

**THE EFFECTS OF PANDEMIC IN THE CIVIL AVIATION
SECTOR: A RESEARCH IN EUROPEAN REGION**



MUSTAFA TEZ

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MUSTAFA TEZ

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YEDITEPE UNIVERSITY

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Name/Surname: Mustafa TEZ

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ÖZET

Bu tez çalışması, genel olarak pandemi döneminde havayolu şirketlerinin karşılaştığı finansal ve operasyonel kriz sorunlarının çözüm sürecindeki dönüşümü incelemektedir. Tezin temel amacı, Covid-19 salgınının etkisiyle sivil havacılık sektörünün operasyonel kimliğinin dönüşümünün detaylarını ortaya koymaktır. Bu vesileyle literatürdeki kavramsal unsurlar çalışmada ön plana çıkarılmıştır. Çalışmanın ikinci bölümünde salgın hastalıkların içeriği ile ilgili genel bir çerçeve bulunmakta ve salgın hastalıkların etkileri değerlendirilmektedir. Çalışmanın üçüncü bölümünde genel olarak sivil havacılık sektörü ile ilgili bir araştırma bulunmakta ve bu bölümde sektörün genel hatları, güncel değerler ile anlatılmaya çalışılmaktadır. Çalışmanın dördüncü bölümünde ise pandemi sürecinde sivil havacılık sektörünün genel durumu incelenmiştir. Bu bölümde pandeminin başta Türkiye ve dünya olmak üzere sivil havacılık sektörüne etkileri analiz edilmekte ve pandeminin etkisi ile sivil havacılık sektöründe yaşanan değişim ve dönüşümler incelenmektedir.

Anahtar Kelimeler: Havayolu Şirketi, Pandemi, Salgın, Sektör, Sivil Havacılık

ABSTRACT

This thesis study examines the transformation in the process of solving the financial and operational crisis problems faced by airline companies during the pandemic period in general. The main purpose of the thesis is to reveal the details of the transformation of the operational identity of the civil aviation industry with the impact of the Covid-19 outbreak. On this occasion, the conceptual elements in the literature are brought to the fore in the study. In the second part of the study, there is a general framework on the content of epidemic diseases and the effects of epidemic diseases are evaluated. In the third part of the study, there is a research on the civil aviation sector in general, and in this section, the general lines of the sector are tried to be explained with current values. In the fourth part of the study, the general situation of the civil aviation sector during the pandemic process is examined. In this section, the effects of the pandemic on the civil aviation sector, in particular Turkey and the world are analyzed and the changes and transformations experienced in the civil aviation sector are studied with the impact of the pandemic.

Keywords: Airline, Civil Aviation, Outbreak, Pandemic, Sector

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ABBREVIATIONS

IATA	: International Air Transport Association
ICAO	: The International Civil Aviation Organization
SGHM	: Sivil Havacılık Genel Müdürlüğü
WHO	: World Health Organization



CHAPTER 1

INTRODUCTION

The Covid-19 epidemic, which has spread from China to the whole world since the end of 2019 and caused the death of millions of people worldwide as of the beginning of 2020, was declared as a pandemic by WHO in February 2020 and has now become a global problem. Although this problem basically threatens human life, it has turned into a problem that threatens the psychological life of people with the black picture it creates. Finally, the spread of the pandemic brought all the functions of human life to a halt. Business life and parallel to this, the existence of a regular financial life for individuals and corporate faced serious threats.

Undoubtedly, with the impact of the Covid-19 outbreak, many business sectors around the world have encountered very serious financial problems due to stopped activities, as well as employees in these sectors have lost their jobs and this situation has indirectly affected the whole society negatively. Some sectors are among the most affected by this financial recession. The transportation sector is at the forefront at this point. It is possible to talk about a serious crisis experienced by the civil aviation industry in terms of airline companies.

Following the official announcement of the pandemic, figures and profitability rates in the civil aviation industry experienced a rapid decline. This decline caused serious damage to the global operations of the sector. Airlines, the main actors of the industry, faced the threat of bankruptcy, and many industry workers lost their jobs. More importantly, the time needed for the sector to recover is extremely long. Therefore, the pandemic has threatened not only the present but also the future for the civil aviation industry. Many airlines with growth plans now have to deal with the threat of bankruptcy, and this does not differ according to the scale of the airlines. However, as a result of the situation in the industry, airline companies have also started to search for a new road map. Because a dark and uncertain time period is expected by the authorities for the future of the pandemic. Therefore, the civil aviation sector is in various searches.

The financial collapse that airlines have experienced as a result of the cessation of people's circulation has made them consider the transport industry a hope. Currently, the civil aviation sector, where the cargo sector carries out joint operations, has decided to transform the aircraft into cargo carrier vehicles as a result of eliminating the chance of taking passengers to the aircraft. Although at first it did not seem like a suitable step for the expectations of the sector, over time, this initiative started to provide simultaneous benefits for the civil aviation sector and the cargo transportation sector. Cargo transportation has become an important financial alternative for airline companies as a result of falling revenues and decreasing number of operations. This situation represents a serious change in the civil aviation sector.

This thesis study examines the transformation in the process of solving the financial and operational crisis problems faced by airline companies during the pandemic period in general. The main purpose of the thesis is to reveal the details of the transformation of the operational identity of the civil aviation industry with the impact of the Covid-19 outbreak. On this occasion, the conceptual elements in the literature are brought to the fore in the study. In the second part of the study, there is a general framework on the content of epidemic diseases and the effects of epidemic diseases are evaluated. In the third part of the study, there is a research on the civil aviation sector in general, and in this section, the general lines of the sector are tried to be explained with current values. In the fourth part of the study, the general situation of the civil aviation sector during the pandemic process is examined. In this section, the effects of the pandemic on the civil aviation sector, in particular Turkey and the world are analyzed and the changes and transformations experienced in the civil aviation sector are studied with the impact of the pandemic.

In the study, two research questions and two hypotheses were determined in order to examine the subject in detail. Research questions are as follows:

Research Question 1: How has operational performance affected by the drop in passenger numbers?

Research Question 2: How are airlines overcoming the negative effects of the pandemic?

On the other hand, the hypotheses determined for the research are as follows:

H1: Due to the negative effects of the pandemic, the number of passengers and operational performance decreased in parallel with each other.

H2: Against the negative effects of the pandemic, airline companies will be able to recover from their operational losses in an integrated way with cargo operations.



CHAPTER 2

EPIDEMIC DISEASES

2.1. Definition of Epidemic Diseases

When evaluated medically, some diseases pose a threat to a large group of people. These diseases prevent people from continuing their lives and even cause them to lose their lives. Therefore, beyond the concept of disease, the concept of epidemic disease has emerged. Accordingly, epidemic disease is the name given to the disease, which affects a large number of people in a certain period of time, and the experiences of the diseases that occurred in the previous period were insufficient (European Commission, 2005, p. 30).

Epidemics are diseases that threaten public health within a certain period of time. The biggest problem in epidemic diseases is the transmission of the disease to large masses in a short period of time and this infectious disease process reaches a level that threatens public health and public safety to a large extent. For this reason, epidemic diseases are considered as diseases that restrict community life and cause suppressive measures (Tognotti, 2013, p. 254). It must be said that restrictions and repressive measures are designed to protect human life.

The most important issue in epidemics is the transition of the disease from one geography to another. Although an epidemic can be effective in a particular area, the main effect of the disease is understood on a large continent. As can be seen in the definition of the epidemic disease, this type of disease manifests itself differently from its previous features. The danger in epidemic diseases is that the microbial structure gets a new structure each time. In this way, it is possible to say that microbes have created a new generation for them (Peterson, 2002, p. 47). According to this view, epidemics have the ability to periodically renew themselves. Therefore, it will be increasingly difficult to diagnose and treat these diseases during the period after epidemics occur.

Epidemic, used to be synonymous with epidemic, is one of the most difficult definitions in epidemiology. Many authors define an epidemic as an incidence of a disease more than expected. In this case, it is meant that the number of sick people in

a certain geography, in the same season and in a certain community will increase. There is a relative increase emphasis in this definition. Detection of an infectious agent that has not been seen before or has not been seen for a long time in a community can be defined as an epidemic. For example, rabies in the US or Rift Valley fever in any of our provinces will be defined as an epidemic. Since epidemic is defined as a relative increase compared to previous years, cases seen over all years should be followed up and recorded. Only in such a case, the endemic speed can be mentioned. Determination of such increases has been made by statistical methods in recent years. Sometimes the words outbreak or cluster can be used instead of the word epidemic (Ergönül, 2008, p. 35).

The concept of epidemic disease is not limited to the content and effects of the disease. In addition, the concept of epidemic disease emerges in various stages. The concepts are as follows (Green et al., 2002, p. 3):

- Epidemic disease: It refers to the new concept that emerges as a result of the spread of a disease to a wide audience, and the current form of that disease is moved from local to general.
- Endemic: It is a concept that is used to express the diseases that are encountered in a certain region, in certain people and which do not have a great impact on the environment.
- Hyperendemic: It is a disease caused by the virus structure in a certain region, which is no longer limited and finds a living space that expands to itself.
- Pandemic: It is the name given to the new disease, treatment and social life form, which is the result of a disease becoming a universal disease by exceeding the epidemic dimension.

Looking at the definitions of gradual and gradual epidemics above, it is observed that, in fact, the course of epidemic diseases can change rapidly. In this case, it is understood that the framework, characteristics and scope of the concept of epidemic disease have expanded.

On the other hand, the characteristics of the pandemic are also informative for a better perception of the process. These features are listed below (Qiu et al., 2017, p. 4-5):

- Wide geographic extension: The term pandemic usually refers to diseases that extend over large geographic areas. In a recent review of the history of pandemic influenza, pandemics were categorized as trans-regional and global.
- Disease movement: In addition to geographic extension, most uses of the term pandemic imply unexpected disease movement or spread via transmission that can be traced from place to place. Examples of disease movement include widespread person-to-person spread of diseases caused by respiratory viruses.
- Novelty: The term pandemic has been used most commonly to describe diseases that are new, or at least associated with novel variants of existing organisms.
- Severity:- The term pandemic has been applied to severe or fatal diseases much more commonly than it has been applied to mild diseases. Global pandemics with high mortality and morbidity occur when a virulent new viral strain emerges, against which the human population has no immunity.
- High attack rates and explosiveness: Pandemics are characterised by high rates of attack and by explosive spread. However, if the transmission is non-explosive, even if it is widespread, this is not classified as a pandemic.
- Minimal population immunity: Although pandemics often have been described in partly immune populations, it is clear that in limiting microbial infection and transmission, population immunity can be a powerful anti-pandemic force.

- Infectiousness and contagiousness: The term pandemic has less commonly been used to describe presumably non-infectious diseases, such as obesity, or risk behaviors, such as cigarette smoking, that are geographically extensive and may be rising in global incidence but are not transmissible.

Epidemics are diseases that gain identity and spread as a result of social interaction and social networks. Looking at the historical background, it can be seen that epidemic diseases are rapidly spreading, largely due to the contact, communication, interactions and intimacy of people. In particular, interactions based on close contact among individuals are the most effective factors for the expansion of areas of epidemic diseases. Scientific researches have also determined that, based on mathematical data, close human interactions have an important effect on the speed of the spread of epidemics and their strong effects (Newman, 2002, p. 1).

The field of medicine that stands out in epidemics is epidemiology. Epidemiology is a branch of medicine that researches epidemics on a large scale and tries to identify prevention methods related to them. This branch of medicine investigates all forms and levels of epidemics in detail and focuses on activities to inform, raise awareness, guide and develop treatment methods according to the effects of the disease. In particular, epidemiology has an important role in determining the causes of epidemic diseases. This task is about informing the masses related to epidemics and especially government administrations (European Commission, 2005, p. 31-32).

2.2. Historical Background of Epidemic Diseases

From past to present, epidemic diseases seem to affect many aspects of human life. Outbreaks weaken political authorities, hit commercial activities and paralyze social life. For this reason, the economic and social consequences of large-scale epidemics make it imperative to consider such disasters with their historical dimensions (Dağlar, 2004, p. 15).

In history, it is said that disease outbreaks were effective as a result of many wars, and in the old world there was a serious relationship between the spread of disease germs and the fall of empires. It is widely believed that diseases play an important role in shaping the history as it is one of the leading causes of death of people. Another fact highlighted is as follows: In the old world, not only goods, thoughts and techniques circulating between communities, but disease microbes moved from society to society. As relations develop, diseases previously limited to one or another part of Eurasia and Africa previously spread to other regions and have been the cause of major deaths where the disease has never been before (Özdemir, 2005, p. 3).

Contagious diseases, which are generally identified as plague in the Middle Ages, believing that there is a divine punishment for an unidentified and therefore sinful life, on the one hand, played a very important role in shaping the world history on the other hand. First in history, M.S. In the 2nd century, the disease, which is probably the measles and flower outbreak, also called Antonine Plague, caused severe population declines and economic difficulties in the Roman Empire. Infectious diseases that caused the disorganization of the empire were an important factor in the collapse of the Roman Empire (Akpınar, 2012, p. 97).

Looking at the history of the world, it is possible to list the major epidemic diseases and their effects that have affected the history of humanity from ancient times to the present (Özkanlı & Turgut, 2020, p. 3047-3048):

- Justinian Plague Outbreak (541- 542) After the Byzantine Empire, it is estimated that 40 percent of the population, affected by the surrounding countries, lost their lives.
- Black Plague (1346-1350) It is known that 25 to 50 million people died in 14th century Europe.
- Asian flu affected 2 million people.
- Spanish flu killed 20 million people.

- The fifth cholera pandemic (1879-1881) resulted in the deaths of 981,899 people in India and Germany.
- Russian flu (1889-1890) affected 1 million people.
- The modern plague (1894-1903) appeared in Yuhán of China and then spread to Hong Kong in 1894 and 10 million people died all over the world.
- The sixth cholera pandemic (1899-1923) caused 1.5 million deaths in the Middle East, North Africa, Eastern Europe and Russia.
- HIV / AIDS (since 1960) has caused 32 million deaths.
- Hong Kong flu 1968-1969 1 million people died.

When the historical process is examined, it is seen that epidemic diseases cause many people to die in many different parts of the world. For this reason, epidemics have harmed the lives of societies in many different ways and with very different effects throughout the world history. Especially HIV / AIDS still causes people to lose their lives.

The cause of the outbreaks has mostly been the reactions of microorganisms to the great upheavals in nature. Wars, population growth, earthquakes, floods, storms, famine, climate abnormalities, homelessness, and environmental pollution can trigger one or two of the epidemics. As an example, throughout history, poverty and deaths in Africa have increased due to cholera, Ebola, AIDS and tuberculosis. HIV has been observed in the slums of Asia, and the hantavirus epidemic in the rural areas of North America. Epidemics have collapsed empires, destroyed armies, have constantly changed the way we live and still change. Considering the epidemic diseases experienced by the world, cholera epidemics have ensured that hygiene measures are taken, led to the development of the nursing profession and brought the application of oral fluid therapy to the agenda. Smallpox outbreaks have led to the discovery of the vaccine as an important treatment for this outbreak. Tuberculosis outbreaks have led to the development of live attenuated vaccines. The plague epidemic led to the development of quarantine measures (Parıldar, 2020, p. 19-20).

On the other hand, there are basically four different approaches for the evaluation of epidemics with their historical dimensions (Yolun, 2012, p. 12-13):

- Epidemics play a leading role in the collapse of civilizations and empires. Outbreaks need to be evaluated in terms of their results rather than their biological dimensions. The consequences of epidemic diseases are among the most important material factors that determine the historical course.
- According to the second approach, outbreaks are reflectors that show power balances, class conflicts and deep social changes in a society. Sociological groups in the place of the outbreak may show different reactions.
- The third approach concerns the consequences of outbreaks. Epidemics led to changes in established medical theories and practices. New methods and drugs to try to combat infectious diseases began to be tried. Until the developments in physics, chemistry and biology, traditional methods were mostly used in the treatment of diseases. Later, empirical knowledge overturned traditional knowledge.
- According to the fourth approach, outbreaks and medicine are among the most effective weapons for political power and colonialism. According to William McNeill, endemic digestion has been influential besides cultural factors in dominating the civilizations around Mediterranean, Chinese and Indian civilizations.

Considering the above evaluations, it is possible to see that epidemic diseases have an extremely strong ability to change historical flow. Accordingly, epidemics do not only emerge as a disease; The process after the outbreak helps shape the world.

2.3. Effects of Epidemic Diseases

Epidemics are unexpected situations for societies and government administrations. In such periods, it is extremely important for government

administrations to take precautions, and governments assume an extremely difficult responsibility. The responsibilities and steps to be taken by state administrations are very critical for the healthy functioning of the process, especially regarding the severity of the epidemic diseases. Because the steps of governments on this issue affect both the state and society psychologically (Archibong, Annan & Ekhatomobayode, 2020, p. 2).

