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Objectives

The hotel industry has undergone a huge restructuring after the covid era and embarked onto new strategies in an ever and challenging environment. One such strategy is the Customer relationship management (CRM) process, where hoteliers seek to build meaningful and profitable relationships with customers. CRM essentially is customer centric. It is about identifying, retaining and growing a company's most valuable asset- the customers!

Another popular strategy is the Hotel Revenue Management (HRM). Traditionally, HRM is the art of selling the right product to the right customer at the right price through the right channel. HRM at its core is maximising the net profit generated from the Hotel's property.

CRM and HRM work in perfect tandem in achieving these objectives. It does this and does well by adopting analytics and usage of existing data to predict customers' behaviour.

Thus, we begin by asking questions around these themes by first knowing your customers and how to relate them to boost our bottom line.

Questions you may ask ...

- Who are our most valuable customers and when do they visit?
- Discover how types of deposits taken can affect revenue
- What are possible reasons for bookings cancellations?
- What can be done to limit the impact of cancellation has to our revenue and expenses?
- Discover the customers we should direct our marketing efforts during times of low seasons
- Identify avenues to increase sales
- Who amongst our most valuable customers, can we direct marketing and service dollars to retain and upsell?

Data Preparation

The hotel.csv file was uploaded to the Tableau workbook without any hinges. Observing and studying the data at the outset was crucial to prevent later mishaps. I noted that the data was generally clean, it is not practical to weed and clean the data deeply as my Excel skills are not up to par.

I have converted string months to numbers to concatenate other date variables into a date() data structure thus allowing me to utilise this field for a more continuous and thorough visualisation of trend over time.

The meta-Data explanation were perused before embarking on creating visuals.

An important indicator of performance known as the Average Daily Rate (ADR) was carefully researched and understood. ADR is the closest we have data on revenue performance and forms the basis of HRM. ADR is in simple words, the revenue generated by all our sold rooms divided by the number of nights you sold them for.

Working on a ratio like ADR allows me to make comparisons between customers and not allow large absolute numbers to distort the picture.

Further reading was also carried out to understand how car park spaces and special requests and hotel cancellations can impact on revenue and cost.

Parking provides good revenue to the hotel industry, but it must not be to the extent to price gouge the customer. The price equilibrium should achieve both as a service and revenue.

What exactly are special requests? Upon research, these requests may be offered to customers for free. Examples typically offered free are extra towels, toiletries, a change of higher floor. To the customer is free, but to the hotelier, some of these requests affect the variable bottom line, while some do not such as change of room or floor. The lack of detail in the data forces me to assume to behave as a variable expense.

Identify the Business Risks and Opportunities

Heat map Chart


Density of **High Bookings** and **Lull Periods**
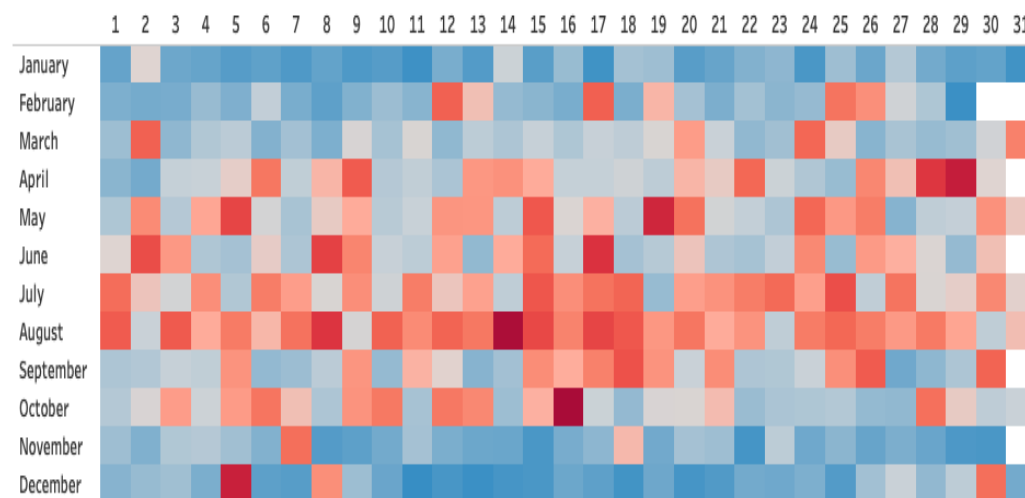
One of the biggest risks is not knowing periods when rooms tend to be vacant or periods of full occupancy where room pricing was suboptimal, or services were jeopardized due to poor planning. Knowing the months affected allows planners to forecast and organise sufficient resources to ensure satisfactory service and profits.

The heatmap is an excellent choice allowing days and months plotted. Clearly highlighting, not only busy periods between May and August but also telling us the middle of these months are the peak.

Between November and February of the following year marks the period of lull. The hotels should target the below mentioned listed countries to sell their rooms (refer to the next horizontal bar chart). They are measured on non-cancelled bookings and filtered for only high ADR customers of a minimum of 30 non-cancelled bookings.

High ADR & Non-Cancelled Bookings Countries to Target
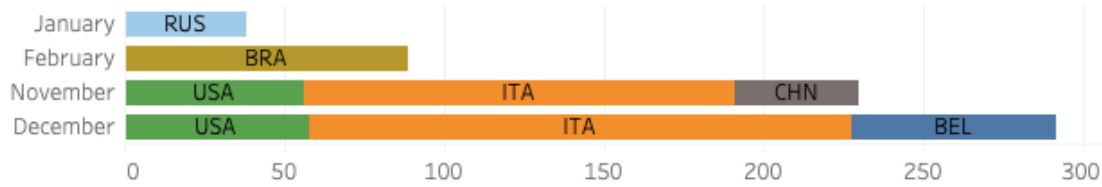
For example, January attracts Russians and February attracts the Brazilians. While in November and December, the hoteliers have greater opportunities to catch as far as China and USA. You would notice overall bookings are very small. Management is advised to divert resources in attracting these customers. They have so much to offer in times of lull and the diversification of risks.

