

Smith Hotels 

Executive Summary

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Introduction

A hotel chain “Smith Hotels” with the properties including full-service hotels and resorts is considering whether to push a newly built app to its customers.

I have analyzed the data from a live test to determine the effectiveness of a new mobile app that has been built by the organization. We have got an deeper understanding of the impact that the mobile app will have on customers' purchase behaviour.

The following questions were answered after the analysis:

- Will the app lead to increased spending on the part of customers?
- How much of an increase in spending do you expect?
- Do you expect the app's effect on spending to vary by customers' characteristics?

The Experiment

- The experiment followed **Before-After design approach**.
- To determine the app's efficacy, the organization ran a live test with a beta version of app.
- A subset of customers who had been enrolled in the loyalty program run by the hotel chain for at least 1 year was **selected at random** and assigned to one of two groups- **Control & Treatment**.

Control Group

- Number of Customers: 2,000
- **Before:** spending behaviour of all customers in the control group was recorded for 1 year.
- **Treatment:** No changes were introduced to the control group.
- **After:** The control group was tracked for another year, and their spending behaviours was recorded.

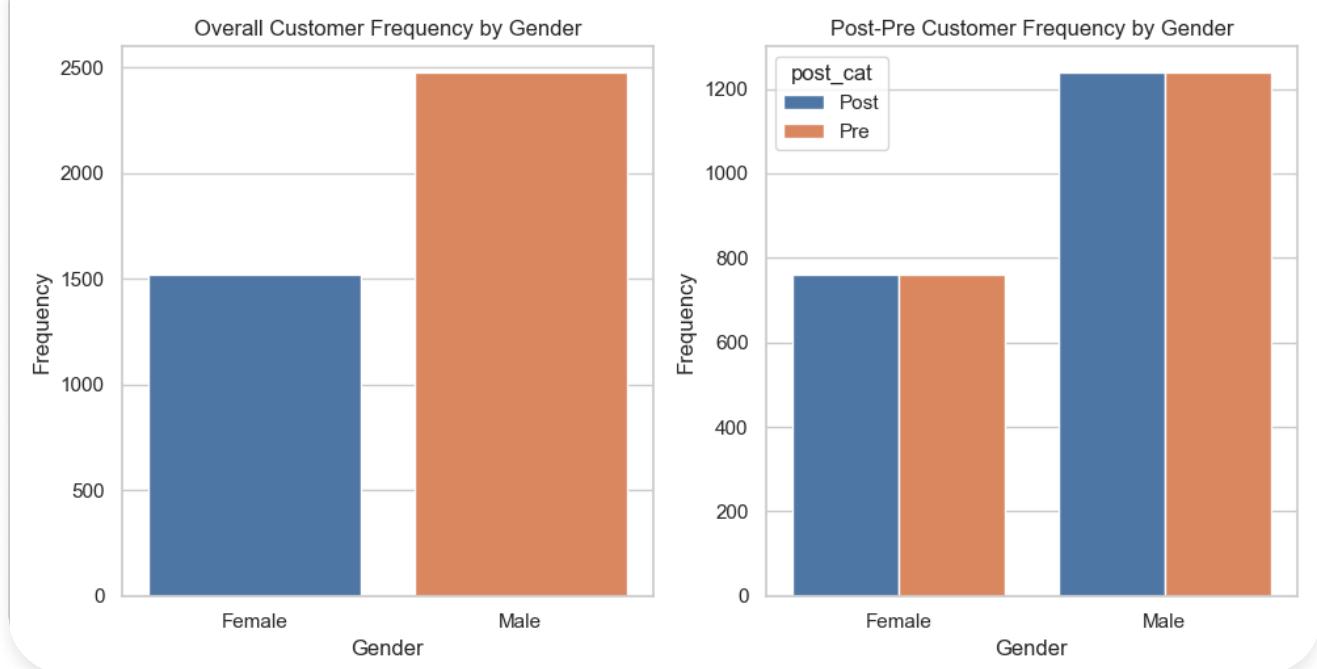
Treatment Group

- Number of Customers: 2,000
- **Before:** the spending behaviour of all the customers in the treatment group was recorded for one year.
- **Treatment:** A mail was sent to all the customers in the treatment group with a link to download the beta version of the app.
- **After:** The control group was tracked for another year, and their spending behaviours was recorded.

