Business Problem

The company operates a versatile fleet ranging from small business jets to medium-sized aircraft. We have been offering high-quality air transportation services for several years, focusing on providing a safe, comfortable, and seamless journey for our passengers.

However, recent challenges have put pressure on our profitability. Key factors contributing to this issue include stricter environmental regulations, higher flight taxes, increased interest rates, rising fuel prices, and a tight labor market leading to elevated labor costs.

To address these challenges, we aim to analyze our database to identify strategies that can improve occupancy rates, ultimately increasing the average profit per seat.

Main Challenges

1. **Stricter Environmental Regulations:**
   Growing pressure on the aviation industry to reduce carbon emissions has led to more stringent laws, increasing operational costs and limiting expansion potential.
2. **Higher Flight Taxes:**
   Governments worldwide are imposing heavier taxes on flights to combat environmental issues, leading to higher operational costs and reduced passenger demand.
3. **Tight Labor Market & Increased Labor Costs:**
   A shortage of skilled professionals in the aviation sector has driven up labor costs and contributed to higher turnover rates.

Objectives

1. **Increase Occupancy Rate:**
   Boosting seat occupancy will help improve the average profit per seat, directly addressing current profitability challenges.
2. **Enhance Pricing Strategy:**
   Develop a dynamic pricing model that adapts to market trends and customer preferences, making flights more attractive and competitive.
3. **Improve Customer Experience:**
   Focus on providing a seamless journey from booking to arrival, enhancing customer satisfaction and loyalty in a highly competitive industry.

The end goal of this task would be to identify opportunities to increase the occupancy rate on low-performing flights, which can ultimately lead to increased profitability for the airline.

Basic Analysis

Aircraft Capacity Overview:

Analyzed aircraft with more than 100 seats to understand capacity distribution.

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.

Below is a breakdown of aircraft models and their seating capacities:

Aircraft code	Number of Seats
319	116
320	140
321	170
733	130
763	222
773	402

Table 1

Ticket Booking & Revenue Trends:

A line chart was utilized to track ticket bookings and revenue trends over time.

- **Key Insights:**
  - Gradual increase in bookings from **June 22** to **July 7**.
  - Stable booking patterns from **July 8** onwards, with a notable peak in bookings on a specific day.
  - Revenue trends closely followed booking patterns, highlighting the strong correlation between ticket sales and revenue.

Further analysis into the factors driving booking peaks could help optimize future sales and revenue strategies.

