

IST 687 PROJECT IMPLEMENTATION REPORT

Net Promoter Score (NPS) Analysis



INTRODUCTION

The purpose of this project is to analyze Hyatt Hotel data and to provide reliable solution to the hotel representatives to improve the Net Promoter Score (NPS). NPS score provides information about the customer experience. The data set contained NPS score of multiple hotels in various locations across the world.

The NPS score is categorized into three parts: Promoters, Detractors and Passives

- Promoters are the customers who have provided rating in the range of 9-10 and are loyal enthusiasts who will always visit the hotel and refer the same to others
- Detractors are the customers who have given low rating which is in the range of 0-6. These are the customers who are unsatisfied with the service provided by the hotel and are most likely to not visit the hotel again
- Passives are the customers who have given the rating which is in the range of 7-8. These are the customers who may or may not be satisfied by the services provided by the hotel

Background

The data set provided by the professor consisted of 12 months of data which consisted from Feb 2014 to Jan 2015. We have done the analysis in two phases: One-month survey dataset analysis and a year survey data analysis. We did the entire year analysis to get a distinct perspective of the data and to contrast the insights we derive from one-month (December) dataset. Our group consisted of four people and our team meetings would revolve around topics which covered questions varying from which factors to be considered to the different models we can use for the project. The first step in our project was to determine the questions that needed to be answered to meet the organization's requirement. Work was divided among team members such that everyone tackled 2-3 business questions to deal with the problems. Once everyone was done with their analysis, the team met regularly to discuss and solve various other questions related to each other's analysis. Once the final data set was finalized which consisted of the desired variables, the next step was to determine different ways to visualize the data. The graphs and plots included various plots varied from maps, bar plots, histogram to have a better understanding of the data.

World Vs California

"More the survey response for any region of service, more the usage and hence more attention have to be diverted to it". When we picked up the December 2014 survey data set, we saw that about 90% of the surveys were from North America, California had received 15% of it making it the state or region which received the highest survey responses.

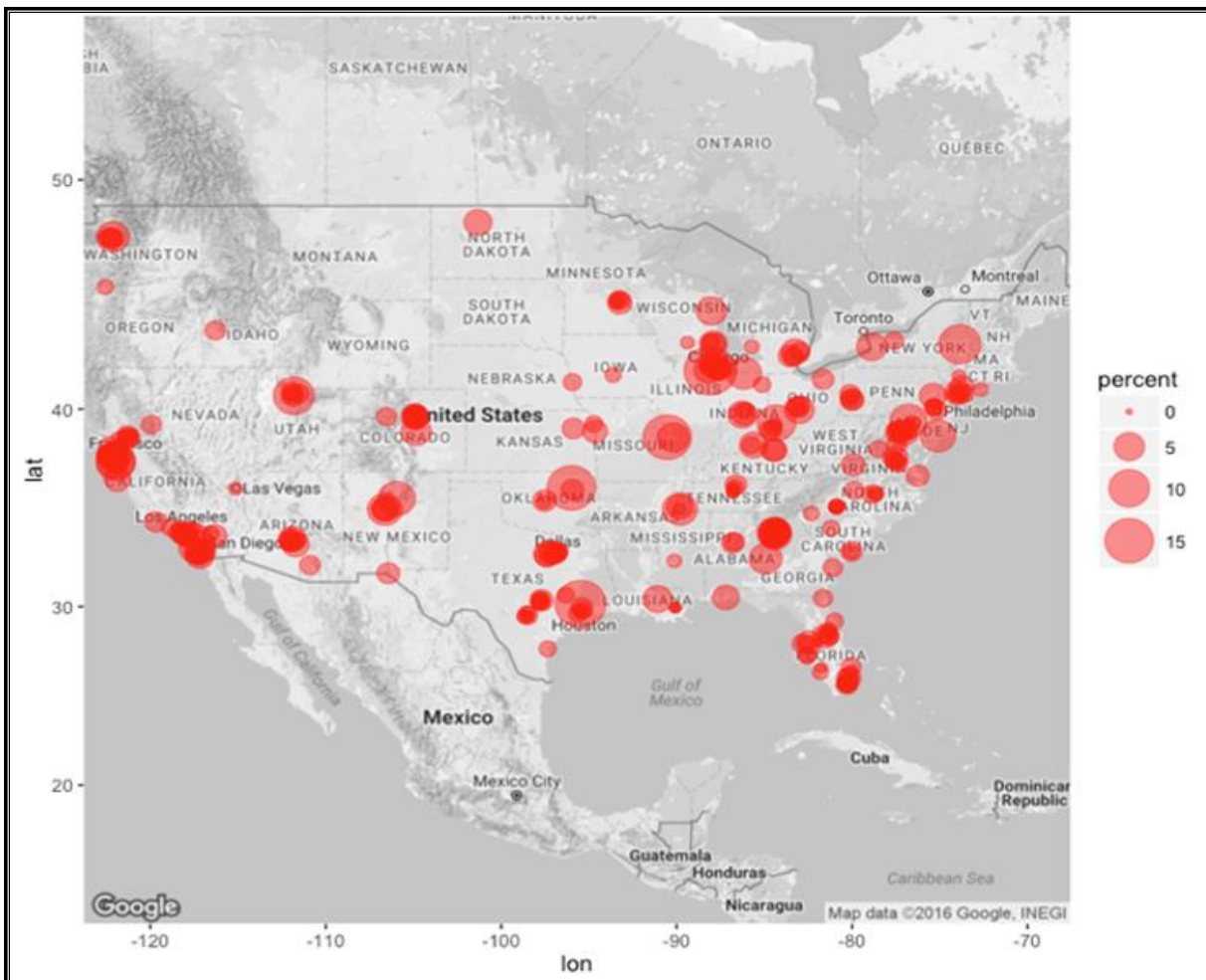
Also, we assumed that guests tend to provide more feedback when something went wrong. Hence, we believe that due to high volume of surveys responses for California state, we need to pivot our data analysis around California instead of the generalizing the analysis. This will also give us an opportunity to gain better insights from the analysis we make.

PART 1: One-month Survey Data Analysis (Dec 2014)

Identifying the month of the year to be analyzed

- The month of December is the holiday season in the United States.
- Also, the month of December is the shopping period where people travel and shop at different places within the country.
- The month of December is also considered to be the time when hotels welcome maximum business and tourists travelers.
- Hence, we selected the month of December from the data set as we believed this data set would provide us key insights and detailed description of various types of customers visiting the Hyatt Hotels.

Identifying the location to be analyzed



Results:

- The size of each dot on the map represents the arrival of customers in the month of December.
- Larger the size of the red dot, more the number of customers have visited that area

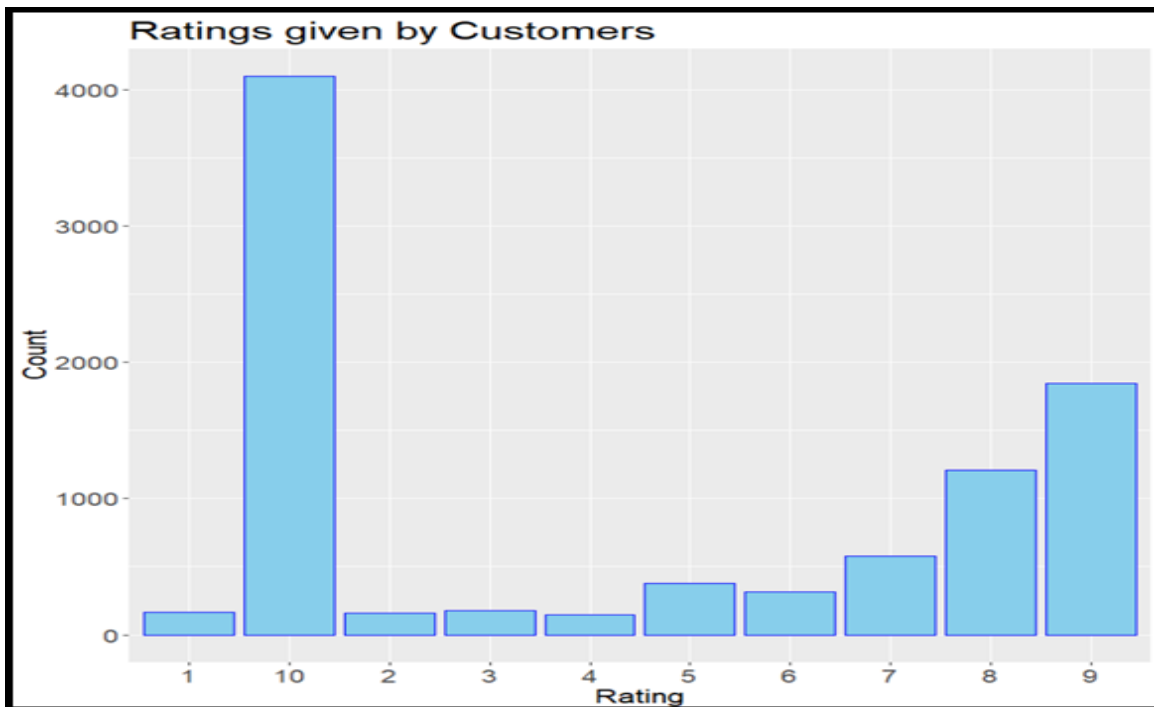
- From the graph above, it is observed that the density of the dark red dots is more in the state of California
- This states that more customers are visiting the state of California in the month of December for either leisure or business purposes
- Due to the above observations, we decided to choose the state of California for the Hyatt Hotel Net Promoter Score Analysis

Analyzing which state has the maximum number of guests from different state

Result and Interpretations

- From the plot below, it is seen that the number of people visiting the state of California is more as compared to any other state in the country
- This indicates that people across the country are more interested in visiting California as compared to any other state in the country
- People visiting the state may visit for different purposes which may vary for business, leisure or leisure and business purposes
- As people are travelling with various state to visit California, the hotels in the state should be well equipped with various facilities that could satisfy the needs of varied customers

Number of Promoters, Detractors and Passive customers in the State of California



Results

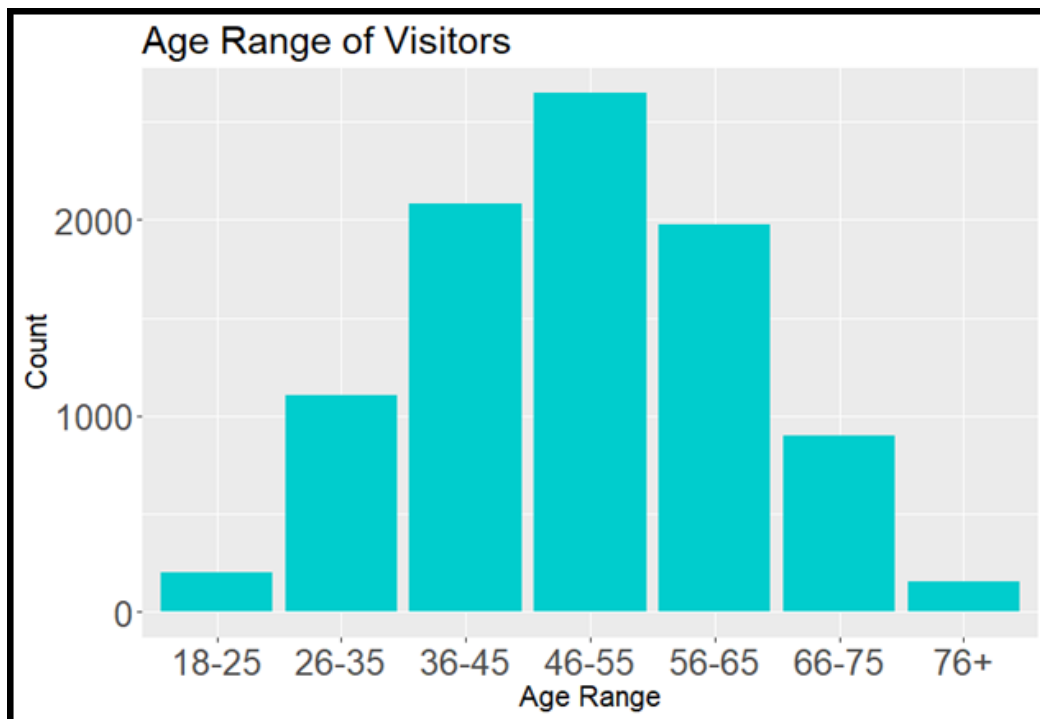
- Promoters are the customers who have rated the overall services of the hotel in the range of 9-10. From the above plot it is seen that the people who have rated the services from 9-10 account for 69% of the total customers

