

IMPACT OF COVID-19 ON GLOBAL AND TURKISH AVIATION SECTOR – PROACTIVE AND PREEMPTIVE MEASURES DURING AND AFTER PANDEMIC

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Abstract

Certainly the biggest problem the world has been dealing with in 2020 has been the Covid-19 pandemic. COVID-19, which emerged in Wuhan province of China and has influenced the whole world and was declared by the World Health Organization an international public health emergency on 30 January 2020, and a pandemic (universal epidemic) on 11 March 2020, has deeply affected the air transport industry (Zhuang et al., 2020; Adiga et al., 2020; Zhang et al., 2020). . In order to prevent the disease from spreading, various travel restrictions were introduced and flights were reduced. The fact that the corona virus is a virus that can be transmitted by the respiratory tract, many passengers are present at the airports and require measures to travel together in the aircraft cabin The fact that airline transport plays an important role on human mobility paved the way for the aviation sector to be constantly at the agenda in terms of both the spread of the pandemic and the prevention activities.

The fact that the global aviation will face a huge negative effect worth of 250 billion dollars according to IATA data suggests that the aviation industry in Turkey will also experience a huge loss of revenue. This study analyzed the measures taken for the aviation sector, which has been significantly affected by the Covid-19 pandemic, and described the precautionary measures implemented in the airline companies and at the airports. This study tried to reveal how global and Turkish national aviation have been affected by the Covid-19 pandemic.

The constraints of the study include the fact that the pandemic is ongoing, the lack of literature on this subject and the lack of data. A compilation with the impact of measures taken in the aviation industry in the later stages of the pandemic on the spread of the disease and the economic effects of the Covid-19 pandemic on the aviation industry can create a wide study area. In further conclusion analysis it may be stated that the concepts of crisis management and crisis leadership have become more important than ever during this period

Keywords: *Aviation Sector, Crisis Management, Pandemic, Covid-19.*

INTRODUCTION

COVID-19, which emerged in Wuhan province of China and has influenced the whole world and was declared by the World Health Organization an international public health emergency on 30 January 2020, and a pandemic (universal epidemic) on 11 March 2020, has deeply affected the air transport industry (Zhuang et al., 2020; Adiga et al., 2020; Zhang et al., 2020). The fact that airline transport plays an important role on human mobility paved the way for the aviation sector to be constantly at the agenda in terms of both

the spread of the pandemic and the prevention activities.

The last 50 years, during which the aviation sector has been developing rapidly, involved contraction and stagnation periods due to various factors on sectoral growth (Gulf Wars, 2008 Global Financial Crisis, SARS, September 11 Attacks). However, there was no crisis like COVID-19 that would bring air traffic to a halt. It is further observed that COVID-19, which started in the Asia-Pacific region at the end of 2019, and spread to Europe, Middle East and North America and the rest of the world as of 2020, has a devastating effect on both human health and economic stability. The decrease in world trade with Asia, especially China, and the fact that countries restricted (stopped) flights to the region in order to prevent the spread of the outbreak had negative effects on passenger and cargo transportation activities (Mhalla, 2020). In this process, the rapid spread of the outbreak in Iran and Italy left the Middle East and Europe with an irrepressible threat and helped COVID-19 to reach a wide area including our country (Zhuang et al., 2020; Bénassy-Quéré et al., 2020; Remuzzi and Remuzzi, 2020).

The advantages of air transport activities in terms of speed, time, reliability and safety play an important role in the preference of users whether domestic or international. For this reason, factors such as the distribution of passenger mobility with China to global destinations via airline networks, airports as crowded areas, and the easier spread of infectious diseases by airborne transmission in airplanes accelerated the emergence of the pandemic in a wide geography with the effect of air transportation (Craig, Heywood and Hall, 2020).

After the recognition of COVID-19, changes in the world order arose, economic bottlenecks occurred, and many sectors faced problems that have not been experienced before. Besides, there have been great changes in the ways people live and organizations operate. The aviation industry is also one of the sectors most affected by COVID-19.

This study examined the measures taken in air transport activities for COVID-19. Furthermore, the study aimed to reveal the economic effects of COVID-19 on the actors of the aviation industry. The study also mentioned the policies implemented in Turkey in line with the data of the aviation sector in Turkey during the COVID-19 process and made an overall assessment regarding the sector.

1. AVIATION SECTOR AND COVID-19 MEASURES

The fact that air transport is a fast mode of transportation and allows for intercontinental transfer increased the spread of COVID-19, which is named as the new type coronavirus, from different points to wider geographies. Expansion of airports to life, shopping and trade centers in addition to being passenger transfer centers between air and ground increases the mobility in the region (Kasarda, 2019; Akca, 2020). For this reason, one of the factors underlying the fact that airline transportation stood out in the process of pandemic is the accelerator role of the number of locals/foreigners entering the country and the human mobility in the region on the transmission and spread of the disease. Moreover, the fact that the spread of any virus can be faster in aircrafts is effective in increasing concerns towards the aviation sector despite all measures taken. In this context, air transport activities, which are thought to contribute the spread of the pandemic, can be transformed into a type of transportation that is not demanded by the people, although it is highly preferred on a global scale (Li et al., 2020; Craig, Heywood and Hall, 2020). Consequently, the aviation industry faces both restrictions and prohibitions and contractions in airline customer demand.

Figure 1: Covid-19 Pandemic in the World



Source: World Health Organization, 2020

During epidemic periods, countries manage activities by establishing national aviation plans and national air transportation facilitation programs. Furthermore, countries are entitled to restrict and stop flights for the purpose of protecting public health with the foresight, recommendations and instructions of the World Health Organization. Within this period, Organizations such as the International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), Airports Council International (ACI), European Aviation Crisis Coordination Center (EACCC), European Aviation Safety Agency (EASA), Centers for Disease Protection and Control (CDC), Federal Aviation Administration (FAA) constantly share information, coordinate and cooperate both internally and among member states (CAAC, 2020).

Besides, within the framework of the civil aviation sector, the Organization of Collaborative Arrangements for the Prevention and Management of Public Health Events in Civil Aviation (CAPSCA) also operates in a similar field in order to protect public health and prevent the spread of any epidemic declared pandemic worldwide (CAPSCA, 2020). International Aviation Authorities provide information, communication and coordination for the safety of the global aviation system by following the actions and plans of the countries (Eurocontrol, 2020). The International Air Transport Association (IATA) and the International Civil Aviation Organization (ICAO) also publish data for following up of the rules and restrictions imposed by the countries in the field of aviation for COVID-19.

During the COVID-19 process, rules for protecting public health were established within the scope of air transport activities. In this context, the procedures to be implemented for passenger safety and flight crew safety have been determined and relevant instructions have been prepared. Every stage, from cleaning of aircraft to intervention to the suspect passengers, has been described in detail. Everything from supplying medical devices for responding to the patients who feel unwell in the aircraft or to isolate the suspect patients, to supply and usage planning of the protective clothing and equipment (Universal Precaution Kit) that will ensure the safety of the flight crew is discussed in detail (CAAC, 2020). Airport operators also carry out necessary disinfection activities in the airports for protecting the health of both flight crews and passengers as well as the other employees (CAAC, 2020). Body temperature measurement of the passengers via thermal cameras, personnel's wearing protective masks and gloves, parking vehicles carrying patients

or suspected patients in special spaces, ventilation of airport and terminal buildings, cleaning of airport and terminal, and activities regarding the security officers and health personnel are detailed (EASA, 2020).

In Turkey, Flight Operations Safety Bulletin was issued by the Directorate General of Civil Aviation within the scope of COVID-19 on 24.03.2020. The bulletin containing a set of rules, regulations, suggestions and recommendations for protecting the public health, minimizing the risk of transmission and increasing the health safety of aviation personnel is applicable to all units and personnel related to Air Transport Enterprises, Terminal Enterprises, Ground Handling Companies, and Representation, Supervision and Management organizations. Flight Operations Safety Bulletin describes the procedures to be implemented in conducting aviation activities within the scope of COVID-19 in detail in line with the suggestions and regulations of the World Health Organization, Ministry of Health, Public Health Directorate, ICAO and IATA.

