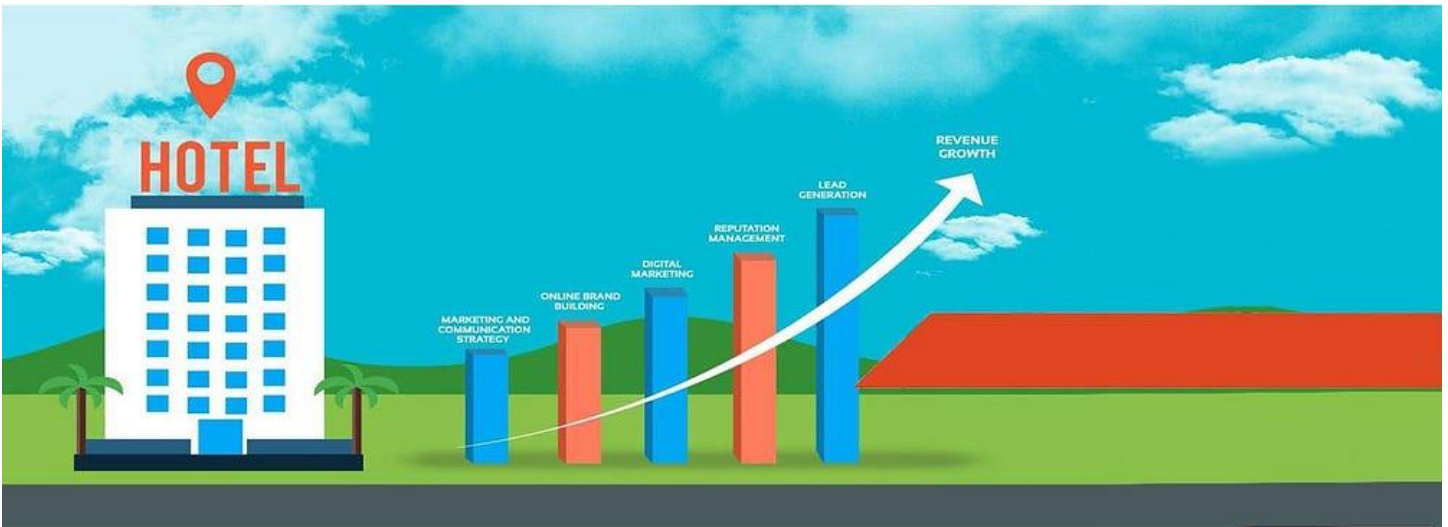# A CASE STUDY IN HOTEL REVENUE ANALYSIS

In the competitive landscape of the hospitality industry, revenue management is a critical factor for success. Hotels must strategically manage pricing, inventory, and other key metrics to maximize revenue and profitability. Understanding the factors that influence hotel revenue allows operators to make data-driven decisions that can lead to increased occupancy rates, higher average daily rates (ADRs), and overall improved financial performance.

In this blog post, I'll take you through the process of joining multiple tables in SQL to analyze hotel revenue across three years—2018, 2019, and 2020 and integrating additional information from the meal cost and market segment tables. I'll also share how this data was visualized in a Power BI dashboard to extract insights and identify trends.

Data Source and Objectives

To conduct a comprehensive analysis of hotel revenue, a diverse range of data sources must be considered. Collecting comprehensive and reliable data is crucial for conducting meaningful analysis. One can collect and compile their dataset using surveys or can use openly available surveys from Kaggle.

