

Business Analytics Competition 2024

Round 1: Descriptive Analytics

University of Rochester

TEAM ISLAND

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Glossary

€ The euro currency

% Percentage

ADR Average Daily Rate

CRM Customer Relationship Management

GDS Global Distribution System

GHR Global Hotels and Resorts (GHR)

K Thousand

TA Tour Agent

TO Tour Operator

Agenda

- A. Executive Summary
- B. Background and Data Overview
- C. Key Findings
- D. Strategy
- E. Appendices



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Executive Summary

Key Findings

- GHR's hotel and resort's monthly revenue exhibits significant seasonal trends, which are significantly affected by regional factors, with Europe playing a dominant role.
- Market Segment: Online TA leads significantly in both booking volume and revenue contribution.
- Distribution Channel: TA/TO is the most commonly chosen among all booking channels for both properties. in ADR and total revenue.
- Repeat Guest: New guests dominate the primary customer segment in the number of bookings and total revenue compared to repeat guests, which is an important field worth developing.

Strategies

We promote "small profit but quick return" as our main strategy object in the low season, which normally starts from October to March, due to maximum occupancy capability in the high season for both GHR's properties.

- We suggest strengthening partnerships with major travel agencies by providing discounts, developing exclusive services or activities, and collaborating on marketing campaigns to enhance the GHR's visibility and attractiveness.
- We suggest enhancing customer loyalty by utilizing CRM systems and launching a hotel loyalty rewards program, not only to improve guest relationships and offer customized services but collect customer's data and preferences to improve an in-depth understanding of distinguished and faithful customers.
- We suggest offering customizable family-oriented services and events to fulfill the needs of families for both properties with different emphasis aspects to attract families.

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Background and Data Overview

Background

GHR is a top European hotel brand that is struggling to make sense of its customer demands in two of its recently-acquired properties. One is a city hotel while the other is a resort. A proper understanding of the customer demands means higher revenue and better planning for in-house services which translates into lower operating costs.

Objectives

There are two objectives for the competition as follow:

- Producing various visualizations to help GHR better understand the guests, booking behaviors, and opportunities to maximize the revenue in their two properties. Please see the Descriptive Analysis Findings for further details.
- Suggesting strategies to maximize the revenue in the two properties. Please see the Revenue Maximization Strategies

Data

GHR provided the two following original data files:

- hotel.csv: contains the booking information for guests in the GHR hotel.
- resort.csv: contains the booking information for guests in the GHR resort.

For data cleansing process, please refer to Appendix A for details.

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Key Findings - Main Indicators

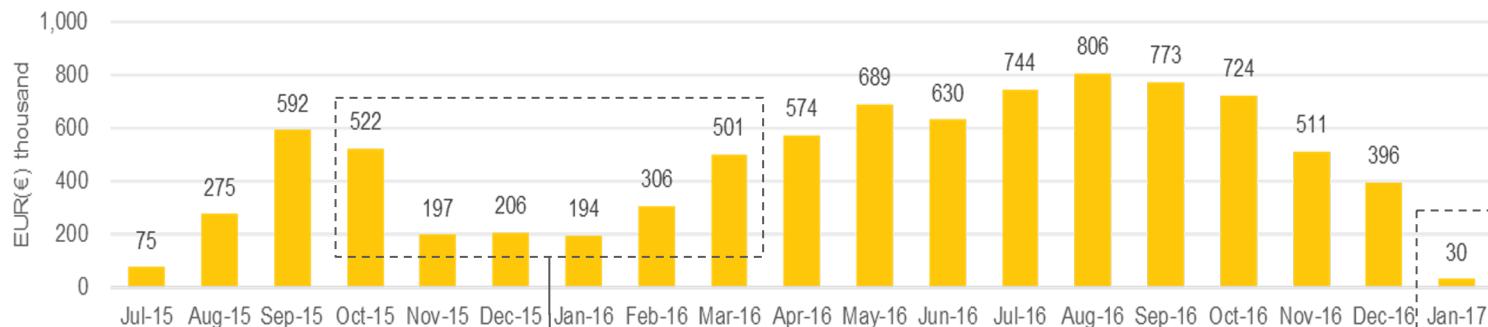
GHS Hotel		GHS Resort
Total Revenue	€ 8.8 million (54.3%)	€ 7.4 million (45.7%)
Average Staying Nights	2.9 nights	4.1 nights
ADR of Hotels/Resorts	€ 100	€ 86
Number of Bookings	30,316	19,787
ADR of Bookings	€ 288.6	€ 374.7
Top Booking Country	Portuguese	Portuguese
Top Booking Region	Europe	Europe



Key Findings - Monthly Revenue

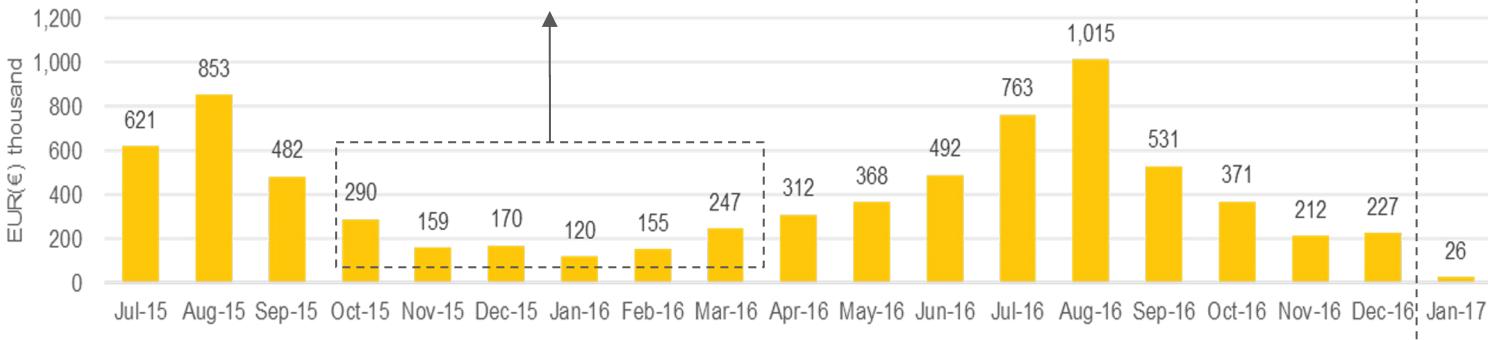
GHR's hotel and resort's monthly revenue exhibits significant seasonal trends

Hotel's Monthly Revenue



The hotel and the resort's revenue are strongly affected by seasonal factors, where the resort has more vital seasonal trends within the date range from the provided datasets.

