Reservation DESK

BI Analysis

Team Super++ Fresh
IS 6481-002 Fall 2016

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Executive Summary

ReservationDesk.com is a hotel booking site that is seeking to utilize business analytics to remain competitive against sites like Expedia and Priceline. Currently ReservationDesk.com is at a BA maturity level of 2 looking to move to a level 3. In our analysis of ReservationDesk.com we were provided with data about bookings in hotels for the state of Utah for the previous 12 months.

From our analysis we were looking to find trends and information about our current customers to be able to create lead data to provide ReservationDesk.com's decision makers. We found that our customers that brought us the most value are booking trips from Connecticut and Kentucky. We also found that the highest value stays were weekend stays rather than weekday. We also found that we have a larger number of bookings in the state of Utah in the winter months. By far the most profitable hotel for our customers to book with is the Little America in Utah. The next top earning hotels are Hilton Garden Inn, Crystal Inn, Hampton Inn in Moab UT, then Comfort Suites.

Our recommendations to ReservationDesk.com management is that we should focus on weekend customers from eastern states like Connecticut and Kentucky. We should also promote to customers with stronger advertising for trips to Utah in the winter. Specifically, we should advertise a great deal more in California during the winter. We feel that there is an untapped potential from California that could be accessed if we were to increase advertising. We also found that weekend and weekday visitors trended to using rooms with Queen and King beds respectively.

ABOUT US

ReservationDesk.com is a hotel booking website that helps get people to the hotels that they love, and has booked over 3.6M nights in the last 12 months. Many booking websites like Expedia and Priceline have their own inventory to get hotel rooms for their customers. Our website, on the other hand, does not use just one source of inventory, but instead uses over ten sources of inventory to gather hotels rooms, including Expedia and Priceline rooms. This results in us having the best availability and best rates for a hotel room. If we do not have a room, no one does. If the prices for a room vary, then we have access to the cheapest one.

We were marketers before we became travel experts. We started selling hotel rooms for MGM properties and realized that we could probably do better on our own so we started using an affiliate program. Since we started as marketers this makes us extremely efficient at getting the right people to the right hotel using search engines like Google and Bing. Long story short, all of our advertising costs are direct to sale. We pay for every first sale.

Another key source to our company are our offline sales. We place phone numbers on our website so that customers can call and speak to a travel agent to make a better decision on where they would like to stay. In an effort to improve the customer's experience, we have invested in proprietary technology where we are able to link the customer's phone call with their

entire experience of the website up until the point of making the call. That way our call center agents are able to know where and when the caller would like to make a reservation before even saying, "hello". Due to this large step almost half of our sales come from the call center.

At first, changes to the website were based upon hunches and personal opinions. We now make a special emphasis on web optimization where we test literally any change to the website to see if it helps or hurts sales. These changes vary from phone number placement to imagery of happy people to hotel images. We have more than doubled our efficiency of getting a customer to make their reservation with the process.

BA MATURITY LEVEL

ReservationDesk.com currently has a maturity level of 2 but is in the process of transitioning to level 3. In December 2015 our company invested in a data warehouse, but the knowledge is quite basic. There is a great deal of work that still needs to be done in order to pull all of our data into the warehouse. Although the framework has been set with our data warehouse, very little consumption has occurred. Analysts spend the majority of their time generating reports for the different departments of the business and most of the information gathered for these reports are based on lag information.

Senior management is the main driving force into our BA team. Some work has been done to integrate with lead information where we are clustering our hotels based on 76 attributes. Once we see the similarities between hotels we can start advertising on new properties with confidence that they will be successful with other similar hotels that we are already very profitable on.
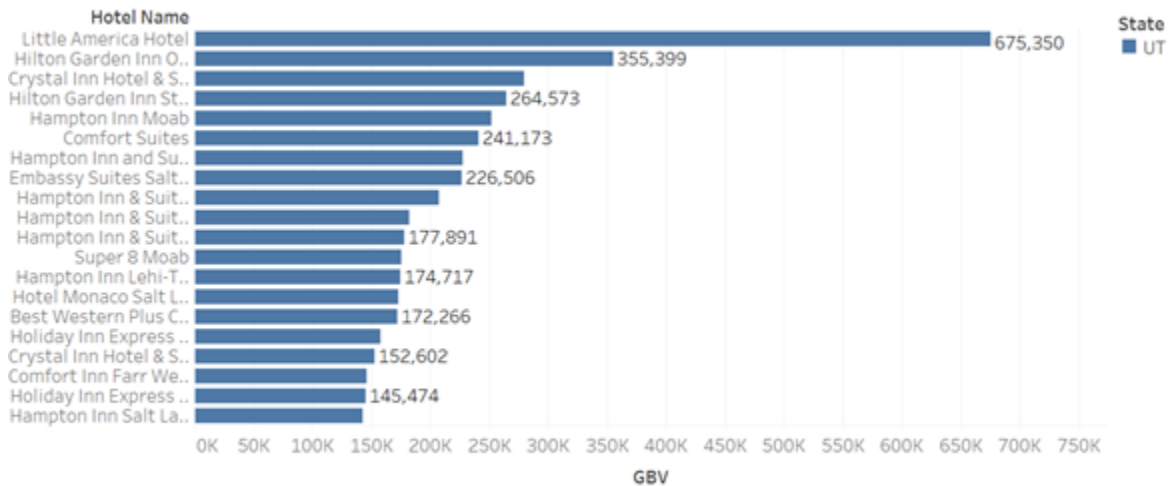
ABOUT THE DATA

Our hope for this group project was to better understand our customer base and see what changes can be made to help our site become more profitable in the three listed spaces: search marketing, offline sales and site optimization. We were given a dataset for ReservationDesk.com for all bookings of hotels in Utah for the last 12 months (October 2015 - September 2016). With this information, we were able to make some important conclusions about our visitors to see what types of travelers are most profitable to our company and who is most likely to use our website. Proper cleansing was made with this data to ensure that test and employee reservations were excluded.