The primary data sources for this project included hotel revenue data from three separate tables for the years 2018, 2019, and 2020. Additionally, I incorporated data from two other tables, one for meal costs and another for market segments. The objective was to join these tables to create a comprehensive dataset for analysis and visualization, ultimately leading to a Power BI dashboard that provided meaningful insights into hotel revenue trends.
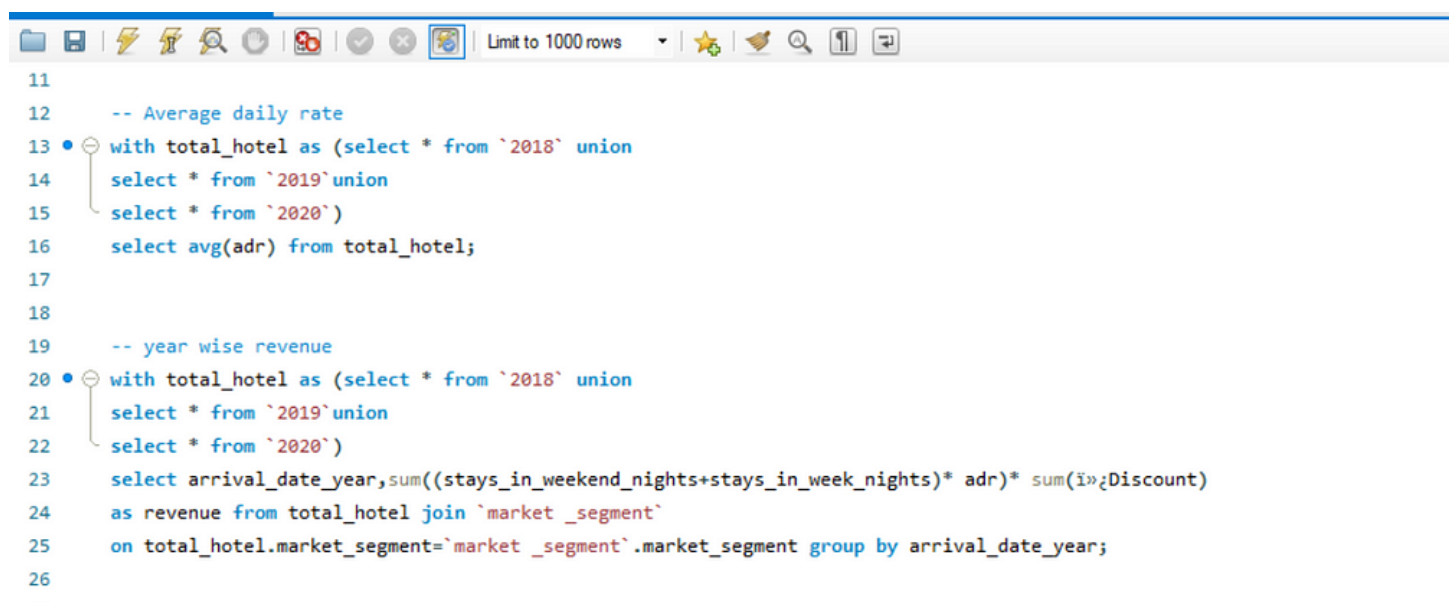
Data Cleaning and Analyzing in SQL

The dataset consisted of mainly three tables representing hotel revenue data for the years 2018, 2019, and 2020. Each table contained information about bookings, revenue, occupancy rates, and other relevant metrics. Additionally, I had two more tables: one detailing meal costs and another describing market segments, which categorized customers into different groups based on their booking preferences and behavior.

To conduct a comprehensive analysis, I needed to join these tables in SQL. Before joining the tables, I ensured that the structures were consistent across the three years. This involved aligning column names, data types, and formats. Consistent structures made it easier to combine the data accurately. Once the tables were joined, I created a unified dataset that included revenue data across all three years, along with meal costs and market segment information. This dataset provided a comprehensive view of hotel revenue, allowing me to conduct in-depth analysis and create data visualizations.

```
1 •    use hotel_revenue;
2
3
4      -- joining the tables
5 • ⊖  with total_hotel as (select * from `2018` union
6      select * from `2019` union
7      select * from `2020`)
8      select * from total_hotel join `market _segment`
9      on total_hotel.market_segment=`market _segment`.market_segment join `meal_cost` on `meal_cost`.meal=total_hotel.meal;
10
11
```

Joining Tables for some Queries

```
11
12      -- Average daily rate
13 • ⊖  with total_hotel as (select * from `2018` union
14      select * from `2019` union
15      select * from `2020`)
16      select avg(adr) from total_hotel;
17
18
19      -- year wise revenue
20 • ⊖  with total_hotel as (select * from `2018` union
21      select * from `2019` union
22      select * from `2020`)
23      select arrival_date_year,sum((stays_in_weekend_nights+stays_in_week_nights)* adr)* sum(ï»¿Discount)
24      as revenue from total_hotel join `market _segment`
25      on total_hotel.market_segment=`market _segment`.market_segment group by arrival_date_year;
26
```

