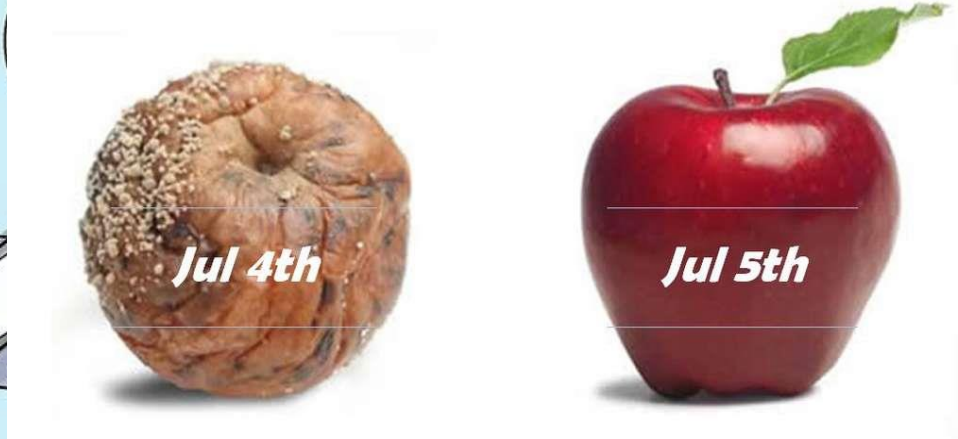


A polished brass nameplate and a hotel bell are placed on a dark wooden desk. The nameplate is rectangular with a slightly raised back and features the text 'HOTEL BOOKING ANALYSIS' in a large, bold, serif font, followed by 'by : Louisa Veronica' in a smaller, sans-serif font. The bell is a classic hotel bell with a rounded top and a small handle. The background is a blurred view of a hotel lobby with wooden paneling and a staircase.

# HOTEL BOOKING ANALYSIS

by : Louisa Veronica

# Business Background



Hotel sells "PERISHABLE INVENTORY"  
Today's rooms can't be sold again tomorrow



Maintain inventory to  
"MAXIMIZE PROFIT"



# How to Maximize Profit



## Keep Existing Customer

- Know customer preference and ensure guest satisfaction



## Add New Customer

- Targeted marketing – sell to right customer at the right price



## Maximize Efficiency

- Detect cancellation and replace with new booking



# Data Understanding



[Link to Kaggle Dataset](#)

- City Hotel in Lisbon and Resort Hotel in Algarve
- Check in date 1 July 2015 – 31 August 2017
- 32 columns, 119390 rows

**PORTUGAL**



A person wearing a dark suit and a white shirt is holding a torn piece of white paper with both hands. The paper has a jagged, torn edge on the left side and a spiral binding on the right side. The text on the paper is in a bold, black, sans-serif font.

**A SATISFIED  
CUSTOMER  
IS THE BEST  
BUSINESS  
STRATEGY  
OF ALL**

Know your Customer

# Know your Customer

## 01 REPEATER GUEST

- Only 3.63%
- Even smaller percentage for city hotel
- Single customer
- From corporate
- Lowest room category
- Lower ADR

is **BUSINESS TRAVELLER**

## 02 NEW GUEST

- City hotel > Resort hotel
- Mostly couple
- From Online Travel Agent
- Lowest room category





Know your Cancellation

efficiency

A hand holding a blue pen with a white arrow pointing upwards and to the right, symbolizing growth or progress. The background is dark blue.

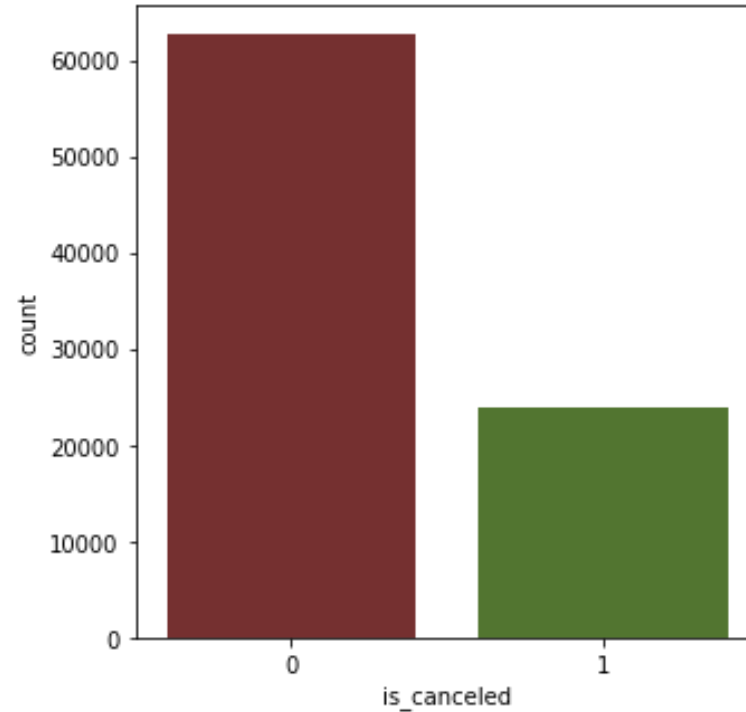
# Why Does Cancellation Matter?