Certain assumptions were made about our users. We made assumptions about customers depending on if they were visiting for leisure or business based on the zip code of the hotel. If a reservation was consumed on Friday or Saturday night they were also classified as leisure. We used 'R' to remove redundant values from 'Room' Column from our Data set. Prior to the implementation of R, the values in the column were a fusion of 'facilities' offered in the room with 'room type'. This helped us better organize room types and see what trends came from the types of rooms customers were booking.

FINDINGS

I. Top 20 Hotels:

Top 20 hotels by sales(GBV)

Sum of GBV for each Hotel Name. Color shows details about State. The marks are labeled by sum of GBV. The data is filtered on Top 20 hotels by sales(GBV), which keeps 20 members.

We wanted to identify the top 20 hotels in order to identify which hotels are our 'rain makers'. Once we identify our top 20 hotels the hope is to take advantage of the 80/20 rule. This rule states that the 80% of the revenues come from the top 20%.

II. Bookings by State:
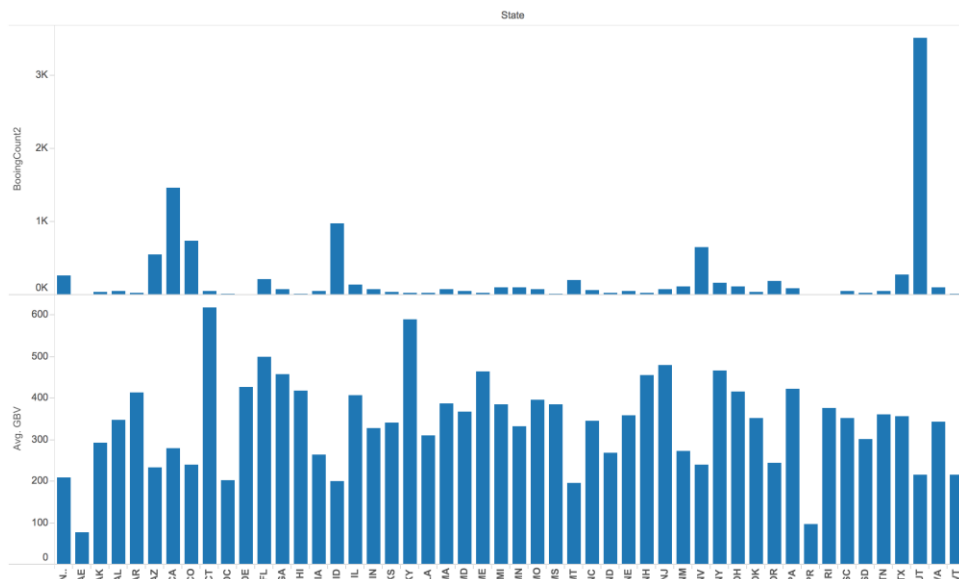
The above graph shows all states booked with total number of orders on top, and average order values below. Although there are more bookings in UT and CA, CT and KY are more profitable for our company with an Average Order Value of $617 and $588 respectively. Although they are low quantity, they are worth the extra effort. This data can be used to help us focus our