Since the past, society is the segment where epidemics have the most serious impact on them. All members of society, both physically and psychologically, are affected by epidemics. At this point, there is no geography, race and country distinction. For this reason, when society encounters epidemic diseases, it first encounters an ignorance problem. Ignorance is the most serious scale issue in which all members of the society have had the biggest problem in escalating the negative effects of epidemic diseases. This ignorance creates an even more intense effect with the effects of epidemics (Kılıç, 2004, p. 13-14).

In the past, when the presence of epidemic diseases was felt, the reactions of the society were extremely limited. Because the society has to produce its own solution within the period when there is no state aid. This situation makes it difficult for the society to fight against epidemic diseases. In the years when plague disease was intensely seen in Europe, epidemic disease has been shown to make people helpless (Tanis, 2017, p. 167).

Non-communicable diseases have become an important public health problem with the increasing number of patients and increase in human lifetime all over the world. The share of deaths due to noncommunicable diseases and the years of disabled life are gradually increasing. Noncommunicable diseases cause the death of 40 million people annually, and this number accounts for about 70% of deaths worldwide. This situation imposes a heavy burden on health systems and affects economic development negatively (Gürel & Aslan, 2019, p. 363).

In fact, the area where the most negative effects are seen in the process is human psychology. This process may cause some mental symptoms in people who do not have any mental illness, as well as causing an exacerbation of the disease in people who already have an existing psychiatric illness, and stress in both the person

and the caregiver. Even though they are not exposed to the virus, people may feel sick or fear of death, feelings of helplessness, or feelings of guilt about people who are sick. As these feelings intensify, they may lead to a weaker person mentally. Stress-induced stigma and loneliness caused by stigmatization can be added to the stress of those struggling with the disease and their relatives. Depression, feeling of loneliness, helplessness, hopelessness, anxiety and panic feeling, intense fears, irritability, intolerance, bursts of anger, unwillingness, difficulty in concentration, extreme mental struggles and thoughts, sleep and appetite problems, physical problems can come into our lives as mental problems that we can all experience (Türk Nöropsikiyatri Derneği, 2020).

On the other hand, the effects of social epidemic diseases are deeper and longer. Accordingly, societies diverge psychologically from each other with the effect of epidemic diseases. This divergence regresses the level of interaction of society. At the same time, the problems experienced by the society cause the communication processes with each other to become negative. Each individual in the community can also exhibit health concerns and wrong attitudes and behaviors. These false attitudes and behaviors create a profound impact for the psychological balance of society (Heymann, 2006, p. 291-292).

From another point of view, epidemics restrict the basic life functions of society. During the years when the intense effects of the Ebola virus were felt in Africa, the public lost the opportunity to access essential foodstuffs, the educational processes of people were disrupted and the social activities of the people were almost completely ended. In the geographies where Ebola is lived, individuals have begun to fear themselves and the people around them (UNDG, 2015, p. 51-53). As seen in the Ebola example, epidemics prevented the basic activities of the society and visibly restricted their life functions. This better explains the degree of threat of epidemics to the lives of people.

2.4. Destructive Effects of Epidemic Diseases on Business Area

Epidemics can be seen as a socioeconomic problem rather than a medical problem in general. The panic environment and anxiety of the future created by epidemics become a visible threat to the sustainability of economic activities. In this

way, it is also possible to assume that epidemics are a long-term threat to the functioning of the global economy. Because epidemics create a dilemma for states. In this dilemma, there is the financial burden of the steps to be taken to save the economy on the one hand and the economy on the other (Bloom, Cadarette & Sevilla, 2018, p. 46-49).

Basically, the public being negatively affected by the pandemic disrupts all economic balances. More generally, poor people often move to escape catastrophic events such as war or environmental disasters, frequently ending up in crowded, makeshift camps or slums where poor sanitary conditions create an ideal environment for epidemics such as ty-phus and cholera. They may also move to find work. Much of this movement is from rural areas into cities, and occurs when cities begin to prosper. As well as offering some protection against epidemics, the changes in living habits (specifically, movement from rural to urban areas) that accompany increased incomes can also make epidemics more likely to occur (Bloom & Canning, 2006, p. 12-13).

Taken broadly, it is possible to evaluate the negative effects of epidemic diseases on the economy from different perspectives (Dündar, 2020, p. 844-845):

- A severe epidemic will lead to a decline in world trade. Investors' confidence will be affected in order to worsen economic outcomes with the tendency of the markets to react excessively under conditions of great uncertainty.
- An epidemic will cause supply shock due to reduced size and productivity of the workforce, disruption of production processes) and transition to more costly procedures.
- At the same time, advances in the technology of recent years may allow some companies, especially in the service industries (such as finance, information technology) to do business through electronic communication, which will allow their employees to work from home.

- Economic effects will emerge, with governments' efforts to prevent an epidemic from starting, to control it when it begins, and to mitigate its harmful effects on public health.
- Attempts to quarantine people will likely result in declines in trade, travel and tourism. Given the increasingly global nature of modern production processes, the use of measures to stop the movement within and across countries can cause major economic disruptions.
- People will not want to fly, and as governments will probably close borders, international travel will drop even if it doesn't end.
- The most important long-term economic impact of an epidemic disease will probably be a reduction in human capital over a long period of time.
- Although the recovery of the investment environment will take years, an epidemic will also produce winners and losers, especially in the real estate market.

Looking at the above factors, it is possible to see that epidemics are an extremely large threat to states and the global economy. In the axis of these threats, epidemics have the ability to radically change the planning and strategies of the global economy. The most serious threat in this process is on the income level of the society and especially on the working lives of working individuals.

On the other hand, when looking at the economic implications of epidemic diseases, the situation can be explained with the following examples (European Parliamentary Research Service, 2020, p. 2-4):

- In 2009, the labor force loss of the H1N1 epidemic disease for the Chilean economy was \$ 16 million.
- Again in 2009, the labor force loss of the H1N1 epidemic for the US economy was about \$ 2 billion.

- Between 2009 and 2011, in the UK, the cost of the H1N1 epidemic alone was worth £ 45 million to the British healthcare system.
- Between 2015 and 2017, the total cost of Zikar virus outbreak disease for the Latin American and Caribbean economies ranged from \$ 7 to \$ 18 billion.
- In 2015, tourism revenues in South Korea suffered a loss of \$ 2.6 billion in financial income due to the MERS epidemic disease.
- The effect of SARS epidemic disease on tourism revenues in Malaysia is a financial loss of \$ 1.7 billion; the value of the same loss for China is \$ 3.5 billion.

When the numerical values above are considered, it is seen that the effects of epidemic diseases on the world economy within a year or within a certain period of time are extremely profound. This depth prolongs the time it takes for the world economy to recover. Therefore, it is seen that the economic effects of epidemics cover much longer time than the effects on health.

2.5. Roles of Governments and International Organizations during the Process

Governments and international organizations play a crucial role in the times when severe effects of epidemics are experienced. These two actors are the most important supporters of the people, financially and spiritually, during epidemic diseases. Again, thanks to these two actors, it is possible to reduce the negative effects of epidemic diseases as much as possible.

Governments are the most active actors of the process during epidemics. Epidemic diseases negatively affect governments from very different perspectives. Social issues, economic crisis threat etc. matters make governments difficult in epidemic diseases. In this process, governments perceive epidemics as national security threats. Epidemics for governments pose a threat in all areas of social life, and their biggest threat is on the economic policies of governments. Because epidemic diseases become an irregular situation for their governments in economic planning (Totten, 2015, p. 202-203).

Nevertheless, governments are the primary actors in the period of epidemics for the healthy management of the process. Accordingly, governments have to take responsibility for the management and direction of the activities of all actors except themselves. Governments' obligations start with emergency action plans in the fields of economy and health. The aim at this point is to slow down the pace of the epidemic and keep the economic resources damaged by the epidemic alive. Then, governments have to create an opportunity to meet the needs of society at the points that the state cannot reach by directing other institutions (Broadband Commission for Sustainable Development, 2018, p. 36).

The role of non-governmental organizations, whose international identities are more important now, is also very important. Non-governmental organizations that have close relationships with the society are trying to minimize the negative effects of epidemic diseases in the national and international arena. The most important advantage of non-governmental organizations is that the society has detailed information about the problems experienced in epidemic diseases. This information facilitates non-governmental organizations to determine the roadmap necessary for the solution and prevention of epidemics (Huang, 2013, p. 30).

When evaluated in general, the critical role of non-governmental organizations in the period of epidemic diseases can be explained by the following factors (Levi & Yoffe, 2018, p. 2):

- In the event of pandemic, it is probable that civil society entities will act independently out of responsibility for the community, whether authorities coordinate their efforts or not. While such independent initiatives will be based on good intentions, lack of coordination and Professional guidance can result in in more harm than good.
- Authorities' ability to control the distribution of information through social mediums is limited, a fact that can result in disinformation and loss of confidence and trust in the authorities.
- Often pandemics are characterized by several sequential occurrences, and it is likely that a pandemic will affect vital functions in the

community. Location of substitute solutions for these functions require constant monitoring for a continuous situational report, allowing the community's considering the need for continuity of operations (COOP).

- In the event of pandemic, individuals within the community might take advantage of gaps in the COOP for their own benefit, including exploitation of vulnerable population, looting and life endangering activities.
- The civil society's vulnerability and resilience factors will determine how much it will be affected by a pandemic.

Especially in the 1990s, when the HIV epidemic was extremely effective, many international organizations and non-governmental organizations, especially the UN, had an important role in the process. These organizations have made serious contributions to the needs of the society thanks to awareness, medical and psychological support services. In particular, the awareness raising issue is the most important step to prevent this epidemic disease from progressing. At the same time, non-governmental organizations have worked more actively than governments and have established close relationships with the community (WHO, 2006, p. 202).

2.6. As the Universal Dimension of Epidemic Disease: Pandemics

While pandemic outbreaks are considered as global outbreaks that can easily spread and cause serious diseases when they emerge as a new virus in the human population; Epidemic outbreaks are considered smaller-scale infectious outbreaks that occur disproportionately within a region or population. It is known that humanity has faced epidemics, pandemics and similarly devastating epidemics throughout its history. Pandemics have accompanied human evolution from ancient times to modern civilization. Today, despite the progress in medical science, the basic tools for infectious diseases remain the same as nearly a century ago. Public health education, isolation, sanitation, congestion reduction, closure and surveillance are essential tools. The impact of an epidemic epidemic on the economy is complex and depends on many factors. These include which groups of individuals are at risk of contracting the

disease, the natural history of the disease (for example how long the outbreak lasts) and how the disease was transmitted (airborne, blood-borne, pathogen-borne). One of the sources of panic created by some epidemic diseases is their unpredictability (Kronfol, 2015, p.7).

It is acknowledged by experts that pandemic flu has serious global economic impacts, both on the demand side and on the supply side. The disease results in the inability to continue work, decrease in employee productivity and therefore decrease in economic production. Loose et al. some people, especially those who have already compromised health, succumb to the disease and die; This situation creates a situation in which the economy can no longer produce or consume goods and services and has both a supply and demand side effect (Loose et al., 2010, p. 4-5).

Flu pandemics differ in severity, both in the number of people affected and the number of deaths. However, pandemics often have a bigger impact than the most severe winter epidemics. The ages of those most affected can vary as much as the number of pandemic waves. It is therefore impossible to predict the form that any future pandemic will take; however, past pandemics can be studied to provide an indication of what might happen in future pandemics. The Black Death, which emerged in the 14th century, was the biggest demographic shock in European history, killing about 40% of its population between 1347 and 1352. While some regions and cities survived, others were severely affected. Britain, France, Italy and Spain lost 50-60% of their population in just one or two years (Koyama, Jedwab & Johnson, 2019, p. 1).

Table 1 Spread stages of the pandemic

<u>Inter-Pandemic Period</u>	
Phase 1	No new influenza virus subtypes have been identified in humans. An influenza virus subtype that causes human infection may be present in animals. If only present in animals, the risk of human infection or disease is considered to be low.
Phase 2	No new influenza virus subtypes have been identified in humans. However, a circulating animal influenza virus subtype poses a significant risk to human disease.
<u>Pandemic Warning Period</u>	
Phase 3	A new subtype, human infection / infections, is detected; It is spread from person to person or, most rarely, by close contact.
Phase 4	Human-to-human transmission is limited, but the spread is highly localized and the virus is not thought to be well adapted to humans.

Phase 5	There are larger clusters, but person-to-person spread is still localized. This shows that the virus is increasingly adapted to humans, but it may not yet be completely contagious.
<u>Pandemic Period</u>	
Phase 6	Outbreak: Increased in the general population and continuous transmission has been detected.

Source: (Dündar, 2020, p. 839)

A disease or condition is not a pandemic just because it is widespread or kills many people; it must also be contagious (Faulds & Bridel, 2009, p. 4-5). According to WHO, for an outbreak to be considered a pandemic epidemic, it must meet the following three criteria (Dursun, 2020, p. 840):

- There is a global disease outbreak caused by an agent (virus or bacteria) that is new to the population (or has not been in the population for a long time)
- If the agent infects people, causing serious illness
- If the agent spreads easily and sustainably from person to person.

The pandemic influenza is naturally occurring events recorded since ancient times. A new type A virus, highly pathogenic and antigenically unique, is easily transmitted to humans and humans. Although the flu virus was not identified until 1933, historical records describe influenza pandemics dating back to the days of Hippocrates. The first severe flu epidemic with important historical records occurred in 1580 and reportedly destroyed some Spanish cities. Ten influenza epidemics have been documented in the last 300 years (Kelley and Osterholm, 2008, p. 6).

CHAPTER 3

CIVIL AVIATION SECTOR AND VARIOUS RISKS ON SECTOR'S ACTIVITIES

3.1. Scope of Civil Aviation Sector

The transportation sector has shown different efforts for many years by producing different alternatives for the passengers and has sought ways to provide better service to the passengers. In this respect, it should be said that road transportation has been a priority choice for people for many years. However, in recent years, it has been observed that airline transportation has become more prominent and has become a priority transportation option for different segments of the society (Yazgan & Yiğit, 2013, p. 424).

It is noticed that the airline transportation and thus the opportunities offered by the civil aviation industry are extremely striking during the period when the technical possibilities offered by modern technology are also considered. The social aviation value of the civil aviation industry has greatly increased, especially as it eliminates long distance problems and responds to the expectations of passengers in a qualified manner. However, in recent years, the issue that has come to the fore for the development of the civil aviation industry and the frequent choice of airline transportation is the relative decline in the prices of flight tickets. This made civil aviation a priority within the transportation preferences of the passengers (Demir, 2016, p. 81).

At the forefront of the civil aviation sector is the fact that it is now able to reach many more segments and is almost in the first place in terms of transportation, both nationally and internationally. Now, passengers prefer airline transportation even for regions close to them that they can reach with their own vehicles and relatively close. This situation shows the value of the civil aviation sector, but also shows how the potential in question for the growth of the sector worldwide has been formed. In the past years, the services of the civil aviation sector, which has not been preferred frequently due to its costs, have gained a strong momentum with the decline in prices in recent years and the increase in competition in the sector (Karaağaoğlu, 2015, p. 3-4).

During the general evaluation period, it is possible to evaluate the factors included in the scope of the developing and growing civil aviation sector as follows (Korul & Küçükönel, 2003, p. 24-25; Cento, 2009, p. 13-14; Karaağaoğlu, 2015, p. 4):

- Government administrations and the private sector have become a part of the civil aviation sector as a result of their commercial trends in profitability ratios and service delivery.
- Passengers have an important responsibility and supportive role within the civil aviation industry, with the impact of the drop in ticket prices.
- Airline companies are the most important service producer of the civil aviation industry with their increasing number day by day.
- In terms of training qualified civil aviation personnel, the existence of institutions providing training in this field is important.
- As a supply chain element, all small and medium-sized enterprises, in which airline companies are in communication, support the functioning of the sector.

Looking at the general elements listed above, although there are many different elements that can be accepted within the elements of the civil aviation sector, it is possible to say that these listed elements have a serious scale in terms of the operation of the system. Airline companies, in particular, are not only producers but also important parties for the stability and functioning of the system. It is observed that airline companies have a large-scale contribution to sustainability within the scope of the civil aviation sector, considering their impacts on service delivery, product and service creation and employment creation (Demir, 2016, p. 83).

Airline transport plays an indisputably important role in transportation for millions of people who are working and have limited free time, and it is preferred over other modes of transport due to its safety and speed. People from almost every sector of the world economy and from all ages and income levels of the world population constitute air transport customers (Okumuş & Asil, 2007, p. 11).