In this context, the health conditions of passengers entering the country have been analyzed using thermal cameras at airports. Healthcare personnel took care of the passengers with high fever symptoms and; in suspicious cases, entry of such passengers to countries were prohibited or restricted. In some countries, passengers were asked to have their health certificates with them to prove that they were well and had no disorder.

Furthermore, as from the middle of March, in some countries, people entering the country were quarantined for at least 14 days and were instructed to pay attention to the social isolation and solo quarantine rules. Passengers and citizens from certain countries with high density of cases were prohibited from entering the countries. Finally, countries closed the border gates to anybody except for their own citizens, and this caused air traffic to decrease by over 90% (IATA, 2020c).

2. COVID-19 OUTBREAK, ITS SPREAD AND ECONOMIC EFFECTS

Corona viruses are a large family of viruses that cause a variety of diseases, from common cold to serious illnesses such as severe respiratory syndrome. On December 31, 2019, the China Country Office of WHO shared the information that there were patients with similar symptoms in Wuhan, China. On January 7, 2020, the disease was identified as a new Corona virus that has not previously been detected in humans, and the disease was named “*Covid-19*” (Covid-19, 2020).

The disease, which started in China, affected more than 100 countries in early March 2020. As of March, the spreading rate of the outbreak decreased in China, while it increased in Iran, Italy and South Korea. Rapid case increases and deaths in European countries suggested that the outbreak reached global dimensions. By the end of March, 192 countries were fighting this virus. The rapid spread of the disease was attributed to its human human-to-human transmission capability although it is a virus that had not been seen in humans before (WHO, 2020a; Wordometers, 2020).

The virus, which has an unclear origin, managed to infect a large number of people in a short time by being transmitted by droplets. More than 600 thousand cases were recorded in the world in a three-month period (Covid-19, 2020). Despite the most extensive travel restrictions applied worldwide to prevent the outbreak from spreading, the rapid spread of the virus sparked a debate on late implementation of some measures. According to the opinion expressed as a result of a study conducted in the USA, 175 thousand people traveled to different countries and carried the virus until China reported the cases to the World Health Organization and 7 million people traveled to different countries and carried the virus until beginning of

travel restrictions (Jin et al., 2020).

571.678 people were infected, and 26.494 people died due to the virus in the world during the period from notification of the World Health Organization about the pandemic on December 31, 2019 until the end of March 2020. The first case in Turkey was detected on March 11, 2020, and 5698 people were diagnosed with this disease and 92 people lost their lives (WHO, 2020c: 2). In summary, the pandemic continued to spread throughout the world through a significant and uncontrolled process in a 3-month period.

Decline in the cargo operations and global trade, especially with China, was determinative in the decrease of business travels and cargo reservations (Hasanat et al., 2020). Besides, the cancellation of tourism reservations also adversely affected vacation-purpose travels and passenger transportation. In this context, passenger mobility at airports worldwide decreased by 12% in the first quarter of 2020 (ACI, 2020a). The decrease in the number of passengers was remarkable especially in the Asia-Pacific region. During the COVID-19 crisis, the air passenger transportation revenues worldwide, especially in the Far East-Asia regions (Australia-China-Japan-Malaysia-Singapore-South Korea-Thailand-Vietnam), decreased by 20% in the first quarter of 2020. In addition, the decline in cargo and passenger transportation activities paved the way for the decrease in share prices of airline companies by 25% in addition to operational stagnation (IATA, 2020c).

The fact that the United States (USA) stopped trips to/from China and the Far East and banned the entry of certain nationals to the country and suspended air transportation, tourism and economic activities paved the way for the disturbance of the financial balance between the two strong trade centers of the world (Maliszewska, Mattoo, & Van Der Mensbrugghe, 2020; Hasanat et al., 2020). After stopping flights to/from China and the Far East, the USA temporarily suspended flights to/from the Schengen Area of Europe too. In this context; the air traffic restrictions that started with China brought along the prevention model through which the countries around the world temporarily stopped aviation activities with each other. These actions implemented to prevent the spread of the COVID-19 outbreak have negative effects on economic mobility (Ozili & Arun, 2020). For example, there were daily 550 flights between the USA and the Schengen Area of Europe. This accounts for cross-continental mobility of approximately 125.000 people every day. When the USA introduced a flight ban for the region, the line, which had an annual turnover of 20.6 billion dollars in passenger revenues, faced financial losses (IATA, 2020b). In particular, the economic loss of Germany, France and Italy, which had a strong connection with the USA in terms of the number of flights, is likely to be very high. The financial impacts of these restrictions that were imposed for the purpose of protecting public health are expected to spread in the short term and medium term.

Asia-Pacific, European Region, North America and the Middle East are considered as regions that will experience economic losses most. The potential absence of heavy traffic expected during the summer period, especially between Europe and North America, is capable of reducing revenues from intercontinental flight activities by 80% in the second quarter (IATA, 2020c).

On April 8, 2020, ICAO published a report showing the effects of COVID-19 on airline revenues. According to the report, if the pandemic-related contraction continues in the form of letter “V”, the market will see the lowest levels in terms of economy, but it will also recover faster. According to the modeling of April 2020, such an estimate considers that the seat capacities will be reduced by 41% and 443 million passengers will be lost worldwide. According to this model, losses of airline companies will account for 98 billion dollars. However, if the pandemic process is prolonged, scenario would get worse and the graphical

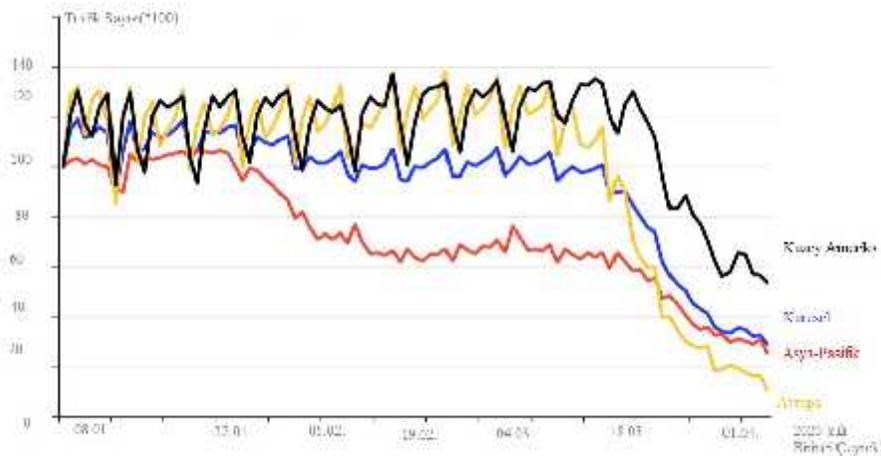
representation handled as the letter “U” shows that the number of seats sold will decrease by 51% and 561 million passengers will be lost. On the basis of airline companies, the estimated financial loss will be around 124 billion dollars in this scenario (ICAO, 2020).

These estimates refer to the estimated losses regarding the revenues for the first and second quarters of 2020. The comparison of the revenues for 2019 and 2020 emphasizes that the total loss will be around 252 billion dollars compared to the previous year, and this figure will reach 314 billion dollars in the event that the outbreak is prolonged (IATA, 2020).

It should be noted that in the interpretation of the economic effect estimates, IATA made predictions to cover the whole 2020, while ICAO published 6-month forecasts. Besides, ICAO addresses international traffic only, while IATA makes prediction modeling by evaluating both international and domestic traffic. However, if COVID-19 cannot be taken under control in the third or fourth quarter, the airway companies will lose 35 billion dollars more every month on a global scale (IATA, 2020c). According to the latest data, the fact that more than 2 million people were infected with Covid-19 worldwide indicates that the financial losses for pessimistic scenarios will be more realistic (World Health Organization, 2020a).