marketing campaigns around the most profitable areas. We can also look at this data by state to see if there is a way to bundle/upsell customers from these states. We could suggest additional items with higher advertising costs to the customers from CT and KY. For the states where they are spending less, we will still recommend additional items but will focus on more economical options that they may be more likely to add.
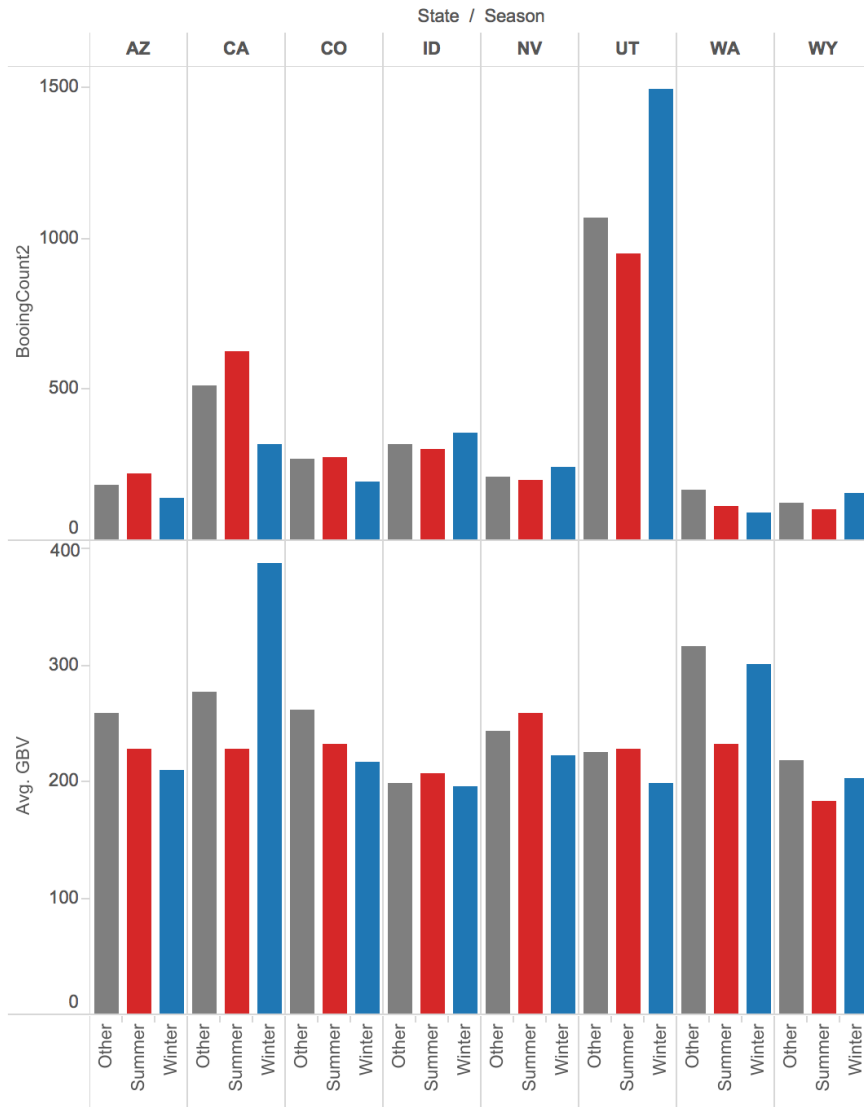
III.   Weekday vs Weekend by State:
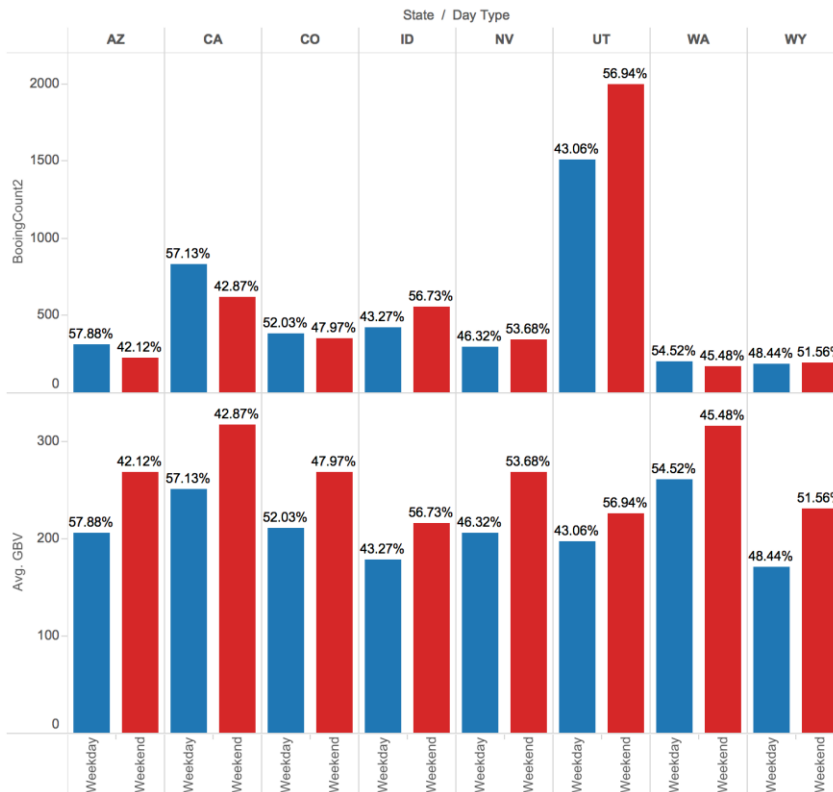
This graph shows the percentage difference of bookings made on weekdays and weekends results in 100% accounting for the top 8 selling states. The bottom graph shows the average order value for each state by day type. Weekends have higher average order values because the customer generally stays more nights. Weekend visits, therefore, represent customers who are willing to purchase more days at one time, which obviously makes these customers more valuable.

Given that these customers are more valuable us, we should be willing to spend more money advertising to attract these customers. On top of that, there are states that have more weekend visitors than weekday visitors. This will let us focus our advertising campaigns in these states towards the blend of weekday vs weekend customers that are coming out of that state.

When given the option we should emphasize on those weekend states as they are more valuable. Weekday customers, while they are less valuable than weekend customers, can still be beneficial for the company so long as our expenses to attract these customers still leave us with a profitable margin. By identifying the states with business/weekday travelers we cannot only make sure that our advertising in targeting the right type of customer, but that the amount we invest in that state matches the type of customer we hope to attract.