Customer Characteristics (Gender)

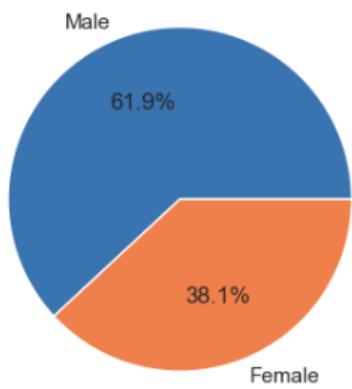
- Total of 4,000 customers are included in the experiment, which then were divided into two groups (Control (2,000) & Treatment (2,000)).
- Frequency of males is much more than females.
 - 2476 males, 1524 females.

Gender Frequency in Experiment.

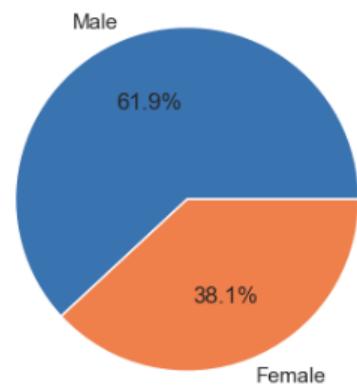
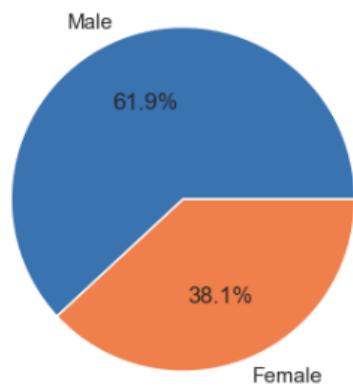


Gender Percentage in All Stages.

Gender percentage in overall data.

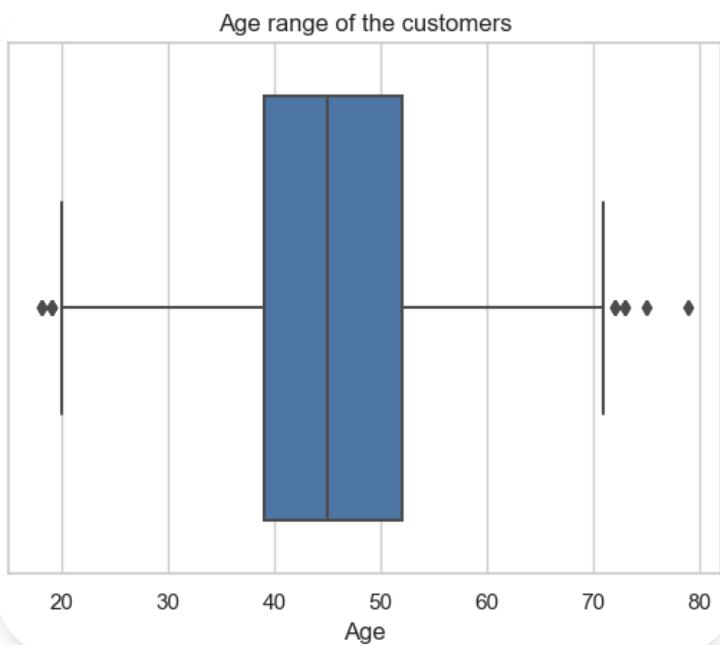


Gender percentage in pre download stage. Gender percentage in post download stage.