The number of passengers worldwide increased by 1.9% in January 2020. In the Asia-Pacific region, there was a decline by 1.8% in January. Then, the rapid spread of the pandemic accelerated the decline of passenger numbers. Global passenger traffic decreased by 28.2% and 620 million passengers were lost in the first quarter of 2020. Decreases in the number of passengers occurred mostly in Asia-Pacific (38.9%), Europe (23.2%) and North America (20.7%). (ACI, 2020b).

Figure 2: Change in Global Air Traffic in the First Quarter of 2020

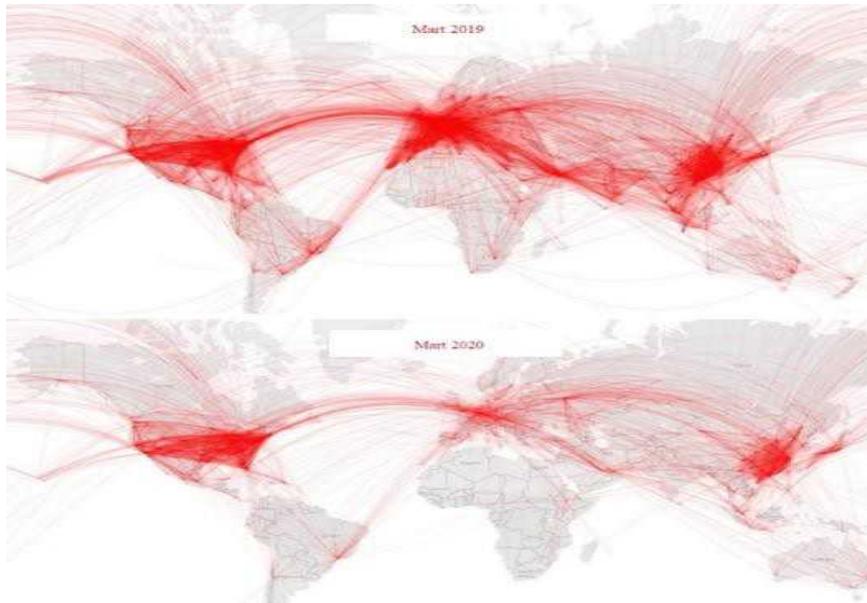


Source: IATA, 2020

Based on the data shown in the Figure-2, the number of traffic started to decrease in the Asia-Pacific Region as of February 2020. With the spread of the pandemic to other continents and countries, the number of air traffic experienced very steep decreases especially in North America and Europe on March 18, 2020. The closure of borders and the prohibition of entry to countries also contributed to the decrease in the number

of traffic (Craig, Heywood and Hall, 2020).

Figure 3: Global Traffic Benchmarking for March (2019-2020)



Source: IATA, 2020

Economic and operational sustainability and sectoral performance can be interpreted by making comparisons between the current period and the same period of the previous year during the evaluations carried out in the aviation sector. In this context, when Picture-3 is examined, the difference between March 2019 and March 2020 is remarkable. This difference represents the worst period experienced by the aviation industry in decrease from one year to the next (ACI, 2020b).

The global health crisis caused serious losses in sectors where transportation, cross-border mobility and consumer behaviors are important. Therefore, the airport sector has also been directly affected by the crisis (ACI, 2020b). Airports have business relationships with both airline companies and passengers. With the commercialization of airports, airport revenues are also diversified. In this context, airport revenues consist of aviation and non-aviation income items. Aviation revenues are composed of revenues from the activities for flight operations between the airport and the airline companies (landing, parking, passenger services, security, etc.). Non-aviation revenues consist of revenues from the commercial units of airports, the primary customers of which are passengers. Non-aviation revenues account for about 40% of airport revenues (ACI, 2020b).

The fact that the airside operations of airports almost come to a halt due to the pandemic prevent generation of aviation revenues. Failure to generate non-aviation revenues for similar reasons leads to major financial problems for airport and terminal operators. In the first quarter of 2020, Asia-Pacific Region airports lost \$5.6 billion, the European Region lost \$2.8 billion and the North American Region lost \$2.8 billion (ACI, 2020b). However, in the first quarter of 2020, while the expectation for airport revenues worldwide was 39 billion dollars, 33% of it was lost and the revenues generated accounted for 26 billion dollars. The \$13

billion loss in the first quarter due to the pandemic corresponds to the annual revenue of the ten largest airports in the Asia-Pacific and European Region (ACI, 2020a; ACI, 2020b). While the worldwide airport sector revenue expectation for 2020 was \$172 billion, it is estimated that there will be a deviation by 45% due to the negative effects of COVID-19 and revenues will decrease to \$76 billion (ACI, 2020a; ACI, 2020b). In this context, the expected total loss is \$24.6 billion in the European Region, \$23.9 billion in the Asia-Pacific Region and \$16.9 billion in the Northern USA. These figures are based on estimates of the current state of the pandemic. It is stated that the estimates may vary depending on the progress of the pandemic (Adiga et al., 2020; ACI, 2020b).

ACI (2020c) conducted a research to reveal the effects of the pandemic on airport operations. The study, conducted with the participation of 25 airport managers, revealed that the airspace sections of most airports were closed. However, 44% of the participants stated that air traffic decreased by more than 90% with the effect of COVID-19.

80% of the participants state that the number of airside employees was reduced by 80% and emphasize that employees were given paid or unpaid leave and administrative affairs are carried out by a remote working model in order to protect the health of the employees and since certain positions need no more employment. It is also emphasized that the units that will serve a limited number of air traffic, especially ongoing cargo operations, work by turns and obey the highest levels of social isolation rules and the watches are scheduled considering the quarantine periods (ACI, 2020c). Similar applications are also available in our country. For example, the air traffic controllers involved in the execution of air traffic control services operate within the framework of quarantine applications determined by considering the incubation period of the virus. Thus, it is aimed to protect both employees and public health within the State Airports Authority (DHMI).

The World Tourism Organization (UNWTO) stated that measures such as travel restrictions and border closures implemented by countries in order to prevent the spread of the epidemic affect tourism-oriented arrivals and predicted that tourism arrivals will decrease by 20%-30% in 2020. In this context, the loss of 20%-30% means that tourism revenues will decrease by 300 to 450 billion dollars, which corresponds to one third of the tourism revenues of 1.5 trillion dollars in 2019. In 2019, the number of international tourists worldwide was 1.5 billion people. Considering the expenditures of tourists in the regions they travel for tourism purposes; it is estimated that losses in induced revenues due to COVID-19 may further increase by 30 to 50 billion dollars. Furthermore, it was stated that the contraction in tourism realized by 4% with the decrease in the air transport-related arrivals during the global crisis period of 2008-2009, and a decrease of 0.4% experienced during the SARS outbreak in 2003 adversely affected the sector. Finally, it is estimated that COVID-19 will also have negative effects on the tourism industry of our country (Acar, 2020).

According to IATA data (2020), a portion, worth of 6.8 trillion dollars, of annual global trade volume is carried by air cargo. In 2019, air cargo transportation lost volume by 3.2% in line with the trade. After these contractions, the stagnation of commercial activities between the USA and China at the beginning of 2020 accelerated the decrease in air cargo transportation. However, the amount of cargo transported through air cargo transportation by the end of March 2020 decreased by 20% compared to the end of March 2019 despite the aid sent among countries (IATA, 2020). The World Trade Organization (WTO) has identified two main scenarios in order to reveal the global effects of COVID-19. According to the optimistic scenario, the world trade volume is expected to decrease by 13% compared to 2019. According to the pessimistic scenario, it is foreseen that one third of the trade volume of 2019, i.e. 31.9% of it, will be lost. This means that expectations for decline in air cargo transportation activities will increase. It is emphasized that if the

pessimistic scenario takes place, the world may face an economic depression similar to the Great Depression experienced 100 years ago (World Trade Organization, 2020).