Resort's Monthly Revenue



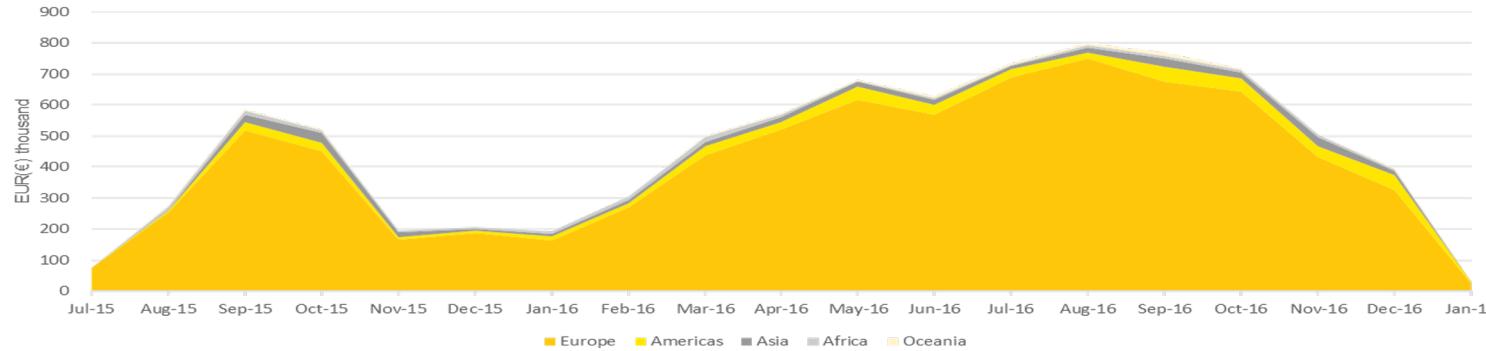
The abnormally low revenue is due to incomplete data.



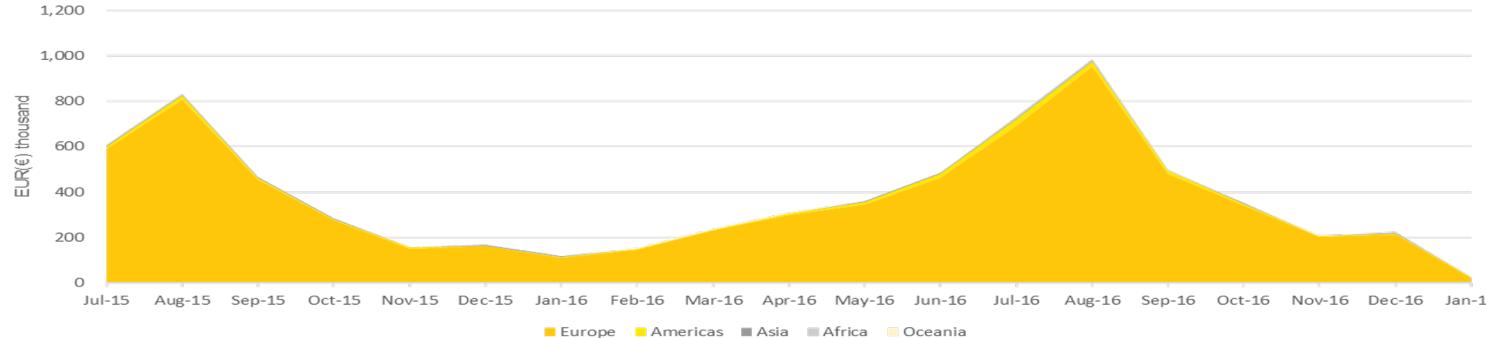
Key Findings - Monthly Revenue by Region

Seasonal trends are significantly affected by regional factors, with Europe playing a dominant role

Hotel's Monthly Revenue by Region



Resort's Monthly Revenue by Region



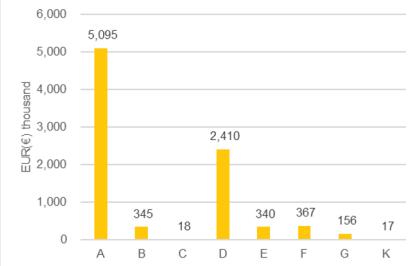


Key Findings - Room Type

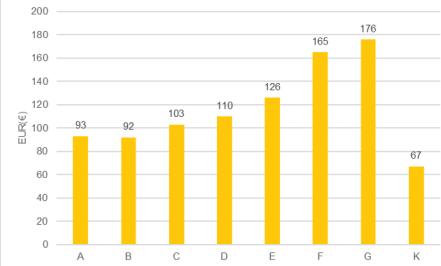
Room types that yield the highest total revenue and those with the highest average revenue are different for each of the two properties

Hotel

Total Revenue by Room Type

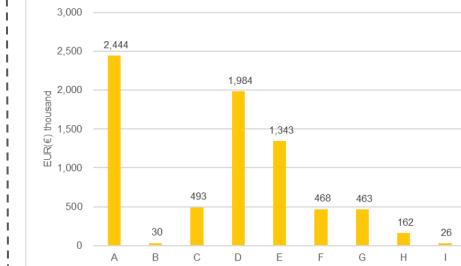


Average Revenue by Room Type

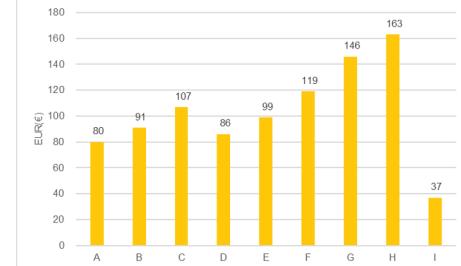


Resort

Total Revenue by Room Type



Average Revenue by Room Type



For the hotel, room types A and D have higher total revenues, amounting to €5,095K and €2,410K respectively. The total revenues for other room types are significantly lower than these two. However, the average revenue for room types A and D is less than that of F and G types. The average revenues for F and G types are €165 and €176, respectively.

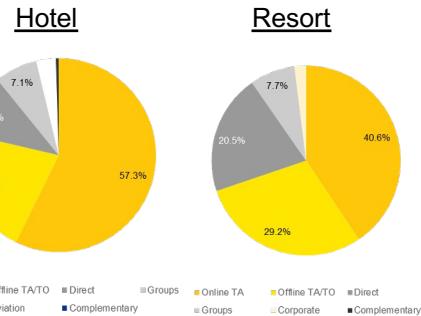
For the resort, room types A, D, and E have higher total revenues, amounting to €2,444K, €1,984K, and €1,343K respectively. The total revenues for other room types are significantly lower than these three. However, the average revenue of room types A, D, and E is lower than that of types G and H. The average revenues for G and H types are €146 and €163, respectively.