Scatter Plot Chart- ADR vs Lead Time

Daily Rate vs Lead Time in Busy May to August
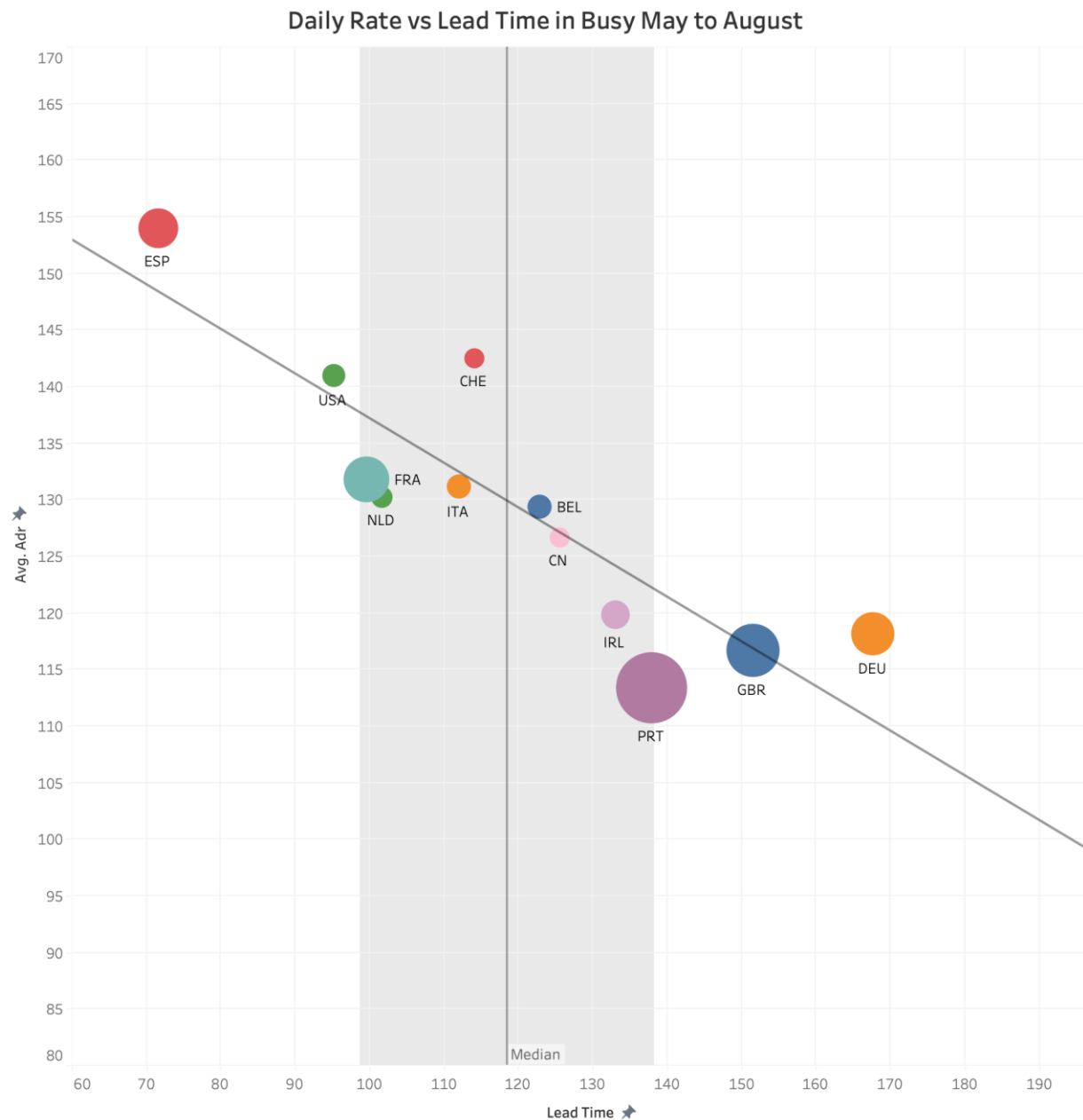
Lead time is defined as the time when a booking is made and the expected time of arrival. ADR is the average daily rate, a ratio that is closely monitored as it tells hotelier how efficient it was able to churn revenue for every room sold. The ratio allows a level playing field to make comparisons between customers.

The scatterplot chart was chosen as it is the best choice to reflect a trend and correlation of data values of two given fields against each other. It also allows easy notice of rate via their gradient. The size of the circles indicates the volume of non-cancelled bookings the country makes.

The chart plots ADR against Lead Time and filtered for "high-net-worth customers" (HNW). The scatter plot chart is selected as it allows for correlation and trends to be determined. Customers are filtered for ADR > 90, and non-cancelled bookings of above 600 in the busy four months.

The result shows the median is at approximately 120 days and the trend suggests that the greater the lead time, the lower the "value" of the customers.

It also suggests the Spanish, USA and French tend to make shorter booking times thus possibly paying more for them. Investigation to their demographics is warranted, it could mean they might be mainly business travellers allowing us to upsell services to them.

Further analysis also rightly pinpoints that the hotel can organise their activities such as hiring more staff around the lead time of 100 to 140 days, to cater to many of its valuable customers resulting in greater net profits while maintaining high standards of service.

On the other end of the spectrum, we have the Germans, British and Portuguese who tend to make bookings much more in advance. Since they are of lower HNW, are these people worth spending valuable resources on? The hotelier may risk a higher probability of cancellation with such a long lead time. We shall investigate this further.

