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Airport Analysis

Objective: Identify opportunities to increase occupancy rate on low-performing flights which can ultimately lead to increased profitability.

To see the original sql, python code and data set info:
GitHub - AnishaChoudhury02/Airline-Analysis: For this project, the goal is to identify opportunitie…

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Business Problem

A hypothetical company operates a ***diverse fleet of aircraft r***anging from small business jets to medium-sized machines. They have been providing high-quality air transportation services to their clients for several years, with primary focus is to ensure a safe, comfortable, and convenient journey for our passengers. However, they are currently facing ***challenges*** due to several factors such as stricter environmental regulations, higher flight taxes, increased interest rates, rising fuel prices, and a tight labor market resulting in increased labor costs. As a result, the company's ***profitability is under pressure***, and they are seeking ways to address this issue. To tackle this challenge, they are looking to conduct an analysis of their database to find ways to increase their occupancy rate, which can help boost the average profit earned per seat.

Objectives

3 MAIN OBJECTIVES

1. Increased occupancy rate
2. Improve pricing strategy
3. Enhance customer experience

Increase occupancy rate: By increasing the occupancy rate, they can boost the average profit earned per seat and mitigate the impact of the challenges we're facing.

Improve pricing strategy: Company needs to develop a pricing strategy that takes into account the changing market conditions and customer preferences to attract and retain customers.

Enhance customer experience: They need to focus on providing a seamless and convenient experience for our customers, from booking to arrival, to differentiate ourselves in a highly competitive industry and increase customer loyalty.

Basic Analysis

The basic analysis of data provides **insights** into the # of planes with **more than 100 seats**, how the **number of tickets booked, total amount earned changed** over time, and the **average fare** for each aircraft with different fare conditions. These findings will be useful in *developing strategies to increase occupancy rates and optimize pricing for each aircraft.* **Table 1** shows the aircraft with more than 100 seats and the actual count of the seats.

	aircraft_code	num_seat
0	773	402
1	763	222
2	321	170
3	320	140
4	733	130
5	319	116

Table 1

In order to gain a deeper understanding of the trend of ticket bookings and revenue earned through those bookings, we have utilized a **line chart** visualization. Upon analysis of the chart, we observe that the number of tickets booked exhibits a gradual increase from June 22nd to July 7th, followed by a relatively stable pattern from July 8th until August, with a noticeable peak in ticket bookings where the highest number of tickets were booked on a single day. It is important to note that the revenue earned by the company from these bookings is closely tied to the number of tickets booked. Therefore, we can see a similar trend in the total revenue earned by the company throughout the analyzed time period.

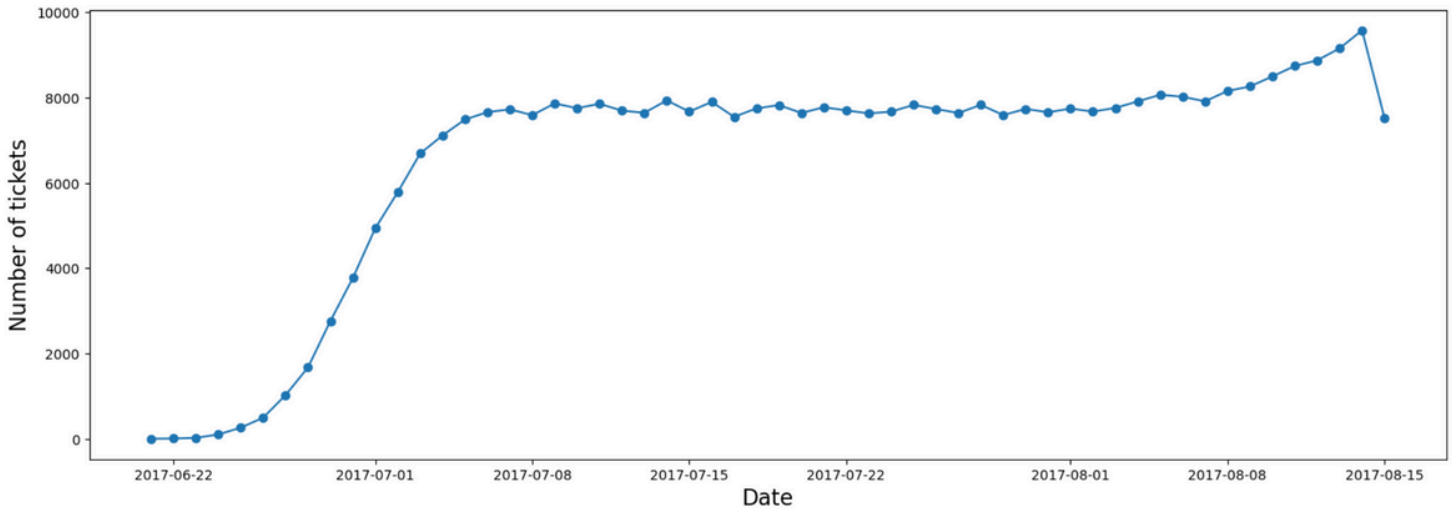

Figure 1

These findings suggest that further exploration of the factors contributing to the peak in ticket bookings may be beneficial for increasing overall revenue and optimizing operational strategies.

Then a bar graph is generated to graphically compare the data after we completed the computations for the average costs associated with different fare conditions for each aircraft. The graph in **Figure 2** shows data for three types of fares: **business, economy, and comfort**. It is worth mentioning that the comfort class is available on only one aircraft, the 773. The CN1 and CR2 planes, on the other hand, only provide the economy class. When different pricing circumstances within each aircraft are compared, the charges for business class are consistently greater than those for economy class. This trend is seen across all planes regardless of fare conditions.