IV.   Seasonality by State:

State / Season

| AZ | CA | CO | ID | NV | UT | WA | WY |

BooingCount2

1500

1000

500

0

400

Avg. GBV

300

200

100

0

Other Summer Winter (repeated for each state: AZ, CA, CO, ID, NV, UT, WA, WY)

Much like the previous graphs, this report shows the total number of bookings in each of the top 8 selling states segmented by seasonality. We have organized seasonality into three parts: winter, summer and other. We decided to spilt the year into these three categories as we feel that this will capture the two distinct tourist seasons (winter and summer) and then lump the less popular tourist times of spring and fall together. The correlation can also be seen below with the average order value for each state by season. One point that is interesting, is that the most profitable season for Reservation Desk varies based on the state where the customer is booking from. This helps us to eliminate some of the seasonality that could otherwise exist if there was one true tourist season for all states. Overall, winter does have the highest average order values. In general it looks like warm states tend to use the website more to visit during the winter, and cold states tend to use it more to visit during the summer although this rule is not absolute and there are exceptions.

If we look at the state of California specifically, we see that even though California visitors book more in the summer, it is more profitable to attract customers from California in the winter when the average is worth over $150 more per booking. Knowing this, we are willing to spend more to advertise to California customers in the winter than we are in the summer. Although we cannot be certain from our available data, we assume that this has to do with the ski season, and the higher hotel rates for the high occupancy on powder days. If we look at Nevada specifically, we see that there are no significant differences in quantity of bookings they make by season. However, Nevada customers actually spend slightly more on their bookings during the summer season and so we should spend more on advertising to Nevada customers during the summer

instead of the winter. Finally, let's look at the Utah customers specifically. Utah customers book more rooms during the winter season by far. However they are much more savvy shoppers in the winter compared to customers in other states based on how much they are willing to spend per booking. This could be due to their familiarity with the state or it could be that their bookings are for less total days due to their relative proximity to where they live.

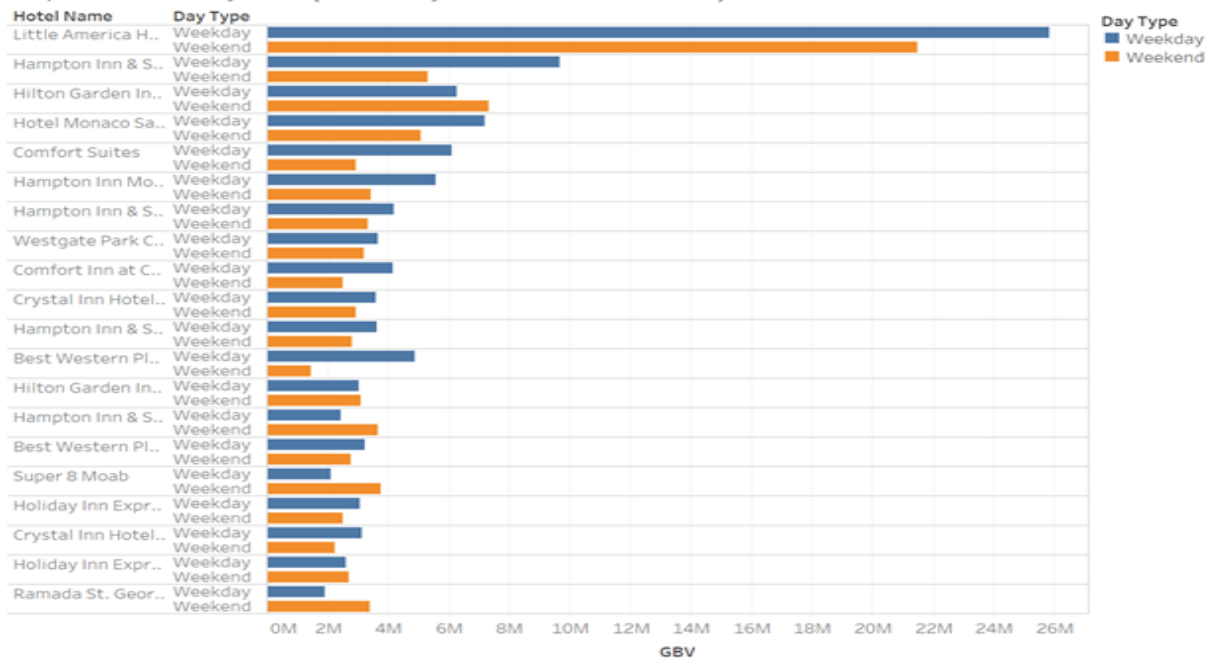V.   Weekday vs Weekend by Season:
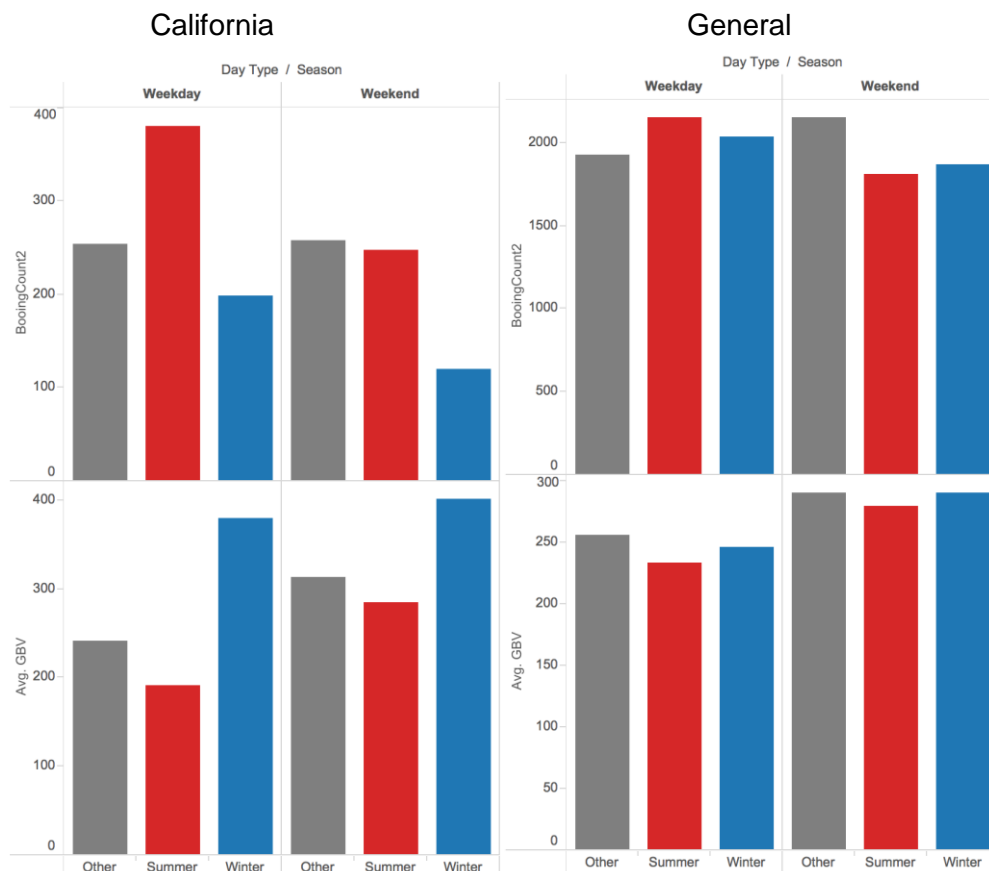
California: The next graph that we wanted to look at is the difference between weekday and weekend customers by season. We will look at the California customers first and again we see here that the average booking is more valuable during the winter regardless of whether it is weekday or weekend. Interestingly enough weekday travel decreases during the winter, which we assume is because business travelers may be more wary of poor weather.

