



EFFECTS OF COVID-19 PANDEMIC ON AIRLINE COMPANIES AND CREW RESOURCE PLANNING

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Abstract

The airline industry is constantly growing, highly competitive, and highly affected by the elements of both task and general environment. Before the COVID-19 Pandemic, airlines were making strategic plans for growth based on the number of destinations and flight frequency, taking into account the task and general environmental factors. With the COVID-19 pandemic, flight bans, restrictions, and quarantine practices have been introduced at national and international levels. This has directly negatively affected airline operations, as it has led to a decrease in the number of destinations, a significant proportion of scheduled/non-scheduled flights cannot be made, and low passenger/customer occupancy rates on the aircraft. These changes in the task and general environment due to the Covid-19 pandemic caused to suffer, shrink or even bankrupt for the airline businesses which already have low profit margins and high fixed costs. The COVID-19 pandemic has negatively impacted the airline operations and thus the activities of the Crew resource planning department. The department was effected by the Covid-19 pandemic about several issues. Such as the workforce at the publish of the crew's rosters, training issues, decrease of the crew resource due to quarantined crew, not being able to use the crew optimally due to prolonged cleaning times on the ground, and hotel and ticket reservations difficulties. With the normalization to be achieved by the elimination of the Covid-19 pandemic, airline companies and their crew resource planning departments can stabilize again. Otherwise, a significant portion of the airlines operating in the air transport sector will not be able to survive.

Keywords: Airline, Crew Resource Planning, Pandemic.

1. INTRODUCTION

Aviation is a sector which is ever-growing, competitive, and highly affected by the task and general environmental elements. Before the Covid-19 pandemic, airlines were making strategic plans for growth which is focused on the number of destinations and flight frequency by considering the task and general environment elements.

Aircrafts which are purchased or leased as a result of these growth strategies constitute a significant part of the very high fixed cost of the airline companies. Airline companies gain income from the passengers by making scheduled flights which are determined one year in advance or non-scheduled flights which are determined according to demand. In the aviation sector, which has a low-profit margin in comparison to the other sectors, the high passenger occupancy rate allows airlines to be profitable.

The covid-19 pandemic has caused significant changes, in the task environment elements which consist of customers, competitors/potential competitors, suppliers, and substitute products as well as the general environment elements which consist of the political, legal, socio-cultural, demographic, technological, and international environment.

2. LITERATURE REVIEW

2.1. Airlines and Crew Resource Planning Department

Air transport can be defined as the displacement of people, load (cargo), or mail by an aircraft from the air in a way that allows space and time benefits. In other words, displacement of people and/or load with an aircraft is only possible with the air transport service. Not only flights that profit-oriented, but also flights for personal purposes can be covered by this definition. Regardless of the purpose, relocation of people, load, or a mail by an aircraft is air transportation. (Gerede, 2002)

Crew resource planning department is the department that calculates the cabin/cockpit crews that airline companies will need in the short and long term, determines the working times of the crew in accordance with national and international rules, performs the planning process of the duties, plans flight training, makes the hotel and transfer organizations needed due to duty planning.

2.2. The effects of the Covid - 19 Pandemic to Task and General Elements and the Airlines

The covid-19 pandemic has negative effects on airlines due to the changes it leads, in the task environment elements which consist customers, competitors/potential competitors, suppliers and substitute products as well as the general environment elements which consist political, legal, socio-cultural, demographic, technological and international environment.

The elements of the task environment are;

- **Customers:** They are the potential buyers of goods and /or services that the business offers to the market. With the Covid-19 pandemic, there has been a significant decline in the sales of the seats which are supplied by the airlines.

- **Competitors:** Competitors are other businesses within the same sectoral environment that produce similar goods and/or services for the same customers. All the airlines in the sector have been affected negatively by the Covid-19 pandemic.

- **Suppliers:** Raw materials, semi-finished products, manpower (Labor), energy, etc. the person or organization that provides production inputs is called a supplier. The entire aviation business, including both airlines and suppliers, was negatively impacted by the Covid-19 pandemic, including aircraft manufacturers.

- **Substituted products:** substituted products are products and services that can replace the products of the enterprise. The use of substitute products has increased due to health concerns of people to their own private vehicles or renting business jets.