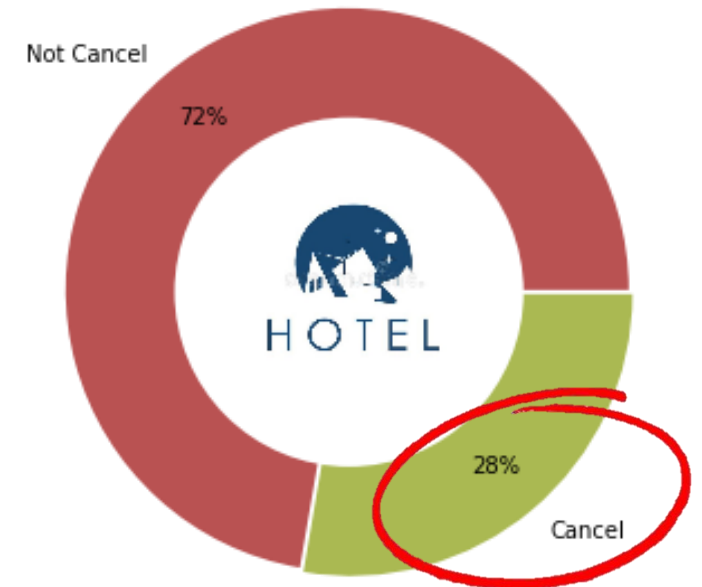
From total data,  
28% is canceled  
booking