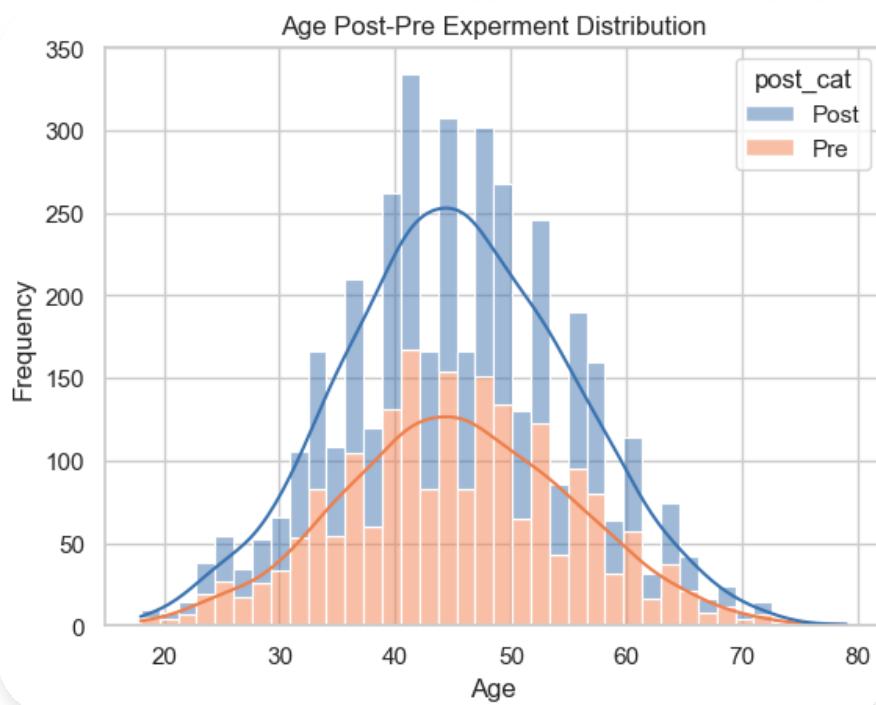


Customer Characteristics (Age)

- The customers age range is from 20 to 71 year old.
- Median age is 45.
- There are outliers in the data. There are small number of customer aged below 20 and above 72.