- **Possible competitors:** The attractiveness of the sectors encourages new entrances to the market. New entrances to the market can be by the newly established businesses or through acquisitions or merges of the businesses which are already existing in the sector. Due to the Covid-19 pandemic, there were no companies that entered the sector with the decrease in the number of passengers and the contraction in the market.

The elements of the general environment are;

- **Political:** It is the environment in which the business operates in the country where the central and local authorities and their affiliated organizations provide and use their political authority. Due to the Covid-19 pandemic, restrictions have increased with the decisions made by countries and people have not been able to travel.

- **Legal:** It is the environment consisting of various laws, statutes, and regulations issued by the state and covering all laws that the business must comply with. Lockdowns and similar restrictions introduced during the Covid-19 pandemic caused people to hesitate to travel.

- **Economic:** It is the environment that consists of factors that affect businesses directly or indirectly such as national income, inflation, monetary and fiscal policies. During the Covid-19 pandemic, with the decrease in the number of passengers, the revenues of the airline companies also decreased, many airlines went bankrupt or came to the point of bankruptcy.

- **Socio-cultural:** Human behavior and socio-cultural values are another important factor group affecting businesses. Factors such as education and culture, social beliefs, traditions, and value judgments constitute the social environment. As the decisions and restrictions made within the framework of the Covid-19 pandemic affected people's travel habits, the number of passengers decreased.

- **International:** It is the environment where many elements such as economic cooperation and wars outside the country of operation, which is the upper system of the enterprise, take place. As of the Covid-19 pandemic, there has been a decrease in passenger traffic between countries with international travel bans. This situation has seriously affected tourism.

- **Technological:** It is an environment where new information is created that will help the business to achieve its objectives and is applied in every environment and consists of activities that lead to an improvement in products and processes.

- **Demographic:** It is the environment that consists of factors related to the structure, characteristics, and trends of the population. The lockdown over the age of 65 and under 20 due to the Covid-19 pandemic negatively affected the market of airlines in this age range. (Yiğit and Yiğit, 2012)

3. RESEARCH METHOD

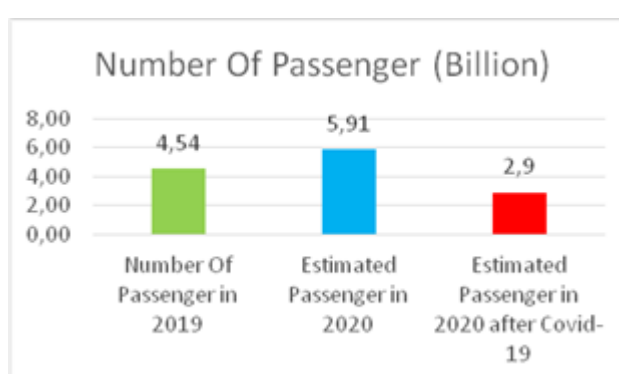
The retrospective method was used in the study. Data of airlines before and after the Covid-19 pandemic has been analyzed by comparing ICAO (International Civil Aviation Organization), IATA (International Air Transportation Association), and DHMI (State Airports Authority) data.

Similarly, differences and new problems in Crew Resource Planning practices before and after the Covid-19 pandemic in a private airline were analyzed.

4. ANALYSIS

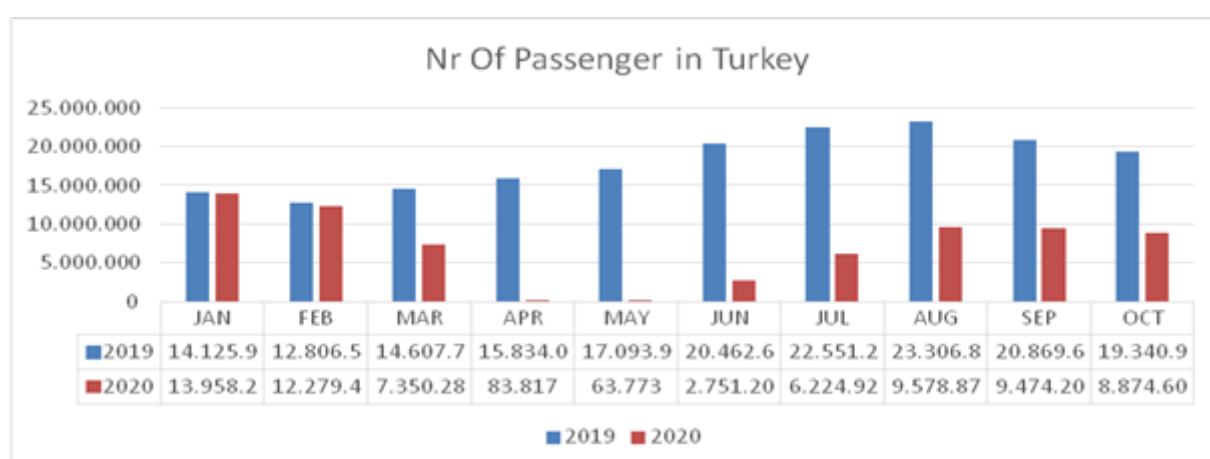
With the Covid-19 pandemic, flight bans, restrictions, and quarantine practices have been introduced at national and international levels. This has directly affected airline Operations in a negative direction, as it has led to a decrease in the number of destinations, a significant proportion of scheduled/non-scheduled flights cannot be made, and low passenger/customer occupancy rates on the aircraft. According to estimations by ICAO (International Civil Aviation Organization), the total number of seats sold by airlines in 2020 will decrease by about 51 - 52% compared to expectations.