## Hotel Cancellation

Count Plot



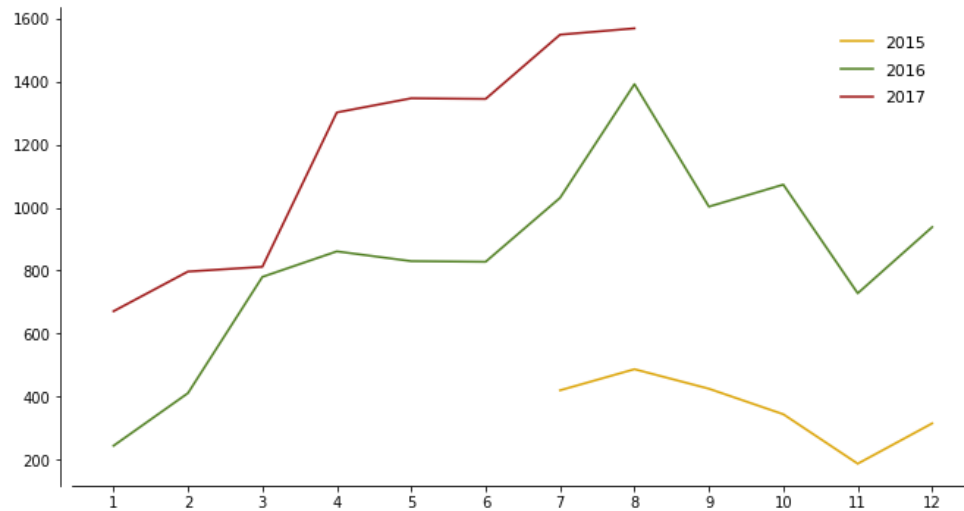
Pie Chart





# Why Does Cancellation Matter?

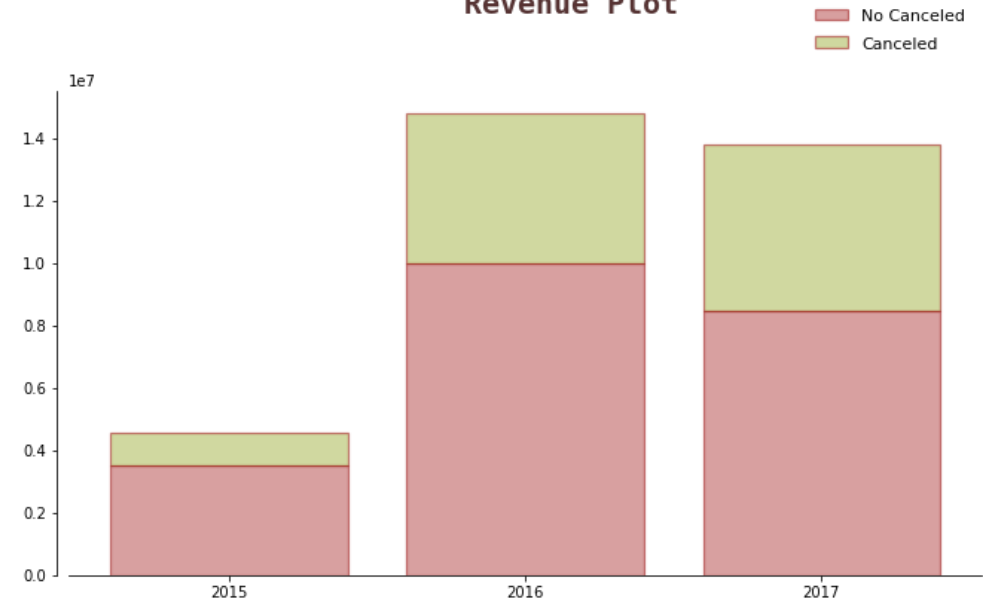
Monthly Cancellation by Year



01

Cancellation increases over the year

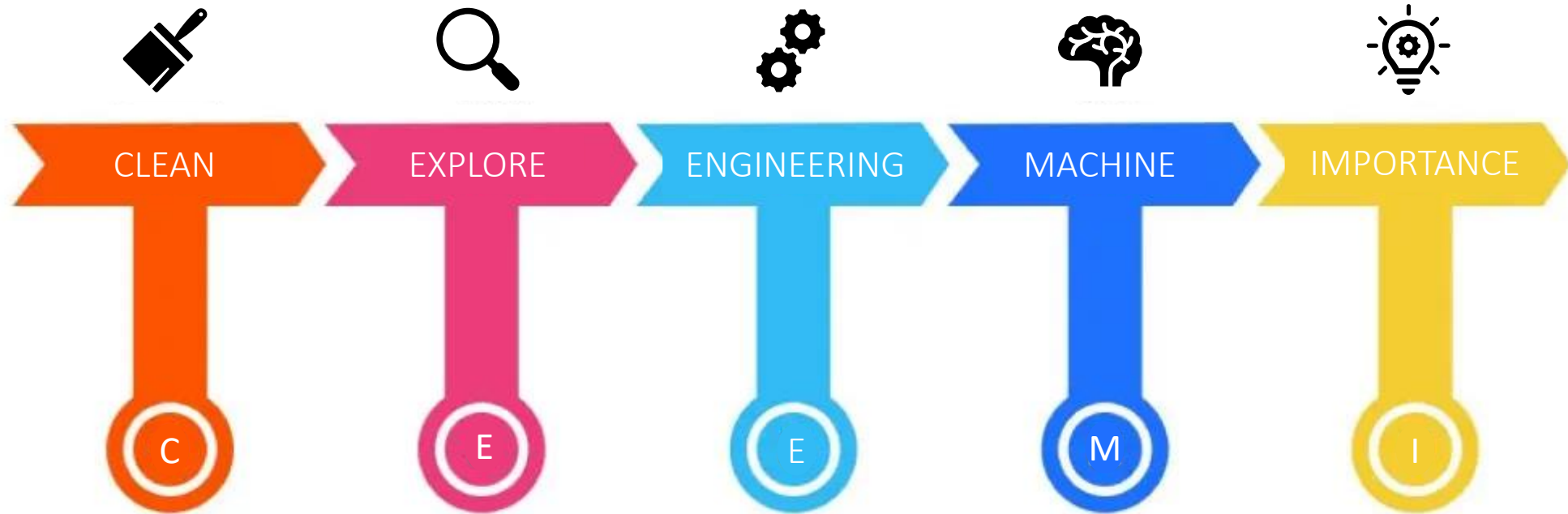
Revenue Plot



02

Loss in revenue increases over the year

# Workflow



Handling  
Missing Value  
and Duplicate

Statistical  
Summary,  
Univariate &  
Bivariate Analysis

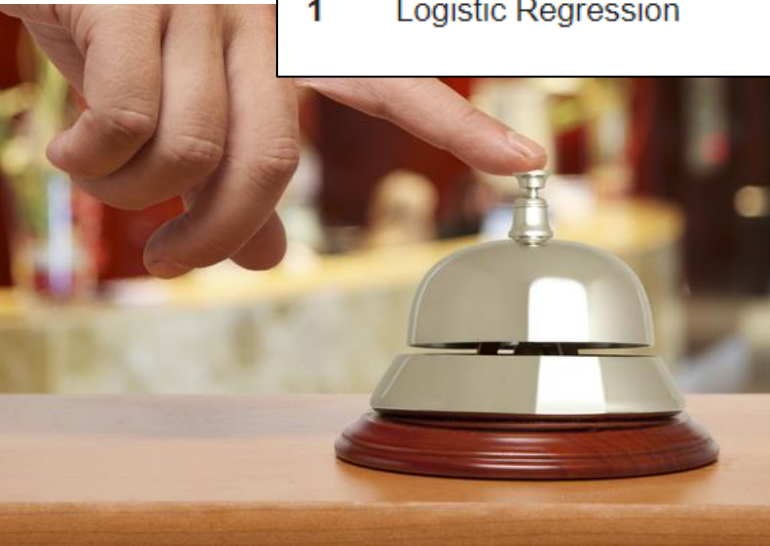
Log  
Transformation,  
Standard Scaler,  
Handling Outlier,  
Encoding,  
Feature Selection

Modelling (XGBoost,  
Random Forest, K-  
