

Business Problem

The company manages a variety of aircraft, from small business jets to mid-sized planes, and has been offering reliable air travel services to clients for many years. Their main goal is to provide a journey that is safe, comfortable, and hassle-free for passengers.

Lately, though, the company has been experiencing some tough challenges. Factors like stricter environmental rules, increased taxes, higher interest rates, rising fuel costs, and labor shortages are all driving up expenses—especially labor costs.

These growing costs are starting to squeeze profits. To deal with this, the company wants to analyze their existing database to discover ways to improve seat occupancy. Increasing how many seats are filled per flight could help raise the average profit they make per seat.

Main Challenges

1. **Tougher environmental rules** – Airlines are now under more pressure to cut down on carbon emissions, leading to stricter environmental laws. These rules make it more expensive to run operations and also limit how much airlines can grow.
2. **Increased flight taxes** – To tackle environmental concerns and generate more revenue, many governments have started charging higher taxes on flights. This pushes up ticket prices and can reduce the number of people willing to fly.
3. **Labor shortage and rising costs** – There aren't enough skilled workers in the aviation industry, which has made it harder to hire and keep staff. As a result, labor costs have gone up and employee turnover has become a bigger issue.

Objectives:

1. **Boost Seat Occupancy**
Filling more seats on each flight will help us earn more per seat and reduce the impact of rising costs and industry challenges.
2. **Smarter Pricing Strategy**
We need to come up with a flexible pricing plan that matches current market trends and what customers want, so we can attract more flyers and keep them coming back.
3. **Better Customer Experience**
From booking tickets to reaching the destination, we should aim to make every step smooth and hassle-free. A great travel experience will set us apart from the competition and build strong customer loyalty.

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:

The initial data analysis reveals helpful insights, such as how many aircraft have more than 100 seats, how ticket bookings and revenue have varied over time, and what the average fare looks like across different aircraft types and fare categories.

These insights can play a key role in shaping strategies to improve seat occupancy and fine-tune pricing for each aircraft model. **Table 1** highlights the aircraft that have over 100 seats, along with the exact number of seats available in each.

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

Table 1

To better understand how ticket bookings and revenue changed over time, we created a line chart. The chart shows a steady rise in the number of tickets booked from June 22nd to July 7th. After that, from July 8th until August, the bookings remain mostly stable. There's also a clear spike during this period, where the highest number of tickets were booked on a single day.

Since the revenue earned is directly linked to how many tickets are sold, we notice a similar trend in the company's earnings. This pattern highlights the importance of digging deeper into what caused the spike in bookings. Understanding those factors could help improve revenue and make better business decisions moving forward.