General: If we look at the overall data to the right, we see that again, winter travel is by far the most valuable on a per booking value. Another point that was interesting to see is that there are slightly more weekend visits during 'other' which consists of our spring and fall periods.

VI.   Hotels by Gross Booking Value:

Top 20 hotels by GBV(weekday and weekend sales)

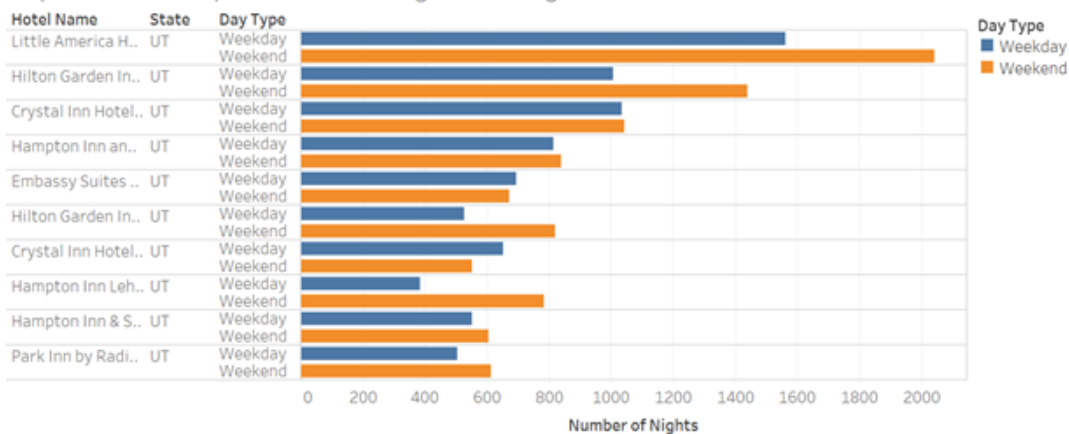| Hotel Name	Day Type
Little America H..	Weekday / Weekend
Hampton Inn & S..	Weekday / Weekend
Hilton Garden In..	Weekday / Weekend
Hotel Monaco Sa..	Weekday / Weekend
Comfort Suites	Weekday / Weekend
Hampton Inn Mo..	Weekday / Weekend
Hampton Inn & S..	Weekday / Weekend
Westgate Park C..	Weekday / Weekend
Comfort Inn at C..	Weekday / Weekend
Crystal Inn Hotel..	Weekday / Weekend
Hampton Inn & S..	Weekday / Weekend
Best Western Pl..	Weekday / Weekend
Hilton Garden In..	Weekday / Weekend
Hampton Inn & S..	Weekday / Weekend
Best Western Pl..	Weekday / Weekend
Super 8 Moab	Weekday / Weekend
Holiday Inn Expr..	Weekday / Weekend
Crystal Inn Hotel..	Weekday / Weekend
Holiday Inn Expr..	Weekday / Weekend
Ramada St. Geor..	Weekday / Weekend

Sum of GBV for each Day Type broken down by Hotel Name. Color shows details about Day Type. The data is filtered on Top10 hotels by GBV, which keeps 20 members.

When looking at the most profitable hotels it is fairly simple to rank the hotels in order from greatest to least. I think that this is a fairly good analysis to do because it would allow us to do further analysis on the individual preferences and then target them with offers for hotels that are just slightly more than their normal hotel booking. In this way we hope to increase the value of individual customers over time. In addition this graph will allow us to look at hotels by weekday vs weekend and then we can promote hotels based on what their strength is in either weekdays or weekends.