3. COVID-19 IN GLOBAL AVIATION

In any global pandemic, various travel restrictions are applied in order to prevent the spread of the disease in general. Intense travel restrictions were also implemented for preventive purposes for the Covid-19 outbreak. At first, flights from Wuhan, China, where the disease was seen, to other countries were stopped, and then, flights from China to other countries were stopped. When the disease was also seen in South Korea, Hong Kong and Japan, travel restrictions were imposed on these countries as well. Then, the increasing number of cases in Iran, Italy and Spain brought aviation to a halt (Wilson & Chen, 2020).

The large number of passengers traveling at the airports makes airports one of the most dangerous areas during the pandemic. It was also thought that people traveling on the same plane are more likely to catch Covid-19 virus, which is also transmitted through inhalation. For this reason, WHO published a document regarding the disinfection rules that should be applied at the airports. According to the rules set out in this document (WHO, 2020b), it is recommended for all aviation personnel;

- Information should be given about Covid-19 symptoms,
- Crew and ground personnel should be reminded about social distance, hand hygiene, respiratory etiquette, environmental cleaning and waste disposal,
- Information should be given on when and how to use masks,
- Considerations for patients with Covid-19 symptoms, and
- Use of protective equipment during first aid.

In case of suspicious cases at the airports, it was emphasized that the process should be carried out under the airport emergency plan in coordination with airport health officials and public health authorities. It was recommended that further risk of infection can be prevented by airport healthcare services by coordinating with the units providing airport support services including aircraft cleaning and cargo-baggage loading, water supply and wastewater services.

WHO stated that the following equipment and supplies must be available in the aircraft cabin during the flights as stated in ICAO standards (WHO, 2020b);

- Dry powder that can turn small liquid spills into sterile granulated gel,
- Antiseptic disinfectant wipes for surface cleaning,
- Face-eye mask (separate glasses and medical mask or combined face shield),
- Gloves (disposable),
- Protective apron,
- Full-length long sleeve clothing, and
- Disposable waste bags.

Air traffic decreased significantly due to the cancellation of flights from/to China by the airline companies

first, and then suspension of the flights of countries where there was any finding related to the disease. According to the data published by Eurocontrol in January, when the disease was not seen in all countries yet, the traffic in the European network decreased by 0.4% and it was foreseen that the traffic would further drop in February (SHGM, 2020b).

According to the February statistics published by Eurocontrol; it was announced that the flight traffic in the European network decreased by 2.6% due to the Covid-19 outbreak. It was also stated that there were decreases in the daily flights of 20 Eurocontrol member countries. It was pointed out that reciprocal flights between China and Europe decreased by 61%, while 98 fewer flights were made daily and the countries most affected by flights with China were Germany, England, France and Italy (SHGM, 2020c).

As stated in Eurocontrol data, the air traffic, which decreased in January, further decreased in February. When the center of the pandemic became Europe and the pandemic became significant in the USA, air traffic decreased substantially in March and there were significant increases in the number of canceled flights.

As seen in the table below, international passenger capacity decreased by 32% so far in March 2020, and a significant decline occurred not only in the countries that experienced the outbreak in early stages but also on a global scale. It is understood that the decrease in air traffic is not limited to the first outbreak countries only. Thus, significant decreases occurred in seat capacities during the flights of all countries dealing with the pandemic. When flights with countries most affected by the pandemic, such as China, Italy, Iran, Korea, are included, there was an average decrease of capacity by 32%, while countries other than those countries also experienced an average decrease of capacity by 20%.

Table 1: Decrease in International Passenger Seat Capacity of Countries (March/2020)

Country	Planned Capacity Change	Capacity Change (%)	Country	Planned Capacity Change*	Capacity Change (%)
China	14.734.300	-82	Germany	4.277.933	-25
Italy	6.852.300	-60	England	3.387.241	-16
Korea	6.511.100	-70	USA	3.217.641	-14
Japan	5.686.700	-50	Spain	2.599.048	-20
Germany	5.331.200	-28	UAE	2.465.717	-20
Hong Kong	5.305.300	-76	Turkey	2.277.434	-31
USA	4.617.500	-18	France	2.106.010	-18
Thailand	4.451.400	-45	Singapore	2.031.900	-35
England	4.261.200	-19	Thailand	1.744.454	-29
Taiwan	4.026.700	-62	Saudi Arabia	1.712.474	-30
Spain	3.289.600	-23	India	1.643.127	-24
Singapore	3.172.100	-43	Malaysia	1.537.179	-33

United Arab Emirates	3.106.000	-24	Switzerland	1.380.332	-24
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(UAE)					
France	2.839.300	-22	Indonesia	986.192	-27
Turkey	2.769.000	-34	Austria	966.037	-26
Vietnam	2.564.200	-55	Japan	935.256	-20
Malaysia	2.424.100	-41	Canada	871.795	-12
India	1.926.300	-27	Portugal	812.785	-20
Saudi Arabia	1.734.900	-31	Denmark	807.531	-25
Philippines	1.626.200	-44	Holland	789.914	-12
Switzerland	1.567.900	-26	Poland	788.068	-21
Indonesia	1.402.000	-32	Israel	788.068	-39
Canada	1.125.900	-15	Belgium	781.479	-26
Austria	1.119.300	-28	Vietnam	754.856	-34
Russia	1.081.500	-18	Qatar	714.608	-16
Australia	1.058.200	-23	Egypt	707.091	-25
Holland	1.027.200	-14	Sweden	673.186	-22
Belgium	1.000.500	-29	Morocco	638.169	-28
Qatar	968.400	-20	Russia	631.076	-12
Portugal	948.100	-22	Australia	619.167	-16
World Total	121.831.580	-32	World Total	58.262.776	-20

* (to China, Iran, Italy and Korea / excluding from China)

Source: CAPSCA, 2020: 9.

The negative impact of the Covid-19 outbreak on the aviation sector in January, February and March, which is called the first quarter of 2020, is shown in the table below on a continent basis. While there was no decrease in the seat capacity of North American flights in January, the seat capacity decreased by 0.3% in the Middle East. While the capacity decrease was going on all over the world during February, it exhibited a big leap in the Asia Pacific region and reached 22.3%. Capacity decrease was significant in all regions in March. In terms of capacity decrease, the Asia Pacific region took the first place with 52.1%.

Table 2: Monthly Regional Capacity Decrease in 2020 (January, February, March)

Region	January	February	March
Africa	-0.2%	-2.5%	-22.7%
Asia/Pacific	-0.1%	-22.3%	-52.1%
Europe	-0.2%	-1.4%	-25.6%
Latin America	-0.1%	0.6%	-11.3%
Middle East	-0.3%	-2.1%	-27.5%
North America	0.0%	-2.4%	-16.7%
Total	-0.1%	-7.9%	-31.7%
Planned Capacity	376.027.900	352.632.800	384.162.700
Actual Capacity (Estimated)	375.495.100	324.885.300	262.331.100

Source: CAPSCA, 2020: 15.

According to the estimates of ICAO, when the estimated impact of the Covid-19 outbreak on the planned international passenger traffic in the first quarter of 2020 in countries where the outbreak is most common is compared to the first planned (CAPSCA, 2020: 20):

- It is expected that China will have to reduce its seat capacity by 40% to decrease the number of passengers by 30.8-32.6 million and airline companies will suffer a total loss of gross operating earnings, amounting to 6.7-7.3 billion dollars, and
- The Republic of Korea will have to reduce its seat capacity by 29% too decrease the number of passengers by 7.8-8.6 million and the gross operating earnings of the airline companies will decrease by 1.5-1.7 billion dollars.
- It is also estimated that Italy will have to reduce its seat capacity by 23% and decrease the number of passengers by 6.7-7.1 million and the gross operating income of the airline companies will decrease by 0.8-0.9 billion US dollars, and
- Iran will have to reduce its seat capacity by 25% and decrease the number of passengers by 730.000-810.000 and the airline companies will suffer a total loss of gross operating earnings, amounting to 120-130 million dollars.