Aircrafts, hangars, airports, simulators of related aircraft etc. many equipment and facilities require large amounts of capital. A large number of personnel are employed in an airline business such as pilots, cabin crew, aircraft maintenance technicians, ground and passenger service workers. As air transport is a service sector, it is considered a labor-intensive sector. The air transport sector is among the sectors most affected by the social, political and economic events experienced. In this context, the airline sector is adversely affected by the epidemic diseases, ongoing domestic disturbances in countries, possible wars, terrorism attacks and fluctuations in the economy. Airline companies, subject to both national and international legal regulations and rules, carry out their operations in accordance with the directives of national and international legal mechanisms (Çalıyurt, 2012, p.3).

In the period that has passed since its emergence as an economic activity until today, airline transportation has developed very rapidly in all aspects. Thanks to this development (considering that air transport emerged much later than land and sea transport) compared to land and sea transport; Today, it is seen that air transportation is the most economical, safest and most comfortable means of transportation. As a result of this feature of air transport, tourism activities have increased in the national and international arena, and countries that attach importance to air transport and are successful in this field have had the chance to show a positive development in economic terms. In addition, thanks to air cargo transportation, it has been possible to quickly transport agricultural products and fresh foodstuffs with commercial value from the geographical regions where they are produced to every corner of the world. The speed in the delivery of commercial products to the targeted market by air transport made it possible for the product not to lose its quality and therefore its commercial value (Korkmaz, 2017, p.28-29).

3.2. Actors of Civil Aviation Sector

As its structure grows and its content expands, the number of actors in the civil aviation sector is also increasing. The number of parties wishing to take a share from the growing financial structure has an important effect on this, as well as the existence of many groups who are trying to take responsibility for the control and regulation of the issue or have the right to do so. It is also possible to say that there are many

national and international actors in question and each has the capacity to influence the process in different ways.

Accordingly, it is necessary to list the actors of the civil aviation sector on a national, regional and international basis as follows (Karaağaoğlu, 2015, p. 4-5):

- International actors: The vast majority of actors belonging to this segment are those with responsibilities for the regulation of the civil aviation sector. In this group, led by organizations such as IATA, ICAO, ACI and JAA, there are mostly determinants of the system's international criteria.
- Regional actors: Regions formed by various economic or political mergers, as well as the regionalism created by the countries that create a flight zone among themselves in terms of aviation, enable the parties to shape the process in accordance with their own policy. In this field where organizations such as EASA, AEA and EUROCONTROL can be given as an example, the EU is one of the most important actors with its airspace regime.
- National actors: This structure, which is largely under the control of state administrations, includes ministries or ministries, airline companies, employees, citizens and passengers. Actors at this point are important for the continuity of the sector in the national sense.

With the presence of these actors, it is seen that the civil aviation industry has fully gained an international identity. This identity not only unifies the industry but also integrates it, creating a system that produces, consumes and controls it. Apart from these actors, other important elements in the system are airline companies, airports, international organizations, international associations and technical support.

3.2.1. Airline Companies

Within the civil aviation sector, the parties that hold the leadership position in terms of management and direction of the system are the airline companies with the employment opportunities they provide and the diverse, capacity-increasing services

offered to the passengers. Airline companies constitute an important economic structure with the investments they have made in technology in recent years, the technical innovations they have made in order to facilitate transportation and the investments they have made that affect all stakeholders of the sector in general. However, the process of airline companies involves more sensitivity than the processes of companies in other sectors. The fact that the industry, in general, acts within very different factors makes the airline companies the enterprises that need to observe very different balances (Tunahan, Esen & Takıl, 2016, p. 240).

What matters and makes a difference for the airline companies is that the structuring of the enterprises is mostly related to the privatization of the companies and in this way, it is possible for the airline companies to carry out larger scale operations. With the rapid privatization of American airline companies and the increasing interest of the private sector in civil aviation as of the 1980s, the system has become largely dependent on the effectiveness of the airline companies and their decision-making (Belobaba, Odoni & Barnhart, 2009, p. 24). On this occasion, it is possible to see that airline companies have become the leading actors of the civil aviation industry over time. In particular, the privatization subject has helped the airline companies in terms of development and rapid action.

3.2.2. Airports

Airports, which have been frequented only by passengers in the past, have ceased to be just a haunt over the years, and have also turned into living spaces. Undoubtedly, the increase in the number of individuals benefiting from the activities of the civil aviation sector with the increasing number of airline companies is of great importance. Thus, airports now have to grow in capacity, offer more as a service and pave the way for the elements of the competing civil aviation industry to act together. Looking at the vast majority of the examples, especially in the world, the civil aviation industry is expected to attach great importance to the development of airports, and therefore facilitate the affairs of the parties of the sector in every aspect of global competition or local competition. In terms of the development of airports, the public sector and the private sector can act jointly as well as the private sector that thinks largely entrepreneurship-oriented (Akpınar, 2011, p. 152).

It is observed that the airports are extremely equipped in terms of technology, while considering the modern structure of the civil aviation sector in the current process. If it is considered that the airlines, passengers, ground services teams, technical teams and all individuals and institutions within the airport need for the existence of this technological structure, it is understood that the airports are also places with constant competition and development within themselves. Being an airport flooded by more passengers is now part of the competition and this development of airports can explain their main goals for international airports worldwide (Marks & Rietsema, 2014, p. 149-150).

As it has attracted attention in recent years, airports are strongly needed to be qualified residential areas. Regarding the flight mobility of the airline companies, the rapid increase in the number of passengers and visitors benefiting from the services of the sector, and the overall growing capacity of the sector, the airports need to grow and qualify in the same way. Therefore, airports, passengers, customers, visitors, employees, etc. It is one of the areas where users are tried to be developed without any discrimination and investment expenditures are made (Marin, 2006, p. 142).

However, the number of passengers who are actively using the airport in recent years and the expectations of other members of the society from the airports in general are increasing. Accordingly, passengers, customers, visitors, etc. It has a serious expectation not only for the airports they use, but also for providing aviation-related services, but also for meeting their social expectations. For this reason, airports are considered as places where quality, capacity and content quality should be increased (Kaya et al., 2005, 15-16). When the situation in question is evaluated on the quality of the airports, it is highly probable that it will cause a competition. The most innovative, the most advanced, the largest capacity, etc. It will also explain the competition to get titles both in terms of deploying airline companies and transforming airports with more visitors into a revenue generating area.

3.2.3. International Organizations and International Alliances

International organizations and associations are extremely important for the civil aviation sector. In order to carry out aviation activities in a qualified manner, this form of organization and the activities of this organization are needed. Worldwide, ICAO and IATA are important actors of the process.

Established in 1947 with the Chicago Convention, ICAO is responsible for providing relations with aviation organizations and operators, determining the needs, determining the issues and application methods required by aviation in the field of meteorology. The main functions of ICAO are to ensure the development of international air transport, to make the necessary planning, to develop techniques and principles related to international air navigation (Cavaklı, 2013, p. 99-100).

On the other hand, when considered on a large scale, it is possible to evaluate the basic functions of ICAO as follows (MEGEP, 2011, p. 14):

- To ensure the safe and regular development of civil aviation in an international context and on a global scale,
- Improve flight safety,
- To support flight and airport security,
- Supporting the construction and operation of air transportation vehicles for peaceful purposes,
- Ensuring the development of airlines, airports and air navigation facilities for more effective international civil aviation,
- To meet the global requirements of safe, orderly and economical air transportation,
- To prevent waste caused by unfair competition,
- To fully protect the rights of the countries that accept the ICAO agreement and to provide equal opportunity to the countries in terms of

international airline management, and not to discriminate between the parties.

- To strive for the development and renewal of all issues concerning international civil aviation.

On the other hand, IATA was established in Havana, Cuba in 1945 as an interline company to provide safe, safe and economical air transportation. IATA had 57 members from 31 countries in its establishment. Now it has over 270 members from 140 countries worldwide. Modern IATA is the continuation of the International Air Traffic Association, which was founded in 1919, with the first international scheduled flight. The general duties of IATA are to ensure the spread of safe, orderly and economic air transportation for the benefit of all the people of the world; developing air trade and working on issues related to these issues; preparing cooperation environments between air transport initiatives dealing directly or indirectly with the international air transport service; To cooperate with ICAO and other international organizations (MEGEP, 2011, p. 12).

On the other hand, other prominent international organizations around the world are shown in Table 1 (Mihandoust, 2017, p. 7-8).

Table 2 Nationally and internationally effective civil aviation organizations

<u>Organization</u>	<u>Function</u>
ACI	ACI is the only global trade representative of the world's airports. Founded in 1991, ACI represents airports interests with governments and international organizations such as ICAO, develops standards, policies and recommended practices for airports, and provides knowledge and training opportunities to raise standards worldwide.
IFALPA	IFALPA represents more than 100,000 pilots and flight engineers in nearly 100 countries around the world. As the global voice of professional pilots, IFALPA's mission is to provide representation,

	service and support to promote the highest level of aviation security worldwide.
FAA	FAA is the US national aviation authority. An agency of the United Nations Department of Transportation is empowered to regulate and oversee all aspects of American civil aviation. The Federal Aviation Act of 1958 created the organization under the name of the Federal Aviation Agency. The agency adopted its present name when it became part of the Ministry of Transport in 1966.
ECAC	Established in 1955 as an intergovernmental organization, the European Civil Aviation Conference ECAC aims to harmonize civil aviation policies and practices among member states, as well as to advance understanding on policy issues between member states and other parts of the world. ECAC's mission is to promote the continuous development of a safe, efficient and sustainable European air transport system.
EASA	Established in 2002, EASA is the European Union Authority in aviation security. The main activities of the organization are strategy and safety management, certification of aviation products and surveillance of notified bodies and EU Member States. Agency staff consists of more than 700 aviation experts and managers from all EU Member States.

When evaluated in terms of international associations, different strategies of airline companies come to the fore. At this point, the most important issue is the partnership need of the airline companies. Airline companies are not always in financial partnerships. Airline companies find a new partnership area thanks to international associations. These partnerships are designed to increase the comfort level of passengers, and these partnerships also increase the commercial value of airlines (Sánchez, Valls & Úbeda, 2019, p. 1-3).

In the past years, passenger potential has been evaluated as the most important financial resource for airline companies. But in the coming years, international activities were seen as one of the most important sources of income and prestige for airlines. International associations of airlines have emerged as a result of this idea. International associations of airlines are now critical, especially in terms of prestige and attraction. The innovative identities, image values and nature of the activities of the airline companies are now evaluated with their membership in international associations. For this reason, every year, more and more international airlines strive to be part of any international association (Villar, Tafur & Jia, 2011, p. 4).

In airline companies' international cooperation activities, prestige and quality are important factors, but in general airline companies also want to benefit from each other's advantageous situations. These advantageous situations are extremely important for the mutual interests of airline companies. In international collaborations, the partnership issues of the airline companies are as follows (Šimunović, Tatalović & Bajić, 2011, p. 2-3):

- Code share-joint operations
- Frequent Flyer Program cooperation
- Joint use of ground facilities
- Flight schedule coordination
- Joint advertising and marketing
- Ground handling coordination
- CRS/IT sharing and development
- Joint purchase of fuel
- Joint maintenance
- Block space agreements
- Exchange of cabin crew.

The applications listed above show that the international cooperation of airline companies is very detailed. In this way, the association of airline companies enables a common sense of value and a common structure of activity.

3.2.4. Technical Support

In the civil aviation industry, the technical support provided to them is of great importance in terms of effectiveness, in order for airline companies to perform a healthy flight and make an advertisement over it. Considering the existence of both aircraft and in-aircraft mechanisms in terms of repair, maintenance and development, the importance of technical support increases. Based on this, technical support is gaining more importance with the technical support provided by the airline companies as well as the technical support provided by them. Although the technical support investments made by the airline companies themselves cause huge costs, technical support is very important for the airline companies in terms of technical reliability and development (Özer & Ersoy, 2012, p. 175).

3.2.5 Others

Aircraft manufacturers have now become one of the most important actors of the civil aviation industry. The largest asset in the airline industry, the supply of aircraft can take a long time, especially if new aircraft are purchased. Aircraft manufacturers mostly make their production to order, and it is very difficult to find a new aircraft on the market that an airline can buy immediately. It may take a very long time to deliver the order, as the production of the custom-made aircraft takes a long time, the manufacturers are limited and the queues are waiting due to the orders of other airlines. Orders made during the period of high demand can be delivered when the economy deteriorates and demand shrinks (Gerede, 2015, p.18).

The aviation sector needs aircraft maintenance organizations and maintenance personnel who continue their maintenance activities in these organizations to achieve the zero-accident target without compromising flight and ground safety. As a result of the industry, in the smallest unsafe situation and / or a possible plane crash, people will either completely or largely die, as well as aircraft maintenance organizations in the airline business and organization will suffer a great prestige and financial loss. Human factors are the main cause of errors and accidents in many sectors, especially

the aviation sector. While studies investigating the root causes of human factors in aviation used to focus especially on flight personnel (pilot, cabin crew, etc.), recently maintenance errors in aircraft maintenance organizations have begun to be emphasized (Erol & Kanbur, 2017, p. 185).

On the other hand, it is necessary to admit that all elements of technology are also an important factor in the civil aviation sector. The airline industry is a capital, labor and fuel intensive industry. In the current process, with new technologies and methods, the fuel consumption and personnel requirement of aircraft have decreased and it has become more capital intensive. Technology turnover rate is very high day by day, more efficient, faster, more comfortable and safer aircrafts are produced. In order to maintain its position in the sector and to compete, the airline must keep up with technology development with large investments. However, fuel and personnel still maintain their importance due to the increasing oil prices and the sector's human-oriented and service-based nature (Çancı & Erdal, 2003, p. 77).

Technology has a great importance in the civil aviation industry, especially in terms of the development of business practice and business quality. The size of the data volume to be handled by airlines requires big data analytics. In this way, companies in the industry can distinguish themselves from their competitors and stay at the top of the market by combining their ability to collect and manage large amounts of data, both internally and externally, with artificial intelligence, machine learning and deep learning capabilities. An airline company can achieve significant savings with the use of big data and digitalization. As an example of this, airlines can save approximately \$ 1.7 billion in fuel costs with speed and altitude optimization, live weather tools that enable pilots to avoid storms. Each delay minute in flight costs around \$ 80-100. If turnaround delays could be reduced, savings of about \$ 0.8 billion could be achieved across the industry. Stakeholders who create value from big data in the sector and realize its economic benefits are in a very advantageous position from the very beginning in terms of expertise and leadership in the field in question. Because the stakeholders who have a command of technological systems and infrastructure determine permanent regulations, approaches, standards and practices in this field. These stakeholders; They are always one step ahead in the sector in terms of identifying trends in the market, providing targeted services, increasing customer

loyalty and predicting opportunities that will put their companies ahead of their competitors (Çukur, 2020, p.25).

Finally, the human factor also has a great value for the civil aviation industry. The aviation sector is a set of technical services and in order to create the demand that can meet the capacity increase experienced with the use of wide-body aircraft in the sector, airline companies have turned into a customer-oriented structure and have entered the need to meet the personnel needs required for this structure. The fact that the enterprises had a profit-oriented structure in the previous periods caused the demands and needs of employees and customers to be ignored, but in the current process, the understanding of human resources management, which will ensure the best use of the knowledge, skills and competencies of employees, has become valid (Küçükönel and Korul, 2002, p. 68).

External factors such as fuel prices, economic conditions, legal constraints, and internal factors such as flight line design, automation systems, and the need for skilled workforce are considered important factors in determining success in airline companies. In addition to these, customer satisfaction is becoming increasingly important as a factor affecting success in the airline industry. Delays in flights, loss of luggage, flights with excess seats, cancellations and decreases in the service quality of employees can cause passengers not to prefer airline operations. On the other hand, the need for personnel trained in the aviation sector is an extremely important issue in the aviation sector. The importance of trained manpower comes to the fore due to the rapid spread of automation usage. Today's understanding of human resources management looks at work and production in terms of human beings and positions people as an indispensable element of production (Akyurt & Elderly, 2018, p.425).

3.3. Current Potential of Civil Aviation Sector

It is possible to think that the acceleration caught in the 2000s and the increasing competition level had a great impact on the financial growth of the civil aviation sector. However, fluctuations in the international financial system caused the financial size of the civil aviation sector to change constantly. For this reason, it is possible to talk about the frequently changing figures in the name of the growth and general potential of the sector. However, when evaluated in general, it is seen that

civil aviation is better than many other sectors that are at the forefront in terms of profitability and employment potential worldwide. If this outlook is evaluated in 2018, the following will appear (ICAO, 2019, p. 17):

- The sector's international financial capacity has reached \$ 820 billion.
- Airline companies from USA, EU and Far East dominate an important part of the market and this dominance corresponds to 62% of the total share.
- Internationally, the sector's annual growth rate is increasing steadily, and this figure was 4.3% in 2018. The value of international investments in the sector on an annual basis increased by 7.6% in 2018.