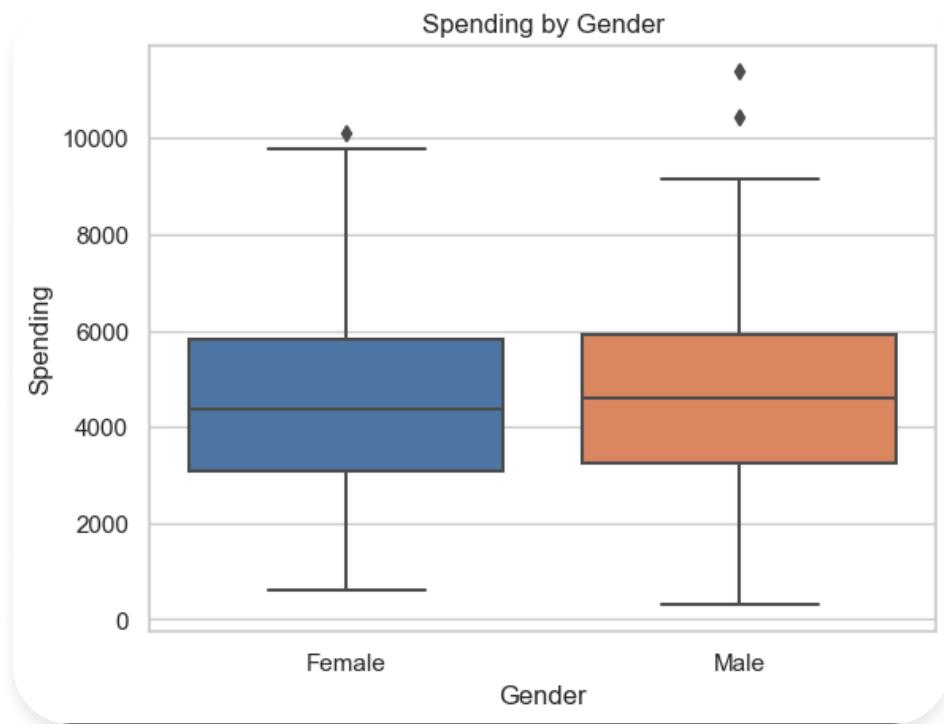


- The age is almost symmetrical

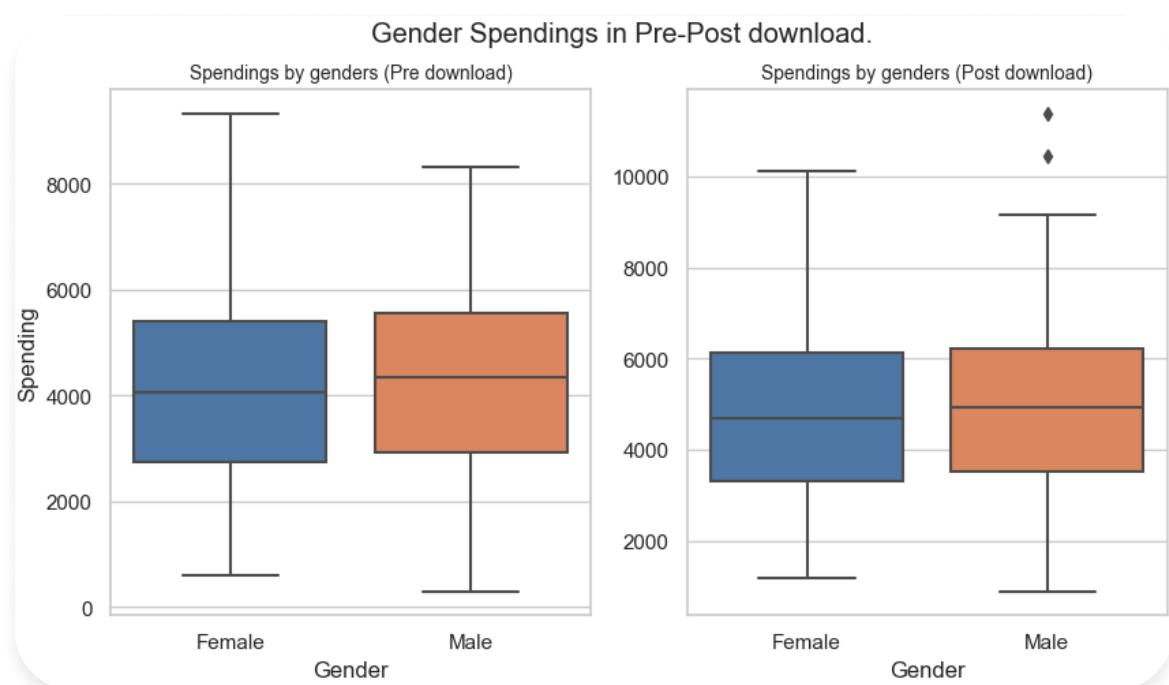


Purchase Behaviour of Customer.