3. STATE OF THE AVIATION INDUSTRY IN TURKEY

There have been attempts to fly in different nations in various centuries throughout history, and the interest and curiosity towards aviation has continuously improved. The foundations of today's aviation began to be laid in the 20th century. The Wright Brothers' first aircraft flight led to the emergence of a new mode of transport. Investments for military aviation during World Wars I and II particularly contributed to the acceleration of civil aviation activities in the 1950s. Development of aircraft has brought new needs in the sector, and harmonization of factors such as technological change, globalization and new management models enabled to reach today's structure that incorporates different actors.

In the early stages of the aviation industry, the market conditions were state-controlled and not competitive. The emergence of liberalization movement for airline transport in the US in 1978 had an impact upon various innovations in Europe in the 1990s and in our country in the 2000s. In this context, the Turkish Civil Aviation Law of 1983 no 2920 entitled the private sector players to engage in civil aviation activities. Later in 2001, *price tariffs* article of the relevant law was amended. Thus, airline operators were allowed to set and report prices for their own activities in order to submit them to the relevant ministry for approval. In 2003, the decisions made by the General Directorate of Civil Aviation (SHGM) in 1996 that restricted the presence of the private airline companies and allowed for solo control of flag carriers were abolished by the Ministry of Transport of the period. The policies implemented in this process allowed the private sector to operate more comfortably in air transportation, opening the sector to competition. Marketization of the aviation industry, which has a growing market, accelerated the emergence of innovations that will further improve aviation. Moreover, new airports were built to meet the demand increased with the development of air transportation, and new businesses and organizations were included in the sector by adopting the approach that each business provides support services from other businesses, focusing on its own core capability. In this context, our country's aviation industry, together with airline companies and organizations such as terminal operators, airport operators, ground handling companies, maintenance and repair organizations and training, has gained the ability to compete in the international arena (Bal and Küçük Yılmaz, 2019; Aldemir and Şengür, 2018; Yaşar and Gerece, 2018; Gerece, 2011; Battal, Yılmaz and Ateş, 2006; Korul and Küçükönel, 2003).

According to 2018 data of ICAO, our country is among the top 12 countries in the rankings of RPK (Revenue Passengers Kilometer), RTK (Revenue Tons Kilometer) and FTK (Freight Tons Kilometer). The European Air Traffic Report of ACI (2019) states that Istanbul Airport is among the five biggest airports in Europe. Besides, the same report states that Antalya Airport is the second airport with the highest rate of change in the European Region compared to the previous year (Source: SHGM, 2020).

The main element underlying the developments in the aviation sector of our country is the extensive investment activities carried out for the sector. It is planned that all actors in the sector will show a systematic development, from airport projects to the development of maintenance-repair and training centers. The sector is also strengthened by the Bilateral Aviation Negotiations carried out in this process. According to the year-end data from the Directorate General of Civil Aviation for 2019, Turkey has become a country having links to 136 countries and 328 points. The number of aircraft, seat and cargo capacities of airline companies increased. Furthermore, the number of domestic and international destinations increased to 384 in total. However, in the Report of Turkish Exporters Assembly (2019), there are 7 aviation companies in the ranking of top ten services exporters (Source: SHGM, 2020).

In Turkey, aviation activities are carried out at 58 airports, 5 of them domestic and 53 both domestic and international. The airport accessibility average of passengers worldwide is 71.41%. With the breakthroughs and investments realized in our country in recent years, idle airports were put into operation and new airports were opened. For example, the first phase of Istanbul Airport was completed to begin aviation operations on October 29, 2018. As a result of the developments discussed, the airport access average of passengers in our country reached 91.34% (SHGM, 2020).

In our country, there are 170 air transport companies, 11 of which are airline companies. Having 546 aircraft in total, the airline companies' seat capacity was 103.763, and the cargo capacity of the cargo aircraft was 2.296.450 kg in 2019. There are also 270 Maintenance and Training Enterprises. There are totally 40 ground

handling companies of group A, B, C, and totally 215 authorized agencies of group A, B, C. The fleets of air transport companies include 1487 aircraft registered in the Turkish Register (SHGM, 2020).

At the end of 2019, the total number of passengers reached 209 million, and air traffic reached 2.030.291 in Turkey. In addition, the cargo amount was 3.436.423 tons. Furthermore, the sector turnover was 27.2 billion dollars at the end of 2018, and it was stated that the turnover of 2019 would reach 30 billion dollars (SHGM, 2020).

Finally, it can be said that the number of personnel employed in the sector is over 210.000 (SHGM, 2020). Considering the number of personnel employed in the sectors related to the aviation industry, the numbers are likely to increase. However, with COVID-19, which emerged in the first quarter of 2020, the aviation sector's transportation activities decreased by more than 90% worldwide. Failure to perform aviation operations prevents generation of aviation revenues. For airline companies, personnel expenses are the second most significant cost item following the fuel expenses. Again, personnel expenses are an important cost item for many different aviation companies in the sector. Although aviation companies, try to prevent redundancies during this process by means of unpaid leaves and government supports, the possible economic problems that may occur in the second and third quarters of 2020 are likely to affect employment opportunities. Employment opportunities in the logistics, retail and tourism sectors affected by the aviation sector are expected to be limited for similar reasons.

Figure 4: European Airspace Traffic 2019-2020



Source: Eurocontrol, 2020

On the other hand, when the effects of COVID-19 on air traffic are evaluated, the decrease in the number of traffic in European Airspace and Turkish Airspace is shown in the Figure-4. The image shared by Eurocontrol (2020) addresses the traffic of March 31, 2019 and March 29, 2020. The Hub-and-Spoke system airports in Europe collect passengers from different parts of the world in this region and provide cross-continental transits. Air transport has been heavily affected by the decisions taken in order to prevent the spread of COVID-19. When examined the density of Turkish Airspace on March 29, 2020 shown on the right side of the Figure-4, it can be said that the difference that has emerged compared to the previous year is unprecedented in the history of aviation. Most of the planes seen on March 29, 2020 in the Figure-4 are cargo planes. Besides, air traffic services continue to be provided to state aircraft and medical aid carrying planes that use the airspace.

It is seen that, in the first quarter of 2020, total airplane, total passenger and total cargo traffic increased in our country during January, February and March. However, when making benchmarks in the industry, it is of great importance to compare the values with the data for the same period of the previous year. Besides, revealing the growth rates between months will help to find out the impact of COVID-19. In this context, the number of domestic-international and transit traffic increased from January 2020 to February 2020, but the rate of growth decreased to 1.35 in the period from February 2020 to March 2020. By the similar method, the increase rate for domestic-international and transit passengers between January and February 2020 was observed as 1.88, but this value decreased to 1.28 in the period of February-March 2020. Finally, it can be said that the growth rate of the total freight decreased from 1.96 to 1.38.

On the other hand, based on the data published by the State Airports Authority, the changes between the first quarter of 2020 and the first quarter of 2019 were examined. In this context, considering the changes in total aircraft traffic, including domestic, international and transit, the number of traffic was found less for February 2020 compared to the previous year, and this decline became more evident in March 2020. Likewise, when compared the number of domestic, international and transit passengers in the first quarter of 2020 with the number of previous years, there was a decline as of January and this situation showed a serious breakdown in March. Finally, the total amount of freight consisting of cargo, mail and baggage significantly decreased compared to the previous year.

Table 1: Proportion of First Quarter Indicators of 2019 and 2020

Indicators	Change between January 2019 - Q1 2020	Change between February 2019 - Q1 2020	Change between March 2019 - Q1 2020
All Aircraft	2.00%	2.2%	-11.4%
All Passengers	-0.08 %	-2.2%	-18.9%
All Freight	1.9%	2.8%	-9.3%

Source: DHMI, 2020 (compiled from the data of January, February and March).

From the outbreak of the COVID-19 epidemic to date, various developments have also been experienced in the aviation industry in order to protect public health. For example, in order to protect public health and reduce the spread of the epidemic, regulations and rules were established for airline operators in the civil aviation sector in our country on January 29, 2020. Besides, thermal cameras were used to serve for measurement and observation at airports. Thus, the regulations of 29 January 2020 define necessary applications for controlling the entrances and exits to/from the airports and conducting flight operations in a healthier manner.