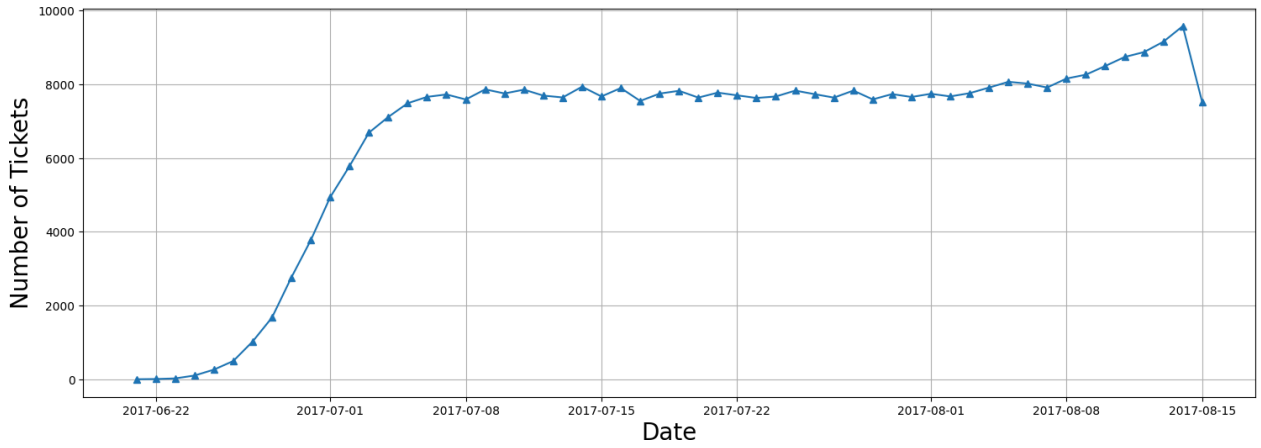

Figure 1

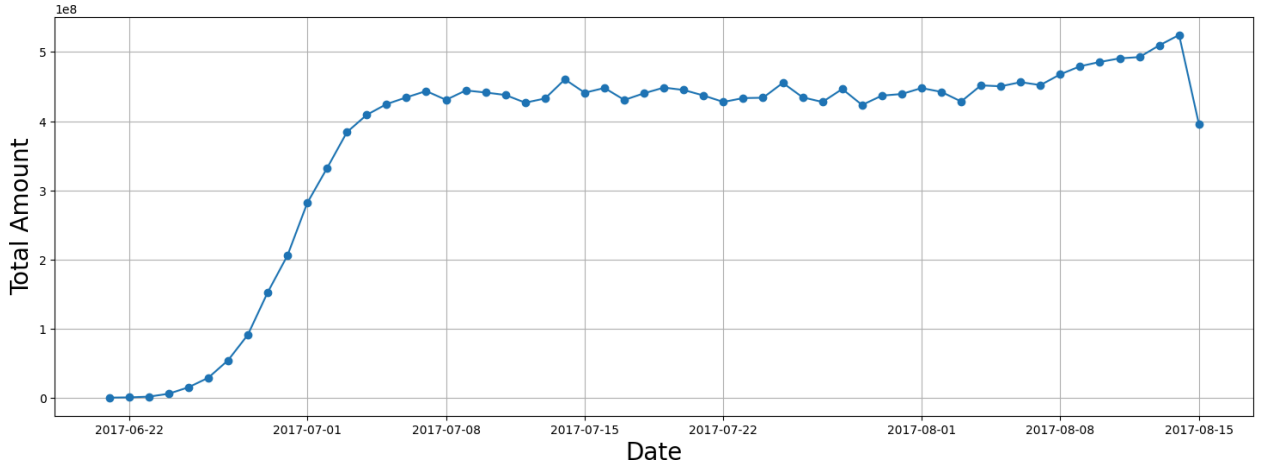

Figure 2

Fare Class Analysis:

A bar graph was created to compare average fares across different aircraft and fare classes: **Business**, **Economy**, and **Comfort**.

- **Key Observations:**
  - **Business Class** fares are consistently higher than **Economy** across all aircraft.
  - **Comfort Class** is exclusive to the **773** aircraft.
  - **CN1** and **CR2** aircraft only offer **Economy** class fares.

This data suggests pricing plays a significant role in influencing booking patterns.