Key Findings - Market Segment

Online TA leads significantly in both booking volume and revenue contribution. However, when considering ADR, Aviation and Offline TA/TO are the leaders for the hotel and the resort, respectively

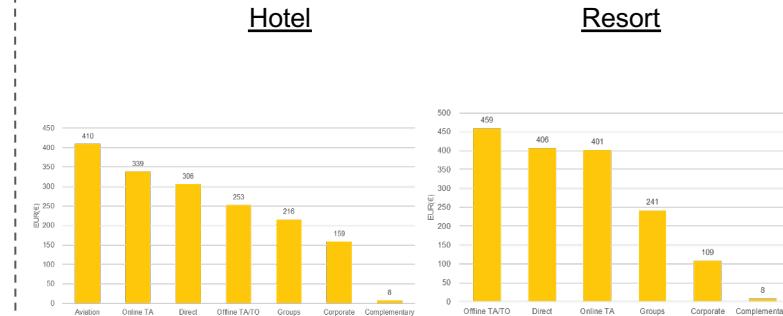
Total Revenue % by Market Segment



Booking Count by Market Segment



ADR by Market Segment



In both of GHR's properties, Online TA constitutes the largest share of revenue, accounting for 60% in the hotel and 40% in the resort, followed by Offline TA/TO, which accounts for 20% and 30%, respectively.

In both of GHR's properties, Online TA has the highest proportion in terms of booking volume, with a 50% share in the hotel and 40% in the resort, followed by Offline TA/TO with 24% and 23%, respectively.

While Aviation boasts the highest average revenue at €410, its contribution to total revenue is less than 1%. Online TA has an average revenue of €339, and direct sales stand at €306.

Offline TA/TO leads with the highest average revenue, reaching €459. It's closely followed by Direct sales at €406 and Online TA at €401.



Key Findings - Customer Type

Transient guests represent the primary customer segment for GHR's properties, while contract guests generate the highest average revenue

Total Revenue % by Customer Type



Booking Count by Cusomer Type



ADR by Customer Type



In both of GHR's properties, transient customers constitute nearly 70% of revenue in both the hotel and the resort, making them our main customer types. Following this are transient-party customers, accounting for 26% and 16%, respectively.

In both of GHR's properties, transient customers have the highest proportion in booking volume, accounting for 64% in the hotel and 72% in the resort. Following are transient-party customers, with 31% and 21%, respectively.

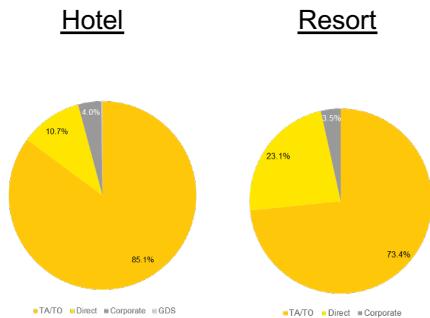
In both of GHR's properties, Contract customers yield the highest average revenue, at €335 in the hotel and €639 in the resort. However, their contribution to total revenue is only 4.5% and 9%, indicating limited representativeness. Next, the average revenues for transient and direct sales are €309 and €384, respectively. Although not the highest, their significant share in total revenue still has a decisive impact.



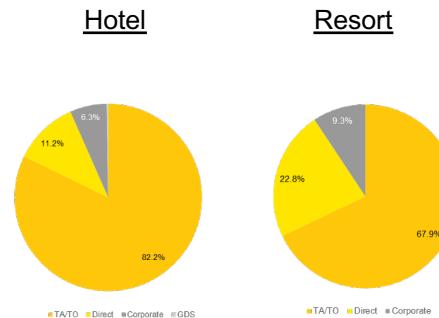
Key Findings - Distribution Channel

For both GHR's properties, TA/TO is the most commonly chosen among all booking channels. Not only does it have a high average unit price, but its revenue share is also substantial

Total Revenue % by Distribution Channel



Booking Count by Distribution Channel



ADR by Distribution Channel



In both of GHR's properties, TA/TO forms the central portion of revenue, contributing 85% to the hotel and 73% to the resort. It is succeeded by direct bookings, which represent 11% and 23% respectively.

In both of GHR's properties, TA/TO holds the largest share in booking volume, accounting for 82% in the hotel and 68% in the resort. Direct bookings follow with shares of 11% and 22% respectively.

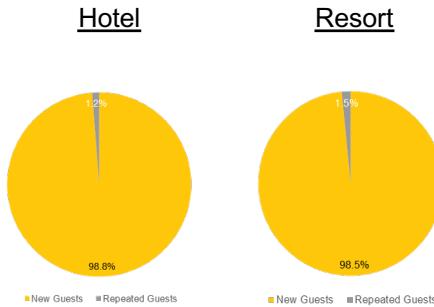
In both of GHR's properties, TA/TO has the highest average revenue, which is €299 and €405, respectively. The hotel, unlike the resort, has an additional channel through GDS, with an average revenue of €234.



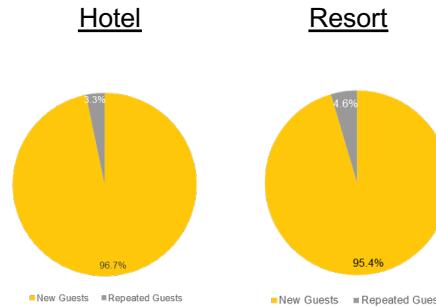
Key Findings - Guests Type

In GHR's properties, new guests constitute the primary customer segment, typically generating a considerably higher average revenue than repeat guests

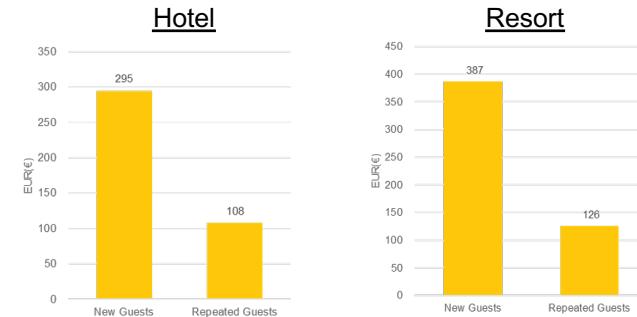
Total Revenue % by Guests Type



Booking Count by Guests Type



ADR by Guests Type



In both of GHR's properties, it's evident that new guests are the principal contributors to our total revenue, making up close to 99%. This highlights that our revenue is predominantly derived from new customers, with repeat customers accounting for less than 1.5%.

In both of GHR's properties, among the total number of bookings, new guests make up the most significant proportion, nearly 96%. Conversely, repeat customers account for less than 4%.