Nearest Neighbor,  
Logistic Regression),  
Data Balancing,  
Hyperparameter  
Tuning

Partial  
Dependence  
Plot

# Cancellation Model

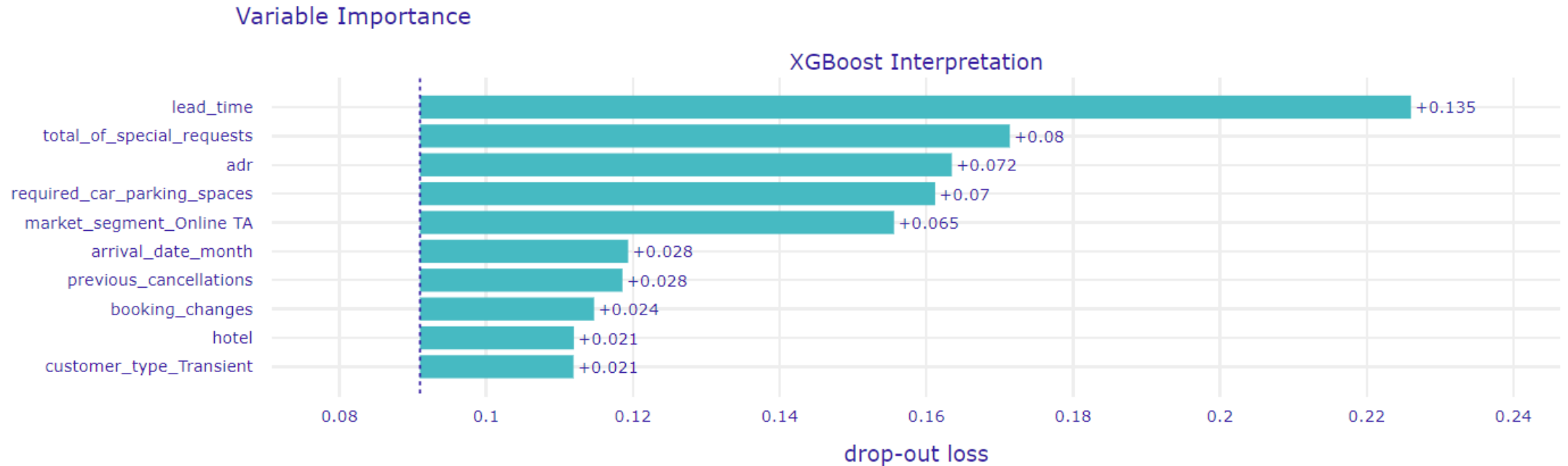
Model Performance Tuning						
	Model	Parameter	Accuracy	Precision	Recall	F1
0	XGBoost	{'max_depth': 10, 'n_estimators': 100}	75.16%	54.49%	75.79%	63.40%
2	Random Forest	{'max_depth': 70, 'n_estimators': 500}	74.78%	54.04%	74.80%	62.75%
3	K-Nearest Neighbours	{'metric': 'manhattan', 'n_neighbors': 20, 'weights': 'distance'}	70.41%	48.63%	75.03%	59.01%
1	Logistic Regression	{'C': 11.288378916846883, 'penalty': 'l2'}	70.09%	48.27%	74.60%	58.62%