VII.   Top 10 Hotels by Number of Nights Booked:

The below analysis is especially important because we already know that multi-night customers are far more valuable than single night customers as we are able to allocate the expense of advertising over more days. This graph helps identify the hotels that are most likely to attract multi-night bookings from customers. One thing that we can use this graph for is to help us try and move customers away from hotels that are typically single night stays and towards these hotels that have a higher percentage of multi-night stays.
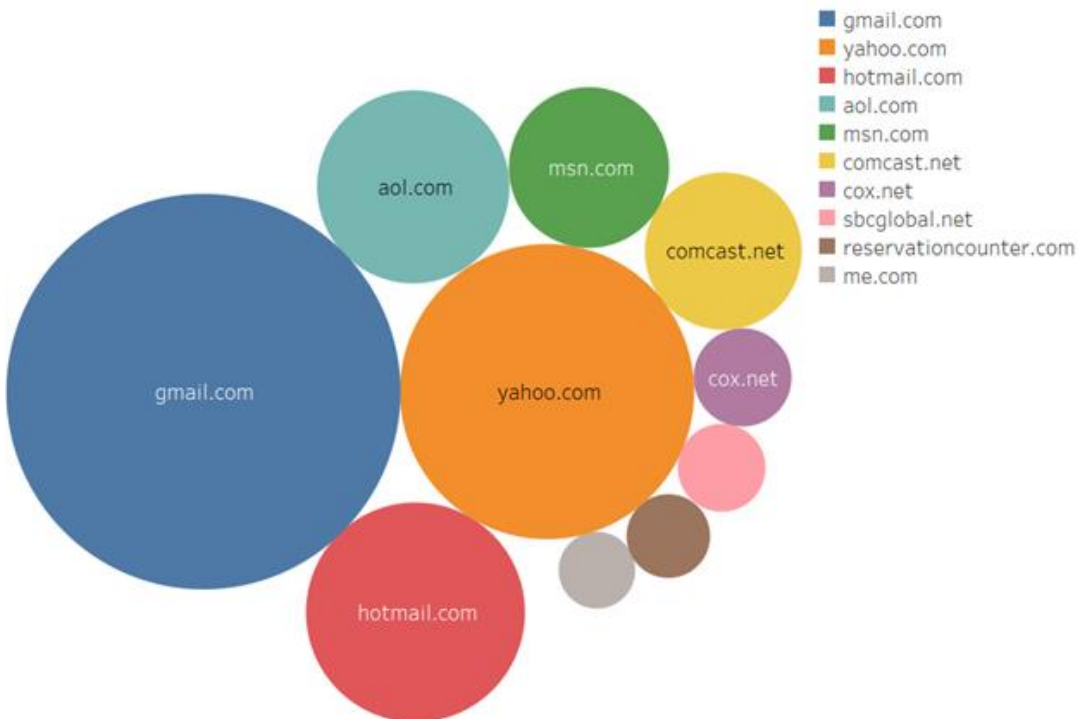
Top 10 hotels as per number of night booking

Hotel Name	State	Day Type	
Little America H..	UT	Weekday	
		Weekend	
Hilton Garden In..	UT	Weekday	
		Weekend	
Crystal Inn Hotel..	UT	Weekday	
		Weekend	
Hampton Inn an..	UT	Weekday	
		Weekend	
Embassy Suites ..	UT	Weekday	
		Weekend	
Hilton Garden In..	UT	Weekday	
		Weekend	
Crystal Inn Hotel..	UT	Weekday	
		Weekend	
Hampton Inn Leh..	UT	Weekday	
		Weekend	
Hampton Inn & S..	UT	Weekday	
		Weekend	
Park Inn by Radi..	UT	Weekday	
		Weekend	

Day Type
■ Weekday
■ Weekend

Number of Nights: 0 200 400 600 800 1000 1200 1400 1600 1800 2000

Sum of Number of Nights for each Day Type broken down by Hotel Name and State. Color shows details about Day Type. The data is filtered on Top 10 hotels as per no of booking, which keeps 10 members.

VIII.   Top 10 Domains for Booking Hotels: The obvious take away from the below analysis is to identify the channels that most customers are using to book hotels and then to

Top 10 domain for booking hotels

■ gmail.com
■ yahoo.com
■ hotmail.com
■ aol.com
■ msn.com
■ comcast.net
■ cox.net
■ sbcglobal.net
■ reservationcounter.com
■ me.com

Email Address (Domain). Color shows details about Email Address (Domain). Size shows sum of Number of Nights. The marks are labeled by Email Address (Domain). The data is filtered on Top 10 email domain, which keeps 10 members.

advertise in those channels. However another more interesting way to look at this information would be in combination with advertising cost information. The more popular

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a platform is the more advertisers it attracts which increases the cost of advertising in that space. We hope to use this information to help us identify opportunities to advertise on the less expensive platforms that still attract our customers. Essentially, we plan on using this information as we analyze where to spend our advertising dollars to try and maximize the value we obtain with advertising.