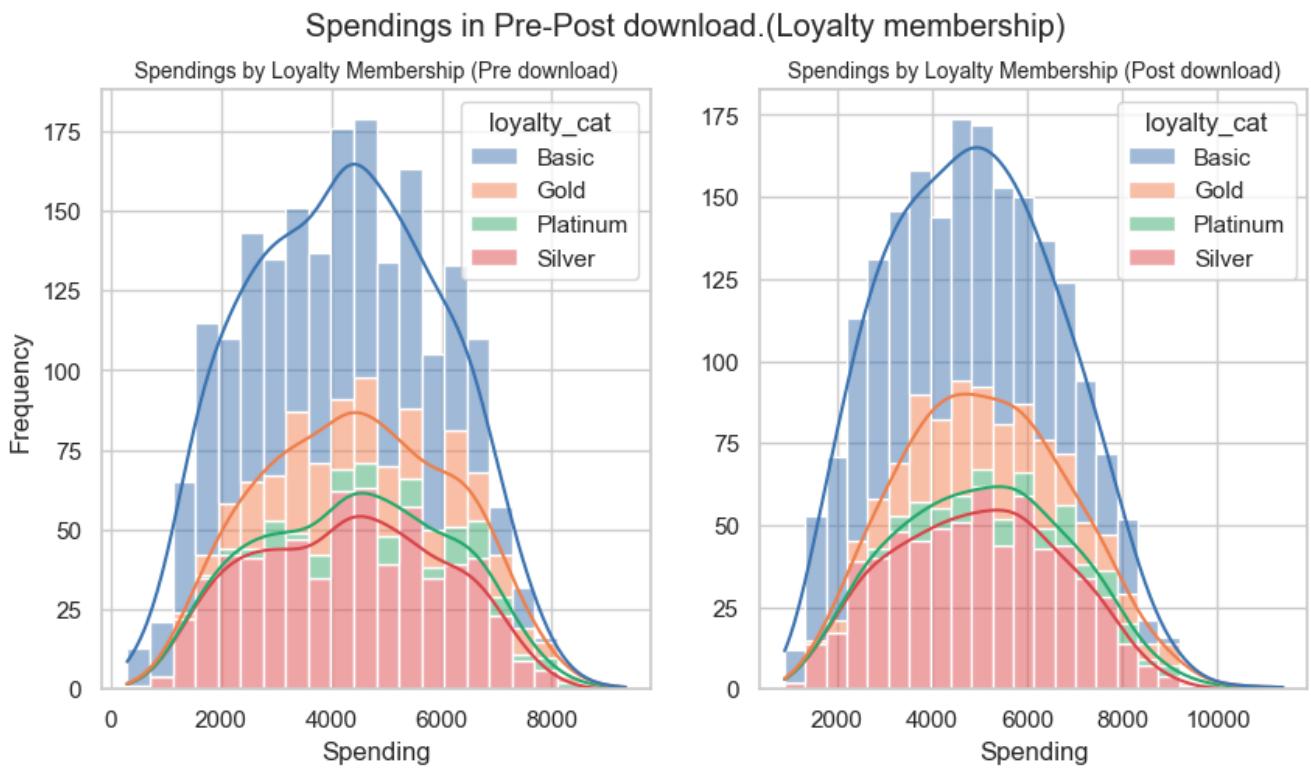
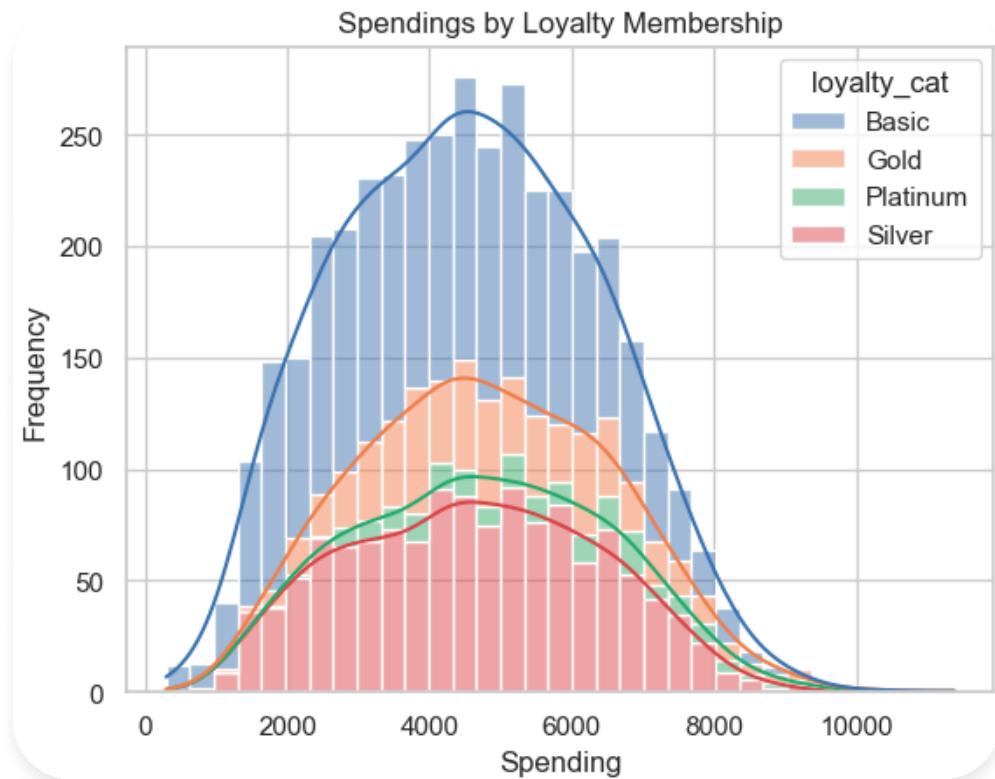
- Males have higher mean in spending but females have higher range of spending.



- Post download period have higher spending range and almost high mean than the pre download.



- Basic tier of loyalty membership has highest frequency of spending.