XGBoost is the BEST model to  
predict cancellation

Key Metric : Recall and F1

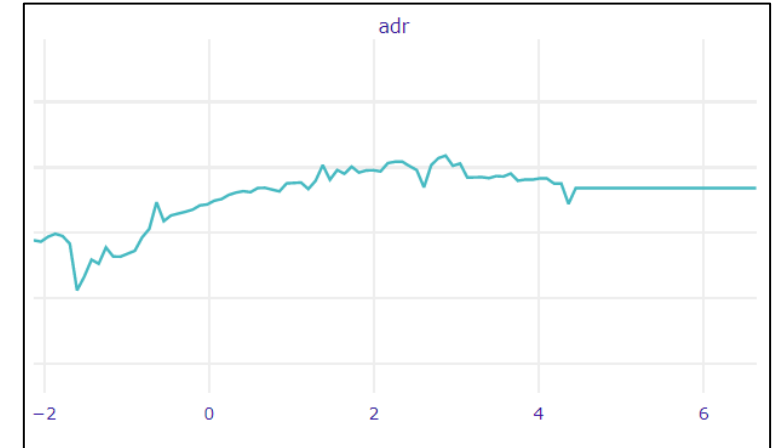
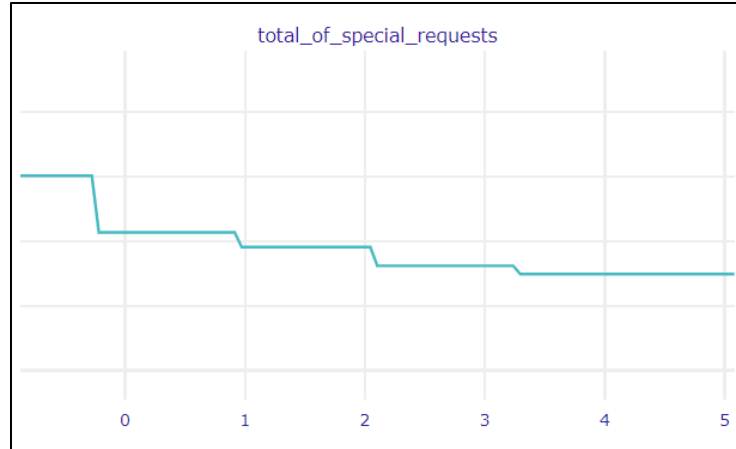
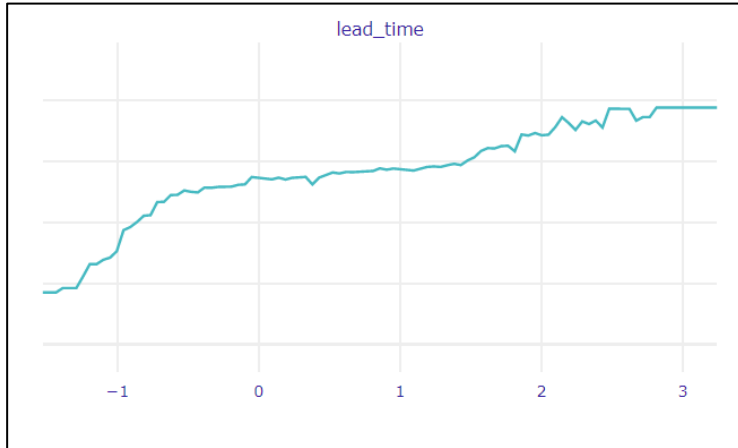
# Variable Importance



Lead time is the most importance feature,  
followed by total of special request and ADR



# Variable Importance



**Higher lead time means  
higher cancellation**

Guests who book far from  
check-in date are more likely to  
cancel



**Many special request means  
lower cancellation**

Guests who make request are  
serious about the booking and  
less likely to cancel