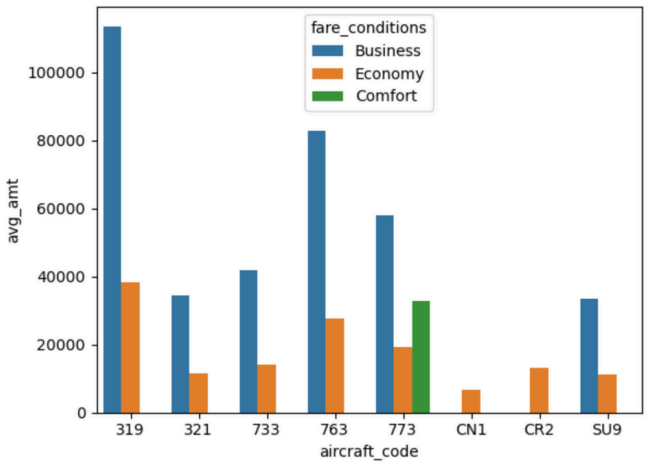

Figure 2

Analyzing Occupancy Rate

Airlines must thoroughly analyze their **revenue** streams in order to **maximize profitability.** The overall **income per year** and **average revenue per ticket** for each aircraft are important metrics to consider. Airlines may use this information to determine which aircraft types and itineraries generate the most income and alter their operations appropriately. This research can also assist in identifying potential for **pricing optimization** and **allocating resources** to more profitable routes. The below figure 4 shows the total revenue, total tickets and average revenue made per ticket for each aircraft.

For each aircraft, the total revenue per year and the average revenue per ticket

The aircraft with the **highest total revenue** is SU9 and from table below, it can be seen that the price of the business class and economy class is the **lowest** in this aircraft. This could be the reason why most people bought this aircraft ticket as it costs less compared to others. The aircraft with **least total revenue** is CN1, and the possible reason behind this could be that it only offers economy class with the least price. It might be also be due to its poor conditions or fewer facilities.

	aircraft_code	ticket_count	total_revenue	total_revenue/ticket_count
0	319	52853	2706163100	51201
1	321	107129	1638164100	15291
2	733	86102	1426552100	16568
3	763	124774	4371277100	35033
4	773	144376	3431205500	23765
5	CN1	14672	96373800	6568
6	CR2	150122	1982760500	13207
7	SU9	365698	5114484700	13985

Table 2

Occupancy rate

The **average occupancy per aircraft** is another critical number to consider. Airlines may measure how successfully they fill their seats and discover chances to boost occupancy rates by using this metric. **Higher occupancy rates** can help airlines increase revenue and profitability while lowering operational expenses associated with vacant seats. Pricing strategy, airline schedules, and customer satisfaction are all factors that might influence occupancy rates. The below **table** shows the **average booked seats** from the **total number of seats** for each aircraft. The occupancy rate is calculated by dividing the booked seats by the total number of seats. Higher occupancy rate means the aircrafts are more booked and only few seats are left unbooked.

	aircraft_code	booked_seats	num_seats	occupancy_rate
0	319	53.583181	116	0.461924
1	321	88.809231	170	0.522407
2	733	80.255462	130	0.617350
3	763	113.937294	222	0.513231
4	773	264.925806	402	0.659019
5	CN1	6.004431	12	0.500369
6	CR2	21.482847	50	0.429657
7	SU9	56.812113	97	0.585692

Table 3

Airlines can assess how much their total yearly turnover could improve by providing all aircraft a **10% higher occupancy rate** to further examine the possible benefits of **raising occupancy rates.** This research can assist airlines in determining the financial impact of boosting occupancy rates and if it is a realistic strategy. Airlines may enhance occupancy rates and revenue while delivering greater value and service to consumers by optimizing pricing tactics and other operational considerations. The below figure shows how the **total revenue increased** after increasing the occupancy rate by 10% and it gives the result that it will increase gradually so airlines should be more focused on the pricing strategies.

	aircraft_code	booked_seats	num_seats	occupancy_rate	Increased occupancy rate	Incr total annual turnover
0	319	53.583181	116	0.461924	0.508116	2.706163e+09
1	321	88.809231	170	0.522407	0.574648	1.638164e+09
2	733	80.255462	130	0.617350	0.679085	1.426552e+09
3	763	113.937294	222	0.513231	0.564554	4.371277e+09
4	773	264.925806	402	0.659019	0.724921	3.431206e+09
5	CN1	6.004431	12	0.500369	0.550406	9.637380e+07
6	CR2	21.482847	50	0.429657	0.472623	1.982760e+09
7	SU9	56.812113	97	0.585692	0.644261	5.114485e+09

Table 4

Conclusion

To summarize, analyzing revenue data such as total revenue per year, average revenue per ticket, and average occupancy per aircraft is critical for airlines seeking to maximize profitability. Airlines can find areas for improvement and modify their pricing and route plans as a result of assessing these indicators. A greater occupancy rate is one important feature that can enhance profitability since it allows airlines to maximize revenue while minimizing costs associated with vacant seats. The airline should revise the price for each aircraft as the lower price and high price is also the factor that people are not buying tickets from those aircrafts. They should decide the reasonable price according to the condition and facility of the aircraft and it should not be very cheap or high.

Furthermore, boosting occupancy rates should not come at the price of consumer happiness or safety. Airlines must strike a balance between the necessity for profit and the significance of delivering high-quality service and upholding safety regulations. Airlines may achieve long-term success in a highly competitive business by adopting a data-driven strategy to revenue analysis and optimisation.

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