Looking at the figures in general, it is possible to realize that the current potential of the civil aviation industry and the annual value increases have reached a remarkable level. On the other hand, the fact that the sector has achieved a steady growth acceleration annually can be considered as important, and the development of the sector only for companies of USA, EU and Far East origin can be considered as a competition problem.

During the period considered in terms of its contributions to the world economy, the civil aviation sector is the sector that has the most significant impact in the field of transportation. The potential of the civil aviation industry has also strengthened the interactions between state administrations and civil aviation industry actors. Because as airline companies increase their potential, the level of trust in these companies also increases. The increasing level of trust also helps governments to financially support the actors of the civil aviation sector. Although the sector's expenditures are at an extremely high level, the potential of the sector has an expense-profit-loss balance (İnan, 2019, p.24-26).

The existence of many different countries and businesses within the financial potential of the civil aviation sector creates a positive outlook for the competition of the sector. However, in order to ensure the permanence of this image, it is an important obstacle that the airline companies from certain parts of the world pose.

Accordingly, state administrations and airline companies with high financial investment power can hold stronger in the aviation sector. In this image, it is possible to evaluate the level of competition in the world civil aviation sector according to the reports of 2018 within the following factors (IATA, 2019, p. 23):

- Far-east origin airline companies and mechanical manufacturers, who have been away from the industry for many years, are increasingly dominating the sector.
- Medium-sized airlines that only serve in the national market now fly to at least one international destination, thereby triggering both national and international competition.
- The airline companies of the Gulf countries have participated in the competition in the sector very quickly and effectively and the sectoral investments of the airline companies belonging to these countries are increasing day by day.
- In the civil aviation industry, where competition and investment levels are extremely high, the number of mergers is increasing due to global financial risks, and this number increased by 20% in 2018.

Although competition is a strict situation, the civil aviation sector is shaped by the decisions of certain countries, especially countries and airlines that have a high financial investment potential. Especially in recent years, the emergence of a large number of high-scaled airline companies from the Far East region and the region where the Gulf countries are located shows the changing competition balances in the sector. On the other hand, if the mergers are too high in the sector, it shows that joining forces in terms of resistance against competition has become an imperative.

From another point of view, investments are one of the most important issues in the civil aviation industry. In terms of the development of the civil aviation sector, the parties that make the most serious investment and take responsibility are state administrations. In the current process, state administrations, which have been participating in the sector at a lower level compared to the past, support the private sector mostly in this process, and thereby reduce the burden of the state in the sector,

and thus the profitability concerns. While it is observed that the investment potential of the state is extremely high in the first establishment years of the sector in the late 1950s, the state tries to get rid of this burden in the remaining process (Özer & Ersoy, 2012, p. 175).

Although state administrations did not make as high investments as expected in the current process, it is observed that they still have a serious potential in terms of investment. Looking at the overall outlook in 2018, it is observed that the following investment factors have emerged (TOBB, 2019, p. 50-52):

- State investments made on behalf of civil aviation internationally in 2018 increased by approximately 5.7%.
- Europe and the Far East region are the regions with the highest state investment in the civil aviation sector (on average, between 7% and 8%).
- Public civil aviation investments are mostly in the form of technical support and field grants.
- In order to create qualified human resources for civil aviation, government administrations create courses, certificate programs and postgraduate education programs, mostly on scholarships.
- Due to the wide employment area, government administrations place a special emphasis on the civil aviation sector and, therefore, announce incentive programs to increase the employment potential of the sector.

Considering the listed items, it is observed that state administrations have indirect contributions to the sector even though their investment potentials have decreased. More importantly, it can be considered that government support has an important role in the increase in the numbers and financial levels of Far Eastern civil aviation companies, which have been experiencing a serious potential increase in recent years.

Although the place of government administrations in the civil aviation sector has decreased gradually compared to previous years, the necessity of government administrations to support the private sector intensively as a result of the financial returns and employment opportunities that the sector can provide. This necessity is extremely important in terms of easing the increasing financial burdens of state administrations, but there is a need for the existence and investments of state administrations in terms of survival and control of the sector (Gerede, 2011, p. 37).

Recently, it has been observed that airline companies are in a merger trend in order to increase their potential. Airline mergers have become an integral part of contemporary strategic cooperation thinking. However, in order for the merger results to be positive and not to fail, companies need to know their expectations and how to create a healthy merger. The reason for creating a merger should be not only to increase the rate of profitability, but also to enter new markets, create specialized areas of expertise, or increase competitiveness against competitors in the market. In order for the mergers to be successful, it is necessary to define the purpose correctly, to formulate realistic policies, to evaluate the workforce as well as the physical assets and the company environment through macro-level analyzes. Incorrect merger decisions in airline transportation negatively affect all companies involved in the merger. Companies that will create a merger can increase their chances of success by taking some precautions to avoid failure. Although airline mergers have extremely beneficial results for companies, many problems can also arise. The main reason why companies forming mergers encounter these problems is the inability to effectively manage and control the resources that expand with growth. A company that grows or increases in activity volume as a result of the merger is faced with problems related to human resources, marketing, finance, production and product (Aşık, 2008).

3.4. Risks around Civil Aviation Sector

3.4.1. Political Risks

Considering the history of civil aviation, it is seen that aviation activities and national policies are in constant interaction. First of all, the emergence of the aviation industry is a result of wars with political effects. Countries have always regarded the air force as an indicator of their military and thus political strength. Considering the

impact of civil aviation in terms of economy and tourism, it is common for a politically strong country to also have a strong civil aviation sector. It will be possible to reach more distant distances in international trade thanks to air transportation. However, political problems, risks and threats shape the operations of states on civil aviation (O'Connor, 2000, p. 81).

The civil aviation sector is also an indicator of the structure of companies in the sector, network and tariff structures, the country's perspective on commercial activities and trends. Expeditions to the politically prominent countries under favorable conditions will facilitate the development of commercial and social relations with those countries. Air transport operations contribute to the economies of countries and these contributions have an impact on the international balance of power. Therefore, reviewing all the political risk factors in the process is extremely critical for the sustainability of the activities (Yosef, 2006, p. 113).

Aircraft production is of great importance in the political dimension of the civil aviation industry. Aircraft production takes its place in the economic and political maneuvers of large countries as a strategic sector. The cost and production risks of the aircraft, the annual aircraft production capacity of a manufacturer and the place of the large number of purchased or rented aircraft in the total economy have an important place in the analysis. Over the years, the airline companies and the civil aviation industry have started the production of private aircraft designed for passenger transportation by giving up the planes converted from military aircraft. Civil aviation has now become a commercial activity and has been influenced by the dynamics of the economy, social and political developments. On the one hand, the fact that aviation was a new and developing sector, on the other hand, the economic and political conditions of the period caused the airline companies to suffer financial difficulties. Financial risks have begun to create political risks over time, and the issue has shifted from commercial to political (Cannon & Richey, 2011, p. 124-125).

In time, with the global liberalization movements, large, strong, global airline companies have emerged, and the flag carrier airline companies of the countries have gained interaction with the commercial, economic, social and political policies of the countries. In the current process, it would not be wrong to say that the foreign trade policies of the countries and the structure and network structures of the airline

companies are parallel. With the development of airline companies and the reflections of competition in this sector on international political dimensions, global airline alliances have been brought to the agenda and airline companies have not been limited to only the shareholders or the country to which the airline belongs. All sectors and sub-sectors in civil aviation operate under international competition rules and conditions. Although the existence of competition is extremely important, the legal dimension and nature of competition creates various problems and risks. Governments are responsible for the healthy execution of the process in this regard (Vasigh, Fleming & Tacker, 2018, p. 211).

All institutions and organizations in the civil aviation industry operate primarily in accordance with international and national laws. International commercial and financial activities are shaped by international rules and international economic legal regulations in political relations between countries. With international and national legal regulations, sovereignty and commercial relations in the airfields of countries are taken under control. Sometimes, problems in these issues can cause international crises. This prevents the flow of civil aviation activities and poses a risk to the sustainability of aviation operations (O'Connor, 2000, p. 118).

3.4.2. Economic Risks

In addition to creating time benefits in production, civil aviation sector is a sector where significant financial figures are involved with its investments and complex cost structure. Many components are part of an important economic magnitude, from airport construction to terminal management, banks and credit institutions that have created various financing models, such as long-term financial leasing, from aircraft manufacturing to obtaining these aircraft, from civilian aviation training institutions and aircraft supplier industry and technicians. Alliances between airline companies, marketing budgets and applications, hardware and software of information systems for the aviation industry are examples of civil aviation items that create high costs. The civil aviation sector and its subsidiary sectors are an important part of the economic life and can be considered as an opportunity for the spinning of the wheels in recessive economies (Yosef, 2006, p. 145).

Various models and approaches come to the fore in risk calculations in civil aviation. While the growth in civil aviation continues, the topics of the financial function are income management approach, sales and cost analysis per unit seat mileage, diversity and increases in costs, reflection of macroeconomic parameters on activities and financial structure, etc. focus on. In various sector-specific studies, researchers consider three main factors: resources, output produced, and consumption of service. However, with this approach, it becomes difficult to establish a relationship between the financial performance of the enterprises and the transportation service. It is also not easy to conduct a risk analysis. In the face of inputs such as labor, fleet, assets used for ground services and capital, it makes a positive contribution to the understanding of the relationship between the number of flights and passengers, the output obtained and the correct evaluation of performance. The lack of rates directly related to the airline industry limits the possibility of a full assessment of the enterprises operating in this sector. In this way, risk assessments become more difficult (Sakız & Ünkaya, 2018, p. 164-165).

On the other hand, variability of costs is a major problem in the civil aviation industry. Global economic tremors, in particular, have an extremely negative impact on the cost levels of civil aviation. In addition to personnel expenses, which is one of the biggest cost items in aviation, fuel costs have been added over time. Historically, due to the high operating leverage, the financial results of airlines are highly sensitive to small changes in costs and revenues. It is seen that the global and / or national events, especially in the 21st century, affect the financial situation of the airlines and even dragged many of them to bankruptcy. Profitability and financial deterioration have revealed the importance of risk management in many airline companies (Vasigh, Fleming & Tacker, 2018, p. 133).

In the civil aviation industry, one of the methods used extensively against economic risks is the focus strategy. Airline companies that implement a focus strategy focus on a single activity and spend all their power on it. These businesses select a certain part of the market for themselves and act accordingly. When considered in terms of economic regulations, it is clear that a possible change in regulations will radically affect an airline business that follows the focus strategy path. Because these companies focus on a limited field of activity and do not diversify

their activities, when a change occurs in the economic regulations related to their field of activity, they are more sensitive and may be affected by this change because they do not distribute the risk to different fields of activity. For example, a charter airline company only carrying leisure passengers couple Germany-Turkey countries in the market, this market will be held to be affected in any significant level of regulation (Gerede, 2015, p. 148).

When evaluated in general, the growth in the civil aviation sector is expected in the coming years with the growth of the global economy, the need for travelers to travel and the decrease in fuel prices. With the development of technology, aircraft that consume less fuel and have more flight time have been developed. Thus, companies seem to increase sales revenues and profits by selling airline tickets at a more affordable price as they reduce fuel costs. In addition, with the increase in the world population, the number of passengers, flight time of aircraft and seat occupancy rate increase. However, global and local financial crises and the problems that arise rapidly in these issues show that there is a great financial sensitivity in the civil aviation sector. In this way, the risk perceptions of the civil aviation sector become complicated (Dayi & Esmer, 2017, p. 71).

3.4.3 Health Risks

Public health is the area of expertise most involved in preventing the spread of communicable diseases. Public health professionals (supported by infectious disease specialists) are experts on aspects of infectious diseases such as incubation time, virulence, disinfection, diagnosis and preventive measures, and they play a leading role in national pandemic preparedness plans. Aviation medical professionals need their advice when developing a specific aviation preparation plan. On the other hand, the aviation environment is different in many of the important issues facing public health officials. The aircraft cabin environment differs from other modes of transport, especially in terms of reduced air pressure, reduced humidity and special environmental control systems. Also, by its very nature, aviation is an international business, unlike public health-related areas, and is affected to varying degrees by public health policies and procedures at every airport where international flights take place (ICAO, 2012, p. 571).

The civil aviation industry has some health risks in itself. However, important health risks associated with the process arise socially and nationally. These risks harm the functioning of the sector's activities. For this reason, all actors in the sector have to consider all regional, national and international health risks faced by the sector at the same time. Otherwise, the activities of the sector may cease completely. Epidemics, chronic or temporary illnesses of certain passenger groups, hygiene problems, etc. issues could pose a serious threat to the operations of the civil aviation industry (Çakar, 2016, p. 28-32).



CHAPTER 4

THE EFFECTS OF PANDEMIC IN THE GENERAL EUROPEAN CIVIL AVIATION SECTOR

4.1 Generally Effects of Pandemic on the Civil Aviation Sector

Undoubtedly, epidemics have caused serious damages in many sectors around the world, in different ways and with severe effects. World trade was directly affected by epidemic diseases, and in the post-epidemic period, many years were needed for the world economy to recover. A similar situation has existed since the beginning of 2020. The world economy was shaken with the coronavirus threat and the civil aviation sector is one of them.

In a bulletin published by IATA at the beginning of 2020, he recently stated that the SARS virus was the most serious epidemic to date in terms of its impact on traffic volumes in civil aviation. In 2003, IATA stated that the SARS virus outbreak caused Asia-Pacific airlines to lose 8% of their annual passenger kilometer / mile revenue. On the other hand, again, the SARS virus stated that Asia-Pacific airlines lost a total of USD 6 billion in revenue. Again, according to the evaluations of IATA, the 2005 and 2013 bird flu episodes had a much milder and short-term effect. Finally, IATA stated that during the South Korean MERS pandemic, the civil aviation industry experienced a 12% decrease in monthly income (European Parliamentary Research Service, 2020, p. 4).

The evaluations of IATA for the period before coronavirus show that the epidemic has created a direct, fast and challenging effect. In this way, the world civil aviation industry has experienced major problems in the recent past in the process of dangerous diseases such as SARS, H1N1 and MERS. However, the immediate effects of these problems can be considered as the biggest threat to the industry.

In the current process, various travel restrictions are applied in order to prevent the spread of the disease in general during the pandemic threat processes emerging in the world. For the Covid-19 outbreak, intense travel restrictions have been created as a precaution. First of all, flights from Wuhan, China, where the disease was seen, were stopped from all of China to other countries. With the disease also seen in South

Korea, Hong Kong and Japan, travel restrictions have been imposed on these countries. Later, the increasing number of cases in Iran, Italy and Spain brought aviation to a halt (Wilson & Chen, 2020, p. 1).

It is possible to see the related studies have been carried out for epidemic diseases in the past years. In the literature, there are studies in which the effects of swine flu epidemic, ebola epidemic, avian flu and SARS epidemic and foot and mouth disease epidemic on tourism sector are tried to be determined. The studies reviewed focused on the impact of epidemics on the tourism sector of certain regions. For example, Haque and Haque (2018) on the impact of the swine flu epidemic on the Brunei tourism sector, Kuo et al. (2008) focused on the impact of SARS and bird flu outbreaks on Asia's international tourism demand. In this study, an evaluation was made by examining the changes in the number of tourists coming to the regions where epidemic diseases are most common. First of all, the concept of crisis and its relationship with the tourism sector were discussed in the study (Çeti & Ünlüönen, 2019, p.110).

First of all, air traffic has decreased significantly with the cancellation of flights to and from China by airline companies, and then stopping the flights of countries with symptoms of the disease. Eurocontrol has recorded the figures as of January with the worldwide occurrence of the disease, and in particular, it predicted that the flight traffic in the European network will decrease by 0.4% as of February, and the traffic will decrease further in the following months (SHGM, 2020a).

According to the February statistics published by Eurocontrol, it has been announced that the flight traffic in the European network decreased by 2.6% due to the Covid-19 outbreak. It was also stated that the daily flights of 20 Eurocontrol member countries have been reduced. It was stated that reciprocal flights between China and Europe decreased by 61%, with 98 fewer flights per day, and the countries most affected by flights with China were Germany, England, France and Italy (SHGM, 2020b).

As seen in Table 3 below, international passenger capacity has gradually decreased by 32% as of March 2020, and there has been a significant potential decline not only in states with early epidemics, but also on a global scale. Accordingly, it is

understood that the decrease in air traffic is not limited to the first epidemic countries. As a result of the flights of all countries struggling against the epidemic, significant reductions in seat capacity have occurred. When the flights made with the countries most affected by the epidemic such as China, Italy, Iran and Korea are included, there was an average capacity reduction of 32%, while a capacity decrease of 20% occurred with countries other than these countries.