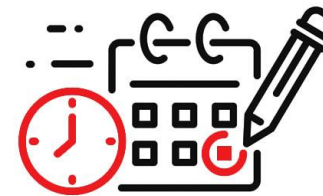


**Higher ADR means  
higher cancellation**

Guests tend to book at higher  
rate, but can be canceled with  
flexibility

Replace Cancellation





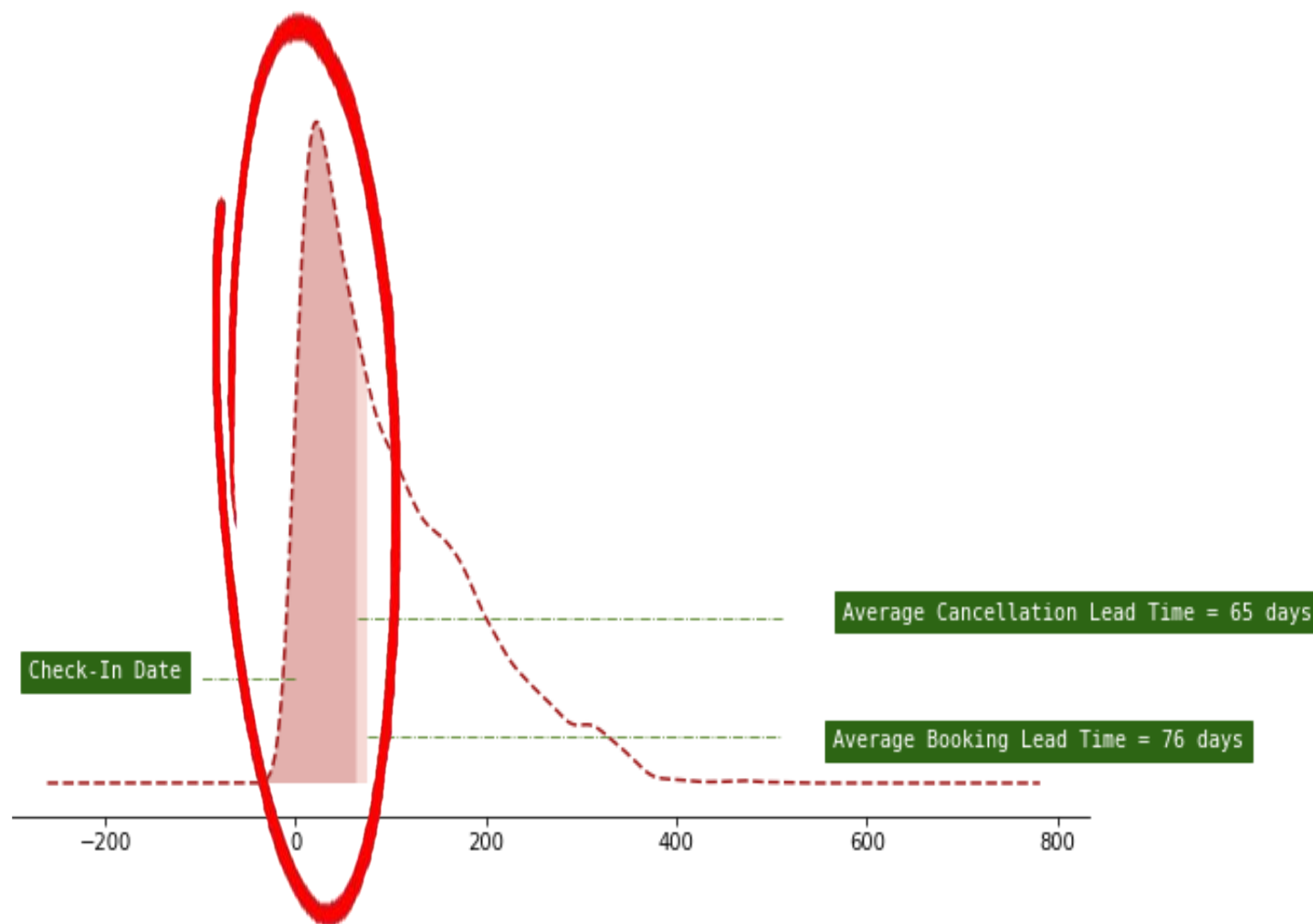
## MAKE YOUR RESERVATION

Guests reserve within 76 days before check-in



## CANCEL YOUR RESERVATION

Guests cancel within 65 days before check-in



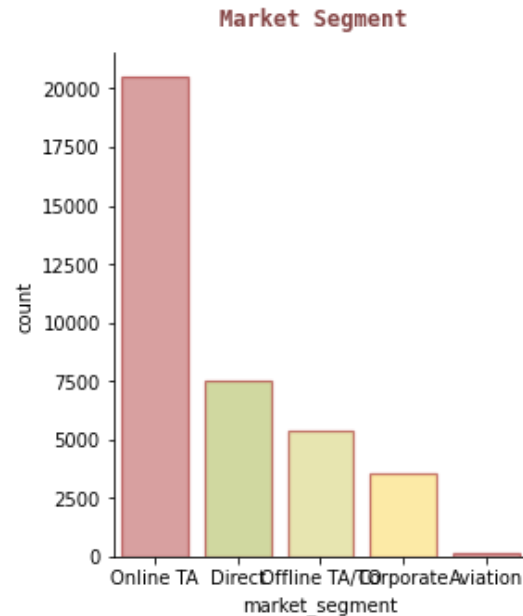
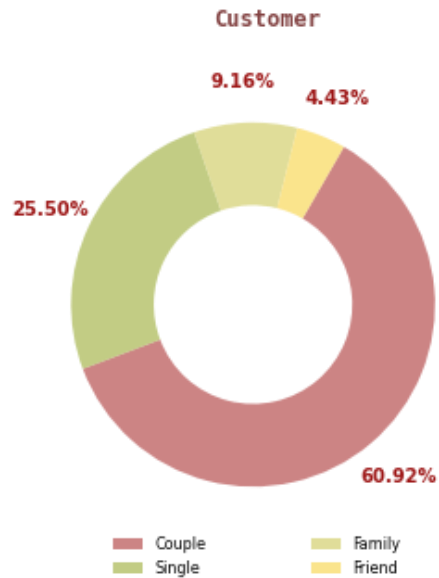
# Lead Time

Hotel has to find booking replacement within  
65 days before check-in date



Who are These Guests?





## Marketing Campaign:

- Couple getaway
- Romantic holiday
- Honeymoon

Targeted Flash Promotion through  
Online TA for Portugal, Spain, or  
European Market only

Special promotional rate  