Within the framework of the recommendations of the Ministry of Health and Scientific Committee regarding the fight with COVID-19, flight restrictions and quarantine applications for countries with intense cases started step by step as from the second week of March (Decisions of March 15, March 17 and March 21) and the Republic of Turkey stopped all international flights on March 27, 2020 (excluding the cargo planes, state aircrafts, aircrafts providing medical support and carrying aid materials, and any aircraft that

will ask for emergency landing due to technical failure. Flight operations are also carried out under special permission for the aircraft that carry out evacuation flights from abroad to our country and vice versa). Furthermore, in domestic air transportation, Turkish Airlines (THY) was designated as the authorized carrier as of March 28, 2020, and the activities of all other airlines were suspended until April 30. THY carried out very limited flight activities for the designated airports in the country at certain days and times of the week, but domestic flights of THY also temporarily ended as of April 3 at 23:59. New decisions are expected to be shared with the public regarding the removal or extension of flight bans in Turkey, or allowance of flights within certain restrictions according to the course of COVID-19 in the upcoming days.

4. COVID-19 IN TURKISH CIVIL AVIATION SECTOR

It was regarded as inevitable that the Covid-19 outbreak, which affected the whole world, would also emerge in Turkey due to its geographical position and since it is a country visited often for tourism and business purposes and it is a country with intensive global cooperation for commercial purposes. Therefore, following the first announcements of the World Health Organization about the global risks, Turkey immediately began to take decisions on measures against the outbreak. Since the outbreak started in China, the first measures included stopping the flights to/from China. Measures taken in Turkey were put into practice in a stepwise manner.

Below are listed the initial measures taken (Dilge, 2020; THY, 2020; HSGM, 2020):

- After the outbreak was reported to the World Health Organization on December 31, Turkey announced on January 22 that preparations were being made to take passengers' temperature, which is a sign of the disease, using thermal cameras at airports in Turkey. However, some studies revealed that thermal camera scans, which are highly important for controlling pandemics at the entrances and exits of airports, cannot detect 46% of infected passengers (Quilty et al., 2020).
- When the World Health Organization declared a global emergency on January 30, the efforts were made to predict the dimensions that the outbreak might reach and take measures accordingly.
- On February 1, 32 Turkish people in Wuhan, which was previously quarantined, were brought to Ankara and they were quarantined following their first checks performed at the airport.
- On February 3, Turkish Airlines (THY) stopped all flights to/from China.
- Three border gates between Turkey and Iran were closed on February 23 due to the increased number of deaths in Iran, and then, 132 passengers and 8 crew members who flew from Iran by THY were quarantined in Ankara on February 25.
- On February 26, the Directorate General of Civil Aviation declared that passenger and cargo flights between Turkey and Iran were stopped, and the Iranian carriers were allowed to arrive at Turkey without any passenger to take passengers to Iran, prohibiting to carry Turkish passengers.

On March 11, Corona virus was detected in 1 person leading to increased measures related to travel restrictions. Following Iran, Italy, South Korea, Iraq and China, flights were also stopped by introducing a travel ban to/from Germany, France, Spain, Norway, Denmark, Belgium, Austria, Sweden and the Netherlands on March 13. Citizens in 9 countries to/from which flights have been stopped were brought to the country on March 17 provided that they were kept under quarantine. At the same time, quarantine

application was started for passengers returning from Umrah visit. These passengers were taken directly from the airport to the dormitories and guesthouses allocated to them. The flights from Turkey to Europe were stopped once the European Union closed its borders to non-member states on March 17. When Europe becomes the center of the corona virus outbreak, Turkey increased the number of countries it was imposing a travel ban to 68, adding 22 more countries to 46 countries it was already imposing a travel ban. Once Russia ceased all international flights on March 26, flights to/from Russia were also suspended (Dilge, 2020).

In line with the recommendations of the Scientific Committee of the Ministry of Health on March 27, the Presidency of the Republic stopped all international flights in Turkey within the scope of fight with the Corona virus. On the other hand, THY was allowed to make a certain number of domestic flights with special permit, and flights of all private airlines were stopped. Furthermore, an obligation was imposed on passengers, who will travel by a domestic flight, to obtain a travel warrant, and it was decided to establish a Travel Warrant Board by the Local Authority of Airport (SHGM, 2020a).

The notam issued as a result of the restrictions imposed on March 27 stated that a limited number of carriers will be allowed to fly for the purpose of bringing the Turkish citizens abroad to the country, and the operators in Turkey will be allowed to fly for the purpose of bringing foreign citizen to their respective countries. The flights that are not covered by the restrictions include cargo flights, public flights, emergency health and emergency technical flights (SHGM, 2020a).

It was declared that THY will be allowed to make domestic flights to Istanbul, Ankara, Samsun, Trabzon, Erzurum, Van, Diyarbakır, Malatya, Gaziantep, Kayseri, Konya, Adana, Antalya and Izmir only as of March 29, at 00:01, within the scope of the restriction imposed on March 27 (SHGM, 2020d). This means that passenger transportation is not allowed at any airport other than those in the provinces listed above. Then, Sabiha Gökçen Airport was closed to all flights as of March 28, at 20:00 (Pegasus, 2020c).

The travel restrictions and closed borders led to cancellation of the scheduled flights, leading the aircraft of the airline companies to remain idle. All airline companies stopped their operations because of the decreased demand due to the travel restrictions and grounded their planes. With the last restriction, all airline companies registered in the Turkish registry, except for THY, had to ground their aircraft. It is anticipated that the financial damage of the aircraft remaining on the ground will be so heavy that the airline companies will not be able to afford. It is thought that many airline companies, both globally and in Turkey, will have financial difficulties and therefore, some airline companies may cease to exist after the end of the pandemic.

4.1. MEASURES IN THE TURKISH CIVIL AVIATION SECTOR FOR THE COVID-19 PANDEMIC

The fact that the aviation sector was the starting point to take measures for preventing the pandemic shows how great the risk that the aviation sector poses. For this reason, it has become imperative to take measures for the aviation personnel who are in direct contact with the passengers carried in this process, for the airport terminal buildings used by the passengers and aircraft cabins. In this context, the measures taken by the airport companies and airline companies in Turkey are examined.

a. Airline Measures

The businesses that have been most affected by the Covid-19 outbreak in terms of the aviation industry are

airline companies that are obliged to directly provide the air transportation service, which is the main activity of the aviation system. With the travel restrictions imposed and the circulars published, most of the airline companies stopped their activities. However, they continued their efforts to take various measures until the flights stopped.

During the Covid-19 outbreak, the evacuation process managed by the government was carried out by THY. With the onset of the outbreak, Turkish citizens in many countries, especially in China, were brought to the country on dates determined by the state. With the circular published on March 27, Turkish Airlines (THY) was authorized as the only airline charged with domestic flights (SHGM, 2020a).

With respect to the Covid-19 outbreak, THY took measures for flight crews, aircraft and in-flight products. THY notified the flight crews about Covid-19 disease, its symptoms and procedures to be followed in-flight. THY ensured that the healthcare personnel returning from abroad were checked and the personal protective equipment and hand disinfectants were used by the personnel (THY, 2020).

THY stated that the planes have been disinfected by a special hygiene team consisting of 4 people before the standard cleaning procedures, and the catering table surfaces, screens, passenger belts, overhead cabinets and armrests where passengers mostly touch have been disinfected using disinfectants and micro fiber cloths, any passenger suspected according to observations made during boarding has been referred to the health authority, and the relevant aircraft has been cleaned using cleaning agents specified by WHO, and the air in the aircraft has been cleaned with High Efficiency Particulate Air (HEPA) Filter systems, and passenger vehicles have been disinfected, and publications and magazines were removed for precautionary purposes (THY, 2020).