- Our aim is to value these customers and make sure that the promoters stay as promoters and maintain the NPS of the hotel
- Detractors are the customers who have rated the overall services of the hotel in the range of 0-6. From the above plot it is seen that the people who have rated the services from 0-6 account for 12% of the total customers
- To improve the NPS, it is important to target these customers by satisfying their needs or improving the facilities they require. Our aim is to make sure that the detractors become promoters or passive customers which will improve the overall NPS score
- Passive customers are those who have rated the overall services of the hotel in the range of 7-8. From the above plot it is seen that the people who have rated the services from 7-8 account for 19% of the total customers
- Our aim is to make sure that the passive customers become promoters and not detractors. This would help in the overall increase of the Net Promoter score of the Hyatt Hotels

Analysis of the Customers with respect to their Age

Results and Interpretations

- From the plot below, it is observed that most of the Hyatt hotel customers are middle aged people.
- The maximum people who visit Hyatt hotel in the state of California are between the range of 46 to 55
- People in the range of 18-25 and 76+ are the least observed in the Hyatt hotel in California



Recommendations

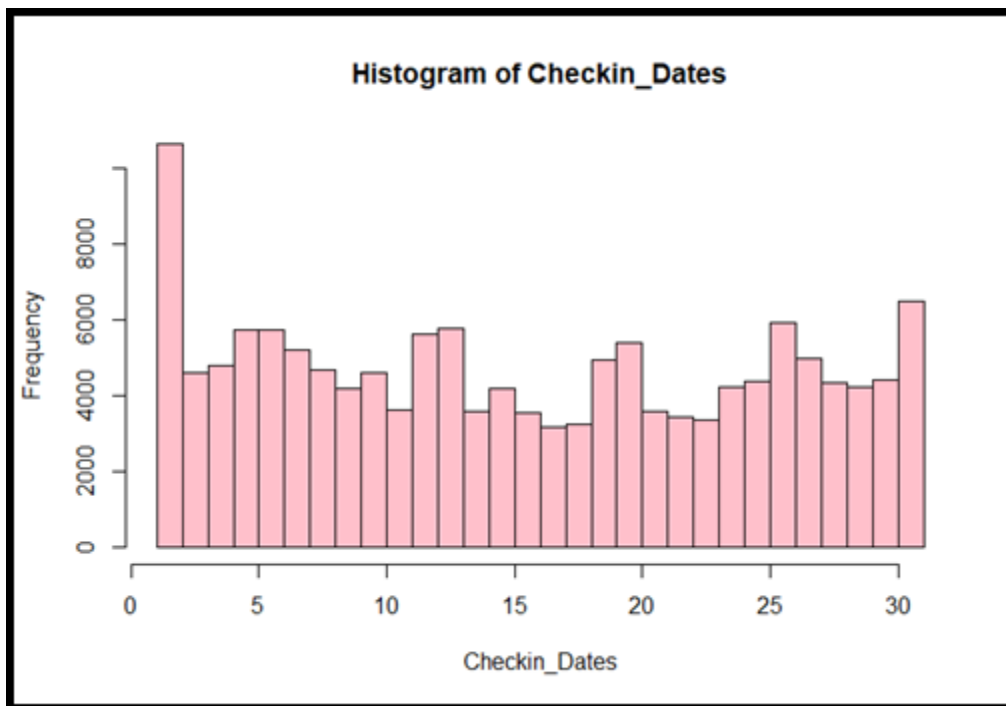
- As maximum customers are in the range of 46-55, Hyatt hotel should maintain the standard of facilities that middle-aged people access so that they should not lose their valuable customers

- People visiting in the range of 18-25 is the least. Hence Hyatt hotel should concentrate on SPA, Gym, Bar facilities that could improve their customer base in this age range
- For people above 76 age group, Hyatt Hotel should bring up more offers such as senior citizen discounts, facilitate more services that would make people in this age group visit their Hotel

Analysis of the Check-In date in the state of California

Results and Interpretations

- From the plot it is observed that the maximum customers check in during the first day of the month
- Observations show that people check in during the weekdays and then there is a drop-in check in during the week ends
- A pattern is observed in the histogram below. It shows that for every fifth or sixth day, there is an increase in the number of check in



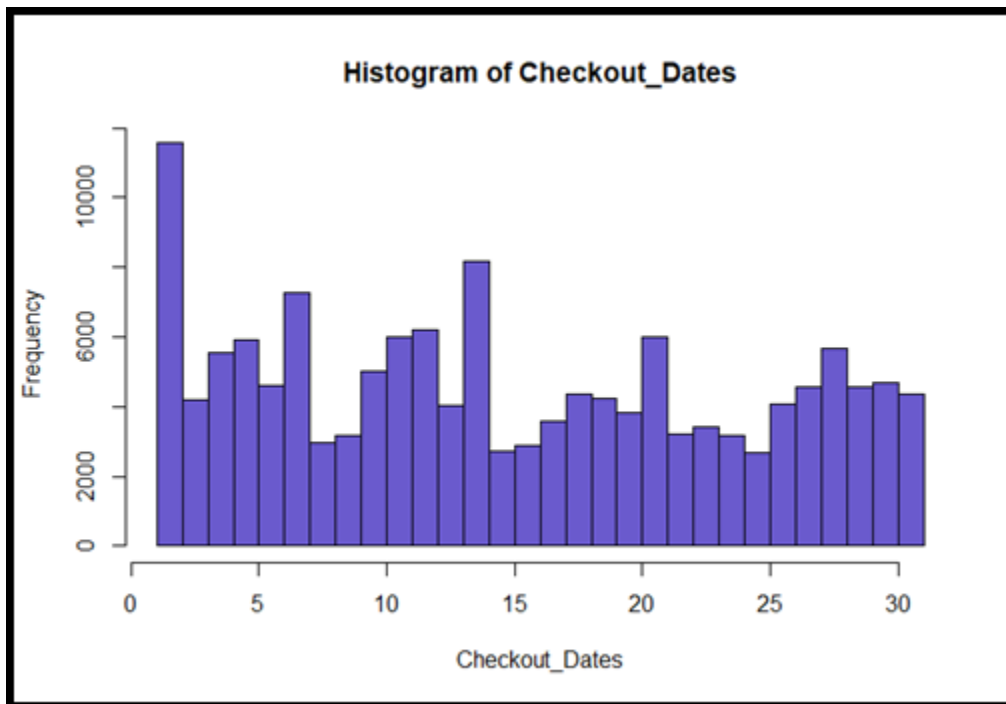
Recommendations

- As the number of customers who check-in during weekends is less as compared to the customers who check-in during week days, Hyatt hotel should concentrate on providing some offers or special discounts during the weekends which could facilitate more customers visiting Hyatt hotels
- To improve total profit, Hyatt hotel could keep a higher price for rooms during weekdays as more people check-in during on these days

Analysis of the Check-In date the state of California

Results and Interpretations

- Like the check-in dates, a pattern is observed in the checkout dates of Hyatt Hotels in California
- After every fifth or sixth day of the month, the number of people who check out increases
- The number of people who check out during weekends is more as compared to the number of people who check out during week ends



Recommendations

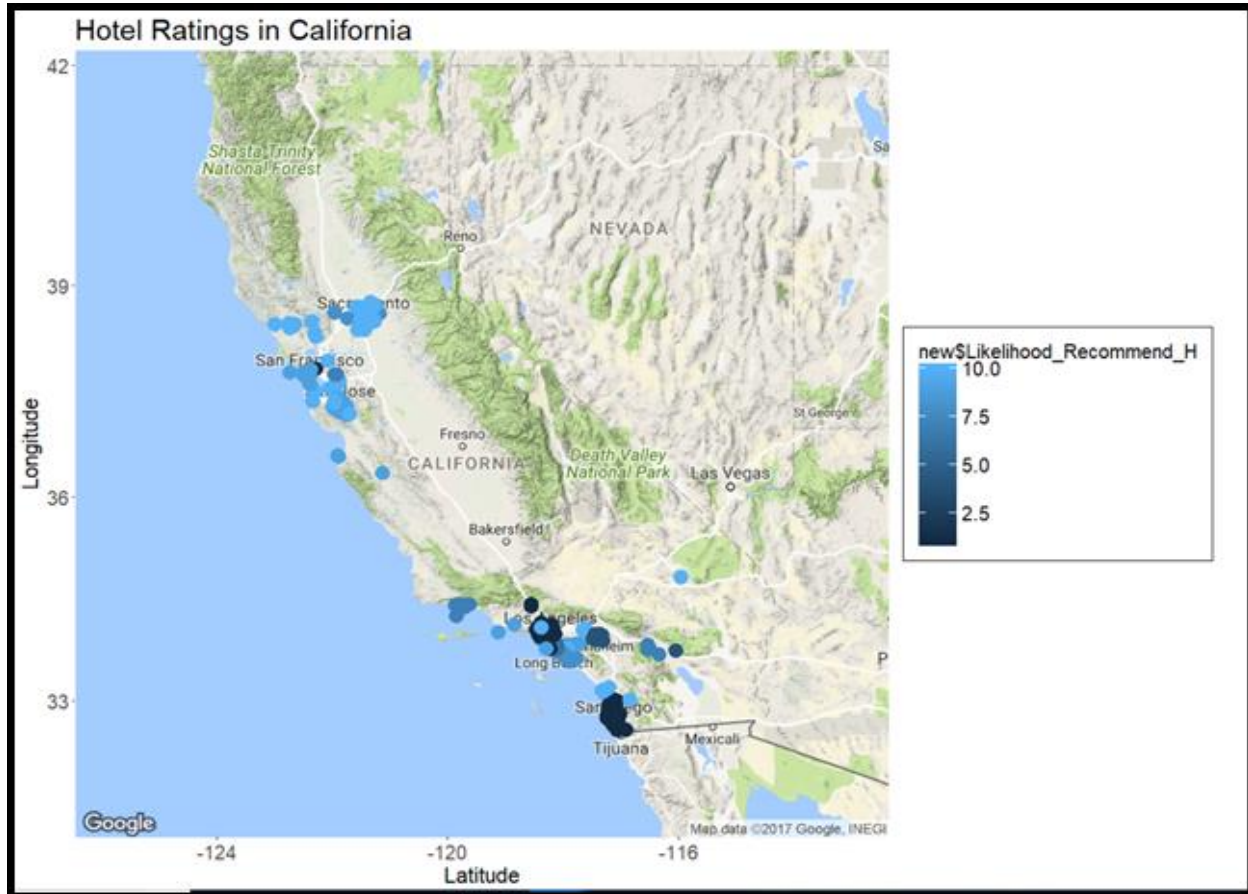
- Since the number of customers who check out is more on weekends, the hotel can provide special offers on those days which will make sure the customers can extend their stay
- Highlight show or program of the hotel should be scheduled on such days which will make sure that the customers would extend their stay

Distribution of customers in the state of California

Results and Interpretations

- The map shows the ratings various customers have given to different hotels in the state of California
- It is observed that there are light blue dots on the north part of the California as compared to the south part of the state
- Light blue dots indicate that the customers are more likely to recommend the hotel and such customers can be considered as promoters

- Dark blue dots indicate that the customers are less likely to recommend the hotel and such customers can be considered as detractors
- From the visualization, it can be derived that the hotel condition and the facilities provided in the north part of California is better as compared to the facilities provided in the south part