Scatter Plot Chart- Risk Reward Matrix
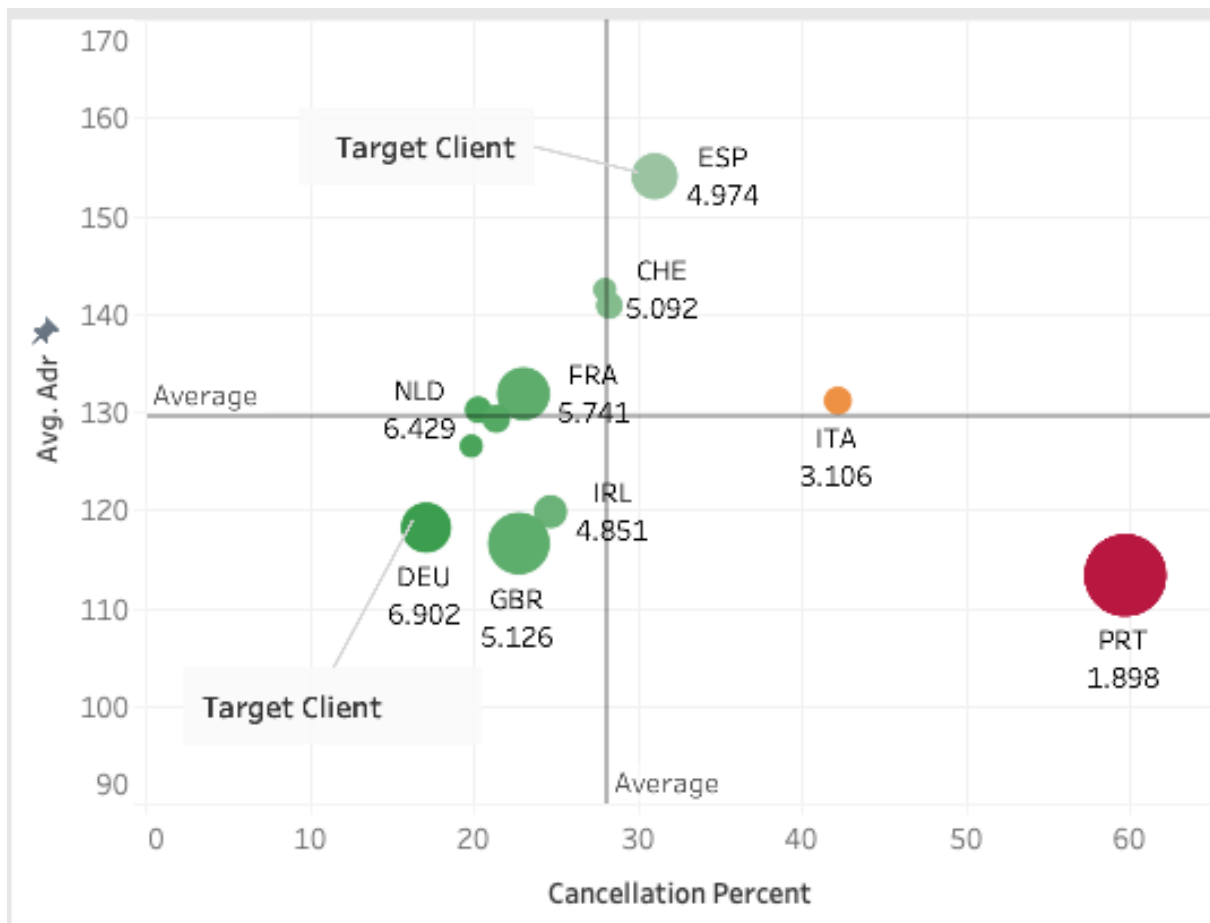
With the many findings covered, I was motivated to discover the risks and rewards of these countries to the hotel in more measurable form, to add financial decision making. I find a risk/reward matrix to be ideal.

To allow me to build one, I needed a scatter plot. The scatter plot benefits are plenty as earlier mentioned. With the same motivations, I was able to develop a risk/reward matrix chart which uses only members of the HNW club and in peak periods. Colours such as red were used to indicate high risks of cancellation. Green represents rather safe.

The colours represent risk of cancellation. Green being low risk. Red being very high risk.

Avg -ADR represents the dollar return from an investment, and bookings cancellation percentage represents the risks you undertake. Then the ADR is divided by the cancellation percent to give you the **risk adjusted return ratio**.

For example, DEU has a risk adjusted return ratio of 6.902, a low-risk investment as it sits on the lower left quadrant while maximising your dollar invested. It can be interpreted as, for every percentage of risk taken, your return on investment is $6.902.

And should Management decide on taking additional risk, Management may focus their resources on customers on the upper left quadrant. I suggest ESP (though it is slightly more to the right) in that respect.

The quadrant which PRT sits in can be defined as high risk, low return. Intuition tells you that PRT is an unwise investment. Do note that PRT is highlighted in red indicating danger due to its large cancellation rates.