IX.   Top 25 Hotels Mapped:

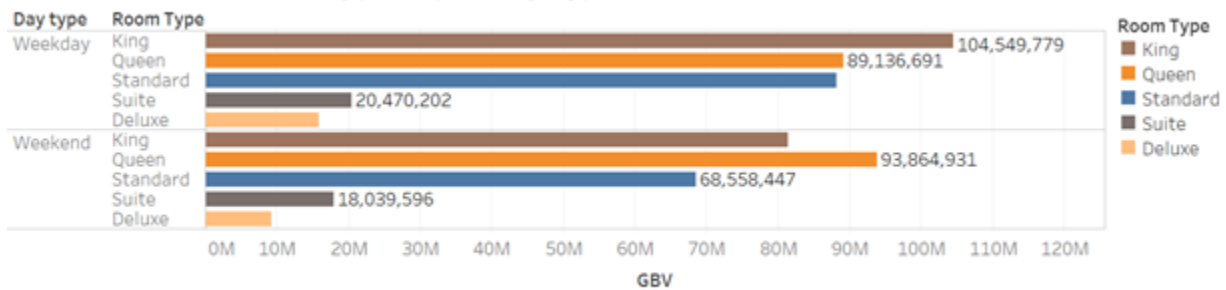Top 25 hotels on map based on GBV
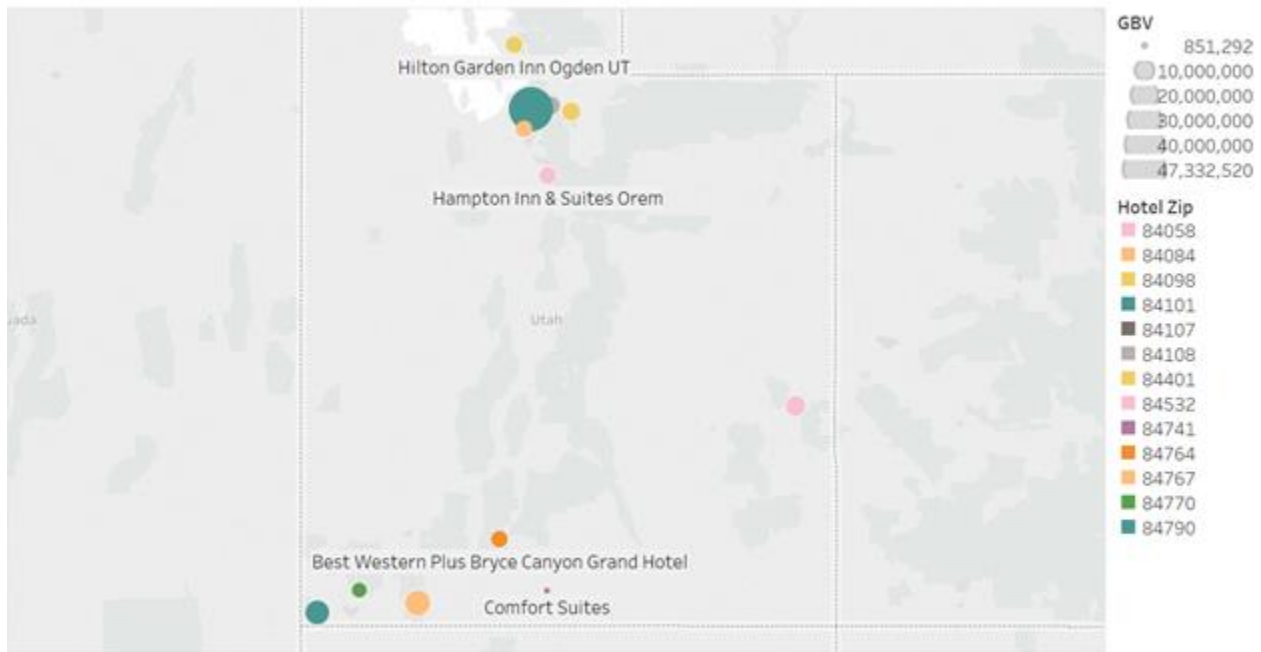
Map based on Longitude (generated) and Latitude (generated). Color shows details about Hotel Zip. Size shows sum of GBV. The marks are labeled by Hotel Name. The data is filtered on In / Out of Top10 hotels by GBV, which keeps In.

It is useful to map where bookings are happening especially in conjunction with an understanding of the state. For example we know that advertising a skiing weekend for a Best Western in St. George or Moab is a bad idea. However advertising for a skiing weekend at a Best Western in Salt Lake City would likely have a better outcome.

X.   Most Profitable Room Type for Weekday vs Weekend:

When we look at weekday bookings versus weekend bookings we generally assume that weekday booking have a higher percentage of business travelers. With that understanding it is interesting to note that during the week rooms with King beds are the most popular but on weekends Queen beds are more popular. Although we can't prove this with our current data, we think that this may be because when businesses are picking up the bill people are more willing

Most Profitable Room Type as per Day Type

Day type	Room Type		
Weekday	King		104,549,779
	Queen	89,136,691	
	Standard		
	Suite	20,470,202	
	Deluxe		
Weekend	King		
	Queen	93,864,931	
	Standard	68,558,447	
	Suite	18,039,596	
	Deluxe		

Sum of GBV for each Room Type broken down by Day type. Color shows details about Room Type. The marks are labeled by sum of GBV. The view is filtered on Room Type, which has multiple members selected.

to spend for the larger bed. The inverse being that when people are on vacation and will be paying their own bill they are more price sensitive and select Queen beds.