THY, which is one of the airline companies that use and distribute in-flight products most, described in more detail the cleaning system it was already applying in this regard. It was pointed out that the materials used for catering in the aircraft have been disinfected in addition to the washing process, and the blankets, headrest covers, and headphones have been cleaned and replaced with new ones for every flight. It has also been emphasized that these cleaning and disinfection processes have been conducted using special chemicals approved by international authorities, which have appropriate pH values and contain no chlorine or allergens (THY, 2020). Anadolu Jet and SunExpress airlines also implemented the measures announced by THY.

Pegasus Airline announced that it manages disinfection processes similar to the those conducted by THY. Furthermore, they pointed out that they were distributing public health passenger introduction form to the passengers from international flights to ensure that the passengers are informed about what to do if they show signs of disease (Pegasus, 2020b). In addition to this, it was announced that cash will not be used for in-flight sales and products can only be bought by credit card as of March 24 (Pegasus, 2020a).

Onur Air performed similar disinfection applications and cabin procedures. Besides, they prepared pamphlets to inform passengers about the coronavirus, outbreak and what to do and presented such pamphlets to the passengers in the seat pockets. They emphasized that cabin crews can take temperature of the patients they suspect (Onur Air, 2020).

Corendon, Tailwind and Freebird, which are airline companies operating charter flights, made necessary arrangements for disinfection of aircraft and cancellation of tickets and implemented the measures suggested by the Ministry of Health until application of the travel restrictions.

Due to the travel restrictions imposed, airline operators had to remotely carry out processes such as changing tickets, making tickets open, and returns for passengers who had reservations. These transactions were tried to be coordinated via call center lines or the internet. Airlines, which were changing tickets or making tickets open only for countries where travel restrictions were imposed, were forced into changing reservations or making tickets open for all domestic and international flights until April 30, with the circular of March 27. THY stopped the online ticket sales service for domestic flights in 14 provinces due to the restriction of travel warrant, and then announced that only passengers who have a travel warrant can make ticketing transactions online.

b. Airport Measures

Airports used to travel and receive services from airline companies are among the places with the highest exposure risk of pandemic. Therefore, once the disease became known throughout the world, measures began to be taken in our country too although it was not seen yet. According to the information shared by airport companies, the following measures were planned and implemented (IGA: 2020; Fraport TAV, 2020; DHMI, 2020);

- i. Use of thermal cameras,
- ii. Areas such as toilets, toilet door handles, faucets, escalator grips, luggage trolleys, elevators, seating stands in passenger waiting areas, which are intensely used by the passengers and staff, are cleaned frequently using alcohol-based disinfectant products,
- iii. Placement of alcohol-based disinfectant stands and disinfectant devices at accessible points for use by passengers and staff,
- iv. Posting notices about Corona virus warnings and precautions in terminal buildings,
- v. Training of the personnel for personal protection measures and awareness raising in line with the Ministry's recommendations,
- vi. Disinfection in ventilation filters and ducts,
- vii. Marking to provide distance between passengers in check-in, boarding and arrival halls,
- viii. Prohibition of entry of people who want to see someone off or welcome any passenger, except for passengers requiring special attention, to the terminal buildings,
- ix. Promoting the use of credit cards as a payment method in parking lots and commercial areas,
- x. Establishing a seating arrangement according to the social distance rule for the seats in the waiting areas.

Apart from the measures taken for the airport, the airport personnel were informed and instructed on use of protective mask and gloves.

4.2. THE IMPACT OF COVID-19 OUTBREAK ON TURKISH CIVIL AVIATION

All businesses that serve the aviation industry within the aviation system have been affected by the Covid-19 pandemic. In addition to airline operators and airport companies; airport ground handling companies and general aviation companies also stopped their activities within the scope of restrictions and measures. Enterprises, which are the suppliers of aviation companies, have also been indirectly affected by the Covid-19 crisis with the cessation of activities. The fact that no domestic flight is allowed for passenger transport except for THY, and international flights were completely stopped, caused that only the planes of the companies engaged in air cargo transportation to be flying.

Table 3: Number of Grounded Planes of Airlines in Turkey (March/2020)

Airline	Fleet	Grounded	Grounded
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		Aircraft	Aircraft/Fleet (%)
Turkish Airlines/AnadoluJet	357	255	71
Pegasus	82	82	100
SunExpress	51	48	94
Onur Air	27	27	100
Corendon Group	22	21	95
Freebird	10	10	100
Tailwind	5	3	60
MNG	6	1	17
ULS	3	0	0
ACT	5	2	40
TOTAL	568	449	79

Source: www.airporthaber.com, (March 2020)

As shown in the table above, approximately 80% of the aircraft operating in the Turkish civil aviation industry and registered in the Turkish registry were grounded. Airline companies suffer revenue losses as long as their planes are on the ground, and this period can be called a period of loss for airport companies since their constant operating costs and personnel costs continuously increase. The aviation sector, which achieved a significant growth, may experience shrinkage without stagnation due to this crisis.

Since it is a global crisis, the problems in the transnational commercial activities and the cessation of tourism activities suggest that it will not be easy for the aviation industry to gain a growth acceleration in the long run. While it is stated by experts that many airline companies will disappear on a global scale, the Turkish civil aviation sector may also encounter such a danger.

The airlines, which do not want to end up like this, may have to develop different revenue and cost strategies. THY, Pegasus and Onur Air officials announced that they applied to benefit from the short time working allowance included in the economic support shield package published by the Presidency (Hava İş, 2020). Thus, it is aimed to partially avoid revenue losses of the enterprises since the salaries to the employees will be paid through the unemployment fund of the government. However, prolonged crisis period, revenue losses suffered by the sector and ongoing uncertainties for the future may cause problems in terms of employment created in the aviation sector.

The fact that airport ground handling companies, which is another branch of the aviation sector, aborted training of their seasonal employees in this process can also be given as an example of the problems that may occur in the course of the process. Moreover, overall aviation activities will also experience stagnation as the tourism sector is affected by the pandemic. Hot air balloon flights in the Cappadocia region were suspended by SHGM until April 30 (SHM, 2020). Stopping international flights also affected private flight traffic and caused general aviation companies to be affected by this crisis.

The fact that the airline companies experience liquidity shortage in the current crisis situation was also

experienced in the previous crises. For this reason, the companies will mostly prefer to use credit to provide cash flow. This was announced on the Public Disclosure Platform (KAP) by the officials of THY and Pegasus listed on Istanbul Stock Exchange (BIST). It can be said that businesses that strengthen their equity by not distributing profits during this crisis period will overcome this process with less damage.

For the aviation industry, two main problems that are important after the cessation of activities will be an indication of how the process will continue. The first one is when travel restrictions and notams (leaflets that will affect aviators' flight and ground safety) will be removed and when operations will resume. The other one is whether or not the demand for service from passengers will resume to the same extent upon removal of the travel restrictions.

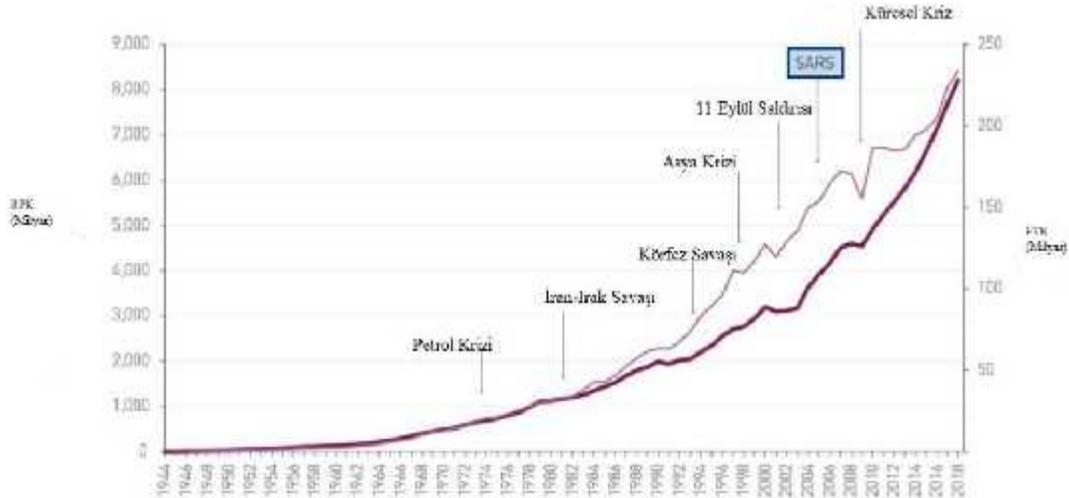
In line with these uncertainties, the aviation industry tries to produce solutions according to different scenarios. In an optimistic scenario, the flights will start after May 15 and the service demand will increase to the previous levels with the summer season. The pessimistic scenario refers to an indefinite prolongation of the process.