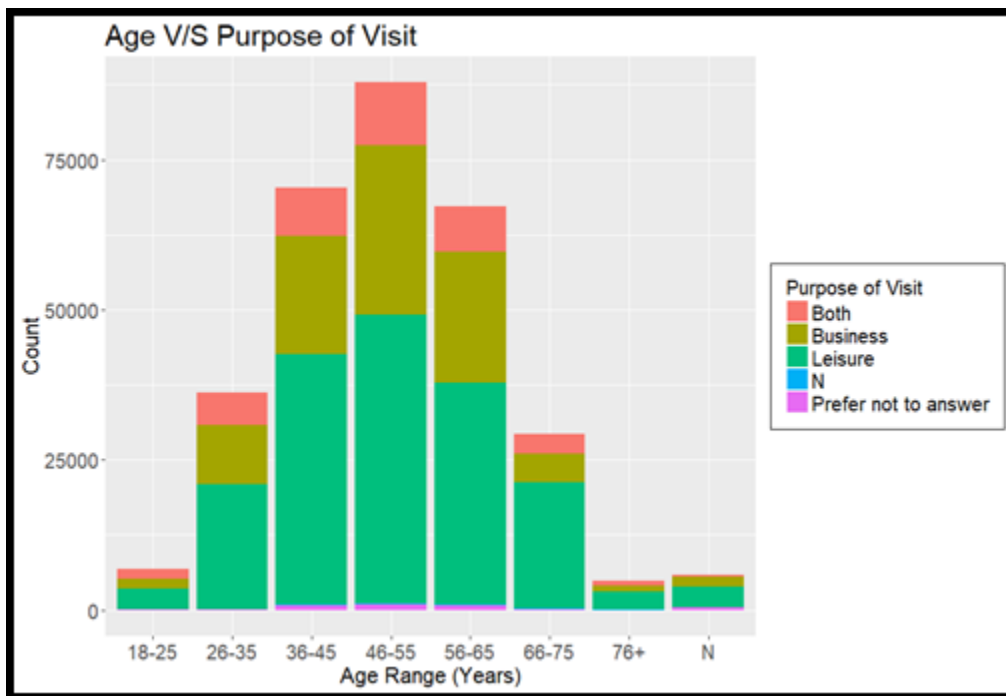
Recommendations

- As the customers visiting the hotels in the north side of California are more likely to recommend the Hyatt, the hotel should try to maintain the facilities that it provides to customers so that they remain as promoters
- The customers visiting the hotels in the south side of California are more likely to be detractors. The hotel must relook at the facilities that it provides to the customers. It should consider the facilities that middle age people use since it is observed that people visiting hotels in California are more likely to be in the middle age range

Analysis of Age V/s Purpose of Visit in San Francisco and Sacramento

Results and Interpretations

- From the plot it is observed that the people in the age range of 46-55 are the ones who visit the most in the hotels in San Francisco and Sacramento
- The number of people who visit these cities for leisure is more as compared to people visiting for just business or both business and leisure
- The number of people in the age range of 18-26 and 76 above who visit the city for business purpose is very less
- The number of people who visit the city for Business purpose is maximum in the age range of 36-65
- People visiting the city for both business and leisure are maximum in the age range of 36-65
- It is observed that people who do not prefer to answer their purpose of visit to the city are only present in the age range of 36-65



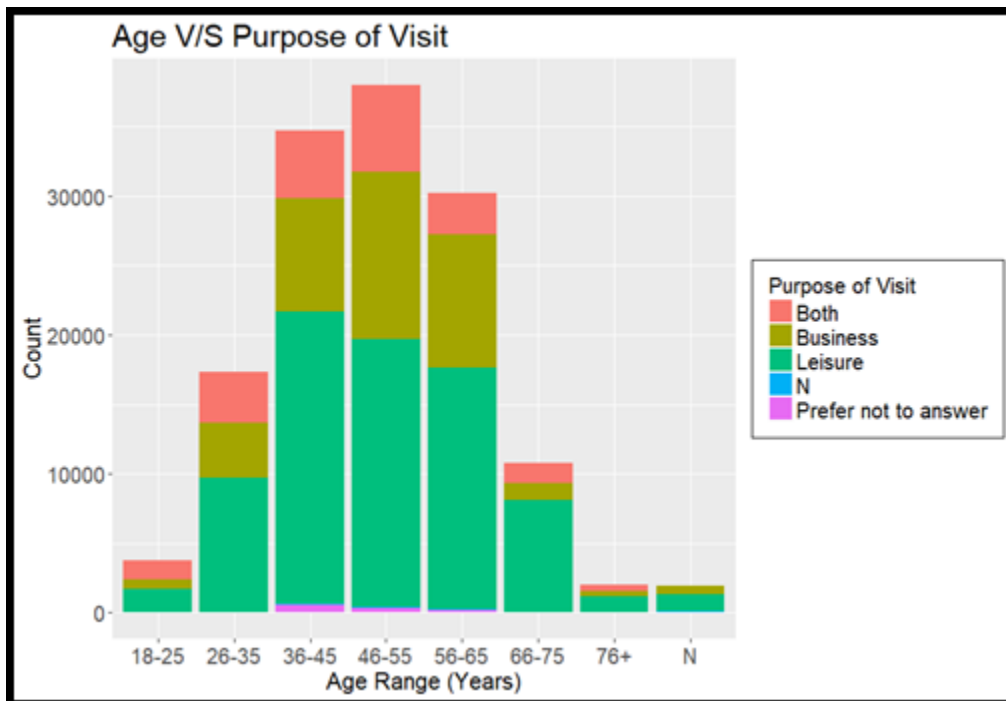
Recommendations

- Hyatt hotel in the city of San Francisco and Sacramento should concentrate on the facilities which would satisfy the needs of people in the age range of 36-65
- As, the number of people visiting these cities come for both leisure and business purposes, the facilities such as business lounge, gym, mini bar and internet should be taken care of
- Since the number of guests visiting the hotel are less in the age range of 18-25 and 76 above, facilities such as fitness area, spa services should be improved which would attract customers in the age range of 18-25
- Special discounts and offers should be made available for customers who are in the age range of 18-25 and 76 above. This may help the hotel in more reservations for the day

Analysis of Age V/s Purpose of Visit in San Diego

Results and Interpretations

- The number of customers visiting the city of San Diego as compared to the cities of San Francisco and Sacramento is less
- Majority of people visit this city for leisure purposes as compared to business or both business and leisure purpose
- As compared to the graph of the San Francisco and Sacramento, it is seen that the more people visit this city for leisure purpose in the age range of 36-45
- The maximum number of people visiting this city for business purpose is in the age range of 46-55
- Almost no one in the age range of 76 above visit the city for business purpose
- Almost equal number of people in the age range of 18-25 visit this city for business or leisure purposes



Recommendations

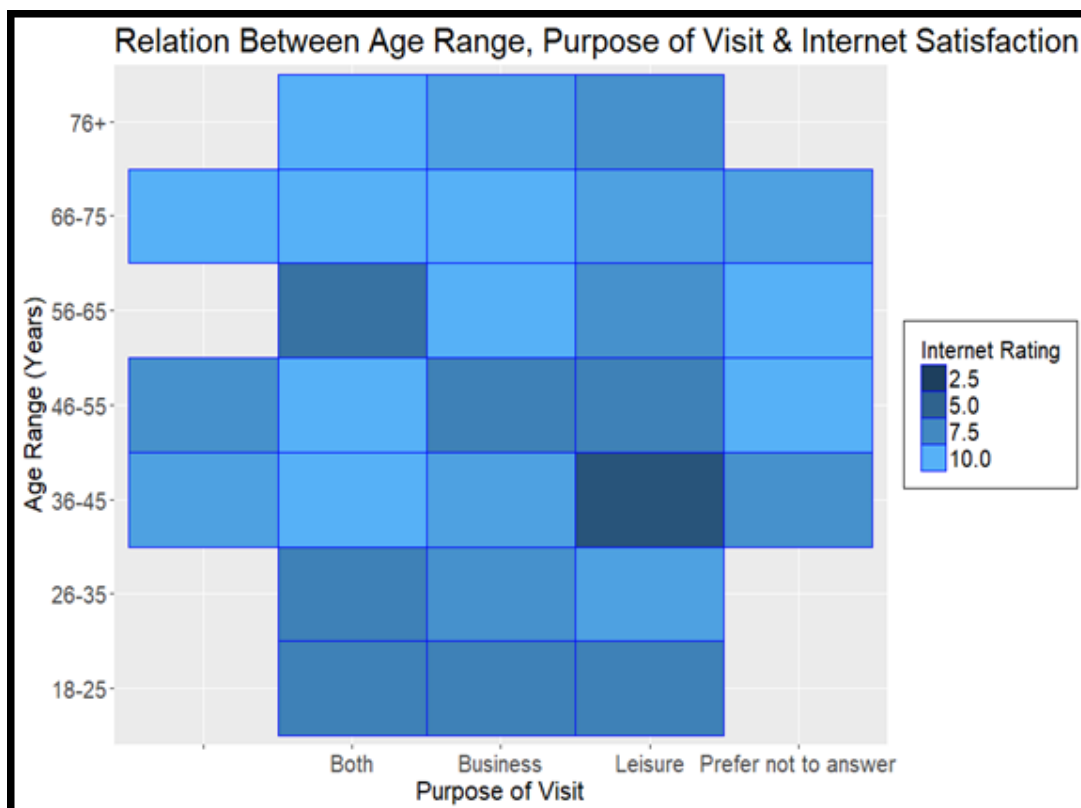
- Since the overall number of people visiting the Hyatt hotel in San Diego is less as compared to the cities in the North, Hyatt should revisit its business model in this area and restructure the facilities it provides in this area
- As maximum number of people visit for leisure purposes, Hyatt should provide services such as free transportation for in-city activities, good food etc.
- Maximum number of people visiting the city for leisure purpose are in the age range of 36-45. Hence, better deals on room bookings should be provided along with high quality services in terms of leisure facilities

- Maximum number of people visiting the city for business purpose are in the age range of 46-55. Facilities such as valet parking, dry cleaning, business center, conference area should be improved by the hotel to maintain the high number of people visiting this city
- Since there is a drastic difference in the number of people visiting the hotel in the below 36 and above 65 age range, offers and facilities that would attract the customers should be advertised
- As very few people in the age range of 66-75 visit the hotel for business purposes, the hotel should concentrate on providing leisure services and facilities to customers in this age range

Analysis of the Relation between the Age Range, Purpose of Visit and Internet Satisfaction in the state of California

Results and Interpretations

- People in the age range of 36-45 visiting the hotel in the state of California for leisure purposes are the most dissatisfied customers when it comes to internet usage
- This is followed by people in the age range 56-65 visiting the hotel for business purposes
- People in the age range 18-35, visiting the hotel for any purpose are largely not satisfied with the internet services provided by the hotel
- Largely, people visiting the hotel for leisure purposes have not been satisfied with the internet services provided by the hotel
- Only people who are satisfied with the internet services provided by the hotel are the ones who are visiting the hotel for business purpose and are in the age range of 56-75
- People visiting the hotel for both leisure and business purposes have not complained about the internet facilities except the people who are in the age range of 56-65



Recommendations

- As seen from the heat map, people visiting the hotel for leisure purposes are the ones who are not at all satisfied with the services provided by the hotel. This means that the internet facility is very important to these types of customers. Hence the hotel should provide better quality of internet service to these customers, by providing additional data, faster speed etc.
- The people visiting the hotel for business purposes seem to be quite satisfied with the quality of the internet services provided to them. It is possible that such customers make limited use of the internet provided by the hotel since they might be using the internet plans or facilities provided by their company. For such customers, the hotel should not be considering concentrating on the internet services, instead concentrate on other services which could affect their satisfaction such as business area, valet parking, elevator services and dry cleaning

Data Modeling Techniques

So far, we have talked enough about data analysis using descriptive techniques. Here, we will discuss various inferential techniques that we used on the data. The results we got were great and with higher confidence level.

Association Rules Technique and Linear Modeling

Association rule mining or a-rules finds interesting associations and correlation relationships among large sets of data items. Association rules show attribute value conditions that occur frequently together in each data set. There are 3 different terms related to a rules.

- Support- It is defined as the number of transactions that include all items in the antecedent and consequent parts of the rule. In other words, it is the probability of any event happening.
- Confidence- It is defined as the ratio of the number of transactions that include all items in the consequent, as well as the antecedent (the support) to the number of transactions that include all items in the antecedent.
- Lift- It is defined as the ratio of confidence to expected confidence.

By adjusting these 3 parameters and defining the variables, we can get many outcomes.