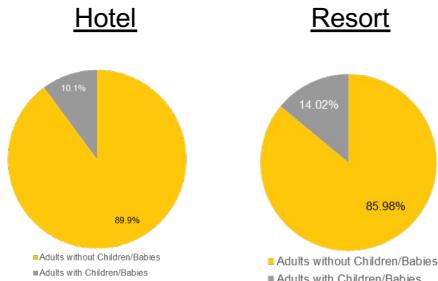
In both of GHR's properties, the average revenue new customers bring is the highest. This reinforces that the hotel and the resort operations are predominantly dependent on new clients, highlighting a substantial opportunity to enhance our approach to retaining and managing repeat customers.



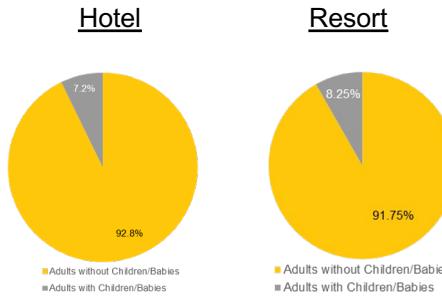
Key Findings - Adults & Adults with Children/Babies

Adults without children/babies constitute the majority of total revenue, whereas those with children/babies generate higher revenue per booking

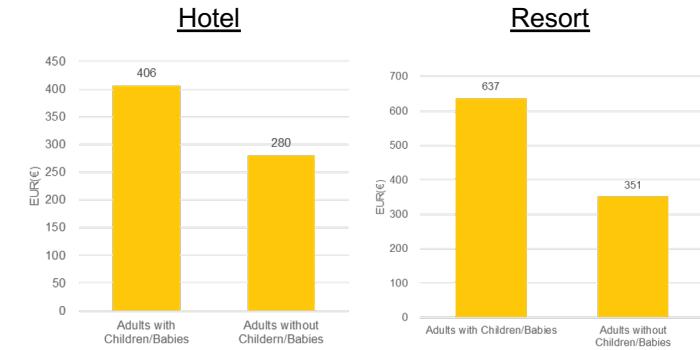
Total Revenue % by Adults with/without Children/Babies



Booking Count by Adults with/without Children/Babies



ADR by Adults with/without Children/Babies



In both of GHR's properties, adults without children/ babies form the core customer base for both properties, accounting for 89% and 85% of their respective revenues.

Adults without children/ babies represent a significant segment of the hotel and the resort, comprising 92% and 91% of their customer bases, respectively.

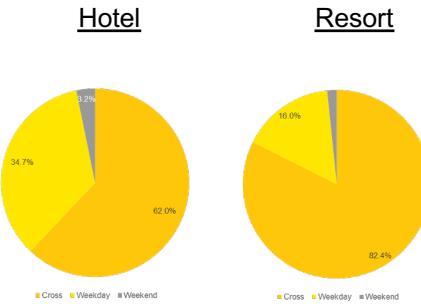
Although adults without children/ babies account for a high proportion of total revenue, their average income is lower than that of adults with children and babies, who have more significant potential for growth.



Key Findings - Staying period in week

Guests favor stays that include both weekdays and weekends, yielding the highest revenue and average order value

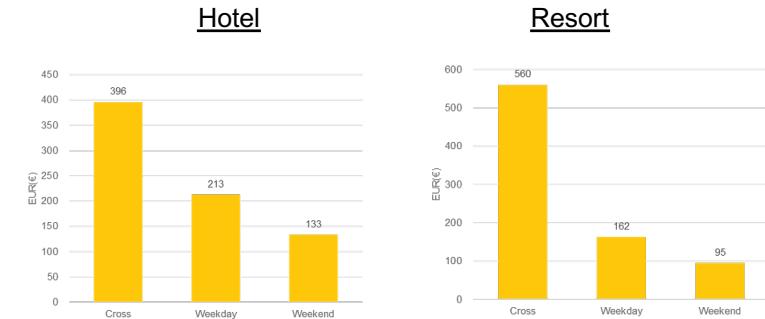
Total Revenue %
by Staying Period in Week



Booking Count
by Staying Period in Week



Booking Average Revenue by Staying Period in Week



In both of properties, the primary source of revenue comes from stays that cross weekdays and weekends. In the hotel, this represents 62% of the revenue, while in the resort, it's even more significant, with nearly 82% of income derived from weekend-inclusive stays.

Hotel customers prefer stays that are either cross-weekday weekends or purely weekdays. For the resort, more than half of the customers opt for cross-weekday weekend stays. Conversely, those who choose to stay only on weekends are few, which presents a potential area for development.

In both of properties, customers who stay across weekdays and weekends generate the highest average revenue per booking, double that of staying exclusively on weekdays or weekends. This indicates that the cross-weekday weekend period is the busiest time for both properties.



Key Findings - Lead Time

For both hotel and resort, guests booking within a lead time of less than 30 days constitute the highest number of reservations; the price is highest for a lead time between 90 to 180 days

Hotel

Booking Count by Lead Time

Lead Time	Count
<30	12,442
30~60	5,163
60~90	3,535
90~180	5,473
180~360	3,514
>360	189

Average Revenue by Lead Time

Lead Time	Average Revenue
<30	252
30~60	297
60~90	315
90~180	345
180~360	294
>360	230

Resort

Booking Count by Lead Time

Lead Time	Count
<30	8,996
30~60	2,682
60~90	1,737
90~180	3,439
180~360	2,622
>360	311

Average Revenue by Lead Time

Lead Time	Average Revenue
<30	206
30~60	429
60~90	542
90~180	587
180~360	514
>360	340

In the hotel, most customers tend to book rooms within 30 days prior to arrival, accounting for approximately 42% of the total booking volume. However, the average room revenue is highest for guests booking 90 to 180 days before arrival.

In the resort, most customers tend to book rooms within 30 days prior to arrival, accounting for approximately 45% of the total booking volume. However, the average room revenue is highest for guests booking 90 to 180 days before arrival. Moreover, the average revenue for lead time of less than 30 days is the lowest among all intervals.