CONCLUSION

The Covid-19 pandemic, which started in China at the end of December, affecting the whole world, has had negative effects on many sectors in all countries. The first measures taken upon declaration of the pandemic by WHO were the measures taken for the aviation sector. Measures that started with countries stopping all flights from/to Wuhan and then from/to China have become widespread with the occurrence of the disease in various countries. The crisis was tried to be managed in the aviation sector by controlling the passengers coming from abroad with thermal cameras, the 14-day quarantine determined as the incubation period of the disease and additional measures for the passengers who felt unwell on the plane. Infectious diseases such as Sars Outbreak, Bird Flu, Swine Flu, Ebola and Mers, which occurred in different periods between 2003 and 2015, air transport industry suffered losses of income especially in countries where the disease was intense, but it was observed that operational activities recovered in 6 months following the crisis (IATA, 2020c; To, 2020). However, the new type of coronavirus, which started in Wuhan, China at the end of 2019, and spread all over the world, had a huge impact on the world since it infects very fast and the risk of death it involves is higher than other types of virus.

As of mid-April, the number of people infected with COVID-19 worldwide exceeded 2 million (World Health Organization, 2020b). Therefore, it is expected that the effects of COVID-19 on the aviation sector will differ from the effects of the previous terrorism, epidemic, war, crisis and disaster situations. According to the estimates made by ACI (2020) within the scope of COVID-19, it is stated that 3.8 billion passengers will be lost worldwide by the end of the year. It is foreseen that the number of passengers lost will be around 1.5 billion in Asia-Pacific Region, 1 billion in the European Region, 800 million in the North America Region and 500 million in other parts of the world. The obscurity and uncertainty about the COVID-19 outbreak will play a role in the change of expectations and rates. Therefore, the aviation sector's losses are expected to further increase in the second and third quarters (IATA, 2020c).

Figure 5: Crisis Periods in Aviation Chronology



Source: ICAO, 2020

During the COVID-19 pandemic, the fact that the traffic, the daily average number of which was 100.000, decreased by more than 90%, contributed to the financial losses of the companies operating in the aviation sector (ICAO, 2020). In this process, in addition to the financial support programs prepared by the governments, efforts are made to minimize sectoral losses through practices such as the payment deferral decisions made by international aviation organizations, and discounts in service fee tariffs made by aviation sector enterprises and authorities. Moreover, IATA (2020) emphasizes that 25 million jobs are at stake due to COVID-19. In some countries, it is stated that, since there is no sufficient number of healthcare personnel, aviation sector employees, especially cabin attendants who received first aid and medical response training, will be assigned to fight against the pandemic and their unemployment will be prevented (Ulaby, 2020).

Air transport is undoubtedly one of the transport modes that allow for spread of the virus along the world due to human mobility and has the most significant effect (Mhalla, 2020). For this reason, although air transport facilitates spread of the virus, it continues to contribute to vital activities in ensuring the sustainability of world's commercial mobility and providing international aid and medical supports. In addition, some countries use aircraft as a patient care area (Mackenzie, 2020). Even in our country, construction of a Field Hospital was started at Istanbul Atatürk Airport (Anadolu Agency, 2020). It is observed that the pandemic is gradually increasing due to many different reasons such as continuing vaccination studies within the scope of the fight against COVID-19, a drug that is fully effective for the pandemic has not yet been found, and the rules determined within the scope of the fight are not observed.

Therefore, it can be said that economic contractions will further happen in the aviation sector during the second and third quarters of 2020. Based on optimistic scenarios, domestic transportation activities are likely to recover to create an economic value, but international transportation activities are likely to develop more slowly in the last quarter of 2020. It is predicted that it will take 1 to 1.5 years following the pandemic for the aviation industry to reach the growth figures for 2019 (ACI, 2020b). On the other hand, COVID-19 also affects the sectors associated with the aviation industry.

Table 3 shows the estimates of 2020-2021 and 2022 prepared by DHMI concerning the aviation indicators of Turkey. The COVID-19 process we experience will cause deviations in these expectations. Even if flight

bans are lifted, holidays and business trips are expected to be at lower levels due to both economic contraction and social reservations.

Table 3: Expectations of Aviation Industry in Turkey for 2020-2021-2022

Indicators	2020	2021	2022
All Aircraft	227.392.604	237.075.134	246.938.420
All	2.274.929	2.368.715	2.457.402
All Freight	3.884.582	4.070.071	4.255.560

Source: DHMI, 2020

The aviation industry has come to a standstill since this rapidly spreading pandemic could not be brought under control, and countries practiced travel restrictions both for international and domestic flights. It can be said that the measures taken on a global scale are similarly implemented within the Turkish civil aviation sector. With the circular issued on 27 March, domestic flights were allowed to 14 destinations only by THY, and all domestic and international flights of other airline companies were stopped. The circular excluded the cargo flights, public flights, emergency health and emergency technical flights. With these restrictions, 79% of Turkish-registered aircraft were grounded, while many airports temporarily stopped their services.

The aviation sector, which went through significant processes such as Ebola, SARS, September 11 attacks and 2008 economic crisis and gained acceleration in its growth, is now facing a much bigger crisis. The aviation companies that implemented the measures in line with the instructions of the international aviation and health organizations during the period when flights continued try to provide effective crisis management by focusing on the financial management after the flights were stopped. Airline companies trying to reduce their expenses will take advantage of the government's economic support packages and attempt to use credits. Thus, they will try to keep their financial structure intact during the crisis period.

Airline companies may face different risks depending on the duration of the pandemic crisis. In the event that the travel restrictions are lifted, and the crisis is resolved in the world as of May, the aviation sector may quickly resume its activities with the summer season and tourism activities that would gain momentum. However, in the event that the crisis lasts longer, or the advantage of summer season would be missed, or the passenger demand would not increase, aviation companies will have great financial difficulties and have to develop solutions for these problems.

Ongoing uncertainties about pandemic cause that the actual impact on the aviation industry cannot be seen clearly. The fact that the global aviation will face a huge negative effect worth of 250 billion dollars according to IATA data suggests that the aviation industry in Turkey will also experience a huge loss of revenue. This study analyzed the measures taken for the aviation sector, which has been significantly affected by the Covid-19 pandemic, and described the precautionary measures implemented in the airline companies and at the airports. This study tried to reveal how global and Turkish national aviation have been affected by the Covid-19 pandemic. The constraints of the study include the fact that the pandemic is ongoing, the lack of literature on this subject and the lack of data. A compilation with the impact of

measures taken in the aviation industry in the later stages of the pandemic on the spread of the disease and the economic effects of the Covid-19 pandemic on the aviation industry can create a wide study area. In further conclusion analysis it may be stated that the concepts of crisis management and crisis leadership have become more important than ever during this period. Furthermore, it is seen that the concept of globalization, which is addressed in almost every research in the field of social sciences, has lost its power and a period has emerged in which countries will continue their existence with entrepreneurial and innovative activities within themselves. Qualitative and quantitative research, and analysis of the practices of aviation companies regarding crisis periods with different variables in the following studies will contribute to preparation of estimation models for unexpected periods.

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