Calculating Average Daily Rate and Year Wise Revenue

```
27
28      -- Cancellation rate
29  •  ⊖ with total_hotel as (select * from `2018` union
30        select * from `2019`union
31        select * from `2020`)
32        SELECT sum(is_canceled)/sum(stays_in_weekend_nights+stays_in_week_nights)* 100 AS Cancellation_Rate from total_hotel;
33
34
35      -- total revenue
36  •  ⊖ with total_hotel as (select * from `2018` union
37        select * from `2019`union
38        select * from `2020`)
39        select sum((stays_in_weekend_nights+stays_in_week_nights)*adr)* sum(ï»¿Discount) as total_revenue
40        from total_hotel join `market _segment`
41        on total_hotel.market_segment=`market _segment`.market_segment;
42
```

Calculating Cancellation Rate and Total Revenue

```
42
43
44      -- No. of hotels in different country
45  •  ⊖ with total_hotel as (select * from `2018` union
46        select * from `2019`union
47        select * from `2020`)
48        select country, count(ï»¿hotel) as hotels from total_hotel group by country;
49
50
51      -- No. of nights stayed by customers
52  •  ⊖ with total_hotel as (select * from `2018` union
53        select * from `2019`union
54        select * from `2020`)
55        select sum(stays_in_weekend_nights)+ sum(stays_in_week_nights) as total_nights from total_hotel;
56
57
```

Calculating No. of Hotel in different Countries and No. of night stayed by Customer

```
56
57
58      -- discount offered
59  •  ⊝ with total_hotel as (select * from `2018` union
60        select * from `2019`union
61        select * from `2020`)
62        select avg(ï»¿Discount)*100 as discount_in_percentage from total_hotel join `market _segment`
63        on total_hotel.market_segment=`market _segment`.market_segment;
64
65
66      -- How many days prior bookings are made
67  •  ⊝ with total_hotel as (select * from `2018` union
68        select * from `2019`union
69        select * from `2020`)
70        select avg(lead_time) as prior_booking_days from total_hotel;
```

Finding Total Discount Offered and Prior Booking Days

```
72
73      -- Number of Total people visiting each year by month and year.
74  •  ⊝ with total_hotel as (select * from `2018` union
75        select * from `2019`union
76        select * from `2020`)
77        select arrival_date_month, arrival_date_year, sum(adults)+ sum(children)+ sum(babies) as total_people
78        from total_hotel group by arrival_date_month, arrival_date_year ;
79
80
81      -- car parking spaces
82  •  ⊝ with total_hotel as (select * from `2018` union
83        select * from `2019`union
84        select * from `2020`)
85        select arrival_date_year, sum(required_car_parking_spaces) as required_car_parking_spaces,
86        sum(required_car_parking_spaces)/(sum(stays_in_weekend_nights)+ sum(stays_in_week_nights))*100
87        as car_parking_space_percent from total_hotel group by arrival_date_year;
88
89
```

Finding Total People Visit per Year and total Car parking Spaces

```
89
90      -- Relationship between ADR and the lead time before booking.
91  •  ⊝ with total_hotel as (select * from `2018` union
92        select * from `2019`union
93        select * from `2020`)
94        select lead_time, AVG(adr) as avg_adr from total_hotel group by lead_time order by lead_time;
95
```