Table 3 Decrease in International Passenger Seat Capacity of Countries (as of March 2020)

<u>Country</u>	<u>Planned Capacity Change</u>	<u>Capacity Change Rate</u>
China	14,734,300	-82
Italy	6,852,300	-60
South Korea	6,511,100	-70
Japan	5,686,700	-50
Germany	5,331,200	-28
Hong Kong	5,305,300	-76
USA	4,617,500	-18
Thailand	4,451,400	-45
Britain	4,261,200	-19
Taiwan	4,026,700	-62
Spain	3,289,600	-23
Singapore	3,172,100	-43
UAE	3,106,000	-24
France	2,839,300	-22
Turkey	2,769,000	-34
Vietnam	2,564,200	-55
Malaysia	2,424,100	-41
India	1,926,300	-27
Saudi Arabia	1,734,900	-31
Philippines	1,626,200	-44
Switzerland	1,567,900	-26

Indonesia	1,402,000	-32
Canada	1,125,900	-15
Austria	1,119,300	-28
Russia	1,081,500	-18
Australia	1,058,200	-23
Holland	1,027,200	-14
Belgium	1,000,500	-29
Qatar	968,400	-20
Portugal	948,100	-22
<u>World Total</u>	121,831,580	-32

Source: (CAPSCA, 2020)

On the other hand, the negative impact of the Covid-19 epidemic on the aviation sector in the first quarter of 2020, when the effects of the pandemic of the civil aviation sector are felt the most, in January, February and March of 2020, are seen in Table 4 on a continental basis. While there was no reduction in the seat capacity of North American flights in January, there was a 0.3% decrease in the Middle East. While the decrease in capacity continued throughout the world in February, it showed a big leap in the Asia Pacific region and reached 22.3%. Capacity reduction was significant in all regions in March. Asia pacific region took the lead in capacity reduction with 52.1%.

Table 4 2020 Monthly Regional Capacity Reduction (January, February, March)

<u>Region</u>	<u>January</u>	<u>February</u>	<u>March</u>
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%
<u>Total</u>	-0.1%	-7.9%	-31.7%
<u>Planned Capacity</u>	376,027,900	352,632,800	384,162,700
<u>Actual Capacity</u>	375,495,100	324,885,300	262,331,100

Source: (CAPSCA, 2020)

The global health crisis has caused serious losses in sectors where transport, cross-border mobility and consumer behavior are important. Therefore, the airport sector was also directly affected by the crisis. Airports have business relationships with both airlines and passengers. With the commercialization of airports, airport revenues have also been diversified. In this context, airport revenues; It consists of aviation and non-aviation income items. The revenues from the activities related to flight operations between airport and airline operators constitute aviation revenues (landing, parking, passenger services, security, etc.). Non-aviation revenues are the revenues obtained from the commercial units of the airports; the primary customers of these units are passengers. Non-aviation revenues constitute approximately 40% of the airport revenues (ACI, 2020a).

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

The fact that airside operations of airports come to a standstill due to the epidemic prevents the formation of aviation revenues. Failure to generate non-aviation revenues due to similar reasons raises major financial problems for airport and terminal operators. In the first quarter of 2020, the airports of the Asia-Pacific Region made a loss of \$ 5.6 billion, the European Region \$ 2.8 billion and the North America Region \$ 2.8 billion (ACI, 2020a). However, in the first quarter of 2020, while the expectation for world-wide airport revenues was 39 billion dollars, a loss of 33% was experienced and a revenue of 26 billion dollars was achieved. The loss of \$ 13 billion in the first quarter due to the pandemic is equal to the annual revenue of the ten largest airports in Asia-Pacific and Europe (ACI, 2020c).

While the worldwide airport sector revenue expectation for 2020 is 172 billion dollars, it is estimated that there will be a 45% deviation due to the negative effects of COVID-19 and the revenues will decrease to 76 billion dollars. In this context, the expected total loss; It is 24.6 billion dollars in the European Region, 23.9 billion dollars in the Asia-Pacific region and 16.9 billion dollars in the Northern USA. These figures are based on estimates of the current state of the outbreak. It is stated that estimates may also change according to the course of the epidemic process (ACI, 2020a).

In the early stages of the pandemic, the future of the civil aviation economy was largely determined. The future of civil aviation in 2020 was defined as extremely negative after March. The actual form and values of the process showed itself as of April.

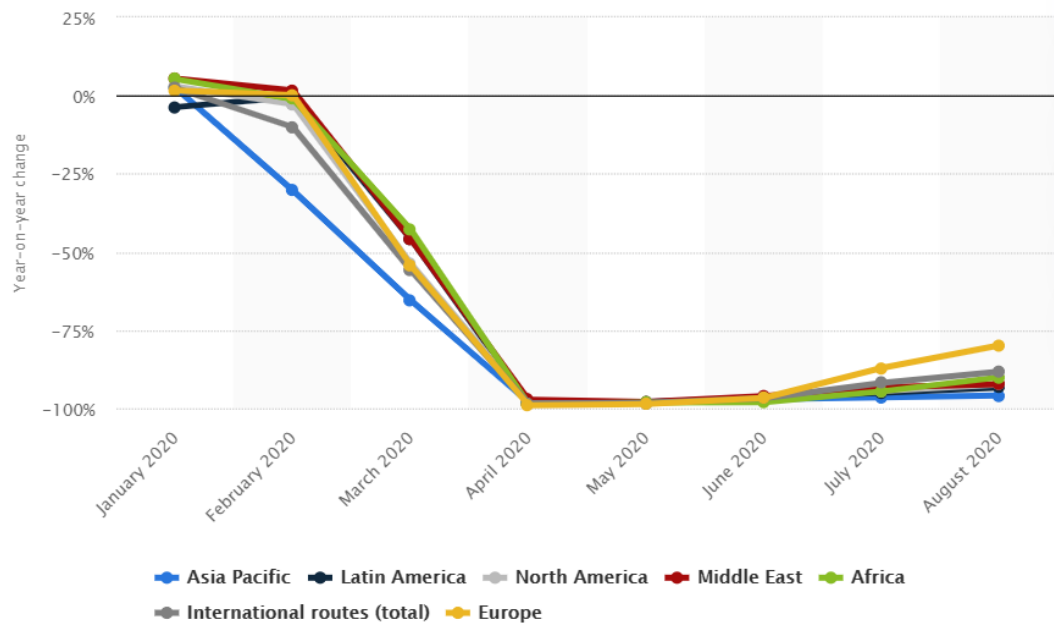


Figure 1 Year-on-year revenue-passenger kilometer (RPK) change on international routes from January to August 2020, by region (Statista, 2020).

According to the Figure 1, the year-on-year revenue-passenger kilometers (RPK) change on international routes gradually declined from January to July 2020 due to the coronavirus outbreak. Compared to August 2019, international RPKs were down 95.9 percent for Asian Pacific airlines in August 2020. As of April 2020, the estimated impact of COVID-19 on the aviation industry stood at 314 billion U.S. dollars in revenue loss. As the COVID-19 crisis persists, the decade long growth of passenger aviation could be disrupted throughout 2020. In the first half of 2020, it is forecasted that air passenger traffic globally will decline by at least by 431 million passengers (Statista, 2020).

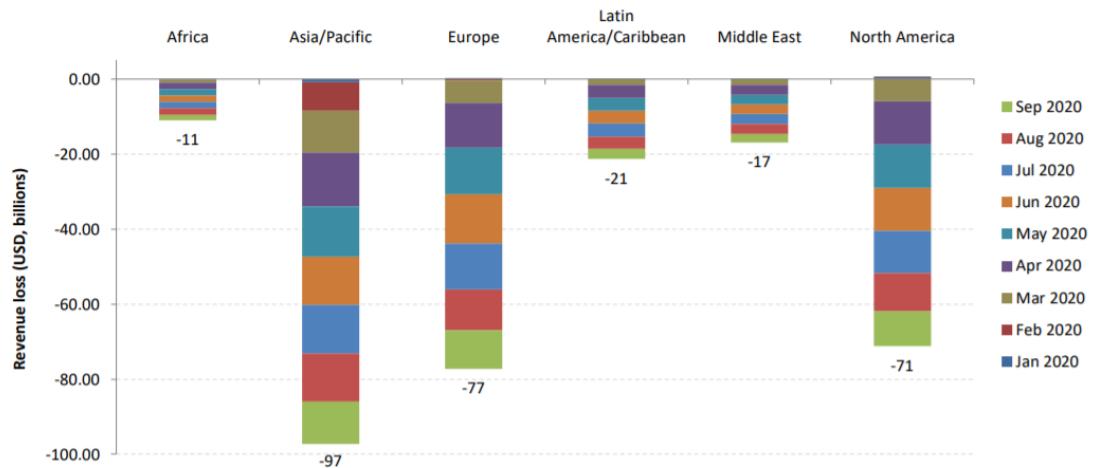


Figure 2 Passenger revenue loss from Jan to Sep 2020 (ICAO, 2020).

As seen in Figure 2, the regional passenger loss of airline companies is extremely high between January 2020 and September 2020. This loss does not appear to be very high for Africa. The Middle East is in a similar situation to Africa. However, Asia / Pacific region, Europe and North America suffered serious losses. Between January 2020 and September 2020, the financial cost of the regions' total loss of passengers reached \$ 294 billion. Again, as seen in Figure 2, the period with the highest losses in the regions is September 2020. The main reason for this is that, in the period of September 2020, passenger numbers and costs were included in the analysis lists of airline companies as clearer data.

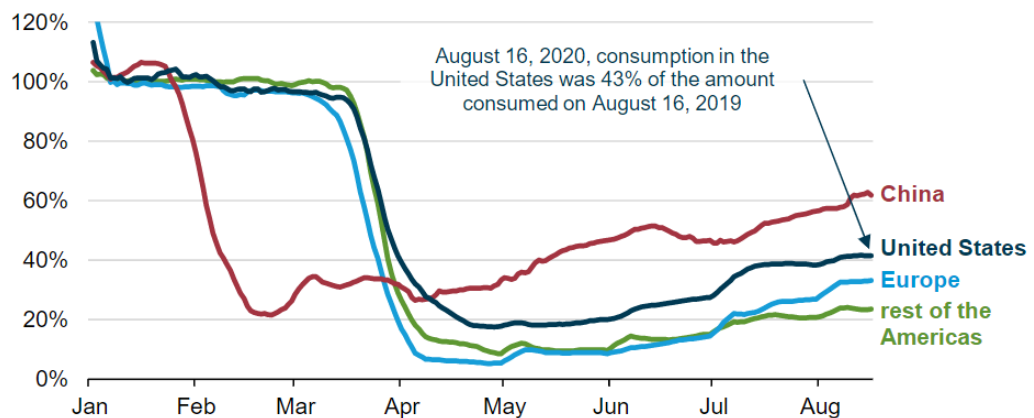


Figure 3 Fuel consumption change of countries' airline companies during the pandemic (U.S. Energy Information Administration, 2020).

In general, the fuel consumption of airline companies clearly reveals the difficult situation of the civil aviation sector during the pandemic period. Undoubtedly, airline fuel consumption rates have dropped sharply. Above, in Figure 3, there is an evaluation on this issue. According to the evaluations in the figure, Europe and the US have reduced their fuel consumption in a period after China. However, this decrease was extremely rapid and sudden. China's fuel consumption has entered into a rapid recovery trend as of April 2020. At this point, it seems that China has recovered faster from the effects of the pandemic in civil aviation.

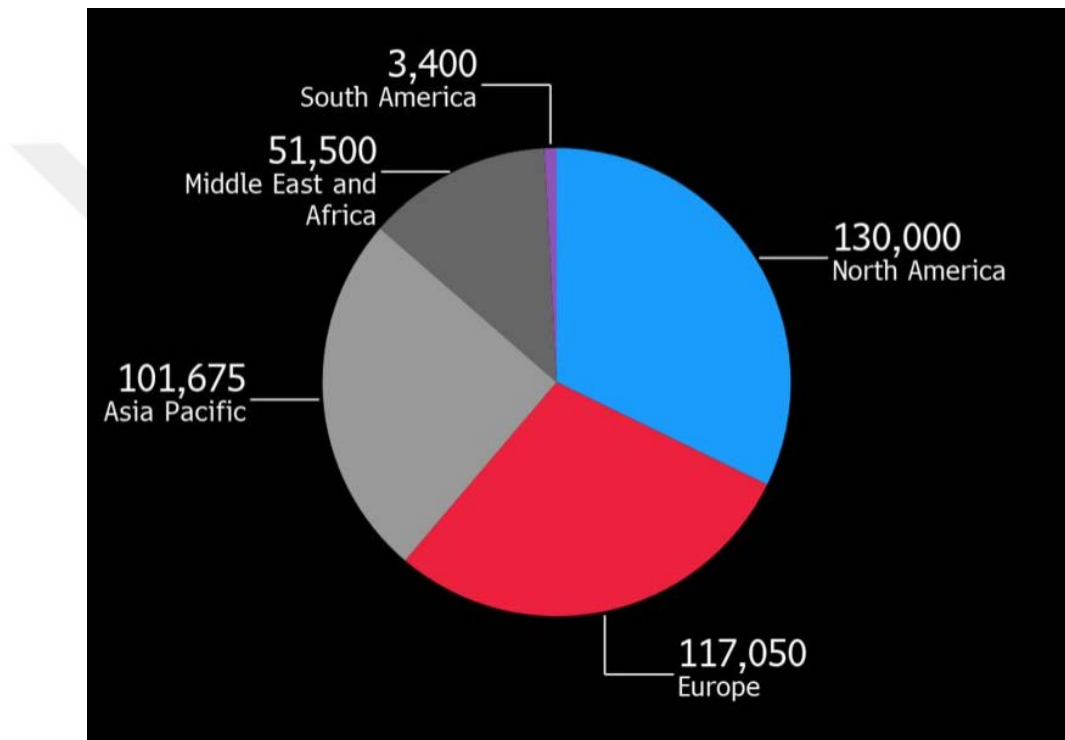


Figure 4 Job loss numbers in civil aviation sector during the pandemic by July 2020 (Bloomberg, 2020).

Undoubtedly, the numbers of unemployed in the civil aviation sector also show more clearly the dimensions of the crisis the sector experienced during the pandemic period. In Figure 4, the employee loss figures of the civil aviation sector regionally as of June 2020 are presented. The region where the USA dominates these figures is the place with the highest employee loss. In this process, Europe is a region where sectoral unemployment figures draw attention.

Majority of the airlines are found to have planes on lease and loans which has imposed a big interest amount on airline owners. Hence, many airlines have decided to shut down their operations and have returned their fleets to lessors. Many airlines have even planned to retire their old fleets before time. Also, it has been emphasised that pandemic has raised a situation of doubt among passengers to travel again which has reduced their confidence and willingness to travel by air (Poonam, 2020, p. 2).

4.2. Effects of Pandemic on Turkish Civil Aviation Sector

The Turkish civil aviation industry has felt the negative effects of the pandemic, just like the civil aviation industry around the world. The Turkish civil aviation industry, which is currently an economy trying to grow, has postponed its growth plans during this period. Possible projects of both private and public sectors for the civil aviation sector have also been postponed. Nevertheless, in general, the Turkish civil aviation industry has been relatively less affected by the process compared to the situation of the civil aviation industry in many different parts of the world.

In order to understand the impact of the pandemic on the Turkish civil aviation sector, which is the date of the first measures taken against the pandemic in Turkey are required to look at the overall appearance in March 2020. Information on the aforementioned appearance is included in Table 5.

Table 5 In Turkey, the number of airline companies' aircrafts on the ground (March 2020)

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

Source: Macit & Macit, 2020, p. 112.

According to the data in Table 5, the first active period of the pandemic in Turkey, it is possible to say that the civil aviation sector experienced a standstill period of serious scale. Some companies have deactivated all their aircraft, and some companies have found extremely limited flight opportunities. In the image in Table 5, it is observed that the most active company is Turkish Airlines.

On the other hand, in the current process, the data shared by Turkish Airlines reveals the most useful information about the Turkish civil aviation industry. Table 6 compares the data of Turkish Airlines in November 2019 with the data of November 2020.

Table 6 Turkish Airlines traffic Data Comparison between November 2019- November 2020

	TOTAL		
<u>Unit</u>	<u>2019</u>	<u>2020</u>	<u>Change (%)</u>
<i>Flight numbers</i>	37.235	16.540	-55,6%
<i>Number of seats for sale</i>	14.999.617	5.978.488	-60,1%
<i>Passenger occupancy rate</i>	82,4%	62,2%	-20,2
<i>Number of passengers</i>	5.739.296	1.995.168	-65,2%
<i>Cargo + post</i>	145.007	132.667	-8,5%

Source: THY, 2020

When in Turkey, Turkish Airlines, which is considered the flagship companies in the civil aviation sector, the figures in Table 6, the Turkish civil aviation sector reveals a negative image in terms of. During the pandemic period, the company faced a serious decline in the number of flights, the number of seats offered for sale, the passenger occupancy rate and the number of passengers. However, the most important issue for the company is that there is no serious decline in cargo and postal transportation. This situation gives some ideas for the future planning of the company and the Turkish civil aviation sector in general.