Relation between purpose of visit, city, age range, NPS type and Gender

We decided to create a model and choose the best possible combinations for all the people who are likely to be promoters or detractors considering the factors such as age range, purpose of visit and gender. We started by setting the confidence level at 60 percent and support at 0.05. The result we achieved were great. We had a total of 93 sets of rules.

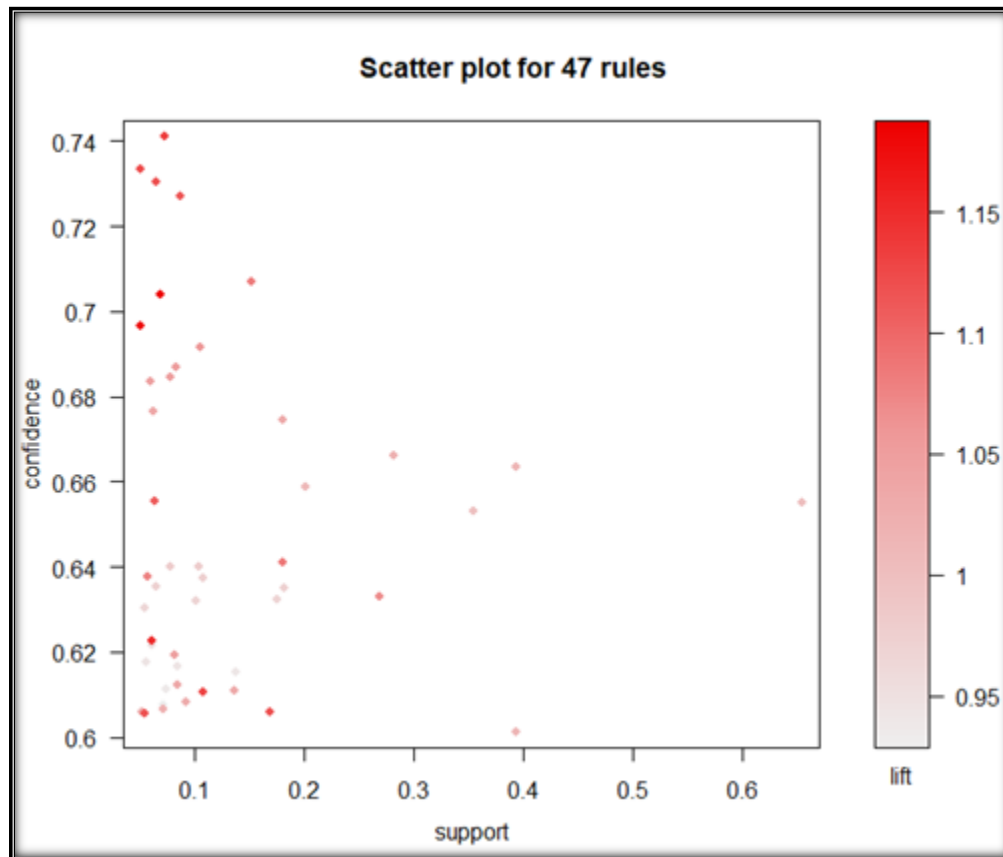
The results were still spread on a broad spectrum. We wanted to be more focused on the results. So, we increased the confidence level to 70% keeping the support same.

As a result, we got 47 rules.

Further sorting the results just for NPS yielded 8 rules.

Lhs	rhs	support	confidence	lift	count
[1] {Age_Range_H=66-75}	=> {NPS_Type=Promoter}	0.07234230	0.7412429	1.131772	656
[2] {Age_Range_H=56-65}	=> {NPS_Type=Promoter}	0.15185267	0.7068789	1.079302	1377
[3] {POV_H=Leisure, Age_Range_H=66-75}	=> {NPS_Type=Promoter}	0.05039700			
0.7335474 1.120021 457					
[4] {Age_Range_H=66-75, State_PL=California}	=> {NPS_Type=Promoter}	0.07234230			
0.7412429 1.131772 656					
[5] {POV_H=Leisure, Age_Range_H=56-65}	=> {NPS_Type=Promoter}	0.08722982			
0.7270221 1.110058 791					
[6] {Age_Range_H=56-65, State_PL=California}	=> {NPS_Type=Promoter}	0.15185267			
0.7068789 1.079302 1377					
[7] {POV_H=Leisure, Age_Range_H=66-75, State_PL=California}	=> {NPS_Type=Promoter}	0.05039700			
0.7335474 1.120021 457					

```
[8] {POV_H=Leisure, Age_Range_H=56-65, State_PL=California} => {NPS_Type=Promoter} 0.08722982
0.7270221 1.110058 791
```



Above rules suggests that leisure travelers in the age range 56 to 65 are expected to be promoters. We can conclude depending on the confidence level of 72.7 %.

Determining the relation between best possible combination for various facilities of the hotels with NPS

Moving a step further, we decided to determine the relation of all the facilities with the NPS. However, the number of facilities given were 30. Therefore, creating A rule model for the those facilities would yield huge numbers with lesser productivity.

Hence, to solve this, we decided to design a linear model which would give a lesser number of facilities to work on.

To begin with, we started running a regression model with NPS as a dependent variable and all the facilities as independent variables.

We used stepwise regression method, where we removed all the variables which were inversely affecting the adjusted R squared value. Although model we had was not a strong one, however, it helped us to cut down the variables from 30 variables to 12 variables with pretty strong numbers.

Linear Model Analysis:

Coefficients: (2 not defined because of singularities)				
	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	8.09738	0.07649	105.864	< 2e-16 ***
variables2[, 2]	0.12244	0.07647	1.601	0.109391
variables2[, 3]	0.34747	0.13411	2.591	0.009587 **
variables2[, 14]	NA	NA	NA	NA
variables2[, 16]	-0.59958	0.07834	-7.654	2.15e-14 ***
variables2[, 19]	NA	NA	NA	NA
variables2[, 23]	0.39797	0.10378	3.835	0.000127 ***
variables2[, 25]	0.63303	0.11952	5.296	1.21e-07 ***
variables2[, 26]	0.68865	0.22270	3.092	0.001992 **
variables2[, 27]	0.32785	0.08766	3.740	0.000185 ***
variables2[, 28]	-0.11150	0.08378	-1.331	0.183240
variables2[, 33]	0.27653	0.07104	3.893	9.99e-05 ***
variables2[, 34]	-0.33855	0.18382	-1.842	0.065541 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Residual standard error: 2.142 on 9057 degrees of freedom				
Multiple R-squared: 0.01669, Adjusted R-squared: 0.0156				
F-statistic: 15.37 on 10 and 9057 DF, p-value: < 2.2e-16				

As the above illustration suggests that the entire model is not supportive enough, however, when we look at the variables and their p values, they have strong effect on the model which suggests that these variables are strong contributors to the NPS.

Now that we have the list of variables which have greater influence on the model, we can go ahead and create an associative rule model which would determine the best possible combinations of the facilities.

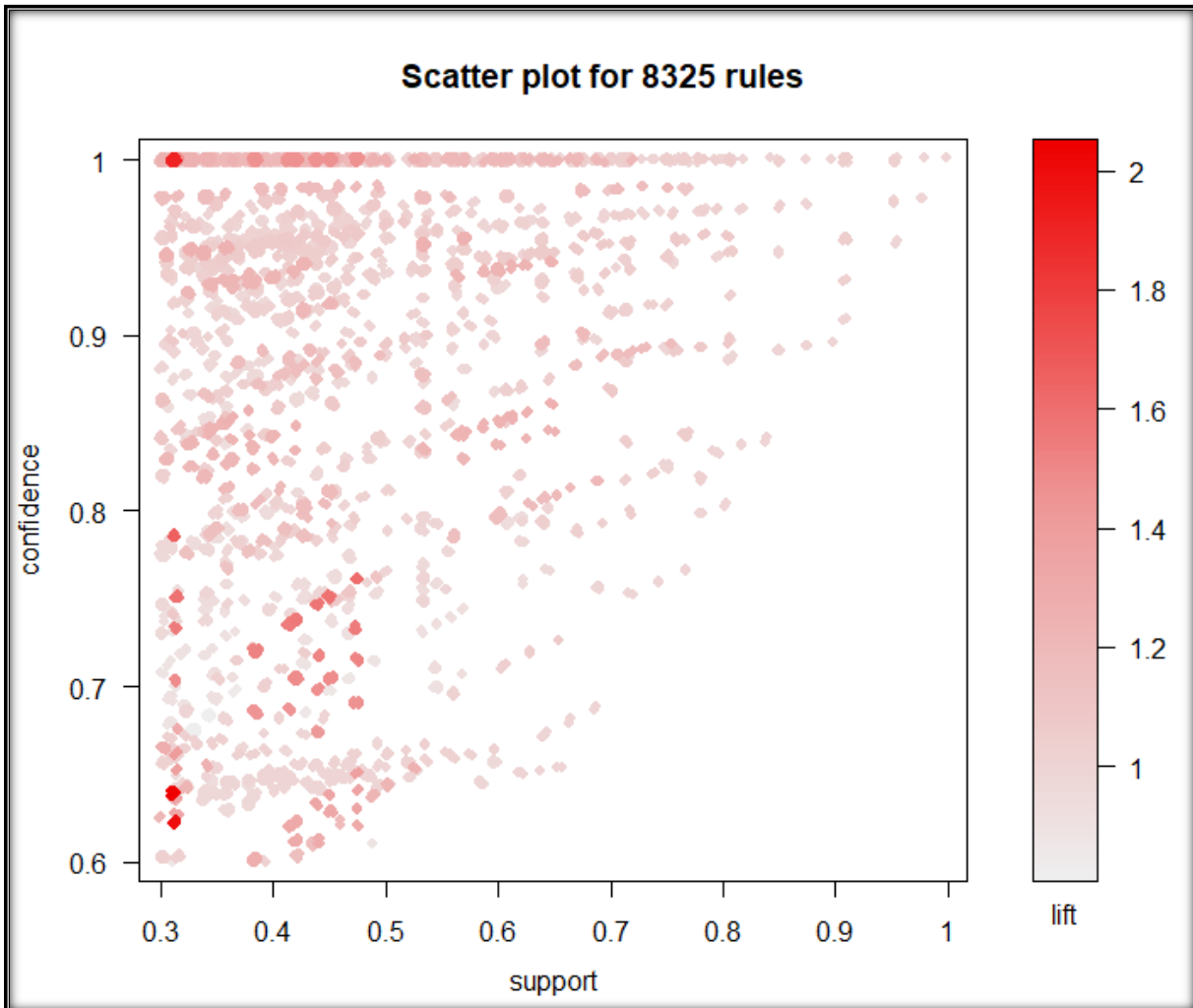
Keeping the support level at 0.3 and confidence at 60 % we got 8325 rules, out of which 506 rules were for promoters.

[500] {Spa.online.booking_PL=N,	
Casino_PL=N,	
Elevators_PL=Y,	
Golf_PL=N,	
Indoor.Corridors_PL=Y,	
Laundry_PL=Y,	
Resort_PL=N}	=> {NPS_Type=Promoter} 0.3409793 0.6392392 0.9760264 3092
[501] {Spa.online.booking_PL=N,	

Casino_PL=N,
Elevators_PL=Y,
Fitness.Trainer_PL=N,
Golf_PL=N,
Laundry_PL=Y,
Resort_PL=N} => {NPS_Type=Promoter} 0.3409793 0.6392392 0.9760264 3092
[502] {Spa.online.booking_PL=N,
Casino_PL=N,
Fitness.Trainer_PL=N,
Golf_PL=N,
Indoor.Corridors_PL=Y,
Laundry_PL=Y,
Resort_PL=N} => {NPS_Type=Promoter} 0.3409793 0.6392392 0.9760264 3092
[503] {Casino_PL=N,
Elevators_PL=Y,
Fitness.Trainer_PL=N,
Golf_PL=N,
Indoor.Corridors_PL=Y,
Laundry_PL=Y,
Resort_PL=N} => {NPS_Type=Promoter} 0.4143141 0.6477586 0.9890344 3757
[504] {Spa.online.booking_PL=N,
Casino_PL=N,
Elevators_PL=Y,
Fitness.Trainer_PL=N,
Golf_PL=N,
Indoor.Corridors_PL=Y,
Resort_PL=N} => {NPS_Type=Promoter} 0.3938024 0.6476242 0.9888292 3571
[505] {Bell.Staff_PL=Y,
Casino_PL=N,
Elevators_PL=Y,
Fitness.Trainer_PL=N,
Golf_PL=N,
Indoor.Corridors_PL=Y,
Laundry_PL=Y,
Resort_PL=N} => {NPS_Type=Promoter} 0.3393251 0.6352188 0.9698879 3077
[506] {Spa.online.booking_PL=N,
Casino_PL=N,
Elevators_PL=Y,

Fitness.Trainer_PL=N,	
Golf_PL=N,	
Indoor.Corridors_PL=Y,	
Laundry_PL=Y,	
Resort_PL=N}	=> {NPS_Type=Promoter} 0.3409793 0.6392392 0.9760264 3092

As we can see that hotels with casino, elevators, fitness trainer, golf, laundry and a resort have 63% chances of getting a satisfied customer.