Table1. Number of passengers in 2019 and expectation for the number of passengers in 2020



As can be seen in Table 1, 4.54 billion passengers traveled by air worldwide in 2019. The forecast for this number for 2020 was 5.91 billion, but due to the Covid -19 pandemic, this expectation dropped to 2.9 billion. There has been a 36% decrease in passenger number expectation.

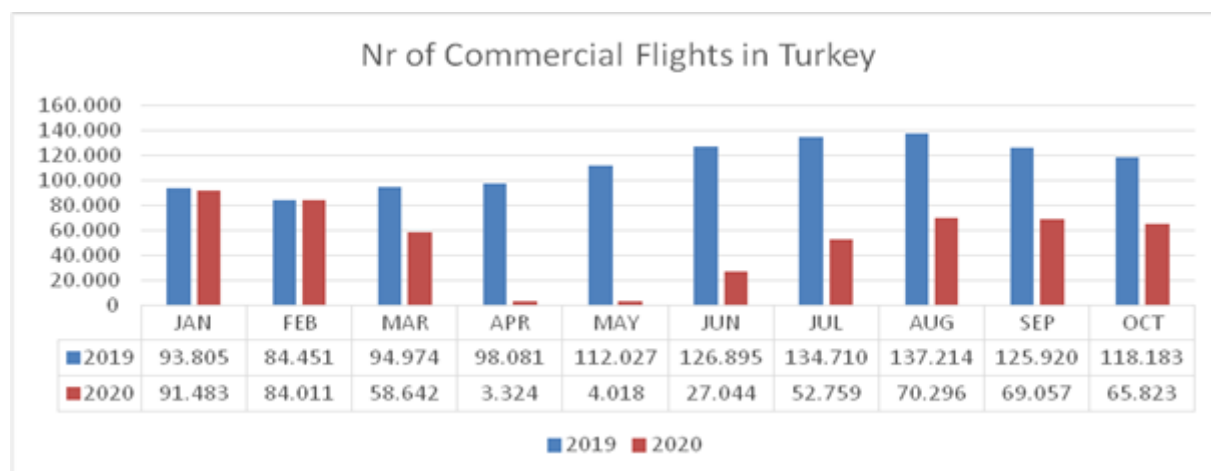
Table 2. The number of passengers in Turkey in the for 10 months of 2019 and 2020



As seen in the Table 2, when the number of passengers travelling by airlines compared for the years of 2019-2020; in the first 10 months of 2019 nearly 181 million passenger has

been traveled by airlines however for the 2020 this number is nearly 70.6 million. There is a 61% reduction in the number of passengers.