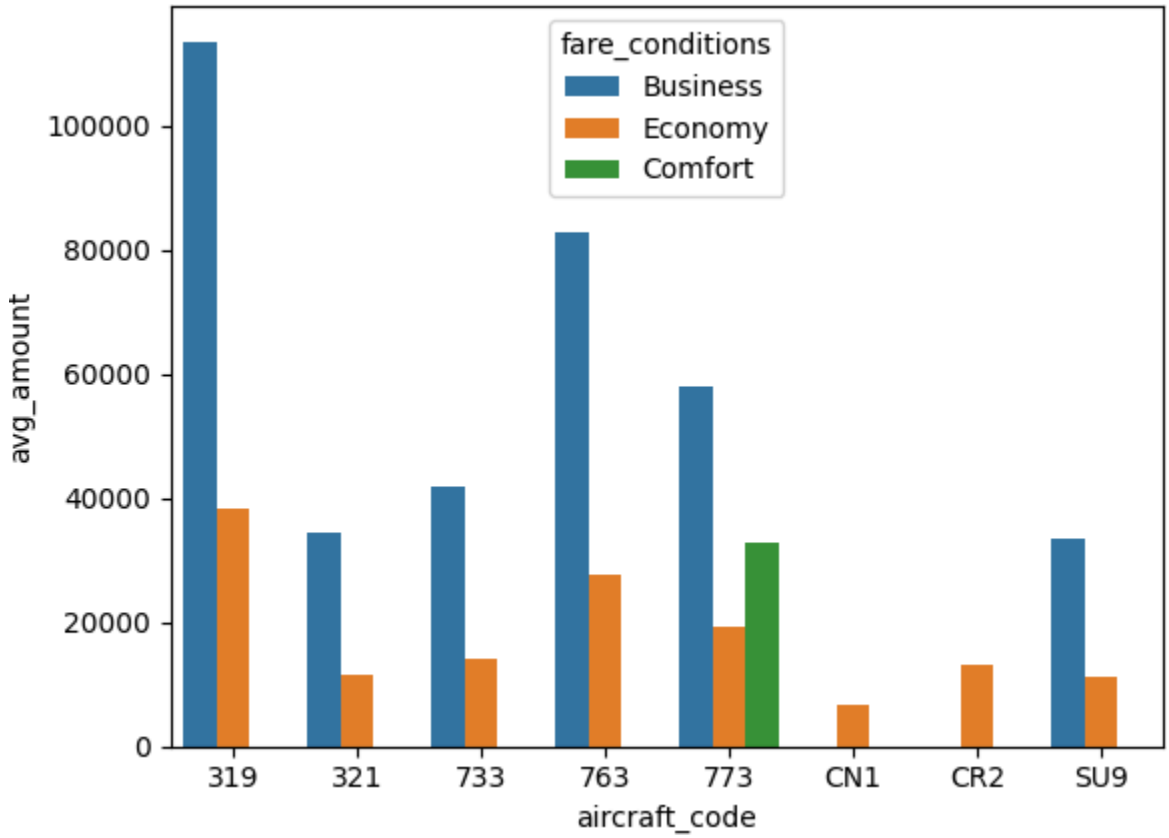

Figure 3

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. The aircraft with the highest total revenue is SU9 and from the figure 3 it can be seen that the price of the business class and economy class is the lowest in this aircraft. This can be the reason that most of the people bought this aircraft ticket as its cost is less compared to others. The aircraft with least total revenue is CN1, and the possible reason behind this is it only offers economy class with very least price and it might be because of its poor conditions or less facilities.

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

Figure 4

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 figure 5 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 aircraft seats are more booked and only few seats are left unbooked.

	aircraft_code	booked_seats	num_seats	occupancy_rate
0	319	53.58318098720292	116	0.46192397402761143
1	321	88.80923076923077	170	0.5224072398190045
2	733	80.25546218487395	130	0.617349709114415
3	763	113.93729372937294	222	0.5132310528350132
4	773	264.9258064516129	402	0.659019419033863
5	CN1	6.004431314623338	12	0.5003692762186115
6	CR2	21.48284690220174	50	0.42965693804403476
7	SU9	56.81211267605634	97	0.5856918832583128

Figure 5

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	Inc occupancy rate	Inc Total Annual Turnover
0	319	53.58318098720292	116	0.46192397402761143	0.5081163714303726	2976779410.0
1	321	88.80923076923077	170	0.5224072398190045	0.574647963800905	1801980510.0
2	733	80.25546218487395	130	0.617349709114415	0.6790846800258565	1569207310.0000002
3	763	113.93729372937294	222	0.5132310528350132	0.5645541581185146	4808404810.0
4	773	264.9258064516129	402	0.659019419033863	0.7249213609372492	3774326050.0
5	CN1	6.004431314623338	12	0.5003692762186115	0.5504062038404727	106011180.00000001
6	CR2	21.48284690220174	50	0.42965693804403476	0.4726226318484382	2181036550.0
7	SU9	56.81211267605634	97	0.5856918832583128	0.644261071584144	5625933169.999999

Figure 6

Conclusion

In conclusion, analyzing key performance indicators such as total revenue, average ticket revenue, and occupancy rates has proven essential in uncovering opportunities to improve airline profitability. The data clearly shows that aircraft with strategic pricing and better amenities tend to perform better in terms of both occupancy and revenue. A critical takeaway from this analysis is the importance of dynamic pricing—offering competitive fares that align with the condition and features of each aircraft. Underpriced tickets can hurt revenue, while overpriced tickets can lead to empty seats, both of which impact profitability.

Increasing occupancy rates emerged as one of the most effective strategies for boosting profits. However, it's essential to strike a balance. While filling more seats is important, it should not come at the expense of customer satisfaction or safety standards. Overcrowded flights or aggressive cost-cutting can lead to poor customer experiences, which could hurt long-term loyalty and brand reputation.

Airlines that leverage data-driven insights to fine-tune their pricing strategies, optimize routes, and improve customer experiences will be better positioned to thrive in the competitive aviation market. By focusing on increasing occupancy rates while maintaining high service standards, airlines can not only boost short-term profitability but also ensure long-term success in a challenging business environment.

Link to data - https://drive.google.com/file/d/1YJxetrnY7wOaT2NGPMWNaju63CyAaDgm/view?usp=share_link