Vertical Bar Chart

Cancellation Risk Among High ADR Countries
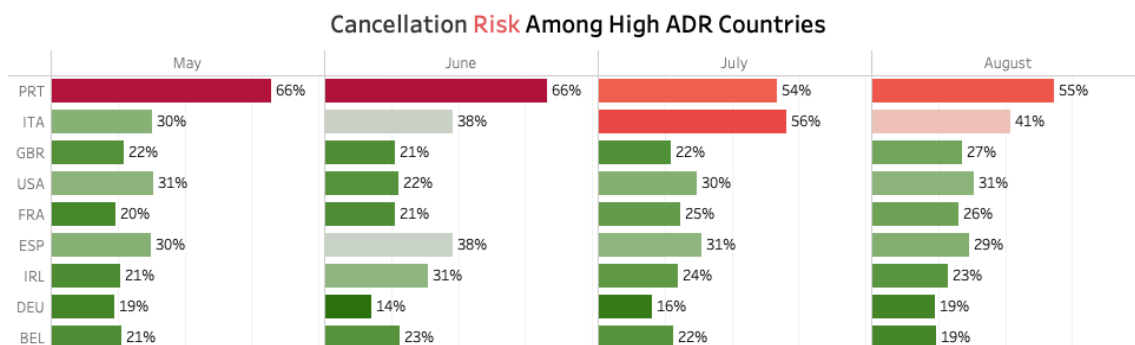
Indeed, intuition backed by this easily understood comparative bar chart where cancellation percentages values were factored to suggest among our most valued customers, the Portuguese (PRT) and Italians (ITA) are prone to making large booking cancellations especially in the peak months of May and June. Colours were manipulated to suggest danger by its distinguishable red indicating very high cancellation rates and green being at the lower end.

For these reasons, we should investigate as to why the Portuguese have such large cancellations to their bookings.

Investigate Portuguese High Cancellation Rates

Tree Map Chart
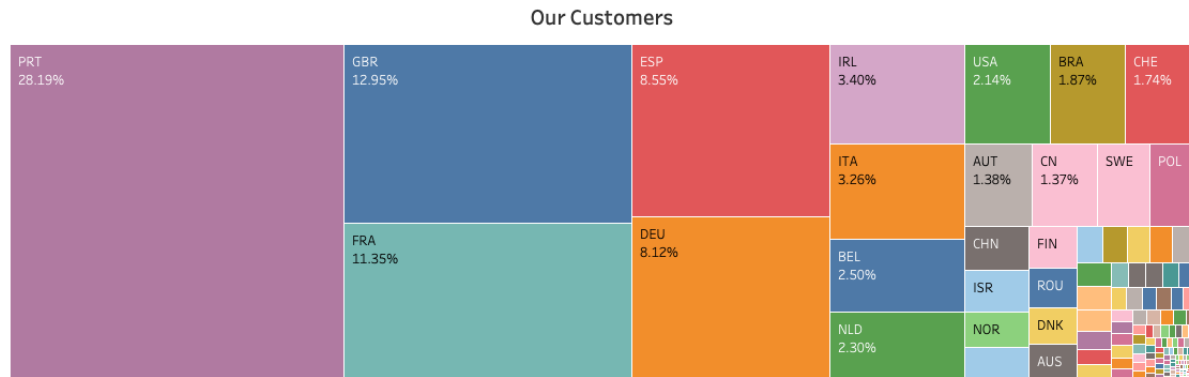
Our Customers

Why are we asking questions about the Portuguese? The tree map clearly shows the proportional booking size PRTPs relatively to the hotel's other customers. In fact, PRT is 2 to 3 times bigger than the next two largest customers.

This chart is created using only non-cancelled bookings. I wanted to point out that PRT is still a valuable customer even with its short comings. If I instead factored in total bookings, PRT will form close to 50 percent of the entire bookings. This is a red flag pointing to trouble as the hotel is not spreading their risks far enough.

Scatter Plot – Cancellation numbers vs Number of No Deposit Types

Cancel against No Deposits
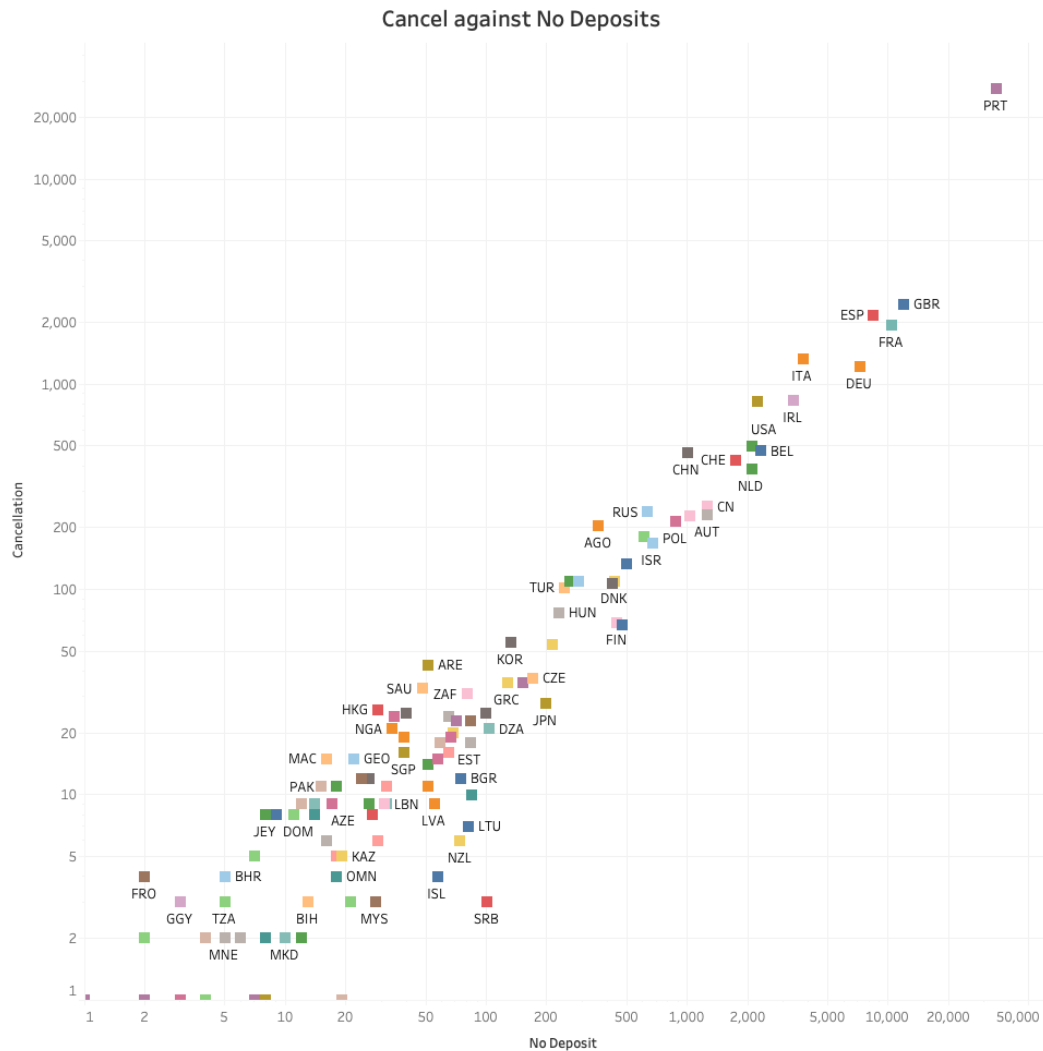
Once again, a scatter plot is used to show a trend between cancellation and no deposits. My intuition tells me that no deposit to the bookings will result in higher cancellations. I needed evidence suggesting the obvious and this chart rightly showcase a positive trend to the top right with the sample size forming a tight cluster suggesting a more positive correlation.