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 - a. Low Season Strategy
 - b. All time Strategy
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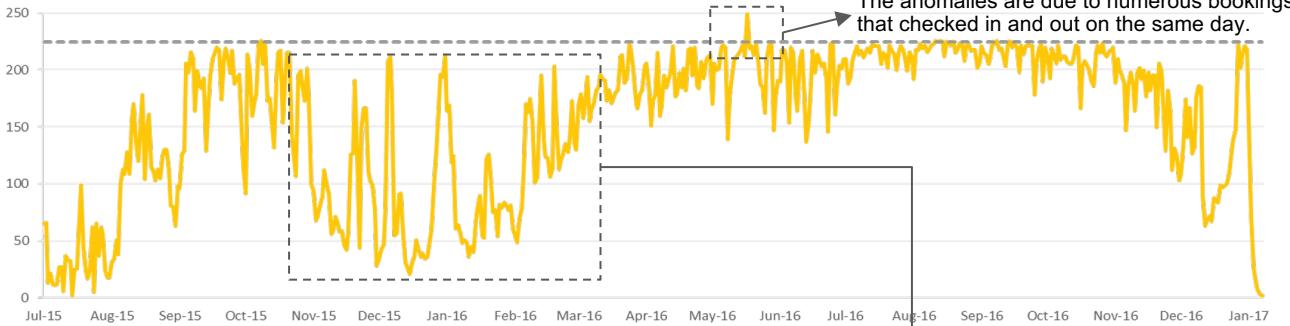
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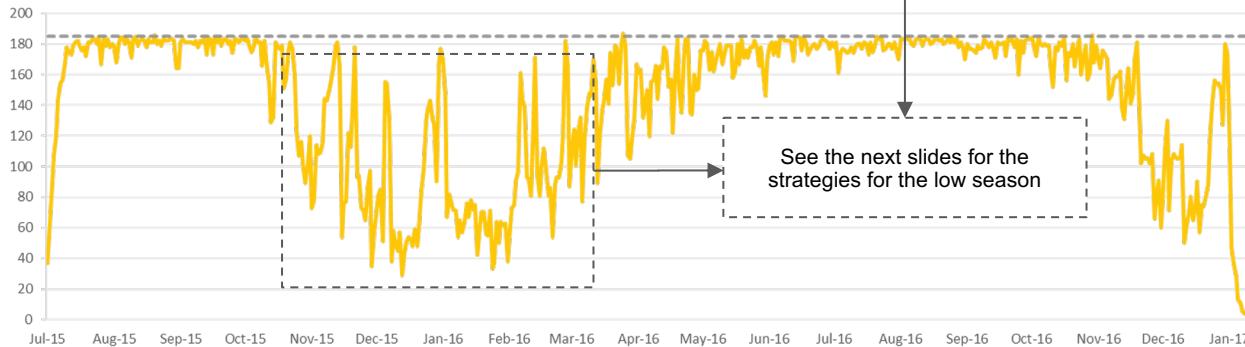


Strategy

There is a noticeable seasonal pattern in the both properties' room occupancy, which leads to maximum occupancy capacity during the peak season



During the peak season, since hotels frequently achieve nearly full occupancy, raising the prices of rooms and services becomes the most effective strategy for increasing revenue during this time. Please refer to Appendix 2 for a detailed analysis of the room type of each property's capacity.

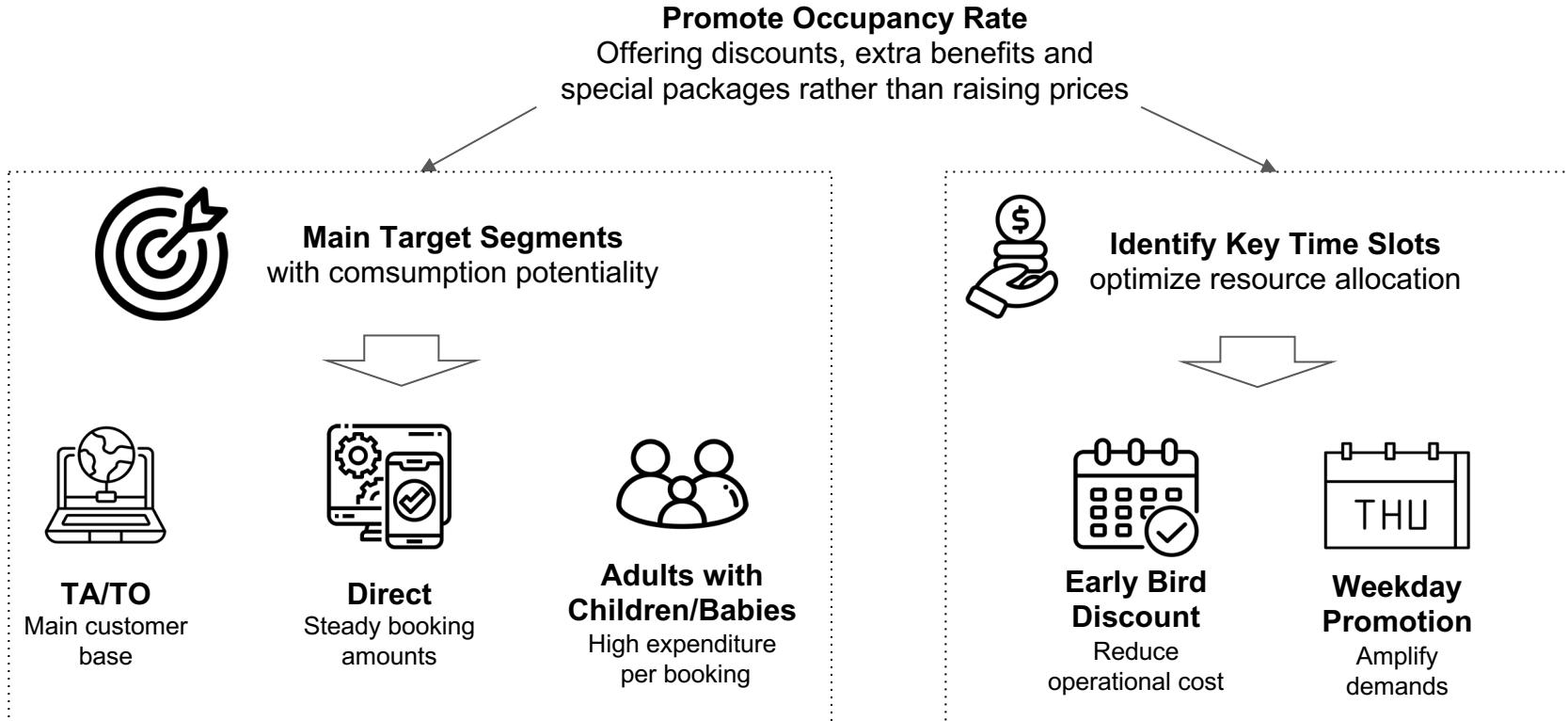


During the low season, particularly on certain holidays such as New Year's Day, properties also experience high occupancy rates. Following the peak season's rationale, raising the prices of rooms and services is equally effective in increasing revenue during this time.