From another point of view, state support has an important impact on the survival of the Turkish civil aviation sector. The most important step in this matter has been the deferral debt processes in September 2020. Accordingly, the government has postponed the payments such as license, extension, electricity, water, heating-cooling, turnover share and tray guarantee fees of the enterprises belonging to the airport, terminal and ground services until January 31, 2021. A 50% discount has been made in aviation services fees for 2020. Negotiations were conducted to postpone the airline companies' debts to Eurocontrol and the negotiations were successful. With the

amendment made in the regulation on air passenger rights, ticket refunds were postponed until two months after the commencement of flights (AA, 2020a).

Another dimension of the issue is related to Turkey's airports. During the pandemic process, there is a visible positivity in this regard. According to Turkey, Turkish Airlines, in terms of the number of daily flights has been one of Europe's most flights carried out by the airline. In parallel with this, the airport that increased its passengers the most during the pandemic period in Europe was IGA Istanbul Airport with an increase of 7% (TRT News, 2020). This situation is directly proportional to the health measures at Istanbul Airport during the pandemic period. Istanbul Airport, which received the "Airport Health Accreditation" certificate issued by ACI, became the first airport in the world to receive this certificate. This certificate is an important prestige element for the Turkish civil aviation industry as well as for Istanbul Airport (ITO, 2020a).

Another important issue for the Turkish civil aviation industry is the awareness of airline companies about the process. Accordingly, the two leading companies in the Turkish civil aviation sector, Turkish Airlines and Pegasus Airlines, have implemented the most reasonable measures they can take in terms of personnel. Pegasus Airlines reduced the working hours of its employees and tried to minimize personnel expenses by reducing employee salaries accordingly. Turkish Airlines, on the other hand, tried to protect the positions of its employees, despite the policy of salary cuts of up to 50%, and thus took a protective measure for the functioning of the system (Air News Times, 2020).

On the other hand, the consumption habits of the people help to shape the market. Accordingly, businesses shape their plans according to the consumers' decisions. During the pandemic process, the civil aviation sector was very negatively affected by the decisions of the consumers and this situation negatively affected the parties that were the partners of the sector as a chain. As an example of this, Şanlı and Erdem (2020) investigated the relationship between the holiday purchase intention of consumers and the effects of the pandemic. According to the most important of the research, while the vast majority of the participants had the intention of going on vacation before the coronavirus epidemic, there was a change in their thoughts of going on vacation due to the coronavirus. In addition, the coronavirus outbreak caused

almost half of the participants to change their holiday destination. This result shows once again that the demand for tourism is fragile and is affected by epidemics (Şanlı & Erdem, 2020, p.1686).

4.3. Forced Transformation of Civil Aviation to Air Cargo Transportation during the Pandemic Period

The civil aviation industry has experienced a serious loss of potential during the pandemic process. Strategies designed to prevent this potential loss have largely failed. At this point, airline companies have begun to attach importance to airline cargo transportation activities and thus have tried to minimize their financial losses. This situation has been the harbinger of a transformation in the operations of airline companies in the civil aviation industry.

4.3.1. Transformation in the International Market

It is possible to see radical changes in the civil aviation sector and the operations of airline companies around the world after the pandemic. During the fight against the epidemic, German Lufthansa, one of the largest airline companies in the world, made radical changes in the Airbus A330 aircraft, and installed masks and other medical equipment on all passenger seats and carried this equipment from Shanghai to Frankfurt via direct flights. Air Canada, which also has another large-scale operations around the world, followed the roadmap followed by Lufthansa and turned the plane into a cargo plane by sacrificing the Boeing 777-300ER's 422 travel capacity. During this period, Air Canada has transported a total load of 30 tons, nine tons of which were mask products (T24, 2020).

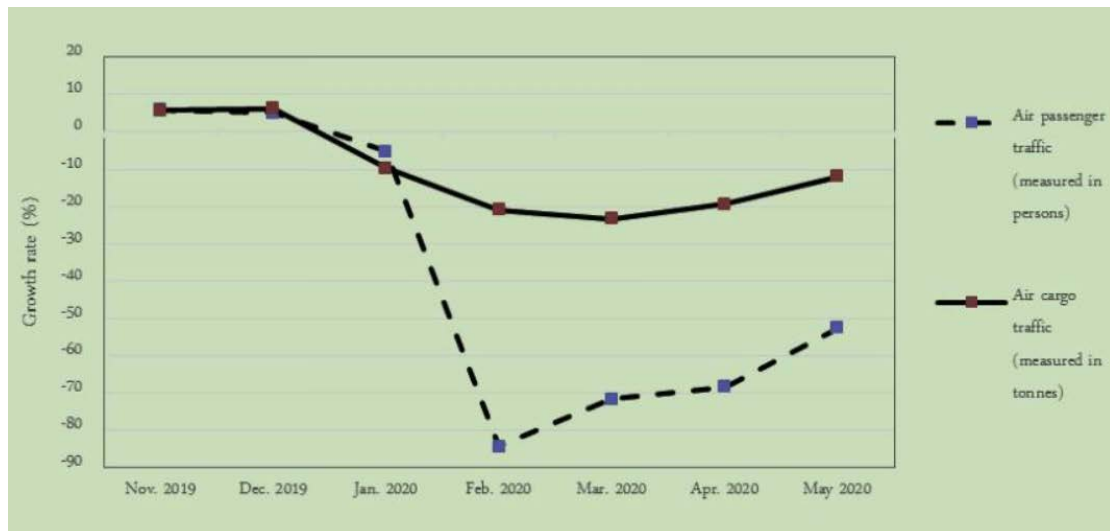


Figure 5 The proportional change of China's civil aviation and airline cargo transportation operations during the period from the beginning of the pandemic to May 2020 (Li, 2020).

In Figure 5, as one of the first and worst affected countries by the Covid-19 pandemic, there are differences between the growth rates of China's airline transportation and air cargo transportation figures. Especially in February 2020, when the highest level of effects of the epidemic was observed, China's airline transportation figures decreased significantly, while air cargo transportation figures show that the Chinese economy has a supportive effect during the crisis period that the Chinese economy has experienced for a certain period.

Looking at the picture that has changed with the Covid-19 outbreak, it has been observed that many globally effective airline companies carry out different and intense activities in terms of airline cargo transportation. These activities can be listed as follows (Sözcü, 2020):

- While Australia-based Qantas Airlines carried a large amount of medical supplies such as gloves, masks and gowns in May and June, the company was one of the first companies worldwide to dismantle seats that belong to passengers only.
- Again, while Qantas Airlines experienced a huge increase in air cargo transportation, it carried tuna from Australia to Japan and coral trout to

Hong Kong; On the way back, it carried medical supplies, car parts and electronic parts from these countries.

- US origin United Airlines carried out a total of five thousand cargo flights, mostly to North America and Asia in a short period of time, while the company's cargo revenue from these operations increased by 36% in the second quarter of the year and reached the level of 402 million dollars.
- American Airlines, also of US origin, started cargo transportation again, after a 35-year hiatus, and decided to transport cargo to 32 destinations in Latin America, Europe and Asia with its Boeing 777s and Boeing 787s aircraft.
- Singapore Airlines has allocated one of the Airbus SE A320 type aircraft in its inventory for airline cargo transportation operations, provided that the passenger seats are removed.
- Adding air cargo transportation to civil aviation operations with the aircraft transformation, Korean Airlines and Asian Airlines have succeeded in making a profit with consumer electronics products as of the dates of their operations.
- Nabil Sultan, head of the cargo division of Fly Emirates airline company of UAE, stated that they have reached more than 115 destinations on a planned basis, not only belonging to the cargo fleets, but also their planes allocated to transport civilian passengers will now be used in air cargo transportation operations alternately.
- Cargo operations initiated by Lufthansa during the pandemic made a contribution of 299 million euros to the company's bottom line in the second quarter of 2020.

Considering the operations listed above and the numerical reflections of the process, it is possible to say that airline companies, which primarily operate globally, have undergone an operational identity change. On the other hand, these changes emerging from the necessities also helped airlines to discover their own air cargo transportation potential and constituted an important step for their future road maps.

Table 7 The rate of cargo flights in total flights during the pandemic period

Flight Type	Rate in Total Flights	
	2019 (until 6 May)	2020 (until May 4)
<i>Scheduled Flights</i>	%85	%32
<i>Unscheduled and Business Flights</i>	%10	%38
<i>Cargo Flights Only</i>	%2	%17
<i>Other</i>	%3	%13

Source: Doğruluk Payı, 2020

As can be seen in Table 7, during the pandemic period, the rate of cargo flights in total flights has increased significantly in May 2020 compared to the previous year's rates. In the same period, compared to the rates of the previous year, scheduled flights and unscheduled and business flights experienced a very serious decrease due to the pandemic effect, while the ratio of cargo within this general share increased significantly. This situation creates the impression that airline companies see the potential returns of air cargo transportation activities as a recipe for salvation, together with the negative financial effects of the pandemic.

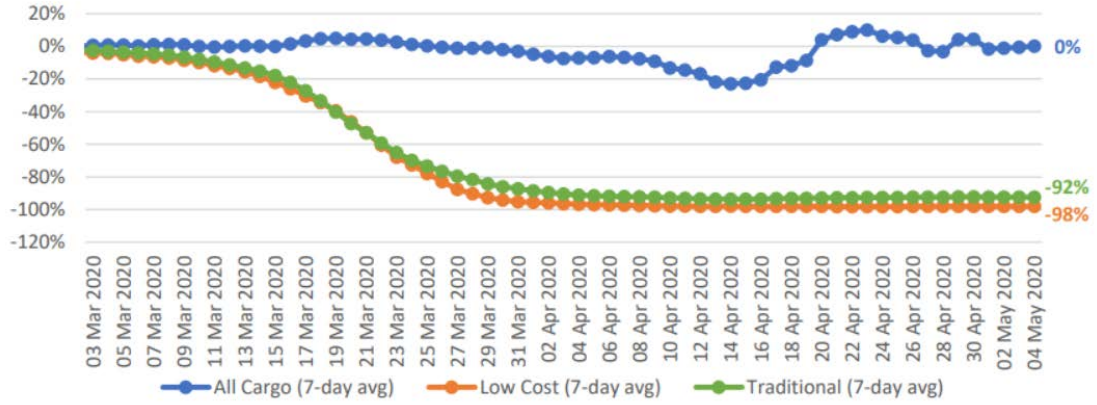


Figure 6 Rates for the type of flight on flights between March 2020-May 2020 (Doğruluk Payı, 2020).

On the other hand, as seen in Figure 6, in the data obtained by Eurocontrol between the dates of 3 March 2020 and 4 May 2020, there are the proportional differences of all flights worldwide according to flight type. Accordingly, when the flight figures are evaluated according to the total, the flights of low-cost airlines and the flights of well-known airlines experienced an exorbitant decline compared to the previous period of the year, while cargo flights experienced an increase of 1% or more.

The transformation in air cargo transportation has caused various changes in the practices and sales of airline companies as well as aircraft manufacturer companies. As the most important example of this, the A380 model of Airbus has started to be transformed into cargo planes in line with the orders and requests of the airline companies, following the large-scale sales and intensive usage figures worldwide. Apart from this, the aircraft manufacturer ATR, which was established with the French-Italian partnership, has also initiated transformation operations in order to facilitate the conversion of its own aircraft to cargo aircraft and to gain additional capacity for cargo operations (Boarding Info, 2020).

4.3.2. Transformation in Turkey

Covidien-19 outbreak, as in many countries around the world negatively affect Turkey's civil aviation sector is also left in the lurch. In this regard, Turkey's most serious problems experienced by scale matters, the tourism sector, which is damaged joint operation with civil aviation. In this way, two different sectors had problems at

the same time as they could not get support from each other. However, air cargo transportation has gained a different momentum during the epidemic period.

Turkey, during this time, has been one of the countries that carry out successful operations. Although the pandemic period has created an extremely serious financial problems in terms of world trade, thanks to a cargo airline cargo industry both in Turkey have provided financial benefits from the process food manufacturers. As of June 2020, Turkish agricultural products have exported 1 million 753 thousand dollars through air cargo transportation. Turkish exporters exported 2 million 811 thousand dollars of fresh fruit and vegetables through air cargo transportation in the period between March 2020 and May 2020. Fresh spring fruits, plums, cherries, strawberries, apricots and peaches constituted 1 million 753 thousand dollars of the said export. In the same period, through air cargo transportation, 224 tons of cherries for 1 million 96 thousand 519 dollars, 383 thousand 27 dollars of apricots against 154 tons, 122 thousand 937 dollars for 23 tons, 95 thousand 136 dollars for 33 tons of strawberries and 14 tons for 55 A thousand 536-dollar worth of peaches were delivered to the foreign market (AA, 2020b).

On the other hand, regarded as Turkey's flag carrier Turkish Airlines company in civil aviation, cargo operations at the site has achieved a significant improvement in air cargo transport company with Turkish Cargo. According to the data shared from the communication department within the company, the numerical reflections of the company's operations are as follows (AA, 2020c):

- In the first half of 2020, by carrying one out of every 20 air cargo, private cargo has grown by 67%.
- In the specified period, while the sector generally shrank by 28%, the global market share of the company increased from 3.9% to 5.4%.
- Between 1 February and 31 August 2020, 30 thousand tons of medicine and nearly 10 thousand tons of medical equipment were transported.
- June 2020 has been the most important and active period of Turkish Cargo, and in the specified period, more than 1100 flights were

organized for air cargo transportation with both cargo and passenger planes.

- In the facilities located at Atatürk Airport, which was opened for use within this period, an area with a total area of 3.500 m² and that can serve in different temperature ranges has been allocated for the use of cargo.

Looking at the general performance of Turkish Cargo, it has been observed that many airlines and airline cargo companies in Europe are in a stagnant period, and are an ideal company for cooperation.

When the operations are evaluated with July 2020 figures, a total increase of 29% in cargo operations is observed compared to the same month of the previous year. Turkish Cargo, which provides return to passenger planes again due to the lack of use of passenger aircraft and the capacity of cargo planes, has increased the average usage time of these aircraft to 11 hours per day by using wide-body aircraft as cargo aircraft, which is the highest usage of the company in all time. has attracted attention as the process. Turhan Özen, the General Manager of Turkish Cargo, stated that the company has become a company that has the potential to provide air cargo transportation services to more than 300 destinations in 127 countries with its wide fleet of 361 aircraft. It aims to be one of the top five companies that perform air cargo transportation (Airport News, 2020).

Taken in the Turkish Cargo basis, the growth of air cargo transportation in Turkey, many sectors have also been shown to help it grow. Especially Covidien-19 outbreak because of all the medical supplies in the world in the process where a heavy demand is present, the majority of Turkish production with medical supplies being moved from one point in the national market, the transfer of the products to overseas markets from Turkey has been said. While such a transfer can be regarded as an important step in terms of growth for Turkish air cargo transportation, it has also been a growth opportunity for the sector to which medical equipment manufacturers are affiliated, just as in food products (Milliyet, 2020).

During the Covid-19 pandemic, the increase in the needs for medical supplies all over the world has actually enabled the emergence of a new industry. Having a special system and vehicle network for the transportation of medical supplies, air cargo transportation companies can make a significant difference and turn this into a financial resource for themselves. As one of these, Turkish Cargo can make a difference worldwide by having an important power in carrying high-precision health products by using active temperature-controlled Envirotainer and CSafe containers, Opticooler with electric air conditioning container, Thermal Dolly and thermally insulated disposable covers. . (MSN, 2020).

The insufficiency of capacity that China has experienced and the increasing urgency level of medical needs have an important effect on Turkish Cargo's gaining importance and increasing its potential. Regardless of the high production and transportation prices, countries such as China and China that are in urgent need of medical products have started to turn to alternative cargo transportation companies. Turkey, from the early days of the epidemic, along with taking important measures in question, the needs of the country has become the number one trading partner. With the effect of the established and positive image of Turkish Airlines, Turkish Cargo also had the chance to manage the processes of orders that are far above its potential. Such a crisis environment has actually created an important managerial and commercial opportunity for Turkish Cargo to introduce itself as a truly qualified airline cargo transportation company. (Aeroportist, 2020).