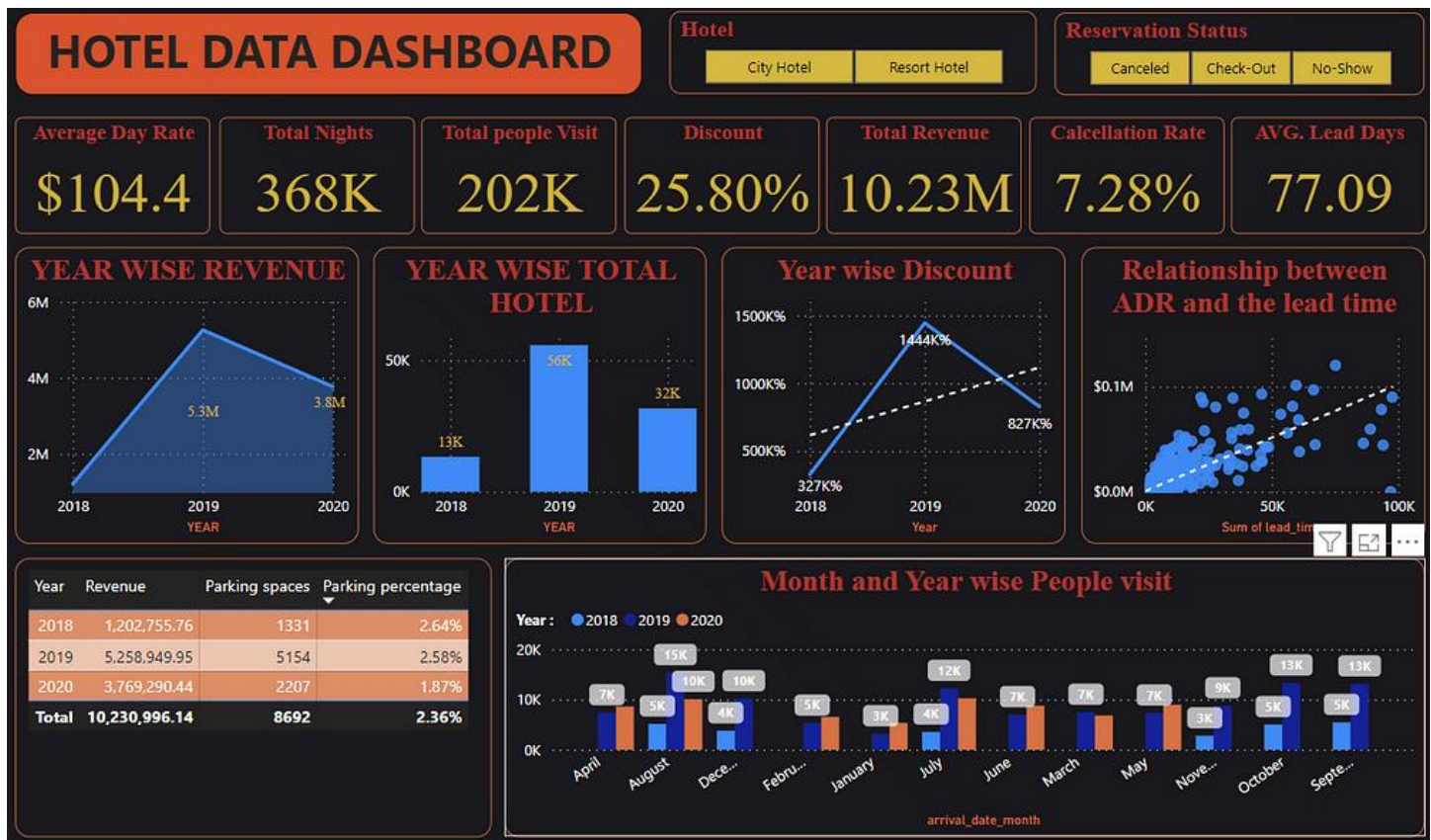**Relationship between Average Daily Rate and Lead Time**

Data visualization

After the data was prepared and analyzed in SQL, I imported it into Power BI to create a dashboard and ensured that the data was structured correctly for visualization.
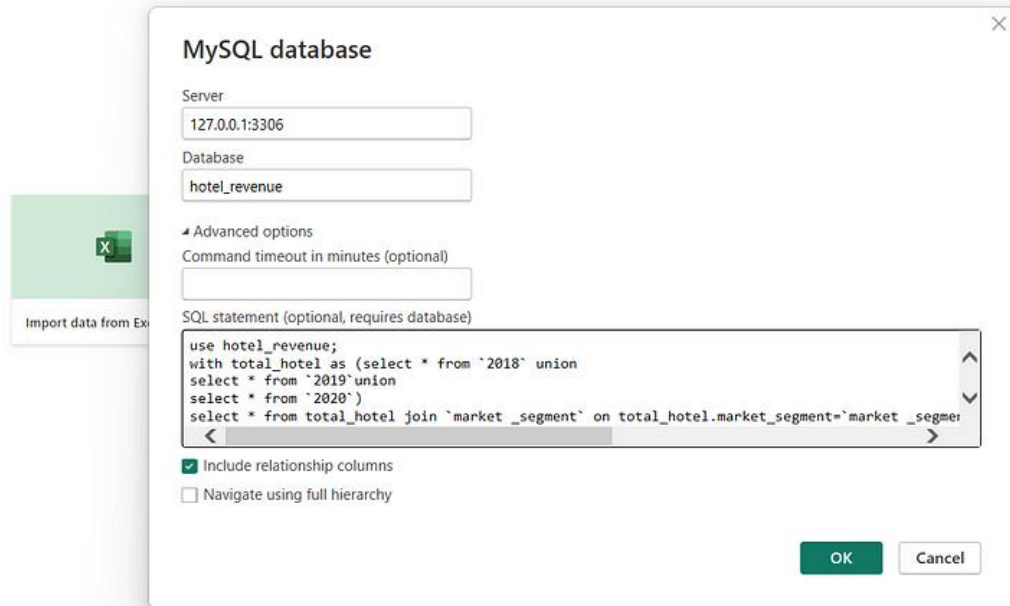
Importing queries from SQL in Power Bi