/ cashback / commission  
to selected agent only  
(based on seasonality)

# Targeted Customer to Replace Cancellation



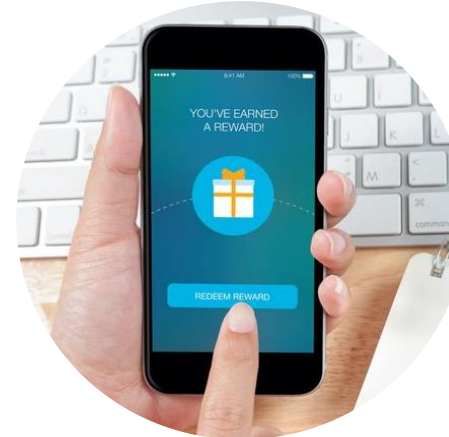
Recommendation

# Recommendation - Keep Existing Customer

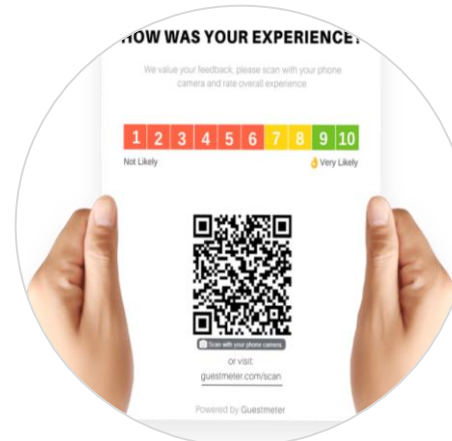
Recap  
guest complaint



Membership  
program



Send guest survey  
upon check-out



VIP recognition





# Recommendation - Add New Customer



- Increase brand awareness for Resort Hotel
- Shift booking to direct booking
- Reduce price gap for lower and higher room category





# Recommendation – Maximize Efficiency



**Strict  
Cancellation Policies**

More stringent  
cancellation policy



**WHAT?  
NO REFUND?**

Non refundable booking  
with advance purchase  
discount



[Link to Script](#)