PART 2: 12-month survey data analysis

Second part of our analysis was to review the data for a year to contract the previous analysis we made based December month of 2014. This will give a unique perspective of validation for the previous analysis we made and scope to find new insights from the data.

Data Import and Cleaning

The next part was to merge the data for all the twelve months each having a million to 1.5 million survey data. This was about 15 million records. In the process of merging we downloaded the survey data sets, we filtered for California Hotel properties and removed all the records which had the “NA” values. Hence the final dataset had about 30,000 survey records for hotels in California State. We short listed the variable which we need as below for the yearly analysis as below.

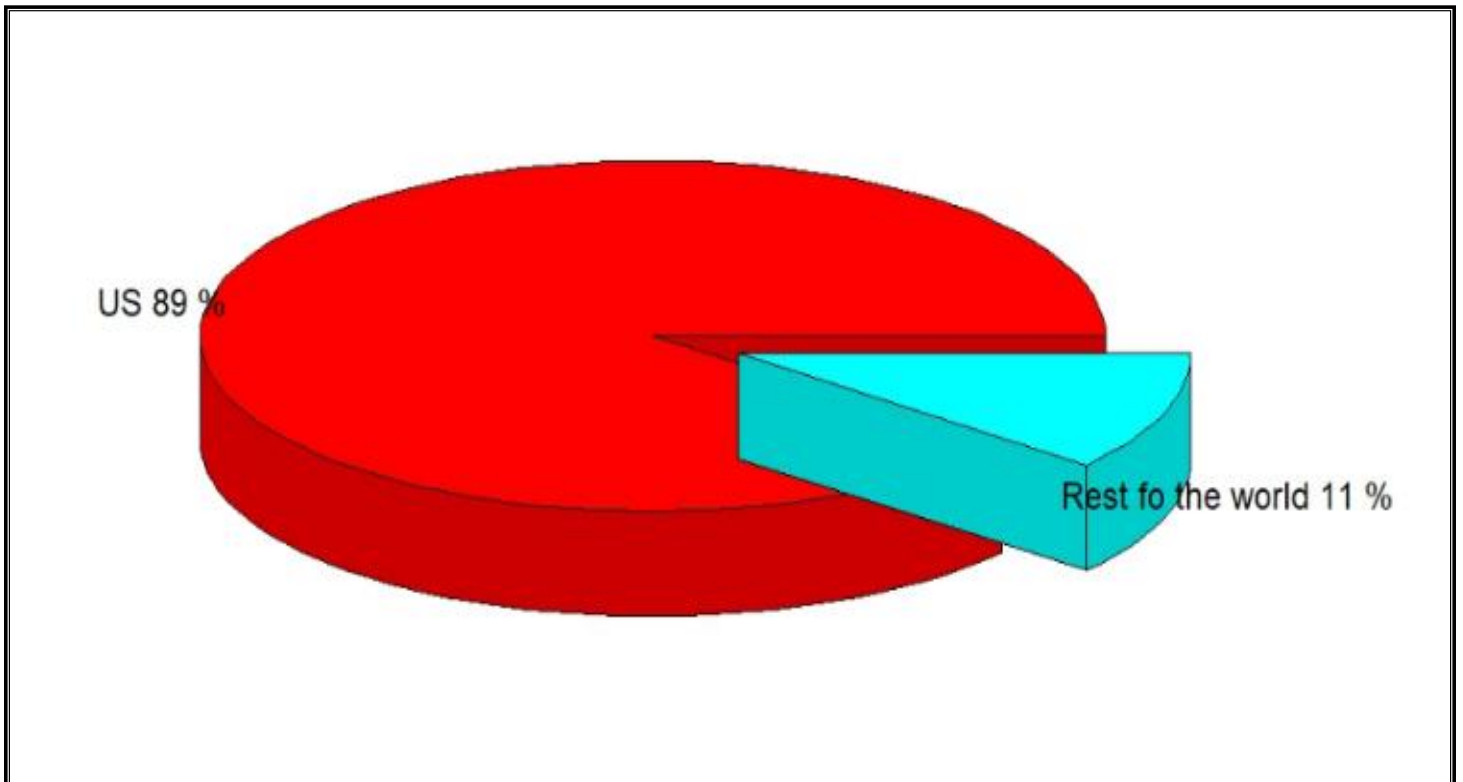
Hotel Location and Facility Parameters	
State_PL	State in which the hotel is located
City_PL	City in which the hotel is located
Property Latitude_PL	Latitude of the hotel's location
Property Longitude_PL	Longitude of the hotel's location
All Suites_PL	Flag indicating if the hotel is all suites
Boutique_PL	Flag indicating if the hotel is boutique
Dry-Cleaning_PL	Flag indicating if the hotel has dry-cleaning
Elevators_PL	Flag indicating if the hotel has elevators
Fitness Center_PL	Flag indicating if the hotel has a fitness center
Laundry_PL	Flag indicating if the hotel has laundry space
Restaurant_PL	Flag indicating if the hotel has onsite restaurants
Spa_PL	Flag indicating if the hotel has a spa
Shuttle Service_PL	Flag indicating if the hotel has shuttle service
Mini-Bar_PL	Flag indicating if the hotel has mini-bar
Pool-Indoor_PL	Flag indicating if the hotel has an indoor pool
Survey Feedback Parameters	
Likelihood_Recommend_H	Likelihood to recommend metric; value on a 1 to 10 scale
Overall_Sat_H	Overall satisfaction metric; value on a 1 to 10 scale
Guest_Room_H	Guest room satisfaction metric; value on a 1 to 10 scale
Tranquility_H	Tranquility metric; value on a 1 to 10 scale
Condition_Hotel_H	Condition of hotel metric; value on a 1 to 10 scale
Customer_SVC_H	Quality of customer service metric; value on a 1 to 10 scale
Staff_Cared_H	Staff cared metric; value on a 1 to 10 scale
Internet_Sat_H	Internet satisfaction metric; value on a 1 to 10 scale
Check_In_H	Quality of the check in process metric; value on a 1 to 10 scale
F&B_Overall_Experience_H	Overall F&B experience metric; value on a 1 to 10 scale
Guest stay	

POV_CODE_C	Purpose of visit
STATE_R	State of the party making the reservation
COUNTRY_CODE_R	Country of the party making the reservation
NPS_Type	Indicates if the guest's HySat responses mark them as a promoter, a passive, or a detractor

Guests from around the world Analysis

Results and Interpretations

Based on the cleaned dataset of 30,000 survey responses for California, we contrasted between the guests from within US and from the rest of the world. Clearly, we see that California hotels service about 89% guest from within United States (US) throughout the year.