The chart takes in samples for all the three years we have data on and includes all customers recorded. The scatter plot is also adjusted to a logarithmic scale allowing one to visualise all sample size with ease. It is with ease one should spot PRT sitting at the top right corner.

You should be able to also notice PRT has the highest gradient amongst HNWs suggesting higher rates of cancelling than its peers when no deposits are made.

Bar Chart- Deposit Types
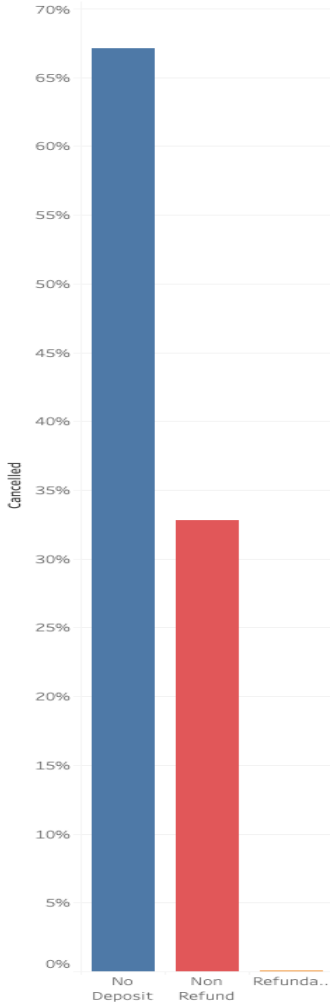
A short introduction of No Deposit vs Non-Refund vs Refundable via a clear comparative horizontal bar chart indicates an unsurprisingly high incidence of cancellations when no deposits were taken.

Surprisingly, Refundable deposits have the least percentage of cancellations. But it also suggests to me that the hotel has likely taken very little "refundable deposits" as the concept of refundable differs little from no deposits. Are the hotels staff defaulting to "No Deposit Types" when they are unaware of the benefits of refundable types?

Leaning towards Non-Refundable deposits. I think this is the right direction to take. As mentioned, we should border around the industry average of 24 percent. A high percentage of cancellation is detrimental to the hotel especially in peak seasons. An insurance such as non-Refund should be made mandatory in peak periods. A lesser path of refundable maybe optimal in down time.