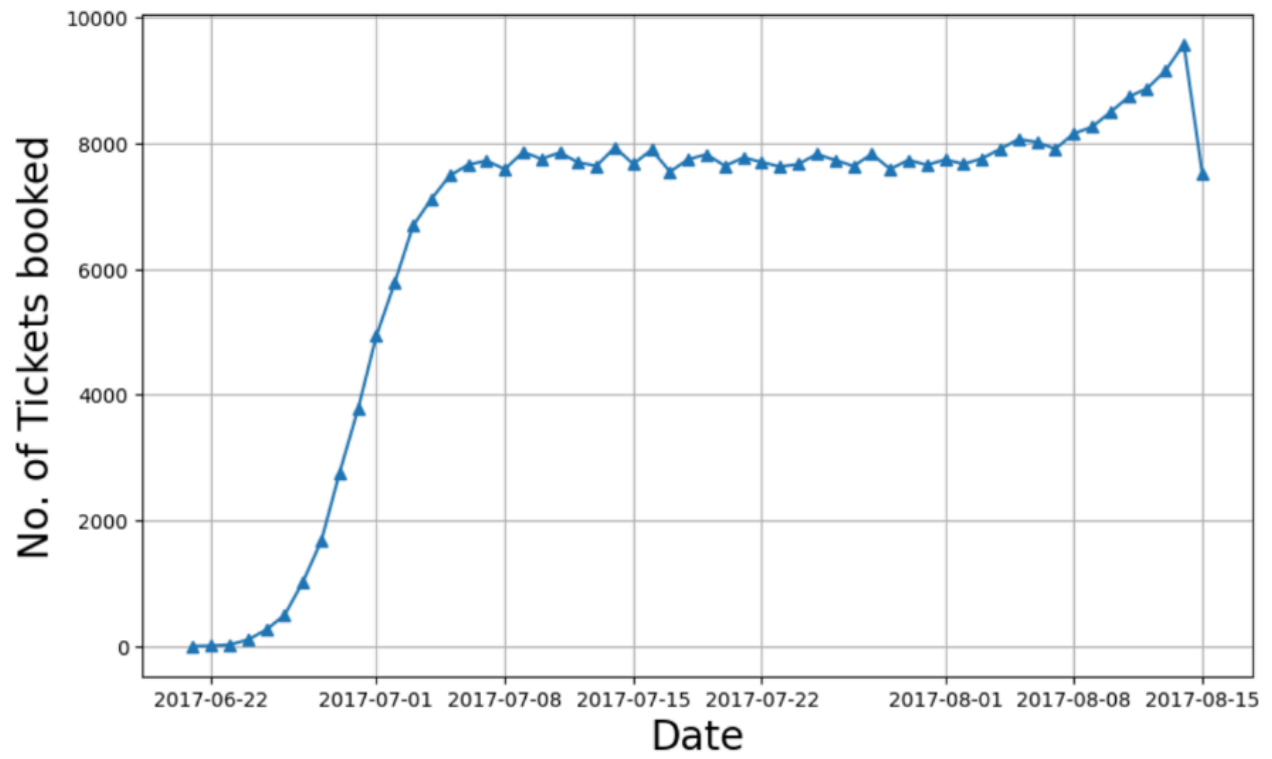


Figure 1

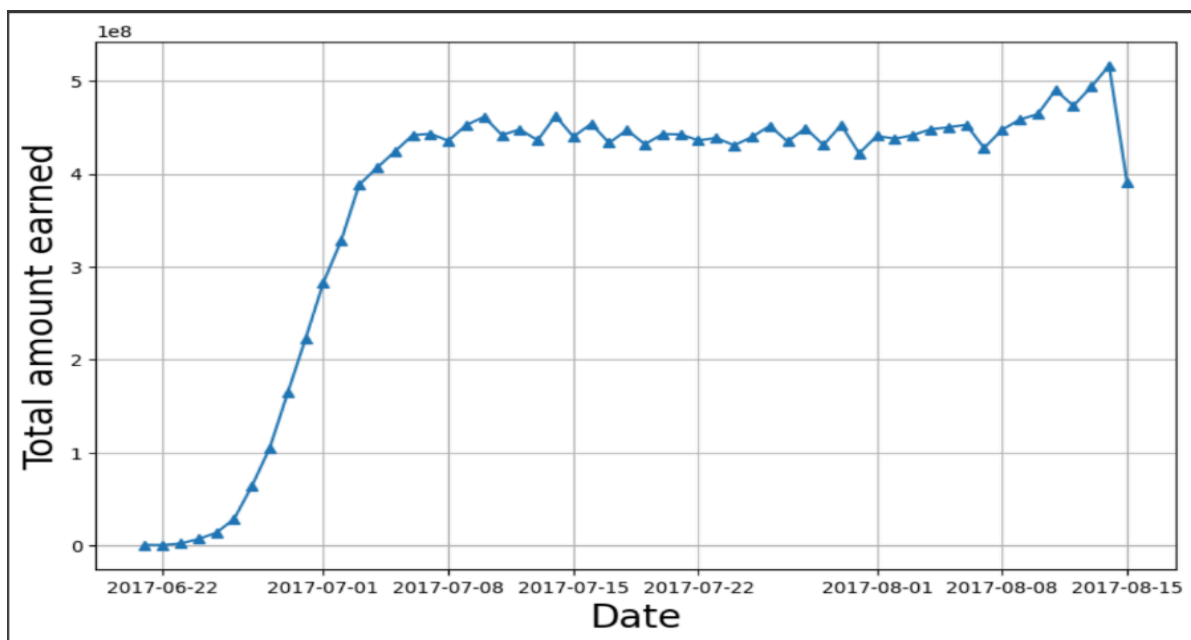


Figure 2

After calculating the average cost for different fare types on each aircraft, we created a bar graph to visually compare the results. As shown in Figure 3, the graph highlights three fare types: economy, business, and comfort. It's important to note that the comfort class is only available on one aircraft — the 773. Meanwhile, aircraft like the CN1 and CR2 offer only the economy class. When we look at the pricing differences within each aircraft, business class fares are always higher than economy fares. This pattern is consistent across all planes, no matter the fare options available.