XI.   Booking Totals by Room Type:
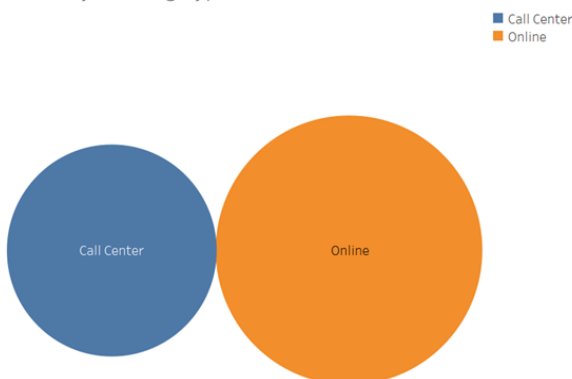
Sum of Rooms Per Room Type
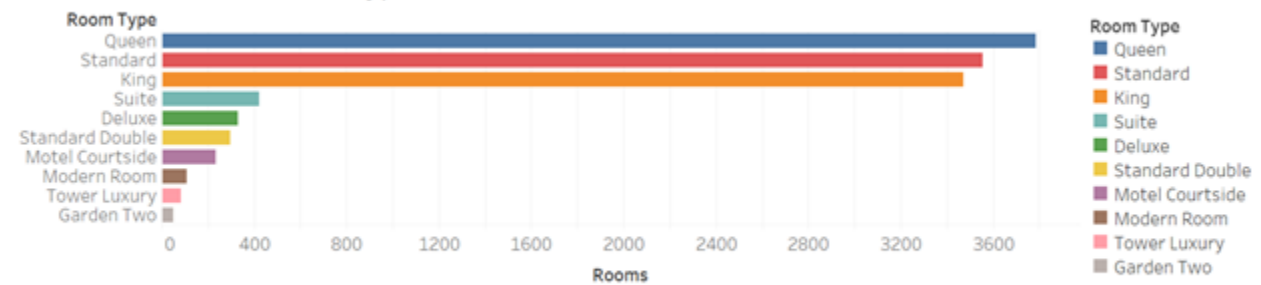
Sum of Rooms for each Room Type. Color shows details about Room Type. The view is filtered on Room Type, which has multiple members selected.

An analysis of room types helps give us insights into which types of room we should advertise for, which types of room will stand on their own and which types of rooms we shouldn't spend money advertising.

XII.   Call Center Bookings vs Online Bookings:

Sales By Booking Types

We believe that call centers are predominantly use by two types of customers. First they are used by people who are uncomfortable using or making purchases online. Stereotypically this group is largely constructed by elderly people who have never adopted online life. The second type of customer are individuals who need extra assistance or advice for their booking and call to speak with the travel guide. The online group will be made up of a wider variety of people, all of whom are computer literate. Knowing the

Online / Offline. Color shows details about Online / Offline. Size shows sum of GBV. The marks are labeled by Online / Offline.

differences in the two groups allows us to try and target our advertising towards them.

XIII.   Using 'R' (programming language) for Data Cleaning:

We used 'R' to remove redundant values from 'Room' Column from our Data set. Prior to the implementation of R, the values in the column were a fusion of 'facilities' offered in the room with 'room type'.

For E.g.: '2 QUEEN BEDS-NON-SMOKING-FREE WIFI-COFFEEMAKER'
After Implementing R: 'Queen'.
Inbuilt R functions from base package such as gsub() and complete.cases() were iteratively used to achieve the aforementioned result.A small sample of code used to implement R in the project is given below.

```
/*R script starts*/

/*To load the csv file in a data frame*/
project <- read.csv("Reservation_Desk_data.csv", na.strings = "")

/* Reassigning the value of data frame for usability purpose */
p1 <- project

/* To check if there are any na values in the data set */
p1[!complete.cases(p1), ]

/* Assigning Sample values to NA */
p1$Room.Type[which(is.na(p1$Room.Type))] <- "Standard"

/* Finding Pattern using Regular Expressions and replacing */
p1$Room.Type <- gsub(".* KING.*", "King", p1$Room.Type)
p1$Room.Type <- gsub(".* queen.*", "Queen", p1$Room.Type)
p1$Room.Type <- gsub(".*Standard .*", "Standard", p1$Room.Type)
p1$Room.Type <- gsub(".*Deluxe .*", "Deluxe", p1$Room.Type)

/* To write a cleaned data frame in the csv file*/
write.csv(p1,file="Reservation_Desk_Filtered.csv")


/* End of R Script */
```

CONCLUSION

The data that we have used on this analysis is only a small portion of what the entire website truly produces. The next step is to see if these trends are consistent across all regions and customers. If these insights prove to be true, our advertising team can work to test these trends of marketing more aggressively to leisure travelers and those that are far away.

From our data analysis we also recommend that ReservationDesk.com increase spending in advertising in a few key areas. First, Kentucky and Connecticut customers are excellent candidates for us to expand our business because our most valuable customers are from these states. We would encourage an increase in seasonal advertising in California. We feel that there is a very large untapped market in California that we could capture more bookings from. The company has a mindset to decrease advertising in the winter and that our "peak season" is in the summer. Our hope is that they will find success in pushing markets harder like Utah where leisure travelling is still high in the winter months.

As we look to change the website and the user's experience, we were interested in finding that weekday rooms featuring a King size bed higher in frequency than our Standard or Queen size rooms. From this information we would recommend to place and promote King rooms more than the others for weekday business travelers, and to push Queen beds for weekend leisure customers.