From another point of view, Turkish air cargo transportation has the advantage of having sufficient capacity and equipment for transporting the vaccine to be produced in the face of this epidemic as well as the medical products expected to be effective especially against the Covid-19 outbreak. This kind of advantage constitutes an important step in the competition point for Turkish air cargo transportation. Although an epidemic period and the civil aviation sector experienced one of the most challenging periods in the history of that process was seized with such an advantage, though it is such a step is extremely valuable in terms of Turkey's competitiveness (MKG, 2020).

In the recent period when the subject of medical supplies transportation has come to the fore, Turkish Cargo has obtained the "CEIV Pharma" certificate at the

end of the training, evaluation and validation process created by IATA in order to carry out global air cargo operations at high standards. Acquiring an important place in the international air cargo transportation competition with the effect of such a move, Turkish Cargo has been registered as the company that performs one of every 20 flights carried out internationally (İTO, 2020b). This general view has shown that Turkish companies, which currently have an important place in air cargo transportation, have the potential to achieve important responsibilities in the Covid-19 outbreak, especially in Turkish Cargo.

During the epidemic period, many airline cargo transportation companies had the opportunity to shrink or review their operations, while Turkish Cargo took important steps towards growth. According to the statement made by Turkish Cargo, as of September 2020; It added London Heathrow Airport, Suvarnabhumi, one of the largest airports in Southeast Asia, Singapore's Changi Airport, and Lebanon's only operational commercial airport Rafic Hariri Airport to its cargo flight network. Within the scope of the winter schedule, Henri Coanda Airport, the busiest airport in Romania, and Allama Iqbal Airport in Lahore, the cultural center of Pakistan, were added to the cargo flight network. Thus, 31 direct cargo plane destinations in the European continent, 22 in the Middle East and 16 in the Far East have been reached (Vatan, 2020).

According to the evaluations of IATA, the epidemic period provided important opportunities for many companies carrying out air cargo transportation, but stated that they experienced indecision as a result of their concerns about leaving their main duties, and this was reflected in their profitability rates. Again, according to the evaluations of IATA, Turkish Cargo is one of the successful airline cargo transportation companies of the epidemic period. According to the evaluations of IATA, Turkish Cargo is one of the most promising and qualified companies of its sector, especially when it boldly assumes transportation responsibility during the difficult times of the epidemic period (Air Cargo News, 2020).

In his article, where he examined Turkish Cargo's operations, Bailey stated that the company's operations were shaped with the aim of reaching all segments, which created a great attraction for manufacturers who wanted to send their products to different channels during the pandemic period. According to the author, Turkish

Cargo has managed to overcome an important deficiency of the sector by providing services in countries where cargo operations are stopped or cargo transportation services cannot reach due to epidemic diseases, especially in countries where the threat of epidemics is intense, and has made itself an important actor for the post-pandemic process (Simple Flying, 2020).

When taken from another perspective, Turkish Cargo's activities are more effective than its competitors that carry out air cargo transportation in Europe. At this point, the fact that Turkish Cargo was selected as Europe's Best Cargo company in the recent past shows how successful the operations are, considering the pandemic period. Especially during the epidemic period, Turkish Cargo, which also carries medical supplies by taking serious responsibilities, has proved that it is taking care of both the public's interests and its own interests at the same time by correctly evaluating the commercial opportunities arising during the epidemic period (Dünya, 2020).

4.4. Evaluation of Research Findings

In this study, the status of the operational activities of the airline companies and the civil aviation sector in general during the pandemic period was evaluated. The outlook has been extremely negative from the first moments of the pandemic. However, as a result of cargo operations, airline companies are taking important steps to recover their operational and financial status. However, these steps are not just to mitigate the negative effects of the pandemic period; these steps are to create an alternative business in the future.

Looking at the general view of the study, the answer of Research Question 1 "How has operational performance affected by the drop in passenger numbers?" comes out. Accordingly, airline companies have suddenly reduced the number and quality of their operations due to the passenger circulation problem due to the pandemic. Such a sudden drop hurt airline companies' profitability rates; however, the most negative impact of the process was on many people who lost their jobs. Because the operational contraction also caused the problem of labor contraction. The crisis situation experienced by airline companies had a negative impact on all stakeholders in and around the industry. Accordingly, the H1 hypothesis in the study, "Due to the

negative effects of the pandemic, the number of passengers and operational performance decreased in parallel with each other" was accepted.

Research Question 2, such as "How are airlines overcoming the negative effects of the pandemic?" has been handled from different angles. However, in the research, the alternative method that airline companies evaluate as the most positive was determined as cargo transportation. In general, air cargo transportation is not a commercial operation that is a priority choice for airline companies. However, with the increase in cargo circulation worldwide rather than human circulation, airline cargo transportation has become the priority choice for airline companies. In the research, it was understood that air cargo transportation operations are seen as valuable financial resources for some airline companies. This type of financial resource does not solve all financial problems of airlines and does not reduce the level of financial losses. In general, the results of the research on this point confirms the proposition of H2 hypotheses as "Against the negative effects of the pandemic, airline companies will be able to recover from their operational losses in an integrated way with cargo operations."

CONCLUSION

The global health crisis has caused serious losses in sectors where transport, cross-border mobility and consumer behavior are important. Therefore, the airport sector was also directly affected by the crisis. Airports have business relationships with both airlines and passengers. With the commercialization of airports, airport revenues have also been diversified. In this context, airport revenues; It consists of aviation and non-aviation income items. The revenues from the activities related to flight operations between airport and airline operators constitute aviation revenues (landing, parking, passenger services, security, etc.). Non-aviation revenues are the revenues obtained from the commercial units of the airports; the primary customers of these units are passengers. Non-aviation revenues constitute a serious part of the airport revenues.

In general, the most serious threat to the aviation sector is the sustainable structure of the pandemic. In this way, the future not only of the aviation industry, but also of many business areas will be at risk. Specific to the aviation industry, the most serious impact of the pandemic will be related to passengers' preferences. Accordingly, passengers will now prefer more distance travel methods. In fact, passengers will only use their own vehicles for certain distances and certain locations. Although air transport is considered as the safest method of travel for many, it is seen that this perception of security has changed negatively with the effect of the pandemic.

On the other hand, the most determining actors of the process were airline companies. Airlines have primarily dismissed a large number of employees. Subsequently, the operational logic of the companies changed radically, and this situation seriously affected the functioning of the system. The biggest hit for airline companies is the sudden decline in flight numbers. The pandemic has negatively changed the flight strategies of airline companies and the financial returns of these strategies. However, as this change was sudden and necessary, many airlines faced the

threat of bankruptcy. Most importantly, airlines, which have great potential in the international arena, were adversely affected by the process and their financial problems created a knock-on negative impact on other, small and medium-sized companies of the sector.

The Turkish civil aviation industry also has felt the negative effects of the pandemic, just like the civil aviation industry around the world. The Turkish civil aviation industry, which is currently an economy trying to grow, has postponed its growth plans during this period. Possible projects of both private and public sectors for the civil aviation sector have also been postponed. Nevertheless, in general, the Turkish civil aviation industry has been relatively less affected by the process compared to the situation of the civil aviation industry in many different parts of the world.

The Turkish civil aviation sector has a more positive outlook, the sector's investment and competition rate is low, but its income rate is extremely high. Thus, Turkish Airlines and Pegasus Airlines had the chance to take more reasonable measures to reduce the effects of the pandemic. Airlines in Europe have made many financial sacrifices in order to recover financially; the main reason for this is high investment costs and intensity of competition. However, the Turkish civil aviation sector has had the chance to continue its operations with limited measures, especially for airline companies. In particular, great efforts have been made to maintain the balance of figures for domestic and international flights.

Considering the negative outlook both nationally and internationally, the transformation of the civil aviation sector should be considered as natural. Sectoral problems, especially in the international arena, have been extremely pressing for airlines to change their revenue direction. For this reason, airline companies have started to pay more attention to air cargo transportation operations for the sustainability of aviation operations. Although the financial returns of air cargo transportation are not compatible with the profitability rate expectations of airline companies, under current conditions, the most profitable operations for airline companies are air cargo transportation operations.

On the other hand, air cargo transportation is seen as an alternative earning area for the future for airline companies. In the following years, even if the negative sectoral effects of the pandemic pass, it is likely that airline companies will continue these operations to a certain extent. The most important indicator of this situation is that airline companies seek agreement with aircraft manufacturer companies with the production of aircrafts suitable for air cargo transportation. Because airline companies transformed many aircraft into cargo planes during the pandemic period, and these operations attracted attention as a separate income area. Therefore, it can be said that the pandemic is a guide for an alternative business strategy for airline companies.

The Turkish civil aviation sector has also been affected by the change and transformation perception of the international civil aviation sector. At this point, it can be said that the Turkish civil aviation industry and airline companies are successful in sectoral transformation. Because Turkish airlines have understood the benefits of the process faster and more clearly. From another point of view, Turkish air cargo transportation has the advantage of having sufficient capacity and equipment for transporting the vaccine to be produced in the face of this epidemic as well as the medical products expected to be effective especially against the Covid-19 outbreak. This kind of advantage constitutes an important step in the competition point for Turkish air cargo transportation. Although an epidemic period and the civil aviation sector experienced one of the most challenging periods in the history of that process was seized with such an advantage, though it is such a step is extremely valuable in terms of Turkey's competitiveness.

When considering Turkey's industrial potential, the transition to a cargo airline has been extremely friendly and helpful. Especially Turkish Airlines has experienced the most serious change process in this process, and this change has created positive results for the company. When evaluated from this point of view, it is possible to evaluate the compatibility of the Turkish civil aviation sector with the conditions of the civil aviation world during the pandemic period as an international example.

Overall, the information gathered from the study showed that the civil aviation sector and airlines do not have strong and sustainable emergency plans for times of crisis. This situation made both the present and the future of airline companies risky during the Covid-19 process. For this reason, future planning of airline companies

should be built on much more solid foundations. It is understood that airline companies need serious strategic plans, especially in financial planning and human resource planning. This image shows that the pandemic is an important warning mechanism for the future of airline companies. On the other hand, it is possible to think that the pandemic is an important chance for airline companies. Accordingly, airlines have realized that alternative operations along with the pandemic are very valuable commercial activities for them. In this way, after the airline companies changed the design of the aircraft, they highlighted the issue of cargo compatibility for future aircraft orders. At this point, it has emerged as a fact that airline companies should pay more attention to alternative operational processes, including air cargo transportation.

Future research may allow the title and content of this study to be taken further. At this point, three issues that can be considered as suggestions for future research come to the fore. The first of these is to obtain healthy and detailed data on the process. Since the onset of the pandemic was extremely sudden, many institutions and organizations could not fully evaluate the general outlook of the industry. Based on this, apart from certain institutions and organizations, no sector actors could report properly. This is related to the sudden and inexplicable emergence of the negative effects the industry has experienced. For this reason, the data of the detailed reports to be published in 2021 for 2020 are important. A more in-depth analysis can be made in 2021 with the data of 2020. Again, if these data are related to all actors of the sector, it will be easier to develop clearer determinations and future predictions about the process. Because the sector does not only occur in airline companies; The management problems and financial problems of all actors in the sector during the pandemic period affect the future of the sector. Therefore, an evaluation that includes all actors is needed.

Another important issue for future studies is the collection of authorized opinions on the subject. The views of important actors in the sector regarding the effects of the pandemic have a critical impact on the general outlook and future of the sector. Therefore, after collecting detailed data on the process, meetings and interviews with civil aviation officials will be useful in analyzing the situation of the sector. During the pandemic process, although the data about the civil aviation sector

reveal many things, the views of the managers and other authorized actors on the subject will help to evaluate the process in detail and to create healthy future predictions.

Finally, with the operational changes of the sector, the meetings with the officials from the air cargo transportation field will be important. The operational change in civil aviation has the most positive impact on the cargo transportation sector. In this way, discussing the change process of the sector with the actors on the other side of the issue will increase the quality of the studies. At the same time, different views on the future of the sector will improve the quality of the recommendations on the sector.

REFERENCES

- AA (2020a). Bakan Karaismailoğlu: Türk sivil Havacılık Sektörü Kovid-19 Salgını En Az Etki ile Atlıyor, Retrieved from <https://www.aa.com.tr/tr/ekonomi/bakan-karaismailoglu-turk-sivil-havacilik-sektoru-kovid-19-salginini-en-az-etki-ile-atlatiyor/1967904> (29.11.2020).
- AA (2020b). “Pandemi sürecinde hava kargoyla 1,8 milyon dolarlık meyve ihracatı gerçekleştirildi”, Retrieved from <https://www.aa.com.tr/tr/ekonomi/pandemi-surecinde-hava-kargoyla-1-8-milyon-dolarlik-meyve-ihracati-gerceklestirildi/1888194> (11.10.2020).
- AA (2020c). “Turkish Cargo Pandemi Döneminde Rekor Seviyede Büyüdü”, Retrieved from <https://www.aa.com.tr/tr/sirkethaberleri/ulastirma/turkish-cargo-pandemi-doneminde-rekor-seviyede-buyudu/659532> (21.09.2020).
- ACI (2020a). The Impact of COVID-19 on the Airport Business. Retrieved from <https://store.aci.aero/wp-content/uploads/2020/08/COVID19-4th-Economic-Impact-Advisory-Bulletin.pdf> (15.09.2020).
- ACI (2020b). Airside Safety and Operations under COVID-19. Retrieved from <https://aci.aero/wp-content/uploads/2020/04/200403-Airfield-Ops-Advisory-Bulletin-FINAL.pdf> (15.09.2020).

- ACI (2020c). The Impact of COVID-19 on the Airport Business: Preliminary Assessment. Retrieved from <https://aci.aero/wp-content/uploads/2020/03/200323-COVID-19-Impact-on-Airport-Business-Presentation.pdf> (15.09.2020).
- Aeroportist (2020). “Pandemi ve Türk Hava Kargo Taşımacılığına Etkileri”, Retrieved from <http://www.aeroportist.com/pandemi-ve-turk-hava-kargo-tasimaciligina-etkileri.html> (18.11.2020).
- Air Cargo News (2020). “Turkish Cargo Continues to Outpace The Market”, Retrieved from <https://www.aircargonews.net/airlines/turkish-cargo-continues-to-outpace-the-market/> (11.10.2020).
- Air News Times (2020). Havacılıkta Pandemi Krizi: Kış Çok Zor Geçecek, Retrieved from <https://www.airnewstimes.com/havacilikta-pandemi-krizi-kis-cok-zor-gececek-54548-haberi.html> (01.12.2020).
- Airport Haber (2020). “Pandemi Dönemi Turkish Cargo'ya Yaradı”, Retrieved from <https://www.airporthaber.com/havacilik-haberleri/pandemi-donemi-turkish-cargoya-yaradi.html> (28.09.2020).
- Akpınar, H. (2012). Bulaşıcı Hastalıkların Yayılımının Tahmininde Deterministik Modellerin Kullanılması. Öneri, 10(38), 97-103.
- Akyurt, İ. Z. ve Yaşlıoğlu, D. T. (2018). Havacılık Sektöründe Ekip Planlama Yönetimi: Bir Türk Havayolu Örneği. İşletme Araştırmaları Dergisi, 19(1), 424-446.
- Archibong, B., Annan, F. & Ekhaton-Mobayode, U. (2020). The Epidemic Effect: On the Politics and Economic Burden of Infectious Disease. New York : Columbia University.
- Aşık, N. A. (2008). Şirket Birleşmeleri ve Sivil Havacılık Sektöründeki Uygulamaları. Retrieved from <https://www.mevzuatdergisi.com/2008/06a/02.htm> (17.07.2020).