Guests from different state within United States Analysis

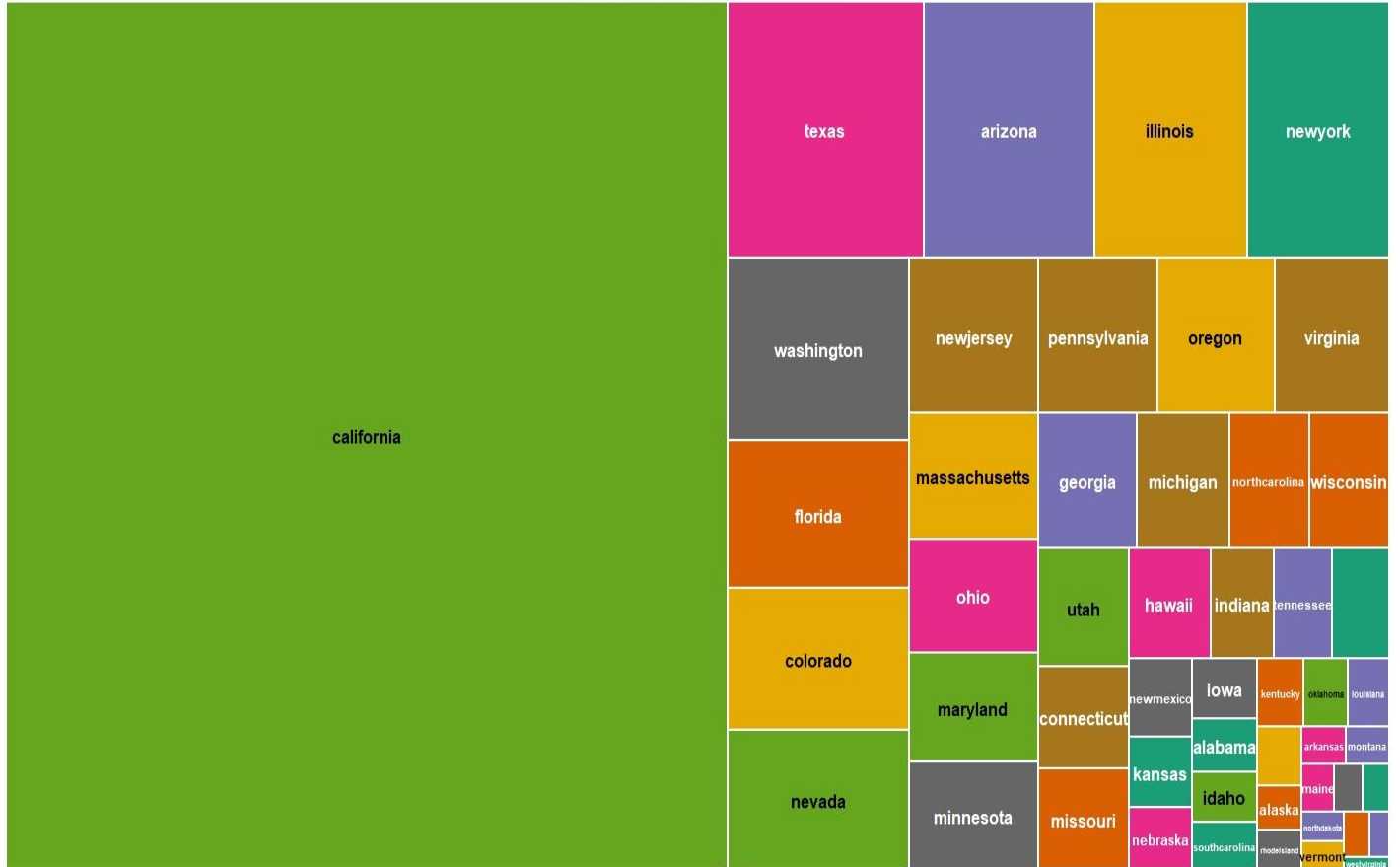
Results and Interpretations

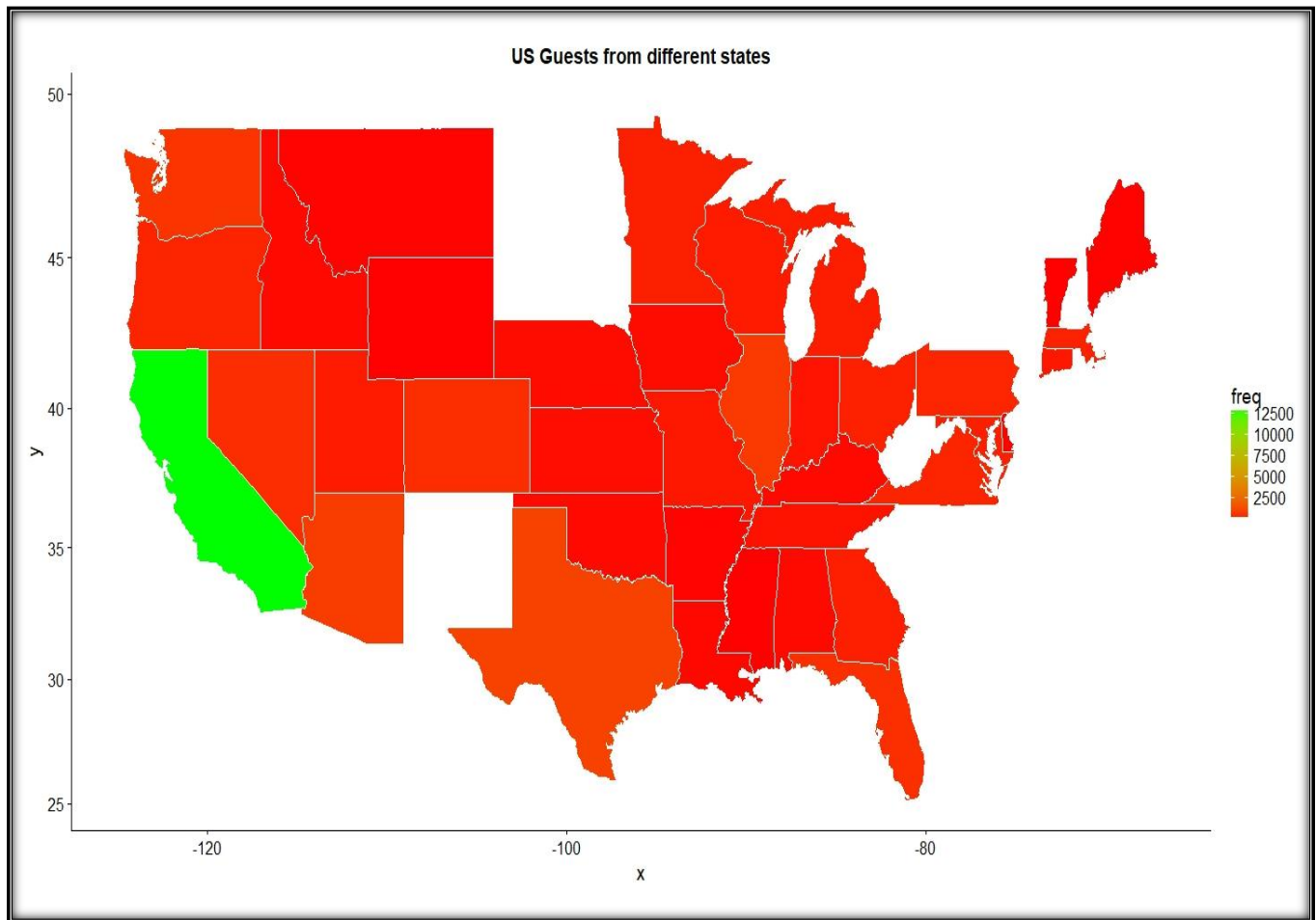
We now are considering guests from United States who visit Hyatt hotels within California State. We saw that about 52% of the guests where from within the California state. This is when we released that we need to concentrate on the guests from within the California state.

Recommendations

Hyatt hotels at California State can invest their resources considering Californian residents as the primary customer.

US Guests from different states





City Wise Guest Stay Analysis

Results and Interpretations

Below word cloud image show the pattern of the guests from around United States who stay in Hyatt hotels in different cities within California State. From the 30,000 surveys we used for this yearly analysis we see that San Diego city attracted most of the guests.



Linear Modeling Analysis

Results and Interpretations

We wanted to understand how different service aspects matter towards a guest recommending (Likelihood_Recommend_H) the Hyatt hotel they stayed in. We did a linear modeling analysis using Likelihood_Recommend_H as the dependent variable and independent variables such as Overall_Sat_H, Guest_Room_H, Tranquility_H, Condition_Hotel_H, Customer_SVC_H, Staff_Cared_H, Internet_Sat_H, Check_In_H, and F&B_Overall_Experience_H. Overall satisfaction (Overall_Sat_H) had a very high correlation with likelihood to recommend compared to other variables. If you see none actually correlated well apart from the over satisfaction.

Facility Total: We created a variable by adding the number of facilities provided each of the Hyatt facilities such as All Suites_PL, Boutique_PL, Dry-Cleaning_PL, Elevators_PL, Fitness Center_PL, Laundry_PL, Restaurant_PL, Spa_PL, Shuttle Service_PL, Mini-Bar_PL, and Pool-Indoor_PL. And then, used this variable to see if it actually correlated to the variable Likelihood_Recommend_H, but as you can see it didn't correlate enough to get much of the business insights.

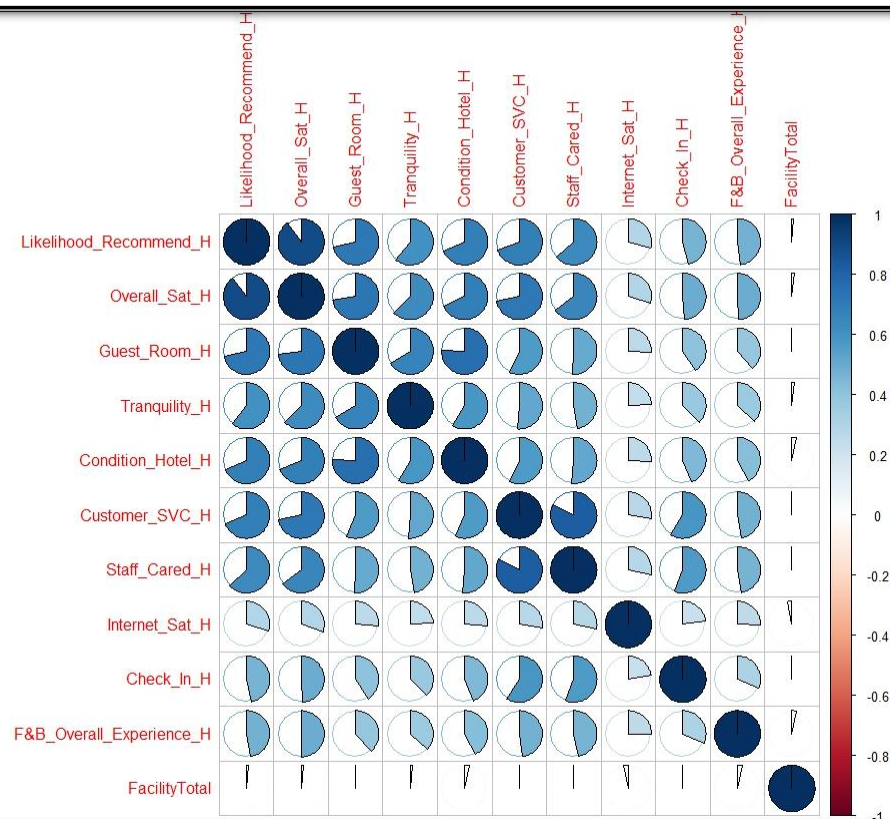
```
Call:
lm(formula = Likelihood_Recommend_H ~ ., data = corMatrix)
```

```
Residuals:
    Min       1Q   Median       3Q      Max
-8.0136 -0.1325 -0.0626  0.1482  8.2608
```

```
Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   -1.122304   0.038058  -29.490 < 2e-16 ***
Overall_Sat_H    0.818867   0.005071  161.479 < 2e-16 ***
Guest_Room_H     0.073083   0.004841   15.097 < 2e-16 ***
Tranquility_H    0.022334   0.003286    6.797 1.08e-11 ***
Condition_Hotel_H 0.096608   0.004862   19.872 < 2e-16 ***
Customer_SVC_H   0.058554   0.006602    8.869 < 2e-16 ***
Staff_Cared_H    0.053536   0.005390    9.932 < 2e-16 ***
Internet_Sat_H   0.009067   0.002170    4.179 2.94e-05 ***
Check_In_H      -0.021743   0.003911   -5.560 2.73e-08 ***
`F&B_Overall_Experience_H` 0.017066   0.003182    5.363 8.23e-08 ***
FacilityTotal   -0.003779   0.002304   -1.640 0.101
```

```
---
signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 0.7596 on 30767 degrees of freedom
Multiple R-squared:  0.8181,    Adjusted R-squared:  0.818
F-statistic: 1.384e+04 on 10 and 30767 DF,  p-value: < 2.2e-16
```



Recommendations

California State Hyatt Hotels should consider below services as the top most priority to gain better recommendations from the guests.

1. Guest Room
2. Hotel Condition
3. Customer Service

Linear Modeling with Multiple variables

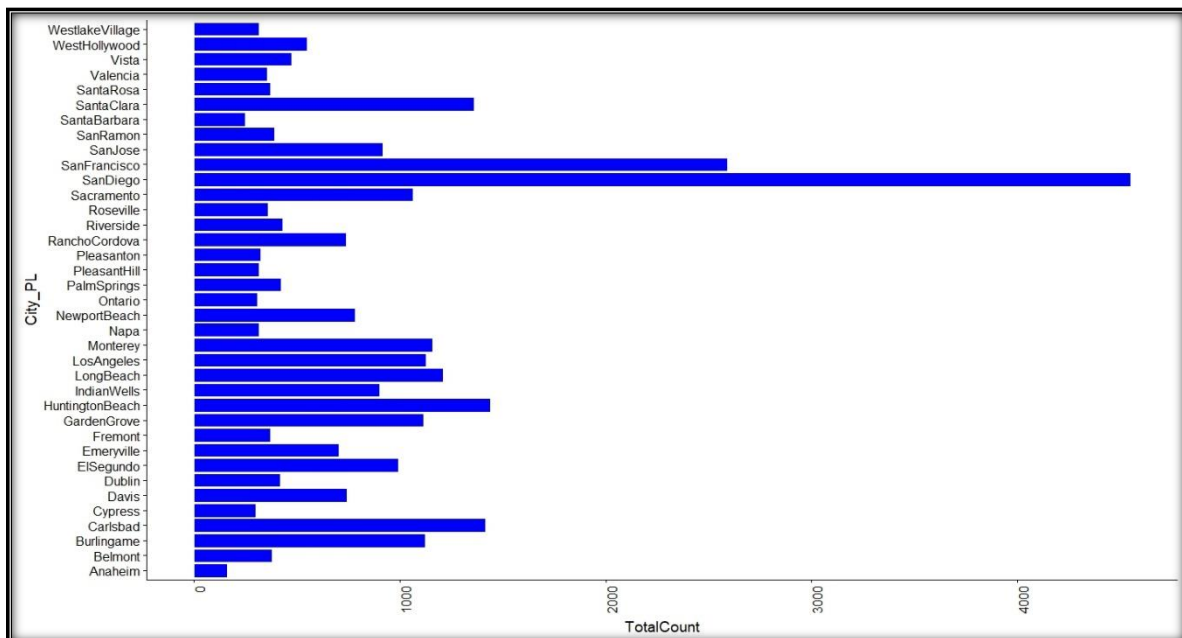
Results and Interpretations

We created a function which actual inputs a data frame of independent variable values and a dependent variable vector and outputs a combination of independent variables which will have the highest R square value. We tried using it for all the feedback variables and the likelihood to recommend variables. But, we saw that the highest R square value was for the combination of variables which included all independent variables. Hence we didn't include that results here as we couldn't get further insights from that analysis. But, I have added the code we created at the end.

City Wise Net Promoter Scope (NPS) Analysis

Next, we shifted our analysis towards city wise net promotor score analysis where we will review the number of promoters, passive, detractor and using this data will analysis city wise NPS values across California state.