Low Season Strategy - Overview

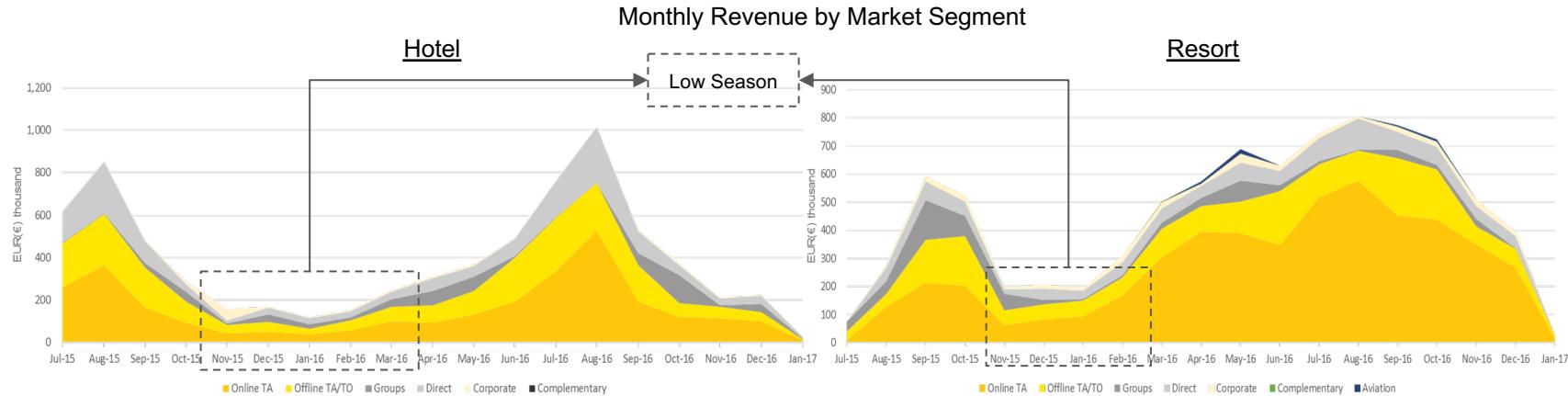
“Small profit and quick return” acts as the overall strategy during the low season





Low Season Strategy - TA/TO

During the low season, TA/TO (including both Online TA and Offline TA/TO) continues to be the primary customer base in both properties, contributing the most revenue



- In each property, TA/TO's expenditure is substantially higher than the aggregate expenditure of all other market segments combined.
- Moreover, TA/TO accounts for the highest number of bookings across all market segments, contributing to more than half of the bookings in both properties.

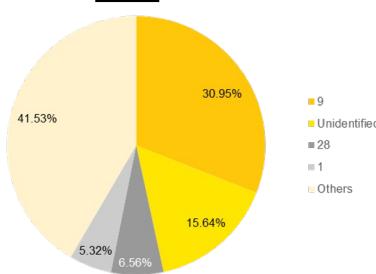


Low Season Strategy - TA/TO

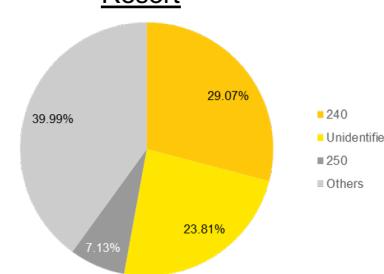
Strengthening partnerships with major travel agencies who appear to be key booking channels is a well-targeted approach to attract TA/TO

Market Share of Travel Agencies in the Low Season

Hotel



Resort



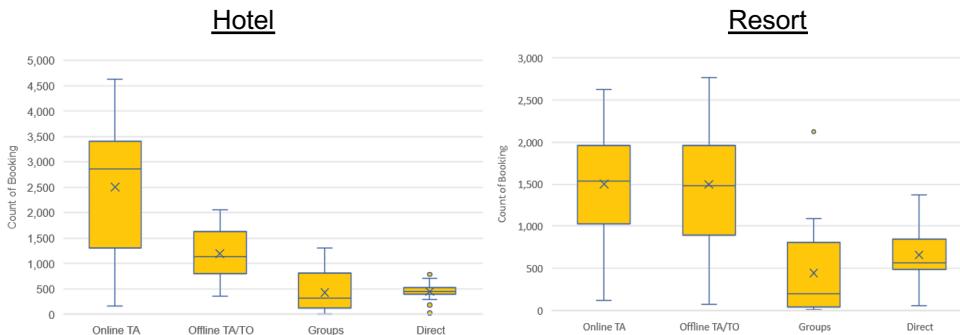
- Furthermore, travel agencies 9, 28, and 1 together account for more than 40% of the hotel's travel agent market, while agencies 240 and 250 account for more than 35% of the resort's market.
- To leverage this, properties can increase revenue by forging deeper partnerships with these agencies. These strategies could encompass:
 1. Providing exclusive discounts to these agencies incentivizes them to prioritize GHR's properties.
 2. Developing exclusive services or activities specifically for guests booking through these agencies.
 3. Collaborating with these travel agencies on marketing campaigns to enhance the GHR's visibility and attractiveness.



Low Season Strategy - Direct

From an annual viewpoint, Direct consistently forms a steady customer base; during the low season, revenue from Direct ranks third for both properties

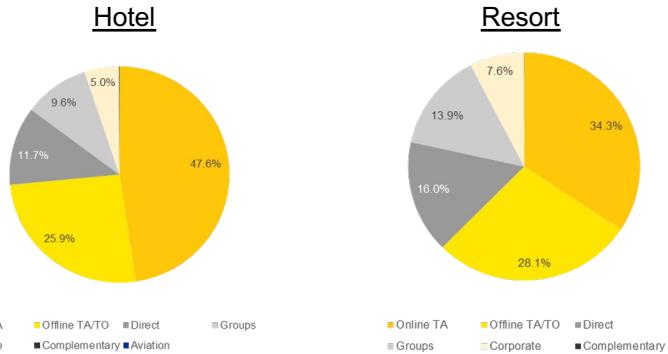
Monthly Volume and Variability of Bookings by Large Market Segment



Findings:

- Within large market segments, Direct has consistently provided a stable influx of guests for these two hotels.
- Additionally, Direct ranks as the third largest market segment regarding revenue performance during the low season for both properties.
- These key aspects position Direct as a crucial focus for GHR's development in the low season.