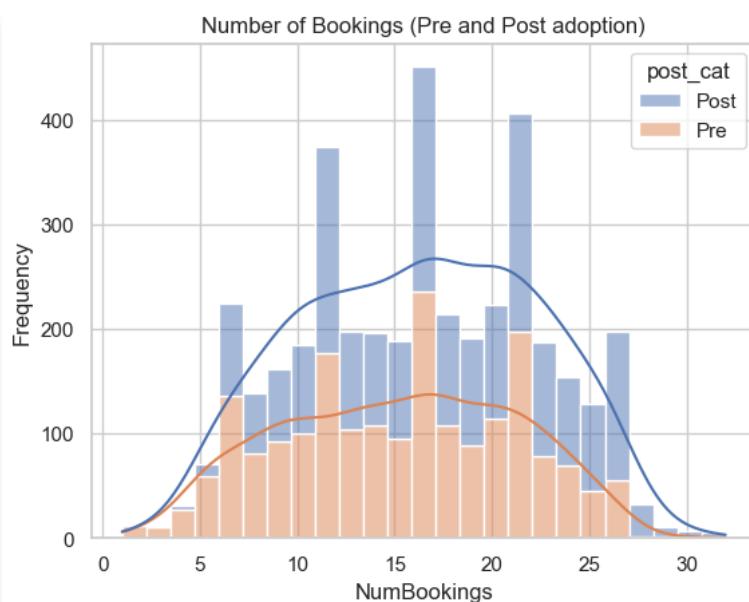


Analysis of Number of Bookings

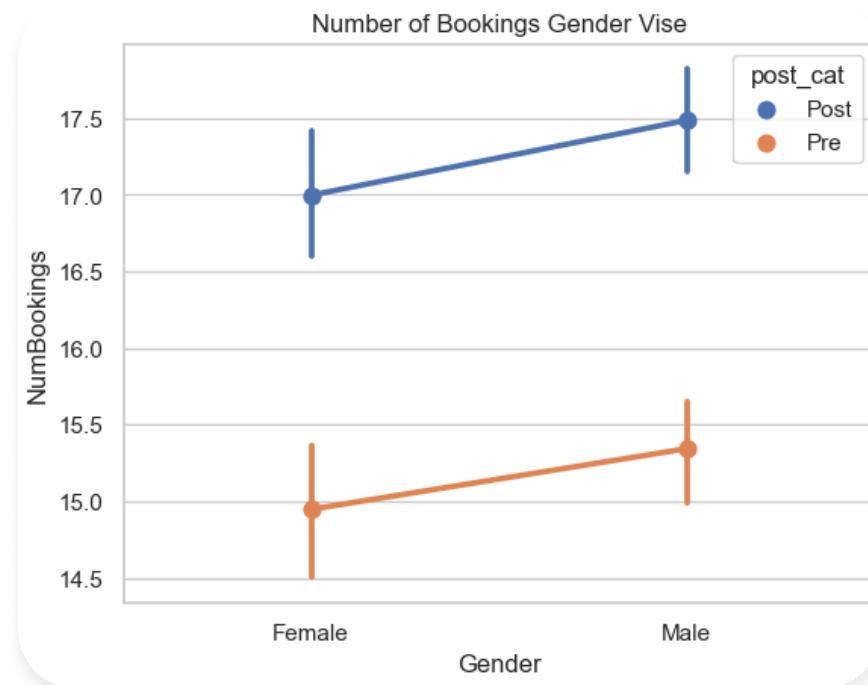
- Spendings is highly co-related with Number of bookings.