DASHBOARD

Data visualization plays a crucial role in making complex datasets understandable and actionable. In this section, we discuss the key insights obtained from visualizations used to analyze our hotel's revenue and related metrics.

1. **Average room rates of different country: $104.4**

2. **Total no. of hotels in different country: 101000**

3. **Cancellation rate: 7.28%**

4. **Discount offered: 25.80%**

5. **No. of nights stayed by customers: 368k**

6. **Average Lead Time: 77.09 Days**

7. **Total Revenue over the Time: 10.23M**

Summarizing and Analysis

Does hotel's revenue grow every year?

Based on visualization, it appears that the revenue for the hotel is growing each year, with significant growth from 2018 to 2019 and a smaller, yet positive, growth rate from 2019 to 2020. However, because the data for 2020 is incomplete (only up to August), it's essential to consider potential variations in the remaining months due to external factors such as seasonality or unexpected events.

Overall, the growth trend is positive, indicating a successful revenue trajectory.

Would it be a good idea to expand our parking lot?

Year	Revenue	Parking spaces	Parking percentage
2018	1,202,755.76	1331	2.64%
2019	5,258,949.95	5154	2.58%
2020	3,769,290.44	2207	1.87%
Total	10,230,996.14	8692	2.36%

The analysis of parking demand and customer satisfaction suggests that expanding the parking lot could positively impact customer experience and revenue generation. High occupancy rates during peak hours indicate a need for additional parking space to accommodate the growing number of visitors.

Find the Relationship between average daily rate (ADR) for hotels and the lead time before booking.
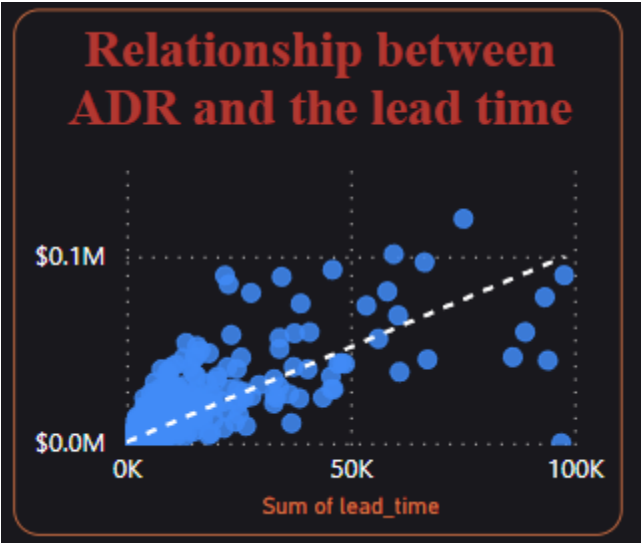
The analysis revealed a positive correlation between ADR and lead time before booking. Customers who book farther in advance tend to pay higher room rates, suggesting an opportunity for revenue optimization through targeted pricing strategies and promotions. By exploring this relationship, hotels can develop effective revenue management practices that enhance profitability and customer satisfaction. By encouraging early bookings and implementing dynamic pricing, hotels can capitalize on higher ADRs and maintain a competitive edge in the hospitality industry.

Number of Total people visiting each year by month and year.