Scatter Plot Chart – Gant Bar – Cancellation Numbers vs Lead Time

Cancellation vs Lead Time
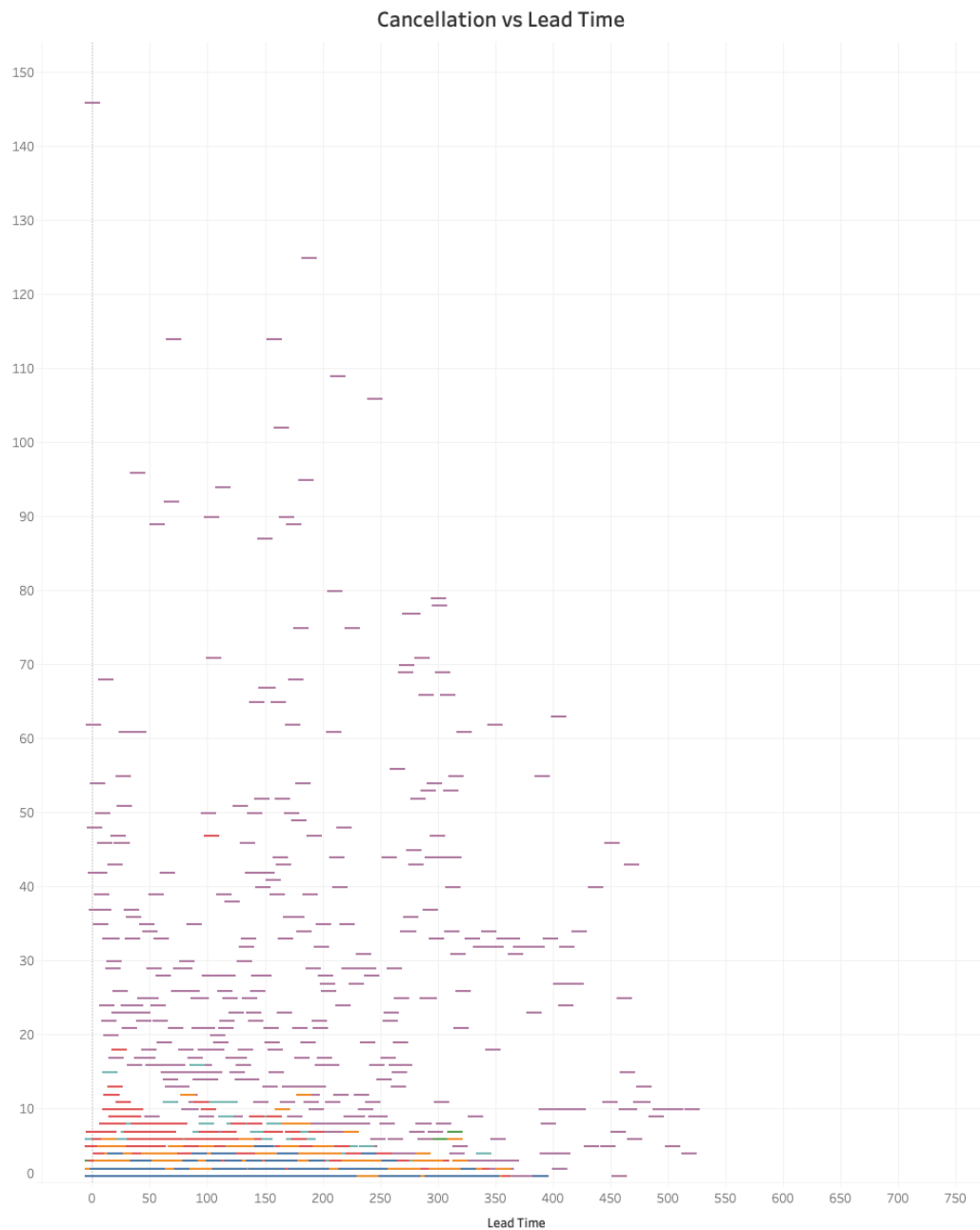
More correlations and hence Scatter Plot chart was selected. Do note that purple represents the Portuguese.

The scatter plot is filtered for HNW and busy months. Total number of cancellations were plotted against lead time in the hopes of finding a reason.

The Gant bars allow us to see clearly of every lead time PRT booking made. Other shapes like line or circle blurs or hides values as PRT are relatively very large. Generally, you can see that the majority of PRT follow the trend of its peers where the earlier a booking is made, the likelihood of cancelling decreases.

But you can also see that there are also wide numbers of PRT bookings scattered with high numbers of cancellation of 30 and above which does not follow the trend of its peers. These outliers are contributing to the oversized cancellation bias.

In fact, when I plot Days-in-Waiting in the follow chart (See below) utilising the Boolean future to segregate non-cancel and cancel of bookings, seem to affirm that the Portuguese have the tendency to cancel when they are unable to obtain an immediate answer. They may tend to prebook with many other hotels when they have nothing to lose while waiting for confirmation.

Boolean Correlation Chart

Days-In-Waiting List vs Cancellation
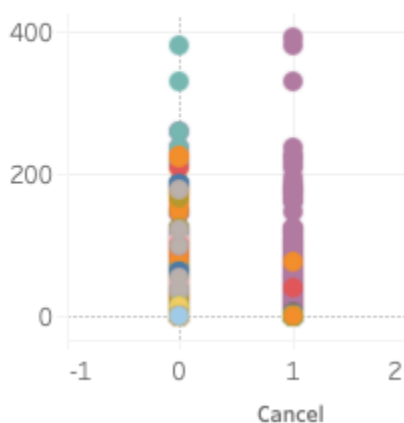
Conclusively, the evidence so far suggests to me that the PRT possess characteristics of risk averse people who are noted for stretching their dollar where and whenever possible while placing a high value for "not losing out".

Study into their demographics and psychological motivations to money should be investigated by the relevant departments, thus allowing the hotel to come up with policies tailored to this group without discrimination.
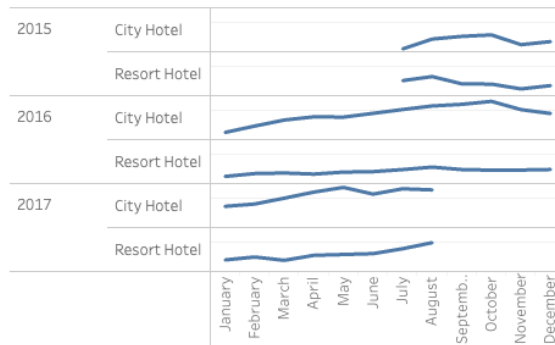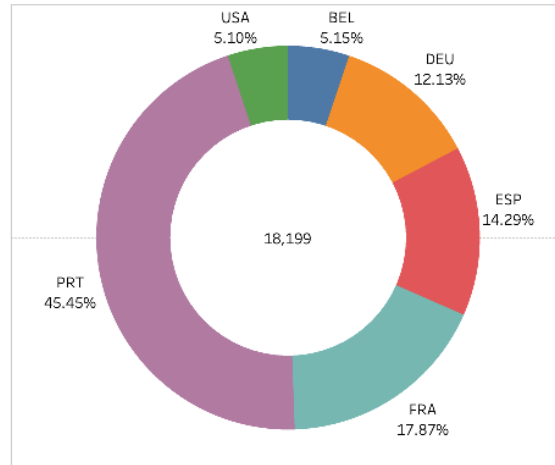
Are Delivery of Service Satisfactory?
Pie and Trend Line Combination Chart