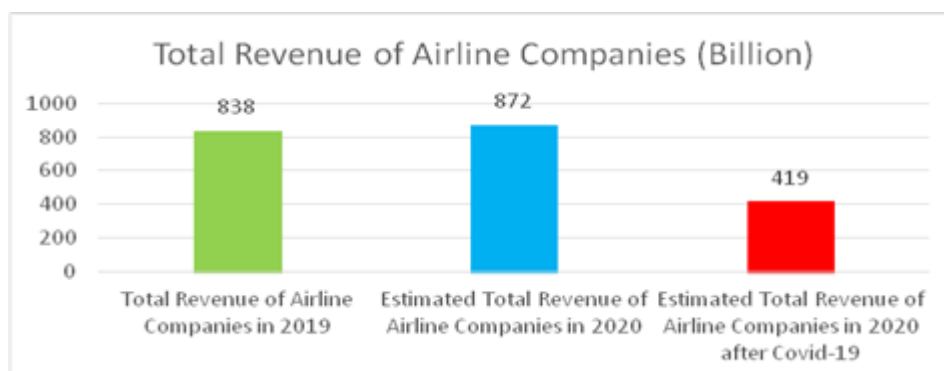
Table 3. The number of commercial flights operated in the first 10 months of 2019 and 2020



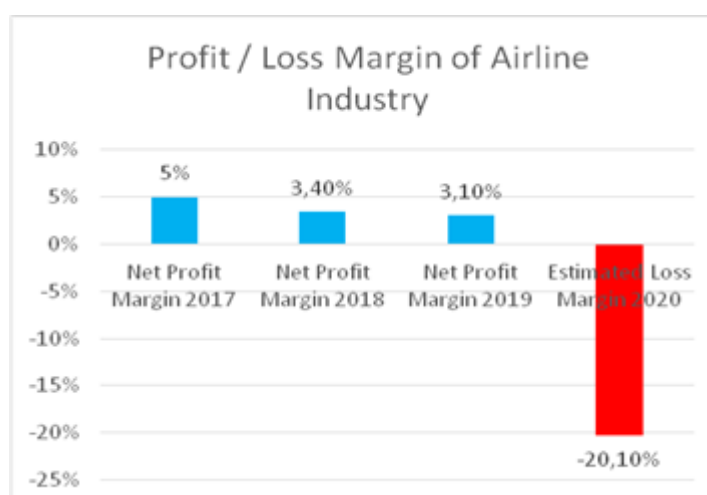
As it can be seen in Table 3; when the commercial flights which are done in the first 10 months of 2019-2020 are compared; there has been nearly 1.13 million flight that have been done in the first 10 months of 2019 whilst this number is nearly 526.5 thousand for the first 10 months of 2020.

As can be seen in Table 2, the decrease in the number of passengers means a decrease in the income of the airlines.

Table 4. Total revenue of airlines in 2019 and their expectations for 2020



According to the estimations of IATA (International Air Transport Association), the Covid-19 pandemic will cause a loss of approximately \$ 252 billion in the total revenues of airlines in 2020. The comparison can be seen in Table 5. In 2019, the total revenue of airline companies worldwide was 838 billion dollars. The expectation for this number in 2020 was 872 billion dollars. Due to the Covid-19 pandemic, this expectation decreased by 50% to 419 billion dollars.

Table 5. Profit and loss margin expectations of the airline industry by years

Airline companies are companies with low-profit margins. Although their income seems high, the profit margin varies between 3% and 5%. In this sector where fixed expenses are high, the decrease in income and low-profit margin causes damage in the sector. As can be seen in Table 5, while the average profit rates in 2017, 2018, and 2019 are around 3% to 5%, the loss rate in 2020 is around 20%.

The Covid-19 pandemic has adversely affected the activities of the airline companies and therefore the crew resource planning department.

Table 6. Frequency of plan publishing of 2020

Increase In The Number Of Plan Made	JAN	FEB	MAR	APR	MA Y	JUN	JUL	AUG	SEP	OCT
2020	Mon thly	Mon thly	Mon thly	We ekly	We ekly	Weekly and Daily	We ekly	Mon thly	Mon thly	Mon thly

Before the Covid-19 pandemic, plans were published monthly. Due to the Covid-19 pandemic, flight cancellations, and uncertainties, plans were published weekly and sometimes daily. This means that the workforce spent by Crew Resource Planning employees for the plan has increased from once a month to 5 - 6 times.

Table 7. Providing of training requirements on a monthly basis in 2020

Training Requirements	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
2020	Prov ided	Prov ided	Prov ided	Couldn't Provided	Couldn't Provided	Couldn't Provided	Prov ided	Prov ided	Prov ided	Prov ided

With the Covid-19 pandemic, there were almost no flights especially in April and May of 2019 in Turkey. Since almost no flight is caused crews to fail to actualize the minimum number of flights required to fly in consecutive days. There were difficulties in the return of

the crews to the operation and there were problems in providing training. For example, a pilot must fly at least 3 flights in 90 days. In cases where he/she cannot achieve this, he/she should receive simulator training again. The intensity experienced in simulators due to the Covid - 19 pandemic and even stopping its activity caused the training processes to be prolonged.