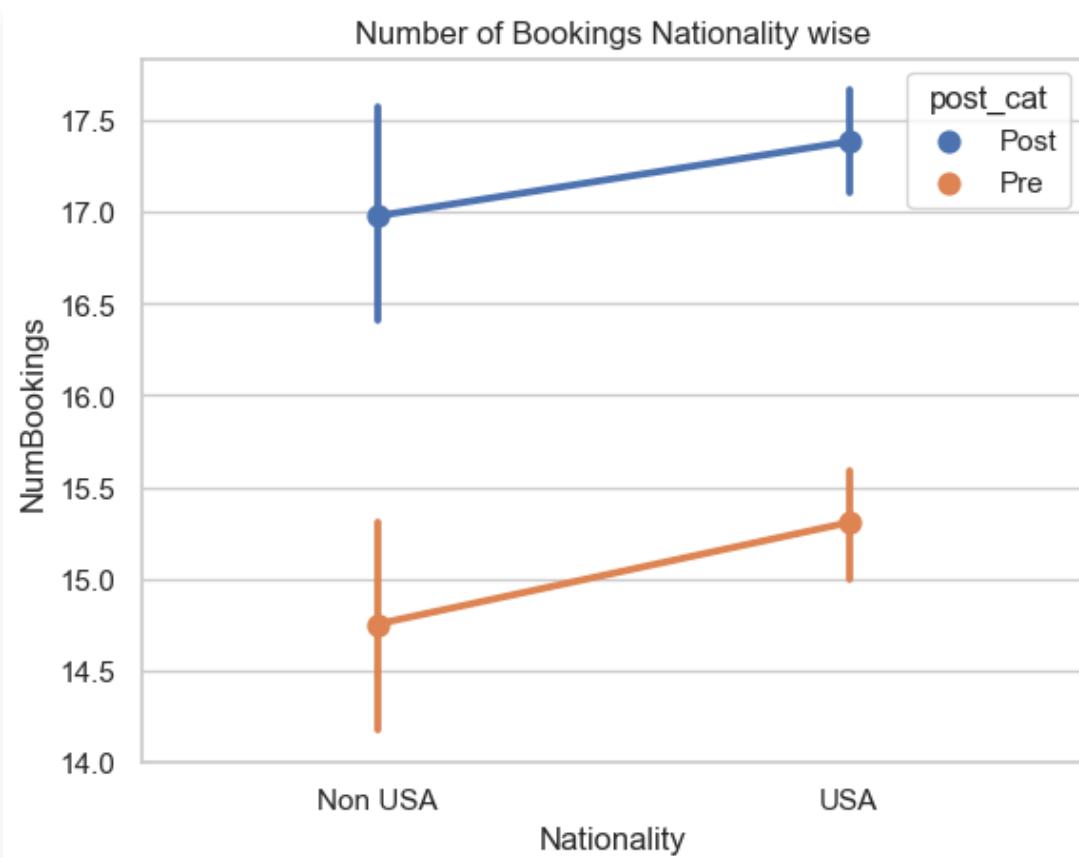
- Number of bookings increased in Post download stage.



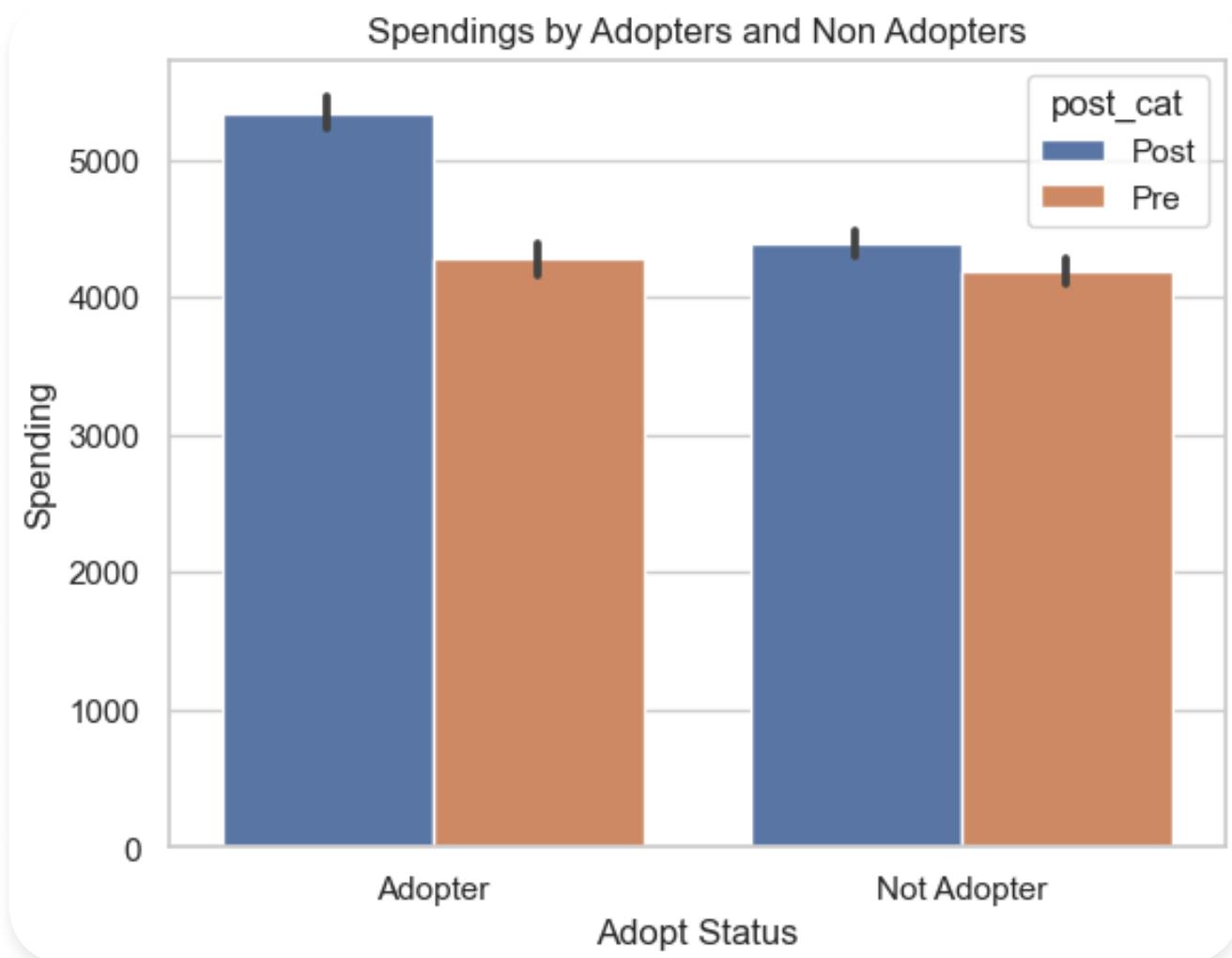
- Number of bookings saw a upward surge in Post download stage in both genders.



