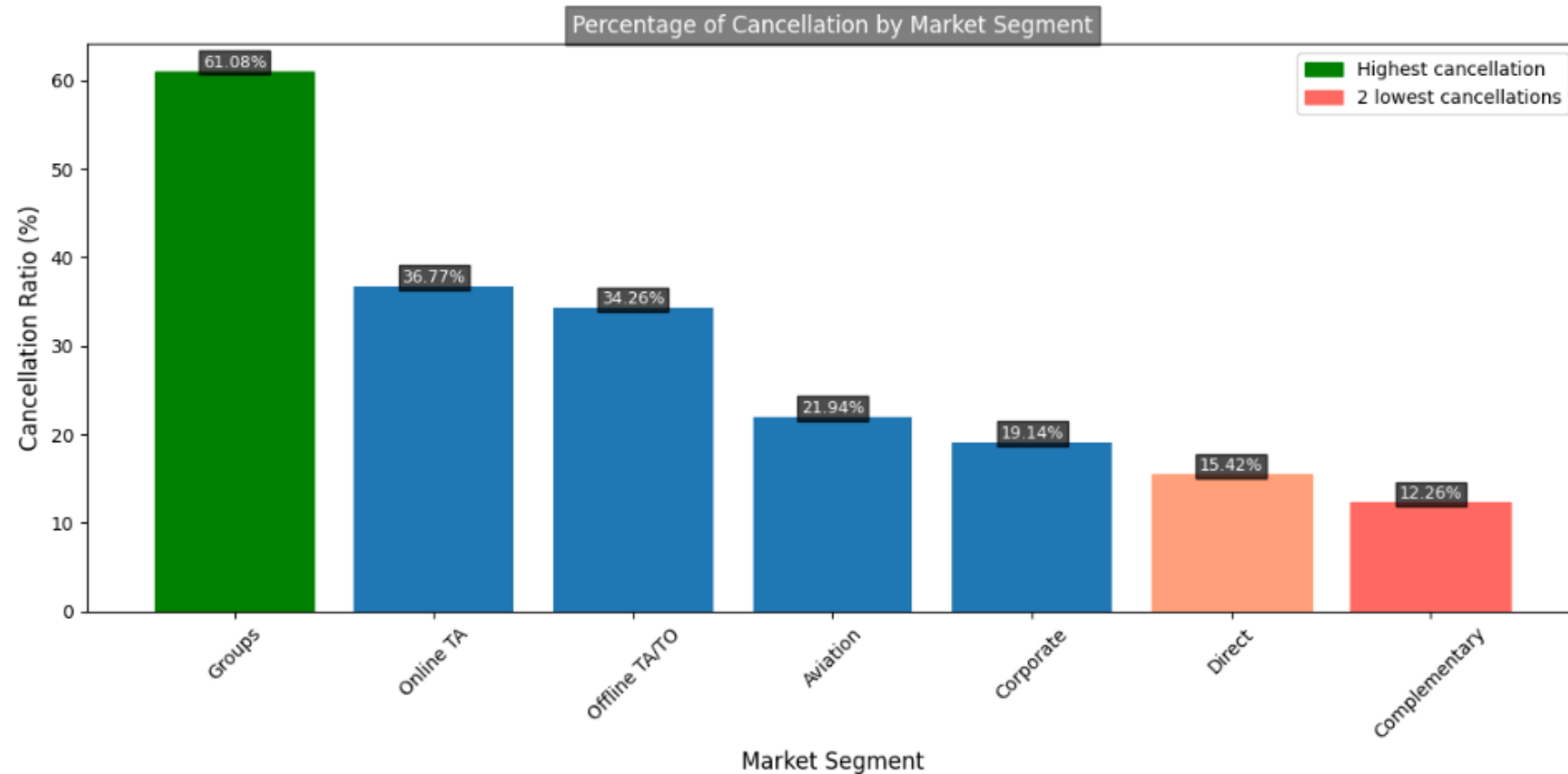
Takeaway:

Customer who book directly or ones who get complementary bookings are least likely to cancel their booking. This might be because the customer would have seen the rooms, leading to less queries about the interior and amenities of the hotel room.

Suggestions based upon Conclusions:

1. Cancellation is mostly **due to high prices** and Hotel cannot do without the higher pricing. Hence, to prevent cancellations without lowering prices, hotel may adopt the following strategies and schemes:

   A.   Keep the customer engaged, and excited about the stay in their hotels, by providing **live dashboard/countdown** or other **animation/gamification** related to their stay – **it would keep the customer wanting to get there.**

   B.   Offer small yet free **incentives** to the customer on a daily basis (if booked few days before) or weekly/monthly basis (if booked weeks before/month before) like coupon for a free snack, one time pool usage for the members, complementary drink. It would keep the customer interested in the hotel services.

   C.   Regularly provide **itinerary plans, tourist spots, food joints recommendation** to enrich the customers hotel stay.

2. As **January** sees the most cancellation which is accompanied by **highest ADRs**, hotel should consider **providing extra discounts** for the customers who are booking early for those months, to prevent them from cancelling their bookings due to competitive pricing of neighbouring hotels. Hotels can run **special marketing campaigns** for these months to lower cancellations and ensure net profit.

3. **Portugal** witnesses the highest number of cancelations in their hotels. Hotels in the region should focus on **improving the quantity and experience** of the hotel stay.

4. **Online booking** sees the second highest number of cancellations – Hotels should produce more **promotional videos**, **aesthetical photos**, and **customer testimony videos**, and regularly offer coupons to prevent customers from cancelling due to competitive pricing of other hotels.