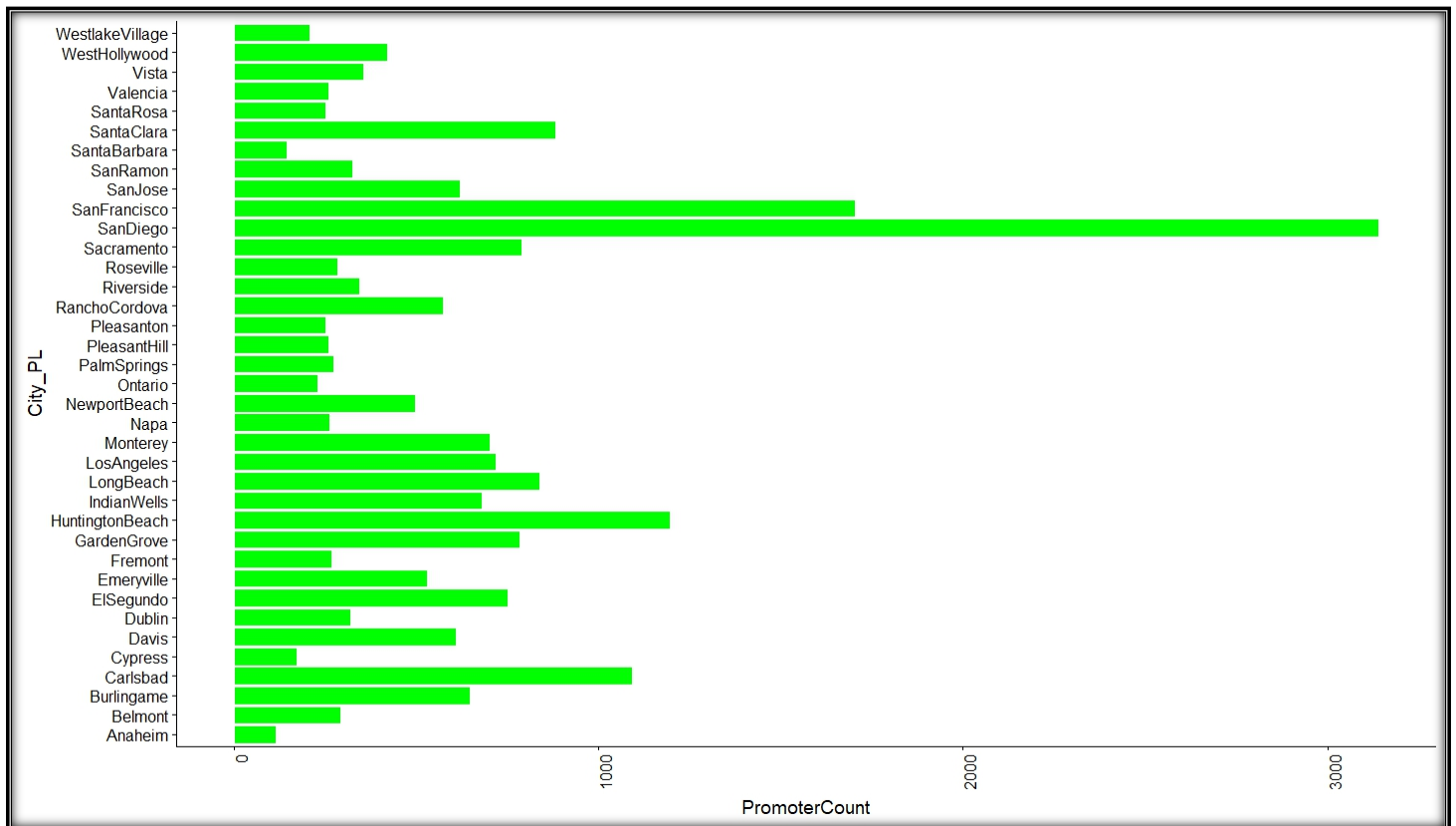
Total surveys considered for Hyatt hotels across California State



Promoters across California cities

Results and Interpretations

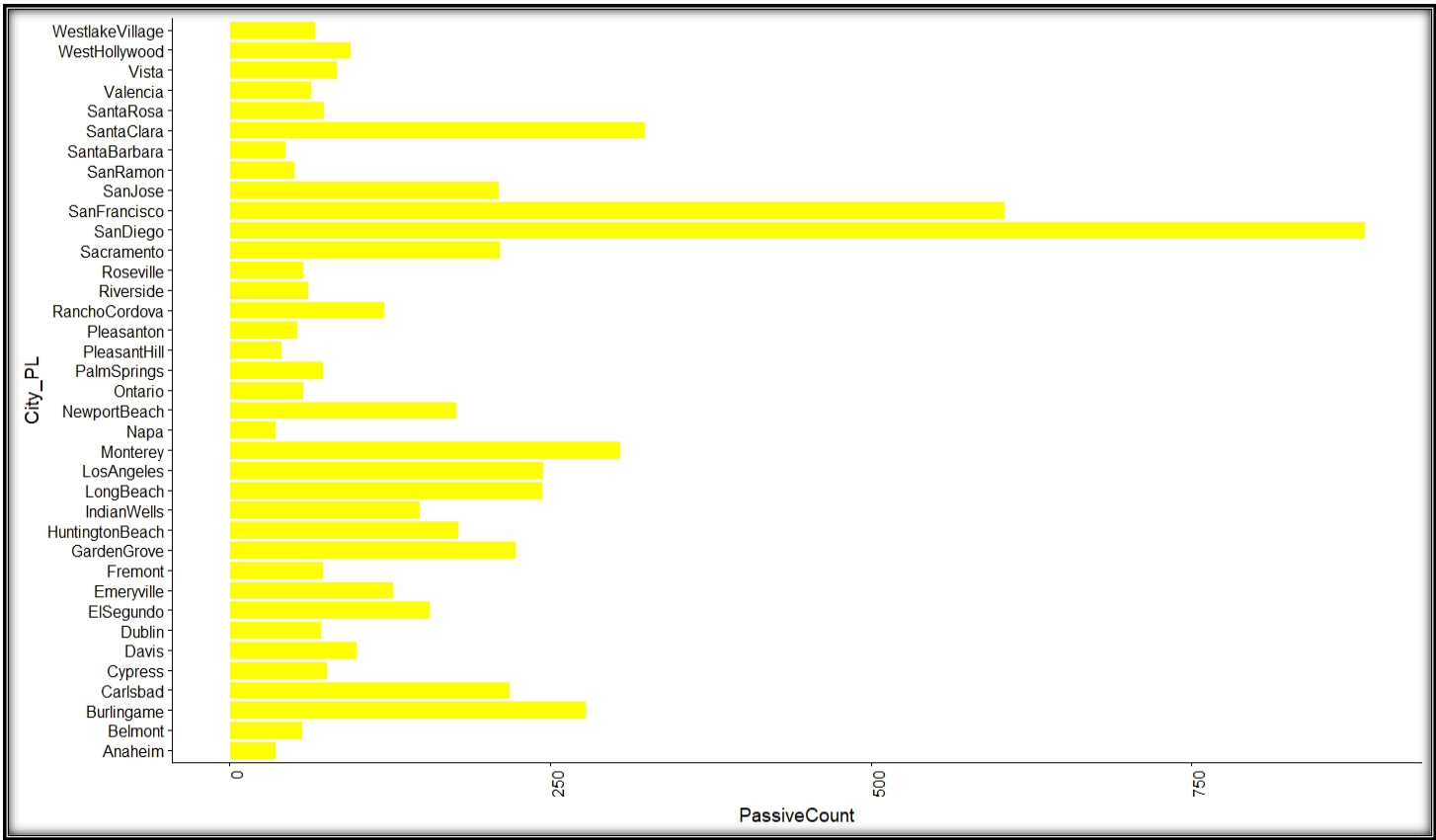
- From the plot it is observed that the maximum number of promoters in the state of California is in the city of San Diego which is followed by San Francisco
- The minimum number of promoters in the state of California are in city of Anaheim and Santa Barbara



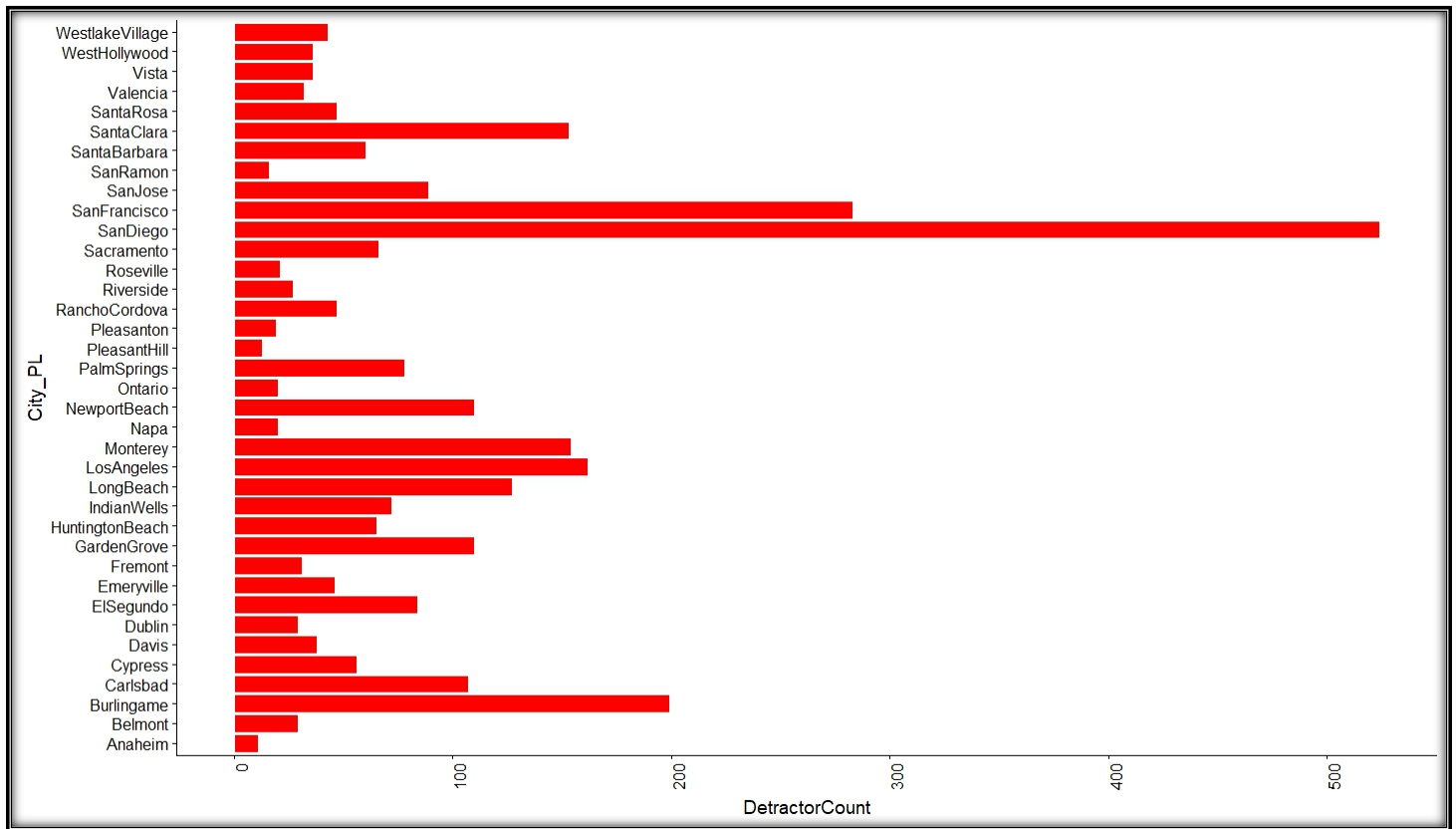
Recommendations

- Hyatt Hotel should maintain the quality of the services provided in the cities of San Diego and San Francisco and at the same time improve the quality of the hotel and the facilities provided in the cities such as Anaheim and Santa Barbara which would thus result in an overall improvement in the NPS score