Evaluate improvements to revenue/cost and service

Car Space Requests
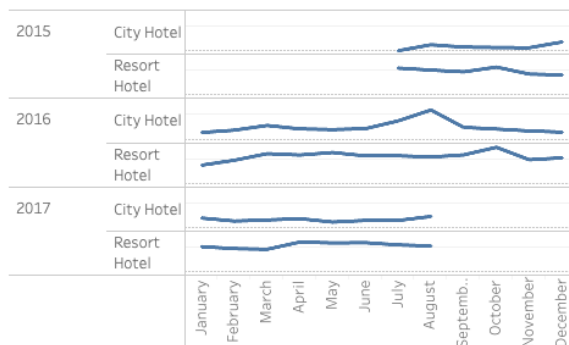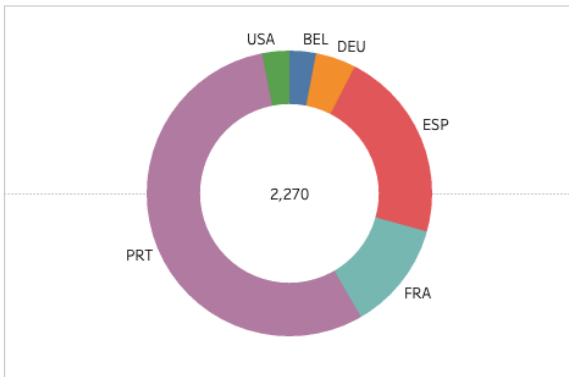
Percentage Special Request

From investigating the Portuguese, I shall turn my attention to finding any short comings in the delivery of service in aspects of Car Space Requests and Special Requests to the hotel's other valuable customers.

Donut charts were utilised to allow for easy comparisons between HNWs in consuming our services and supported by trend line charts. In the study of car space, as the meta-data is unclear, I would in this study assume actual car space required in non-cancelled bookings.

The Donut chart indicates that the PRT are high users of parking spaces more so than its counterparts. Do recall that PRT is 2.5 times larger than the next two largest customers but reflects an almost 50 percent usage. It is also to be noted that ESP has a noticeable usage indicating their high ADR value hence possible higher car ownership/usage. However, trend analysis suggests there is no growing requirement for building more car spaces hence in this respect, the service provided is satisfactory.

Analysing the special request donut chart indicates that the Germans emphasise more on requesting special services as opposed to parking. Do recall from earlier charts suggest that investing into the Germans might be warranted as they provide the highest risk/reward benefit amongst our HNW clients.

Trend analysis suggest that the hotel City Hotel has a growing trend over the years as compared to the rather flat trend of Resort hotel. Why is City Hotel having a growing trend in Special Requests compared to Resort Hotel?

We hope to answer this question in the following dashboard.

City Hotel and Rising Special Requests
Dashboard
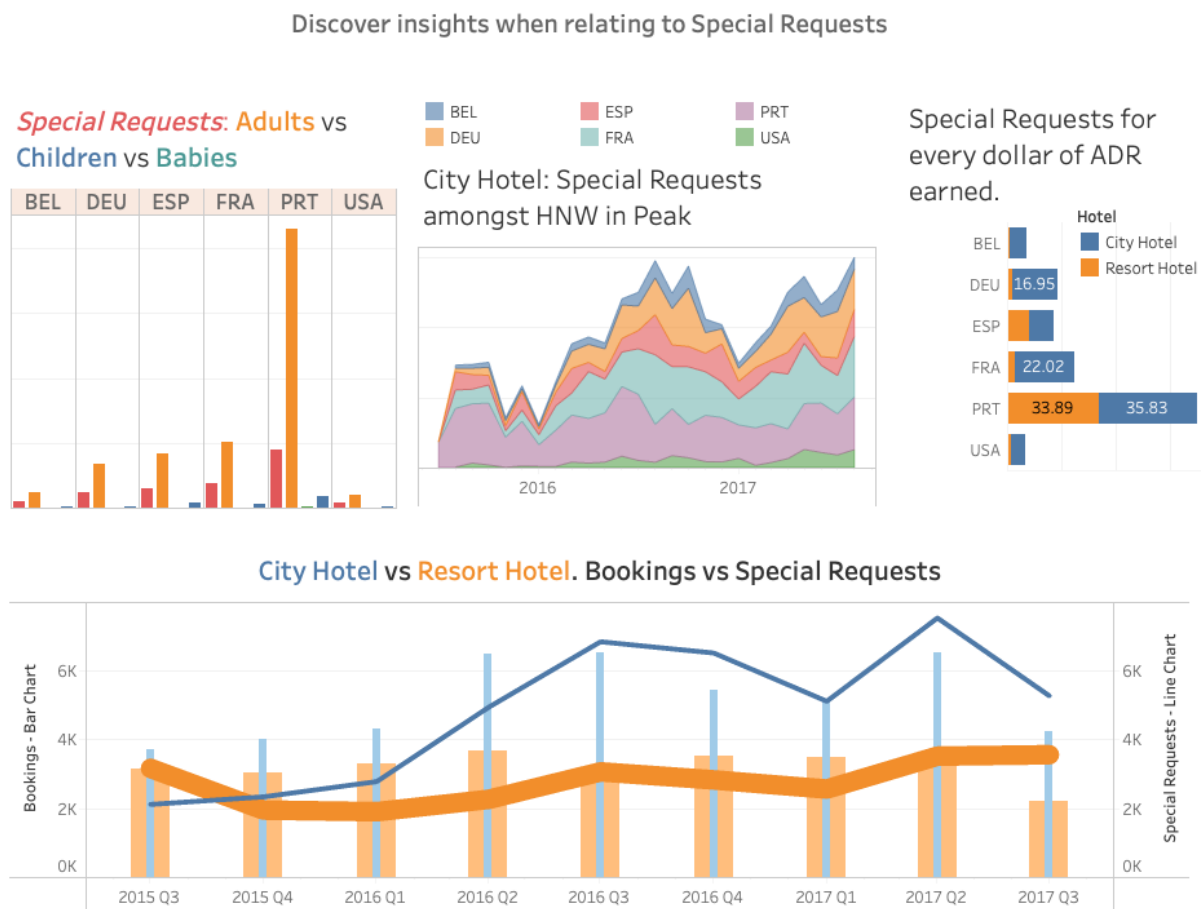
By now, we would have a good understanding of the many benefits and uses of the various types of charts. I do not wish to keep reiterating their uses and benefits but prefer to speak about them now as a dashboard.