Total Revenue by Market Segment in the Low Season



Strategies to maximize revenue from Direct:

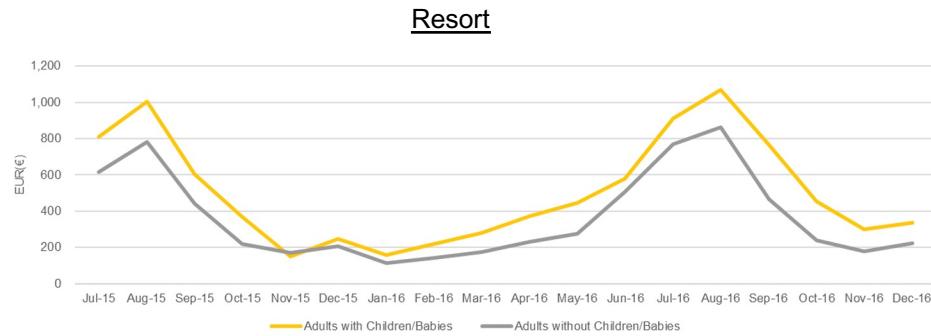
- Leveraging chatbots and conversational AI to drive guest engagement and increase customers' operational efficiency.
- Use detailed information such as birthdays within guest profiles with guest messaging software to build guest relationships and offer personalized services, special discounts, and deals during their stay.



Low Season Strategy - Adults with Children/Babies

The substantial average booking value of adults with children/babies indicates that they are a significant target segment for GHR's future growth

Monthly Average Booking Value by Adults with/without Children/Babies



- Although adults with children/babies do not constitute a high proportion of all customers, their average expenditure is much higher than that of other customers, which means for both properties, adults with children/babies bring in high marginal profits, implying that attracting them can significantly increase GHR's revenue.
- Generally speaking, adults with children or babies indicate they are a family.
 1. For GHR hotels, especially considering the varied nature of family stays in city hotels, offering customizable babysitting services that cater to the specific needs of each family is an effective strategy.
 2. As for GHR resorts, appropriate strategies might include hosting family-oriented events like entertaining games nights, catering to the desires of families on vacation.



Low Season Strategy - Early Bird Discount

Early bird discounts can promote the growth in bookings with longer lead times and alleviate the negative impact caused by a high concentration of bookings within 30 days before arrival

Hotel

Booking Count by Lead Time

Lead Time	Booking Count
<30	4,338
30~60	1,753
60~90	965
90~180	1,043
180~360	169

Average Revenue by Lead Time

Lead Time	Booking Count
<30	4,338
30~60	1,753
60~90	965
90~180	1,043
180~360	169

Resort

Booking Count by Lead Time

Lead Time	Booking Count
<30	4,169
30~60	806
60~90	384
90~180	696
180~360	263

Average Revenue by Lead Time

Lead Time	Booking Count
<30	4,169
30~60	806
60~90	384
90~180	696
180~360	263

- During the low season, both properties primarily receive bookings within 30 days before check-in, leading to considerable uncertainty and higher costs in hotel operational management.
- Implementing early bird discounts can encourage advance bookings, allowing hotels to plan better resource allocation, which includes enhancing the quality of in-house services to reduce operational costs and applying dynamic pricing strategies to the remaining rooms.
- Furthermore, both properties see higher average revenue from bookings made 30 to 180 days in advance, indicating room for discounts, which implements early bird discounts a viable option.

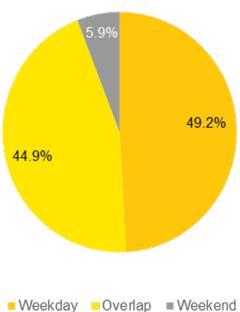


Low Season Strategy - Weekday Promotion

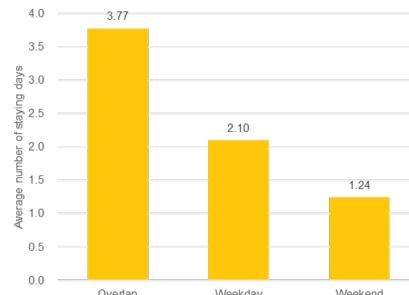
During the low season, both properties can offer discounts and benefits specifically designed to encourage guests to extend their weekday stays

Hotel

Booking Count
by Staying Period in Week



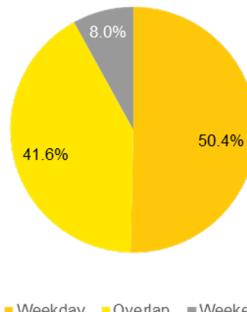
Average Staying Days
by Staying Period in Week



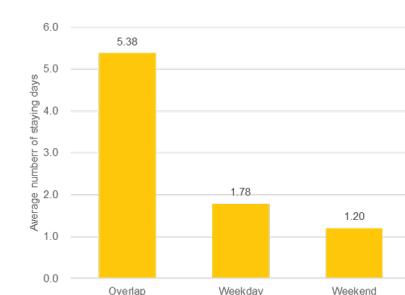
- During the low season, the hotel has the highest number of bookings for weekday-only stays (nearly 50%), with no significant difference in average daily revenue compared to other types. However, weekday bookings typically last only 2.1 nights.
- Therefore, to attract city tourists, the hotel can enhance its weekday benefits by offering complimentary breakfasts and special deals on local attraction tickets to encourage longer stays.

Resort

Booking Count
by Staying Period in Week



Average Staying Days
by Staying Period in Week



- During the low season, bookings at the resort for weekday-only stays surpass 50% of the total, with the average daily revenue standing alongside the highest compared to other types. Yet, weekday bookings average 1.78 nights.
- To boost this, the resort could offer promotions for more extended weekday stays, like offering an extra day free with a three-day booking or a free luxury dinner, motivating guests to extend their stays.

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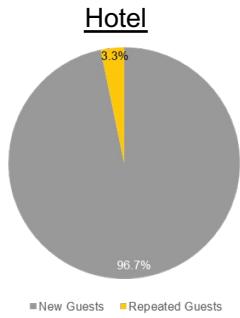




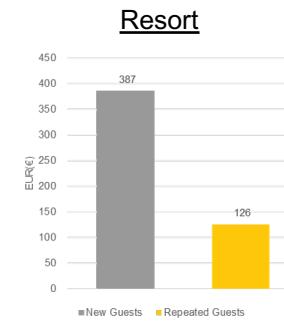
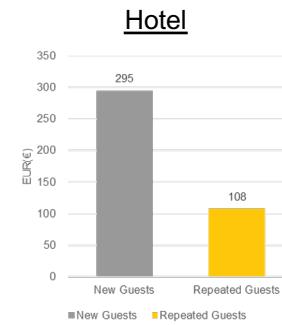
All Time Strategy - Repeat Guests

Implementing Customer Relationship Management (CRM) for repeat guests who possess great consumption potentiality will benefit GHR's long-term revenue growth

Booking Count by Repeat Guest



Average Revenue by Repeat Guest



Citation:

- In the hotel industry, 15% of the customers generate 45% of revenue and 70% of profit.
- Repeat and frequent hotel customers are expected to become less sensitive to price increases, show loyalty, and tend to respond positively to the CRM efforts of the company.
- Please refer to Appendix 3 for detailed research reference.