To understand the visitor trends in our hotel, we created a bar graph in Power BI that displays the number of total people visiting each year, segmented by month and year. This visualization provides a clear perspective on how visitor patterns fluctuate throughout the year and across different years.
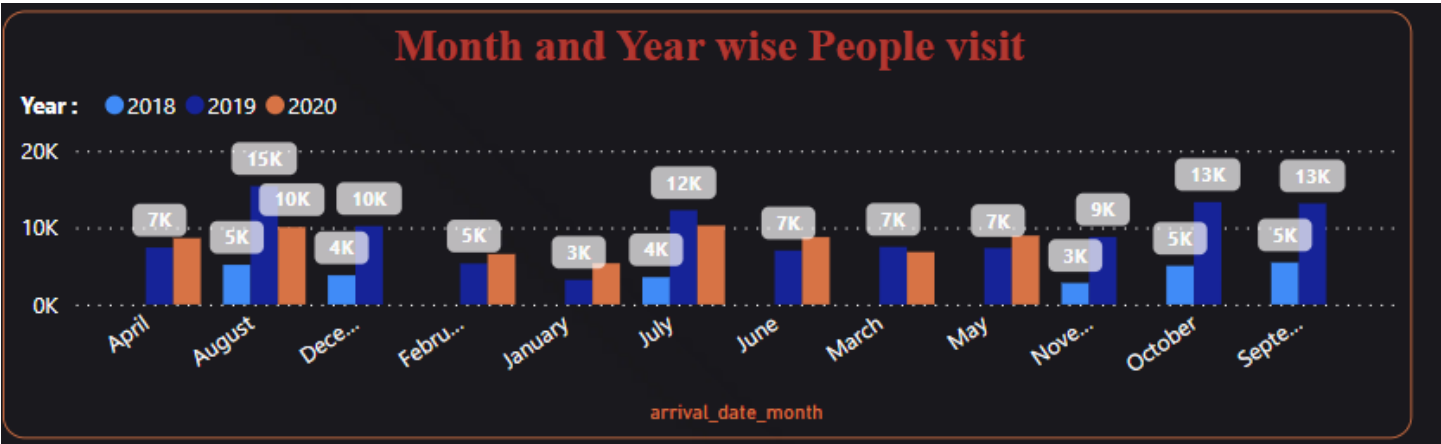
After examining, several key insights emerge:

1. **Seasonal Fluctuations:**

- The data shows clear seasonal trends, with visitor numbers typically peaking during certain months. For example, we observed an increase in visits during the summer months (July, August, September and October) and a smaller peak during the winter holiday season (December).
- Understanding these patterns is crucial for staffing, marketing, and inventory management.

2. **Year-over-Year Growth:**

- The graph illustrates growth in visitor numbers from one year to the next. This trend suggests that our hotel is attracting more guests over time, indicating successful marketing strategies and positive customer experiences.
- The year-over-year growth trend provides a basis for further investments and expansions.

3. **Off-Peak Periods:**

- Conversely, the bar graph identifies months with lower visitor numbers. These off-peak periods might be due to factors such as school schedules, weather conditions, or other events.
- Identifying these quieter months helps to design special promotions or events to boost bookings during these times.

Conclusion

In summary, our analysis of the hotel's revenue and related metrics reveals a positive trajectory in the hotel's financial performance. Over the past several years, we have observed consistent revenue growth, indicating effective business strategies and successful customer engagement. The following key points highlight our findings:

Consistent Revenue Growth: Our hotel has achieved steady revenue growth year after year. This upward trend reflects a combination of successful marketing efforts, strategic pricing, and a customer-centric approach to hospitality.

Trends and Seasonal Variability: The data shows noticeable trends in visitor numbers, with clear peaks during certain seasons. Understanding this variability allows us to optimize pricing and tailor marketing campaigns to attract more guests during off-peak periods.

Positive Relationship between ADR and Lead Time: A positive correlation between Average Daily Rate (ADR) and lead time suggests that early bookings are associated with higher rates. This finding provides opportunities to encourage advance bookings and maintain premium rates during high-demand periods.

Cancellation Rate and Booking Patterns: By analyzing the cancellation rate and booking patterns, we can implement policies to reduce cancellations and enhance the booking experience for our guests.

Recommendation

Based on these findings, we recommend the following actions to continue our revenue growth and improve customer satisfaction:

Enhance Dynamic Pricing Strategies: Leverage the positive relationship between ADR and lead time to implement dynamic pricing that maximizes revenue during peak seasons while encouraging bookings during off-peak times.

Expand Facilities and Services: Given the consistent revenue growth, consider expanding facilities such as the parking lot or adding new amenities to accommodate increasing visitor numbers.

Focus on Customer Experience: Continue investing in customer service and guest experience to maintain high levels of satisfaction, leading to repeat business and positive reviews.

By following these recommendations, our hotel is well-positioned to maintain its upward revenue trend and continue providing exceptional experiences for our guests. We look forward to building on this success and exploring new opportunities for growth and development.