Total Requests were plotted against other dimensions to uncover any correlation and trend. Special Requests in this study is assumed to affect the variable cost of expenses. Balancing the cost of special requests and the delivery of satisfactory service is the desired goal.

Bar Chart

Plotting Special Requests in a bar chart split between Adults vs Children vs Babies for each HNW countries for all hotels indicates that the costliest function points to PRT with family comprising mainly of adults. However, unclear trend can be observed from other HNW countries in any family composition. Again, this affirms my belief for management to enquire into the special requests provided to Adults from PRT to avoid any exploitation of services.

## Horizontal Stacked Bar Chart

Observing the horizontally stacked bar chart filtered for busy months of all three years, where the total sum of Special Requests was divided by the average ADR. This comes up a ratio value as labelled. It basically says for every dollar of ADR revenue, it will cost you by the number of special requests made. In the absence of hard accounting data, this is as close as quantifying cost.

The stacked bars are then split between the differentiating hotels by colour. Observing the comparisons, I see that the majority of HNWs are making more special requests in City Hotel while the so-called risky PRT is balanced for both hotels.

Stacked Line Area Chart

The stacked line chart over the continuous three years was perfect in zooming to City Hotel and provide a view of a higher highs and higher lows trend while also displaying the volume of such special requests. I notice the Germans and the French are making an impact in both respects. Overall, the line also indicates the total number of Special Request has been trending up as well.

Dual Axis Chart – Trend Lines and Bars correlation- Bar in Bar Chart

City Hotel vs Resort Hotel. Bookings vs Special Requests
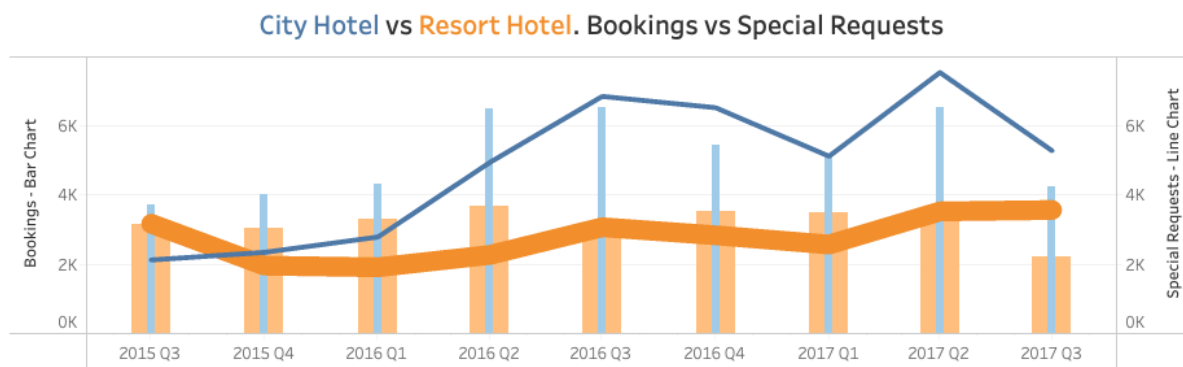
Lastly, I decided to utilise the dual axis trend chart to plot and discover any correlation of non-cancelled bookings with the number of Special Requests for both hotels.

The Bar in Bar chart with different colours allows segregated view of both hotels presenting bookings while also presenting a trend over time. The different coloured lines in the line chart presenting each of the two hotels also supports a trend in that same period.

With bar and line charts in place, we can tell that City Hotel (blue) both variables are in tight correlation and trending positively up, whereas Resort Hotel variables are lacklustre in correlation.

Hence, I have come to conclude that the reason why City Hotel Special Requests are trending positively up over time is simply clients from countries such as Germany and France are relatively making greater

number of bookings with City Hotel. City Hotel is getting more popular compared to Resort Hotel. I recommend Management to study into this and replicate their success.

Conclusion

I would finally conclude by summarising our findings in these bullet points.

- We should divert resources to attract customers from Brazil and Russia as they support us in lull periods.
- We identified that the Germans or Spanish are great to add to our portfolio during peak times. They are also important to diversify our risk
- We identified the Portuguese to be high risk customers as evidence by their high cancellation rates and low HNW.
- No deposit type policies and days-in-waiting list are likely reasons to explain the Portuguese bad behaviour as they have nothing to lose.
- Staff may not appreciate the benefits of refundable deposit.
- I suggest that management to have much more non-refund deposit types targeted at Portuguese customers during peak seasons.
- There could be possible exploitation of special requests by PRT adult customers. Management should investigate the findings.
- City Hotel is getting more and more popular whereas Regent Hotel is stagnant. Study into this.

Reflection

The project has taught me a lot and discover the usefulness of data analysis. I am encouraged to apply these skills on a financial blog site by creating beautiful visualisations to support my assertion.

And yes, I am considering becoming a youtuber after spending countless hours video editing my project. Perhaps I could teach people about how I created my visuals hence monetising my knowledge.

The biggest challenge is trying to think like an Analyst with no experience and answering some quite difficult questions. I overcome this difficulty by googling and playing Tableau a lot.