Table 8. Quarantined crew status on a monthly basis in 2020

Increase in the number of quarantined crews	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
2020	There is no crew member in quarantine.	There is no crew member in quarantine.	There is no crew member in quarantine.	There is no crew member in quarantine.	There is no crew member in quarantine.	There is no crew member in quarantine.	There are crew members in quarantine.	There are crew members in quarantine.	There are crew members in quarantine.	There are crew members in quarantine.

The number of crews quarantined, both due to the number of infected crews and their contact, negatively affected the crew resource planning of the airlines. In order to prevent this, the same crew have been scheduled for flight duties with the same crew for several days.

Table 9. Disinfection times on a monthly basis in 2020

Differentiation of disinfection processes	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
2020	Standard	Standard	Standard	Longer Procedure	Longer Procedure	Longer Procedure	Longer Procedure	Longer Procedure	Longer Procedure	Longer Procedure

Before the Covid-19 pandemic, the cleaning times of the planes while waiting on the ground took around 8 - 10 minutes. With the Covid-19 pandemic, these times have been prolonged, so the waiting times of the aircraft on the ground have increased and the manufacturability of the aircraft has decreased. The time it can spend in the air has decreased even more. For example; while the total waiting time of an aircraft on the ground before the Covid-19 pandemic was around 45 minutes, this time increased to 90 minutes after the Covid-19 pandemic. This also affects the daily flight duty time limit of flight crews and prevents flight crews from making more flights.

Table 10. Problems in hotel and transfer issues on a monthly basis in 2020

Hotel Accom	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT

odation and Positioni ng Problems										
2020	No Proble m	No Proble m	No Proble m	The probl em has occu rred	The probl em has occu rred	The probl em has occu rred	No Proble m	No Proble m	No Proble m	No Proble m

The Crew Resource Planning Department, make accommodation reservations for flight crews at the hotels with which the Purchasing Department has an agreement, if the operation requires. Many hotels with agreements were closed due to the Covid – 19 pandemic and there were problems in finding alternatives for possible hotel needs.

As stated in the definition of the Crew Resource Planning Department, it also organizes airline or road travel organizations for flight crews in line with operational needs. The shortage of flights and the occupancy of the flights have restricted the Crew Resource Planning Department. In addition, transfers from house to airport or vice versa of the crews were carried out with more vehicles due to the passenger restriction in the vehicle. This situation was reflected in the cost of airline companies.

5. DISCUSSION

The Covid-19 pandemic had a negative impact on airlines due to the changes in the task and general environmental elements. The Covid-19 pandemic caused a decrease in the number of passengers/customers, destinations, and flights of the airlines, as well as a significant decrease in their total revenues and increase losses. Reductions in the number of passengers/customers, destinations, and flights, and also the new applications introduced within the framework of the Covid-19 pandemic have also directly affected the airlines' Crew Resource Planning Department.

6. CONCLUSION

As a result, the Covid-19 pandemic caused adverse effects on airlines within the scope of the task and general environmental elements.

The Covid-19 pandemic has caused unforeseen changes in the task environment elements consisting of customers, competitors, potential competitors, suppliers and substitute products,

and general environmental elements consisting of political, legal, economic, socio-cultural, demographic, technological, and international.

The Covid-19 pandemic, which affected the whole world in a short time, caused radical changes in the task and general environmental elements, which had a very negative impact on airlines.

The Covid-19 pandemic, which adversely affected the air transport and tourism industry, caused serious economic losses in all airline businesses. So much so that the precautions taken by governments due to the pandemic and the avoidance of people from traveling due to health concerns caused many regional airlines to go bankrupt and many global airlines to shrink.

The new pandemic measures that can be taken by governments and companies at any time, the instant change of the number of crews, and the pandemic-based problems that may occur during the operation directly affected the number of publishing plans, the training requirements, the increase in the number of quarantined crew, the disinfection times, the hotel and transfer adjustment processes of the airlines' crew resource planning departments.

With the normalization to be achieved by the elimination of the Covid-19 pandemic, airline companies, and their crew resource planning departments can stabilize again. Otherwise, a significant portion of the airlines operating in the air transport sector will not be able to survive.

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