Passive Guests across California cities



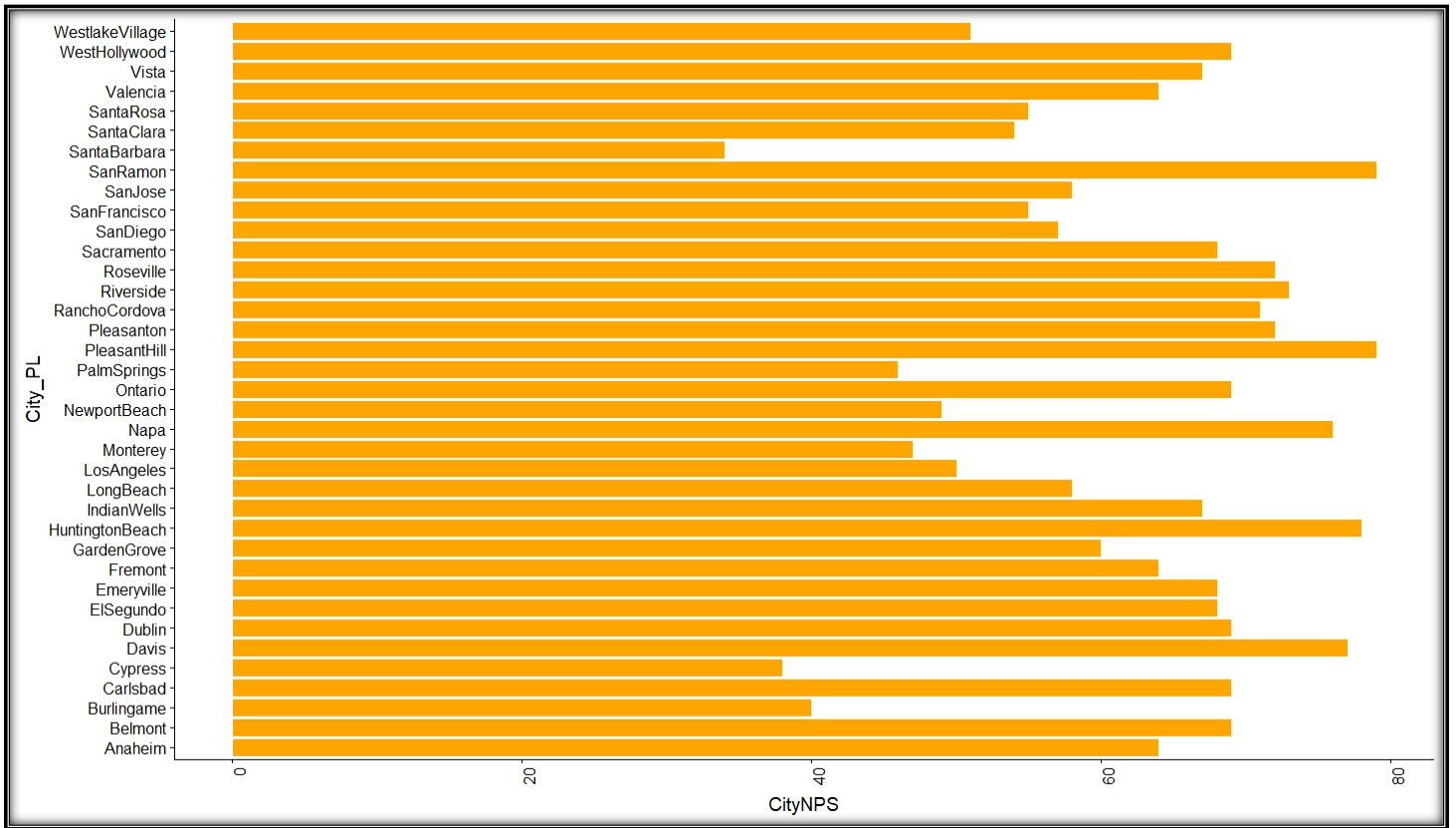
Detractors across California cities



City wise NPS for Hyatt Hotels across California

Results and Interpretations

- From the plot it is observed that the cities like Santa Ramon, Pleasant Hill, Indian Wells, Davis have the maximum value of the NPS score
- Whereas cities such as Santa Barbara, Cypress, Burlingame have the lowest value of NPS score

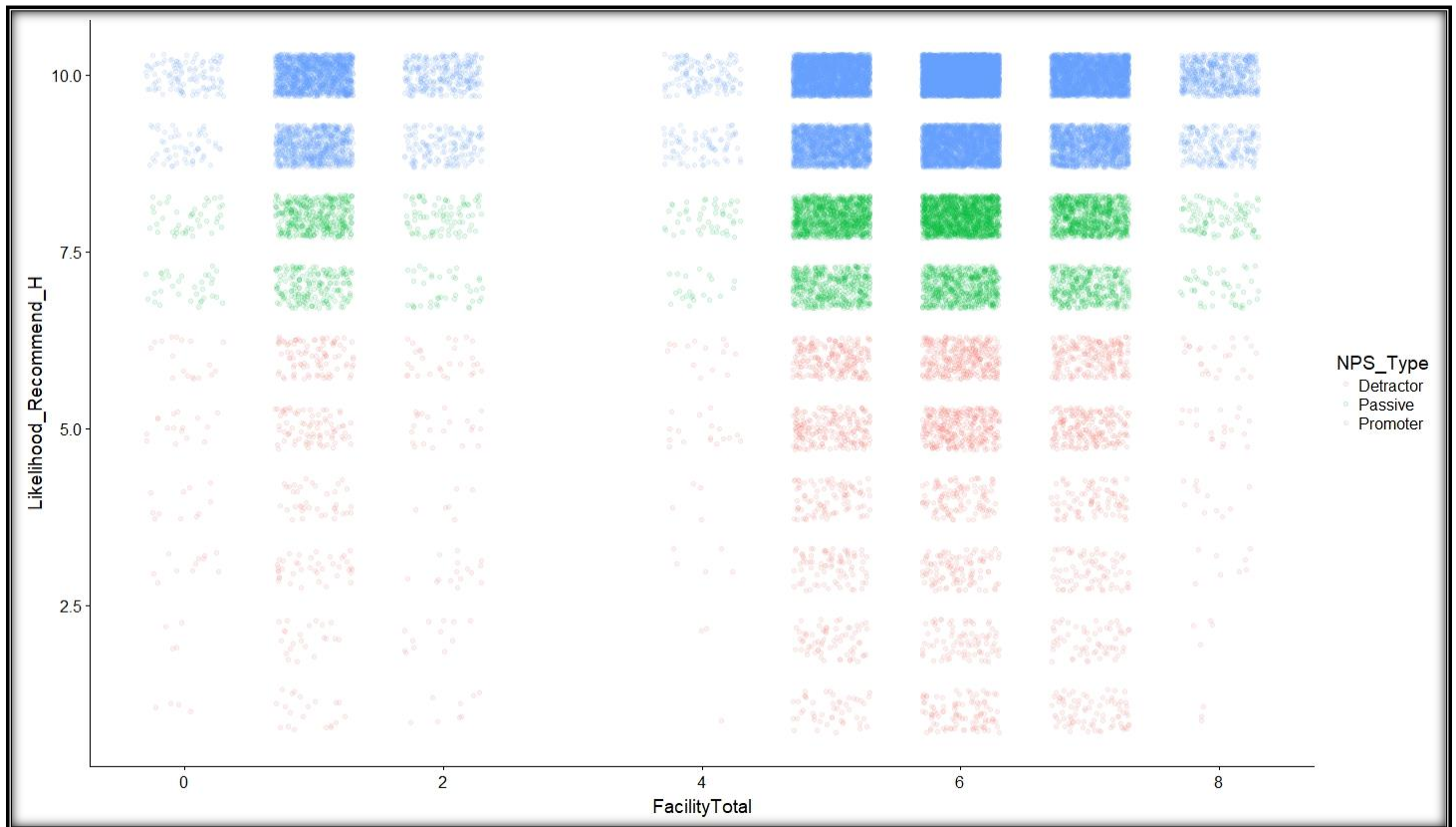


Recommendations

- By observing the factors that make cities like Santa Ramon, Pleasant Hill, Indian Wells have higher NPS score other cities with have a low value of the NPS score should make changes in the facilities it provides and improve the system to improve its overall score

Likelihood to recommend vs Facility Total Analysis

We made an interesting analysis by plotting Likelihood to recommend variable against the total number of facilities provided at each type Hyatt hotel. You can see that most of the responses were received for Hyatt Hotels that had five to seven of the 11 facilities that we considered for this analysis.



Conclusion

We would like to conclude by summarizing all the recommendation we have made in this report so that it will help Hyatt Hotels at California State to take actionable insights from this report.

Hyatt hotels at California State can invest their resources considering Californian residents as the primary customer. California State Hyatt Hotels should consider below services as the top most priority to gain better recommendations from the guests.

- A. Guest Room
- B. Hotel Condition
- C. Customer Service

As the internet service has been rated poor from most of the guests, we would recommend better internet services, say, on demand internet services which will also help the Hotel to better manage the spend for the internet service.

There is less turnout of guests under the age of 45 and over the age of 65, Hyatt Hotels can offer package deals to attract these guests. For people above 76 age group, Hyatt Hotel show bring up more offers such as senior citizen discounts, facilitate more services that would make people in this age group visit their Hotel. It should consider the facilities that middle age people use since it is observed that people visiting hotels in California are more likely to be in the middle age range. Since the number of guests visiting the hotel are less in the age range of 18-25 and 76 above, facilities such as fitness area, spa services should be improved which would attract customers in the age range of 18-25. Special discounts and offers should be made available for customers who are in the age range of 18-25 and 76 above. This may help the hotel in more reservations for the day. Hyatt hotel in the city of San Francisco and Sacramento should concentrate on the facilities which would satisfy the needs of people in the age range of 36-65. As, the number of people visiting these cities come for both leisure and business purposes, the facilities such as business lounge, gym, mini bar and internet should be taken care of. Maximum number of people visiting the city for leisure purpose are in the age range of 36-45. Hence, better deals on room bookings should be provided along with high quality services in terms of leisure facilities Maximum number of people visiting the city for business purpose are in the age range of 46-55. Facilities such as valet parking, dry cleaning, business center, conference area should be improved by the hotel to maintain the high number of people visiting this city. Since there is a drastic difference in the number of people visiting the hotel in the below 36 and above 65 age range, offers and facilities that would attract the customers should be advertised. As very few people in the age range of 66-75 visit the hotel for business purposes, the hotel should concentrate on providing leisure services and facilities to customers in this age range

Most of the check in and check out happen on the first day of month. Hence we would recommend to have right staffing arranged around the hotel services. Also if the Hotels wants to normal the guest traffic across a month, they can announce package deals for the dates where we have less check in and check outs. Also, as the number of customers who check- in during weekends is less as compared to the customers who check-in during week days, Hyatt hotel should concentrate on providing some offers or special discounts during the weekends which could facilitate more customers visiting Hyatt hotels. Since the number of customers who check out is more on

weekends, the hotel can provide special offers on those days which will make sure the customers can extend their stay. Highlight show or program of the hotel should be scheduled on such days which will make sure that the customers would extend their stay.

From the plot it is observed that the maximum number of promoters in the state of California is in the city of San Diego which is followed by San Francisco. Since the overall number of people visiting the Hyatt hotel in San Diego is less as compared to the cities in the North, Hyatt should revisit its business model in this area and restructure the facilities it provides in this area. To improve total profit, Hyatt hotel could keep a higher price for rooms during weekdays as more people check-in during on these days. As the customers visiting the hotels in the north side of California are more likely to recommend the Hyatt, the hotel should try to maintain the facilities that it provides to customers so that they remain as promoters. The customers visiting the hotels in the south side of California are more likely to be detractors. Since the overall number of people visiting the Hyatt hotel in San Diego is less as compared to the cities in the North, Hyatt should revisit its business model in this area and restructure the facilities it provides in this area. The minimum number of promoters in the state of California are in city of Anaheim and Santa Barbara. Hyatt Hotel should maintain the quality of the services provided in the cities of San Diego and San Francisco and at the same time improve the quality of the hotel and the facilities provided in the cities such as Anaheim and Santa Barbara which would thus result in an overall improvement in the NPS score. By observing the factors that make cities like Santa Ramon, Pleasant Hill, Indian Wells have higher NPS score other cities with have a low value of the NPS score should make changes in the facilities it provides and improve the system to improve its overall score.

As maximum number of people visit for leisure purposes, Hyatt should provide services such as free transportation for in-city activities, good food etc. As seen from the heat map, people visiting the hotel for leisure purposes are the ones who are not at all satisfied with the services provided by the hotel. This means that the internet facility is very important to these types of customers. Hence the hotel should provide better quality of internet service to these customers, by providing additional data, faster speed etc. The people visiting the hotel for business purposes seem to be quite satisfied with the quality of the internet services provided to them. It is possible that such customers make limited use of the internet provided by the hotel since they might be using the internet plans or facilities provided by their company. For such customers, the hotel should not be considering concentrating on the internet services, instead concentrate on other services which could affect their satisfaction such as business area, valet parking, elevator services and dry cleaning.