Conclusion:

- Implementing CRM for repeat guests can maintain or even improve their satisfaction, loyalty and willingness to pay, thereby increasing GHR's long-term revenue.

Considering the booking volume and average expenditure, both properties have fallen short in capitalizing on the potential of repeat guests in the past. Hence, the following strategies can be adopted:

- Provide customized services based on the customer's historical preferences. For example, offer preferred room types or special amenities based on their previous stay records.
- Launch a hotel loyalty rewards program, offering points, discounts, or special offers. These benefits can be used during their next stay to encourage repeat bookings.

Agenda

- A. Executive Summary
- B. Background and Data Overview
- C. Key Findings
- D. Strategy
- E. Appendices





Appendix 1 - Data Cleansing and Expanding

Data Cleansing

We have dropped total 95 and 26 inconsistent rows of data, adhering to the following criteria while ensuring data completeness and integrity, from both hotel.csv and resort.csv datasets, respectively.

- Rows are excluded if the sum of “StaysInWeekNights” and “StaysInWeekendNights” does not match the difference in days between “CheckoutDate” and “ArrivalDate”.
- Rows where the combined total of “NumberOfAdults”, “NumberOfBabies”, and “NumberOfChildren” equals zero are also removed.

After data cleansing, we have added some arbitrary columns as follows, and saved as files “hotel_cleaned.csv” and “resort_cleaned.csv” in the attachment for reference.

- Column “TotalNight”, which is equal to column “StaysInWeekNights” and column “StaysInWeekendNights”
- Column “Revenue”, which is equal to column “AverageDailyRate” times column “TotalNight”
- Column “Region”, which is matched to column “country” to respective region by the external file “region_reference.csv”, attached in the attachment

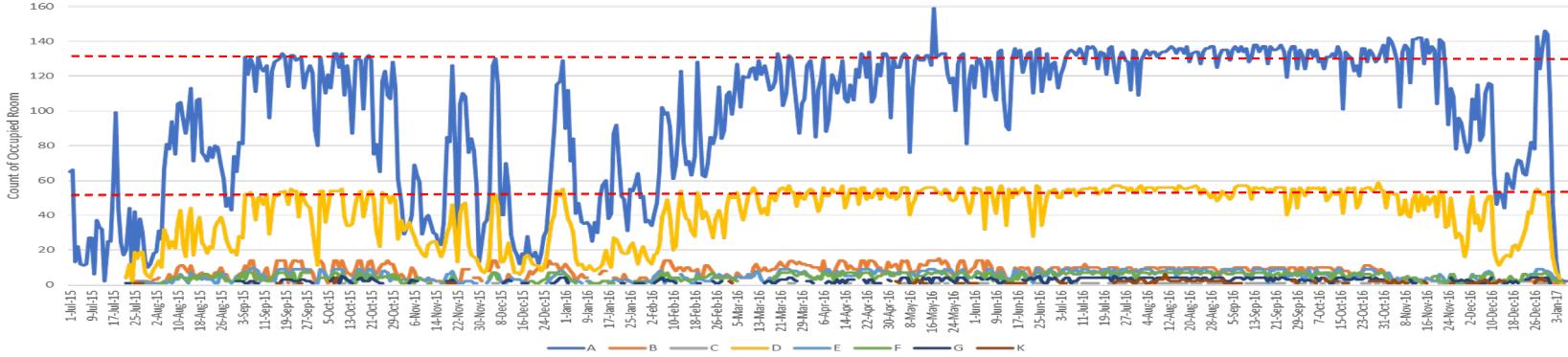
Data Expanding

As the column “AverageDailyRate” is equal to average revenue per booking. For the purpose of calculating daily revenue correctly, we have to expand each booking into individual records with its average daily rate, representing each night stay’s revenue, based on check-in and check-out dates. After expanding, we sum up and group by column ‘ArrivalDate’ to have a better understanding of daily/monthly revenue by region. The files are attached as “hotel_expand.csv” and “resort_expand.csv” in the attachment.

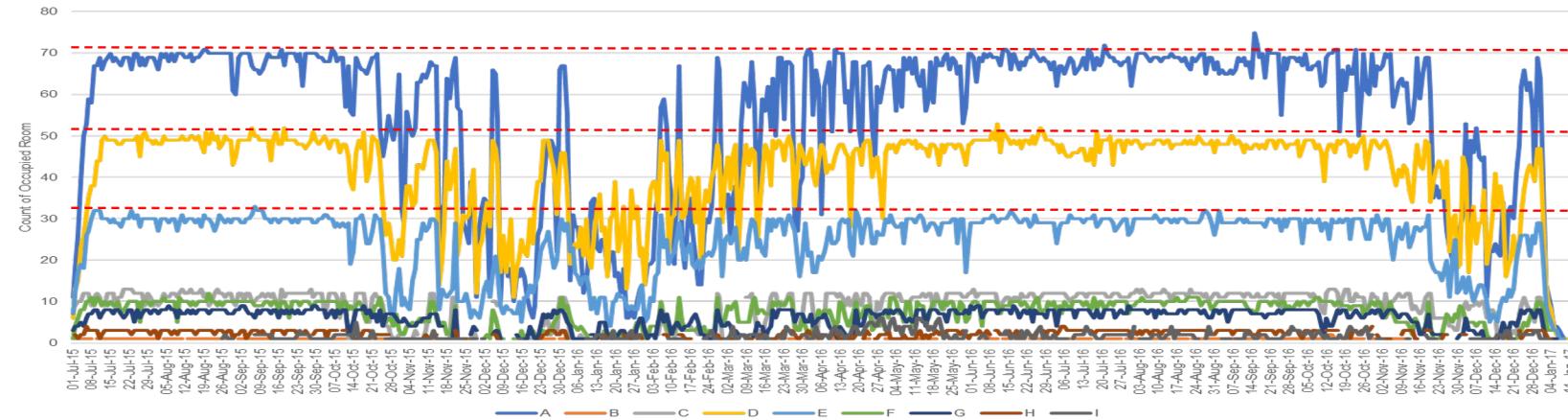


Appendix 2 - Capacity of Each Room Type

Hotel



Resort



Icon made by pictogramer from www.flaticon.com



Appendix 3 - Additional Research Reference of Repeat Guest Slide

Reference

- Ivanovic, S., Mikinac, K., & Perman, L. (2011). CRM development in hospitality companies for the purpose of increasing the competitiveness in the tourist market. *UTMS Journal of Economics*, 2(1), 59-68.
- Dursun, A., & Caber, M. (2016). Using data mining techniques for profiling profitable hotel customers: An application of RFM analysis. *Tourism management perspectives*, 18, 153-160.



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