- Customers from USA has more number of bookings than Non-usa countries.



- New app Adopters have increased number of spendings.



Correlation of features

Correlation of the features of the Experiment.



- Spending, Number of bookings, and Tenure are highly correlated to each other.

Hypothesis Testing

a. Hypothesis of the After only approach.

- Determine where there is a statistically significant difference between the avg spending of men and women.
- The significance level is 5%. Confidence interval is 95%.
- The difference in effect of customer adoption of app on their spending with hotel chain denoted by μ_d

$$H_0 : \mu_d = 0$$

$$H_a : \mu_d \neq 0$$

T-test	
T	12.193523
dof	1998
alternative	two-sided
p-val	0.0
CI95%	[795.5, 1100.43]
cohen-d	0.545311
BF10	4.544e+29
power	1.0

- The p-value is less than 0.05.
- We reject the null hypothesis that there is no difference in treatment effect of customers' adoption of the app on their spending with the hotel chain.

Hypothesis Testing

b. Hypothesis of the Before-After approach.

- Determine where there is a statistically significant difference between the avg spending of men and women.
- The significance level is 5%. Confidence interval is 95%.
- The difference in effect of customer adoption of app on their spending with hotel chain denoted by μ_d

$$H_0 : \mu_d = 0$$

$$H_a : \mu_d \neq 0$$

- The p-value is less than 0.05.
- We reject the null hypothesis that there is no difference in treatment effect of customers' adoption of the app on their spending with the hotel chain.

The difference between Post and Pre stage spending.

```
[181] post_mean_diff - pre_mean_diff
```

```
[181] 861.1210000000001
```

T-test	
T	-11.364886
dof	3998
alternative	two-sided
p-val	0.0
CI95%	[-738.86, -521.44]
cohen-d	0.359389
BF10	1.156e+26
power	1.0

- The difference of spending between Post and Pre stage is \$861.12

Conclusion

- Spendings, Tenure, and Number of Bookings are highly correlated.
- USA has more number of bookings than Non USA customers.
- There is larger difference between Post and Pre download stage. (Post has \$861.12 more than Pre stage.)
- Males have higher spending average but women have higher range of spending.

The New app can be considered succesfull based on the results of hypothesis performed on the business experiment.

It is safe and profitable to roll out the new app for all the customers of Smith Hotels.