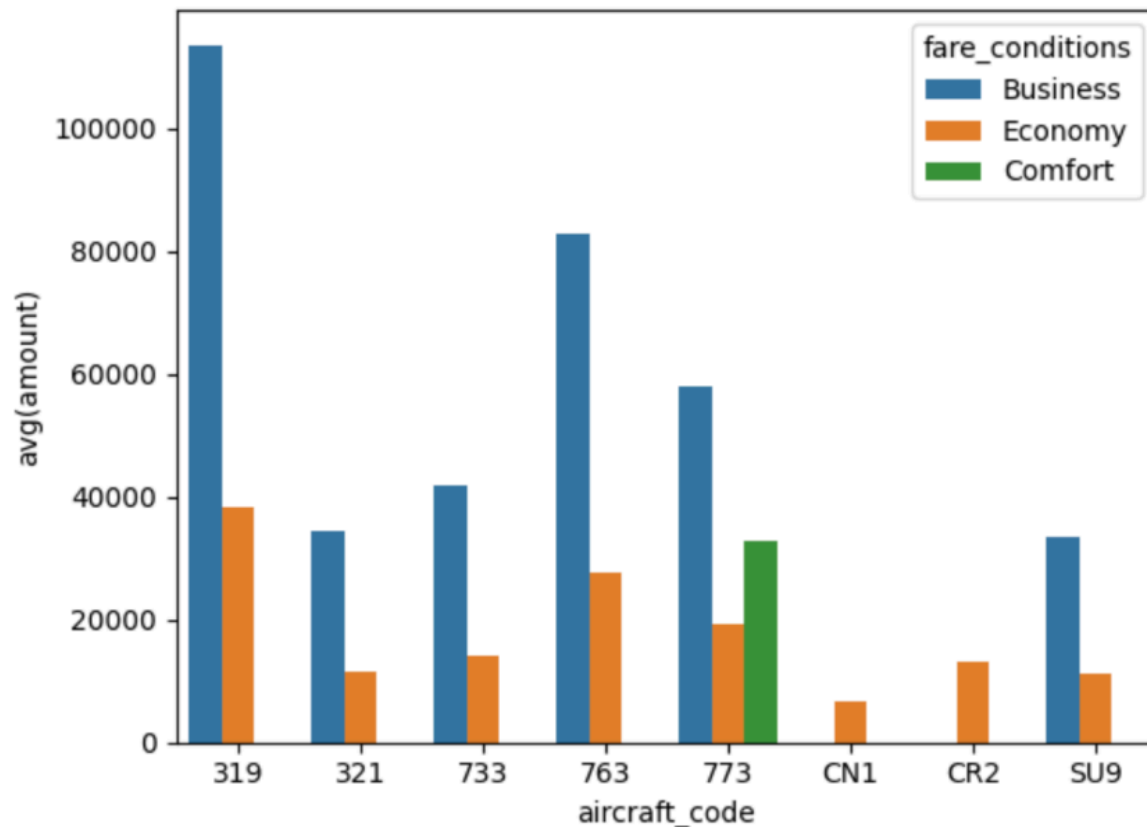


Figure 3

ANALYZING OCCUPANCY RATE

To increase profits, airlines need to take a closer look at where their money is coming from. Two important things to check are how much revenue each aircraft makes in a year and the average money earned per ticket. This helps the airline understand which aircraft types and routes bring in more money, so they can make better decisions on where to focus. It also helps in finding chances to improve pricing and use resources on more profitable routes.

The chart below (Figure 4) shows the total revenue, number of tickets sold, and average ticket price for each aircraft. The SU9 aircraft made the most revenue, and as shown earlier (Figure 3), this aircraft has the lowest ticket prices for both business and economy classes. This could be the reason why more people chose to fly on it — because it's more affordable than the others. On the other hand, the CN1 aircraft made the least revenue, possibly because it only has economy class tickets at very low prices, and maybe due to its lower quality or fewer facilities.

	aircraft_code	ticket_count	total_revenue	avg_revenue_per_ticket
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

Figure 4

The average number of booked seats per aircraft is an important number to look at.

It helps airlines understand how well they are filling their flights and shows where there's room to improve. When more seats are booked, airlines can earn more money and reduce the cost of flying empty seats. Things like pricing, flight schedules, and how happy customers are can all affect how full the flights get.

In the chart below (Figure 5), you can see the average number of seats booked compared to the total seats for each aircraft type.

Occupancy rate is found by dividing booked seats by total seats. A higher occupancy rate means most seats are filled and only a few are left empty.

	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 estimate how much their total yearly revenue might go up if every aircraft flew with **10% more seats filled**. Doing this helps them see whether improving occupancy is a practical way to grow income.

By studying the numbers, airlines can understand the money impact of higher occupancy and decide if they should push this strategy. With smarter pricing and better operations (like promotions, route planning, or flexible fares), they can fill more seats, earn more revenue, and give passengers better value.

The chart below shows the change in total revenue after applying a 10% boost to occupancy. The increase is steady, which suggests airlines should pay close attention to pricing strategies that help fill those extra seats.

Conclusion

To sum it up, looking at revenue data like total yearly income, average ticket price, and how full each aircraft is can really help airlines improve their profits. By checking these numbers, airlines can spot where things aren't working well and make smarter decisions about pricing and flight routes.

One key factor is the **occupancy rate** — the more seats that are filled, the more money the airline can make without wasting resources on empty seats. However, pricing also plays a big role. If ticket prices are too high or too low for certain aircraft, people may avoid booking. So, it's important to set prices that match the aircraft's comfort, features, and travel conditions — not too expensive, and not too cheap.

At the same time, airlines shouldn't increase occupancy by compromising on passenger comfort or safety. There needs to be a balance between making profits and providing a safe, pleasant experience. By using data wisely, airlines can make better decisions and grow steadily in today's competitive market.