- Bloom, D. E., Cadarette, D. & Sevilla, J. P. (2018). EPIDEMIC DISEASES: New and Resurgent Infectious Diseases Can Have Far-Reaching Economic Repercussions. Finance & Development, (June 2018), 46-49.
- Bloom, D. E. & Canning, D. (2006). Epidemics and Economics. Cambridge: Harvard Initiative for Global Health
- Bloomberg (2020). Jobs Are Being Wiped Out at Airlines, And There's Worse to Come. Retrieved from <https://www.bloombergquint.com/business/400-000-jobs-lost-at-airlines-during-coronavirus-pandemic#!/homepage> (21.08.2020).
- Boarding Info (2020). "Havacılık Bülteni-95", Retrieved from <http://boardinginfo.com/havacilik-bulteni-95/> (17.11.2020).
- Broadband Commission for Sustainable Development (2018). Working Group on Epidemic Preparedness Preventing the Spread of Epidemics Using ICT. Seoul: Broadband Commission for Sustainable Development.
- Cannon, J. R. & Richey, F. D. (2011). Practical Applications in Business Aviation Management. Maryland: Government Institutes.
- Cavaklı, S. (2013). Uluslararası Hava Hukuku. Hukuk Gündemi, (2), 96-100.
- Çakar, Ş. (2016). Uçaklarda Kabin İçi İşyeri Ekipmanlarının İş Güvenliği Açısından Risk Analizi İle İncelenmesi. Master Thesis. İstanbul: İstanbul Aydın Üniversitesi Fen Bilimleri Enstitüsü.
- Çalıyurt, K. (2012). Havayollarında Kurumsal Yönetim ve Bağımsız Denetim. Bursa: Ekin Yayınevi.
- Çancı M. ve Erdal, M. (2003). Uluslararası Taşımacılık Yönetimi. İstanbul: UTİKAD Yayınları.
- Çeti, B. & Ünlüöner, K. (2019). Salgın Hastalıklar Sebebiyle Oluşan Krizlerin Turizm Sektörü Üzerindeki Etkisinin Değerlendirilmesi. AHBVÜ Turizm Fakültesi Dergisi, 22(2), 109-128.
- Çukur, F. T. (2020). Sivil Havacılıkta Büyük Veri Teknolojisi Ve Uygulamaları. Ankara: STM Teknolojik Düşünce Merkezi

- Dağlar, O. (2004). War, Epidemics and Medicine in the Ottoman Empire from the Balkan Wars through the Great War. Doktora Tezi. İstanbul: Boğaziçi Üniversitesi Atatürk İlkeleri ve İnkılâp Tarihi Enstitüsü.
- Dayı, F. & Esmer, Y. (2017). Sivil Havacılık Yönetiminde Finansal Kiralama İşlemlerinin Kârlılık Üzerine Etkisi: Avrupa Havayolu Şirketleri Üzerine Bir Uygulama. Akademik Bakış Dergisi, (64), 69-78.
- Doğruluk Payı (2020). “Salgın Nedeniyle Avrupa’da Uçuşlar %86 Azaldı”, Retrieved from <https://www.dogrulukpayi.com/bulten/salgin-nedeniyle-avrupa-da-ucuslar-86-azaldi> (19.10.2020).
- Dündar, N. (2020). Küresel Salgınların Makroekonomik Etkileri Üzerine Bir Araştırma. Uluslararası Sosyal ve Beşerî Bilimler Araştırma Dergisi, 7(52), 837-852.
- Dünya (2020). “Avrupa’nın En İyi Hava Kargo Markası Turkish Cargo Oldu”, Retrieved from <https://www.dunya.com/sirketler/avrupanin-en-iyi-hava-kargo-markasi-turkish-cargo-oldu-haberi-487408> (02/11/2020).
- Ergönül, Ö. (2008). Enfeksiyon Hastalıkları Epidemiyolojisi. İ.Ü. Cerrahpaşa Tıp Fakültesi Sürekli Tıp Eğitimi Etkinlikleri 2008, İstanbul: İstanbul Üniversitesi Yayını, 30-41.
- Erol, A. & Kanbur, E. (2017). Uçak Bakım Örgütlerinde İş Sağlığı ve Güvenliği Yönetimi: Çalışma Sahalarından Örnekler. INJOSOS Al-Farabi International Journal on Social Sciences, 1(2), 181-192.
- European Commission (2005). Diseases. Brussels: European Commission.
- European Parliamentary Research Service (2020). Economic Impact of Epidemics and Pandemics. Brussels: European Parliament.
- Faulds, T. & Bridel, W. (2009). Considerations for the Development of a Pandemic Scenario. Ottawa: The Canadian Institute of Actuaries-Committee on Risk Management and Capital Requirements.

- Gerede, E. (2015). Havayolu Taşımacılığı ve Ekonomik Düzenlemeler Teori ve Türkiye Uygulaması. Ankara: Sivil Havacılık Genel Müdürlüğü Yayını.
- Green, M. S. et al. (2002). When is an Epidemic an Epidemic?. IMAJ, 4, 3-6.
- Gürel, Z. ve Aslan, D. (2019). Halk Sağlığı Bakış Açısıyla Gıda Kaynaklı Krizler ve Önleme Yaklaşımları. Türk Hijyen ve Deneysel Biyoloji Dergisi, 76(3), 361-376.
- Heymann, D. L. (2006). Effects of Social, Environmental and Economic Factors on Current and Future Patterns of Infectious Diseases. Retrieved from <http://www.pas.va/content/dam/accademia/pdf/sv106/sv106-heymann.pdf> (11.05.2020).
- Huang, Y. (2013). Global Health, Civil Society, and Regional Security. In “A Growing Force: Civil Society's Role in Asian Regional Security” Rizal Sukma & James Gannon (Eds.). New York: Japan Center for International Exchange.
- ICAO (2012). Sivil Havacılık Tıbbı El Kitabı (Çev. SGHM). Quebec: ICAO Pub.
- ICAO (2020). Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis. Retrieved from https://www.icao.int/sustainability/Documents/COVID-19/ICAO_Coronavirus_Econ_Impact.pdf (28.10.2020).
- İnan, T. T. (2019). Havayollarında Hizmet: Konfor, Faaliyet ve Performans İlişkisinin Değerlendirilmesi. İstanbul: Hiperlink Yayınları.
- İTO (2020a). İstanbul Havalimanı'na Uluslararası Sağlık Tescili. Retrieved from https://www.itohaber.com/haber/guncel/212585/istanbul_havalimani_na_uluslararasi_saglik_tescili.html (23.12.2020).
- İTO (2020b). “Her 20 hava Kargodan Biri Turkish Cargo ile Taşındı”, Retrieved from https://www.itohaber.com/haber/guncel/212274/her_20_hava_kargodan_biri_turkish_cargo_ile_tasindi.html (19.11.2020).
- Karaağaoğlu, N. (2015). Sivil Havacılık Alanındaki Sektör Beklentileri Ve İstihdam Taleplerinin Akademik Programların Oluşturulmasında Etkisi: YÖK-SHGM

- Sivil Havacılık Eğitim Komisyonu Çalışmaları. Master Thesis. İstanbul: Maltepe Üniversitesi Sosyal Bilimler Enstitüsü.
- Kaya, E. vd. (2005). Havaalanlarında Yap İşlet Devret Uygulamaları: Antalya ve Atatürk Havalimanlarındaki Uygulamaların Değerlendirilmesi. Eskişehir: Anadolu Üniversitesi Yayını.
- Kelley, N. & Osterholm, M. (2008). Pandemic Influenza, Electricity, and the Coal Supply Chain Addressing Crucial Preparedness Gaps in the United States. Minnesota: The Center for Infectious Disease Research & Policy (CIDRAP).
- Kılıç, O. (2004). Genel Hatlarıyla Dünyada ve Osmanlı Devleti'nde Salgın Hastalıklar. Elâzığ: Fırat Üniversitesi Rektörlüğü Orta-Doğu Araştırmaları Yayınları.
- Korkmaz, M. F. (2017). Küreselleşmenin Türkiye'de Hava Taşımacılığı ve Sivil Havacılığı Üzerine Etkileri. Master Thesis. İstanbul: Haliç Üniversitesi Sosyal Bilimler Enstitüsü.
- Koyama, M., Jedwab, R. & Johnson, N. (2019). Pandemics, Places, and Populations: Evidence from the Black Death. London: Centre for Economic Policy Research.
- Kronfol, N. (2015). The Impact of Epidemics on the Economy. Human & Health, (30), 7-8.
- Küçükönel, H. ve Korul, V. (2002). Havayolu İşletmelerinde İnsan Kaynakları Yönetimi. Afyon Kocatepe Üniversitesi Sosyal Bilimler Dergisi, 4(12), 67-90.
- Levi, E. & Yoffe, G. (2018). The Role of the Civil Society in the Event of Pandemic. Tel Aviv: The Israeli School of Humanitarian Aid.
- Li, T. (2020). "A SWOT analysis of China's air cargo sector in the context of COVID-19 pandemic", Retrieved from, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7402658/> (16.10.2020).
- Loose, V. et al. (2010). Economic and Policy Implications of Pandemic Influenza. New Mexico: Sandia National Laboratories.

- Macit, A. & Macit, D. (2020). Türk Sivil Havacılık Sektöründe Covid-19 Pandemisinin Yönetimi. *Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi*, 7(4), 100-116.
- Marin, A. G. (2006). Airport management: taxi planning. *Ann Oper Res*, (143), 191-202.
- Marks, A. & Rietsema, K. (2014). Airport Information Systems—Airside Management Information Systems. *Intelligent Information Management*, (6), 149-156.
- MEGEP (2011). Ulaştırma Hizmetleri Alanı. Ankara: MEB Yayını.
- Mihandoust, G. (2017). Havacılık Sektörü Yatırımları ve Hukuksal Sorumluluklar. Master Thesis. İstanbul: İstanbul Ticaret Üniversitesi Dış Ticaret Enstitüsü.
- Milliyet (2020). “Turkish Cargo’dan Rekor Büyüme” Retrieved from <https://www.milliyet.com.tr/ekonomi/turkish-cargodan-rekor-buyume-6311972> (27.09.2020).
- MSN (2020). “Turkish Cargo, Pandemi Döneminde Rekor Seviyede Büyüdü”, Retrieved from <https://www.msn.com/tr-tr/video/finans/turkish-cargo-pandemi-d%C3%B6neminde-rekor-seviyede-b%C3%BCy%C3%BCd%C3%BC/yp-BB19fI5J> (02.10.2020).
- MKG (2020). “Turkish Cargo Pandemi Döneminde Rekor Seviyede Büyüdü”, Retrieved from <https://mkg.com.tr/turkish-cargo-pandemi-doneminde-rekor-seviyede-buyudu/> (01.10.2020).
- Newman, M. E. J. (2002). The Spread of Epidemic Disease on Networks. *Phys. Rev.*, (66), 1-12.
- O’Connor, W. E. (2000). *An Introduction to Airline Economics* (6th Edition). Connecticut: Praeger.
- Okumuş A. ve Asil, H. (2007). Hizmet Kalitesi Algılamasının Havayolu Yolcularının Genel Memnuniyet Düzeylerine Olan Etkisinin İncelenmesi. *İstanbul Üniversitesi İşletme Fakültesi İşletme Dergisi*, 36(2), 7-29.

- Özdemir, H. (2005). Salgın Hastalıklardan Ölüm 1914 –1918. Ankara: Atatürk Kültür ve Tarih Yüksek Kurumu Türk Tarih Kurumu Yayınları.
- Özer, S. U. & Ersoy, E. G. K. (2012). Türkiye’de Faaliyet Gösteren Havayolu Şirketlerinin Marka Kişiliklerini Belirlemeye Yönelik Bir Araştırma. *Anatolia: Turizm Araştırmaları Dergisi*, 23(2), 173-186.
- Özkanlı, O & Turğut, M. (2020). Salgın Hastalıkların Yeme-İçme Alışkanlıkları Üzerindeki Etkisi: Koronavirüs Örneği. *International Social Sciences Studies Journal*, 6(66), 3046-3057.
- Qiu, W. et al. (2017). The Pandemic and its Impacts. *Health, Culture and Society*, 9-10, 1-11.
- Parıldar, H. (2020). Tarihte Bulaşıcı Hastalık Salgınları. *Tepecik Eğit. ve Araşt. Hast. Dergisi*, 30 (Ek sayı), 19-26.
- Peterson, S. (2002). Epidemic Disease And National Security. *Security Studies*, 12(2), 43-81.
- Poonam, M. (2020). Aviation During and Post Pandemic COVID-19 – Impact and Strategies. *Journal of Aviation and Aeronautical Science*, 2(1), 1-5.
- Sakız, B. & Ünkaya, G. (2018). Hava Yolu Taşımacılığı Sektöründe İflas Riski – Yapay Sinir Ağları ile Aircore Tahmini. *Marmara Üniversitesi Öneri Dergisi*, 13(50), 159-172.
- Sánchez, B. P., Valls, M. P. & Úbeda, J. A. P. (2019). The Contribution of Global Alliances to Airlines’ Environmental Performance. *Sustainability*, (11), 1-16.
- SGHM (2020a). “EUROCONTROL Ocak Ayı Raporunu Yayımladı. Retrieved from <http://web.shgm.gov.tr/tr/haberler/6300-eurocontrol-ocak-ayi-raporunu-yayimladi> (20.03.2020).
- SGHM (2020a). COVID-19 krizi, Eurocontrol Üyesi 20 Ülkenin Uçuşlarında Düşüşe Neden Oldu. Retrieved from <http://web.shgm.gov.tr/tr/haberler/6326-covid-19-krizi-eurocontrol-uyesi-20-ulkenin-ucuslarinda-dususe-neden-oldu> (20.03.2020).

- Simple Flying (2020). "The Impressive Rise Of Turkish Airlines Cargo Operations", Retrieved from <https://simpleflying.com/the-impressive-rise-of-turkish-airlines-cargo-operations/> (18.11.2020).
- Šimunović, S., Tatalović, M. & Bajić, J. (2011). Global Airline Alliances in the Light of Economic Integrations – Croatia Airlines Challenges (April 6, 2011). Proceedings of 8th International Conference «Economic Integration, Competition and Cooperation», 6-9 April, Opatija, University of Rijeka – Faculty of Economics, 1-17.
- Sözcü (2020). "Hava Yolu Şirketleri Çıkışı Kargo Taşımakta Buldu", Retrieved from <https://www.sozcu.com.tr/2020/ekonomi/hava-yolu-sirketleri-cikisi-kargo-tasimakta-buldu-6020671/> (17.09.2020).
- Statista (2020). Year-on-Year Revenue-Passenger Kilometer (RPK) Change on International Routes from January to August 2020, by Region. Retrieved from <https://www.statista.com/statistics/234977/revenue-passenger-kilometers-on-international-flights/> (12.10.2020).
- Şanlı, S. C. & Erdem, A. (2020). Koronavirüs Salgınının Tatile Çıkma Niyeti Üzerine Etkisi. Türk Turizm Araştırmaları Dergisi, 4(3), 1671-1688.
- T24 (2020). "Pandemide Yolcu Uçakları Durdu, kargo Uçakları Uçtu; Turkish Cargo En Hızlı Büyüyen Şirket Oldu", <https://t24.com.tr/haber/pandemide-yolcu-ucaklari-durdu-kargo-ucaklari-uctu-turkish-cargo-en-hizli-buyuyen-sirket-oldu,904586> (11.10.2020).
- Tanış, C. (2017). 20. Yüzyıl Başlarında Osmanlı Devleti'nin Kızamık ile Mücadelesi (1900-1908). Researcher: Social Science Studies, 5 (4), 166-175.
- THY (2020). Trafik Verileri 2020. Retrieved from <https://investor.turkishairlines.com/documents/trafik/kasim-2020-trafik-web.pdf> (16.12.2020).
- Tognotti, e. (2013). Lessons from the History of Quarantine, from Plague to Influenza A. Emerging Infectious Diseases, 19(2), 254-259.

- Totten, R. J. (2015) Epidemics, National Security, and US Immigration Policy. *Defense & Security Analysis*, 31(3), 199-212.
- TRT Haber (2020). Türkiye 17 Yılda 600'den Fazla Anlaşma ile Uçuş Ağını 1 Numaraya Taşdı. Retrieved from <https://www.trthaber.com/haber/ekonomi/turkiye-17-yilda-600den-fazla-anlasma-ile-ucus-agini-1-numaraya-tasidi-536532.html> (13.12.2020).
- Türk Nöropsikiyatri Derneği (2020). COVID-19 Salgınında Ruhsal Sorunlar Ve Baş Etme Yolları: Pandemi Nedir Ve Pandeminin Ruhsal Etkileri Nelerdir?. Retrieved from <https://turknoropsikiyatri.org/126-covid-19-salgnnda-ruhsal-sorunlar-ve-ba-etme-yollar-pandemi-nedir-ve-pandeminin-ruhsal-etkileri-nelerdir.html> (02.05.2020).
- U.S. Energy Information Administration (2020). Demand for Jet Fuel in the U.S. is Recovering Faster than in Many Other Markets. Retrieved from <https://www.eia.gov/todayinenergy/detail.php?id=44996#> (29.02.2020).
- UNDG (2015). Socio-Economic Impact of Ebola Virus Disease in West African Countries: A Call for National and Regional Containment, Recovery and Prevention. New York: UN.
- Vasigh, B., Fleming, K. & Tacker, T. (2018). *Introduction to Air Transport Economics* (3rd Edition). London: Routledge.
- Vatan (2020). “Turkish Cargo, Dış Hattı 6 Noktayı Uçuş Ağına Kattı”, Retrieved from <http://finans.gazetevatan.com/haber-detay/gundem/turkish-cargo--dis-hatta-6-noktayi-ucus-agina-katti/104920/> (28.10.2020).
- Villar, J. J., Tafur, J. & Jia, G. (2011). “Strategic Airline Alliances: Advantages For Major Airlines Being Aligned”, Retrieved from http://oa.upm.es/12479/1/INVE_MEM_2011_105231.pdf (22.06.2020).
- WHO (2006). 2006 Report on The Global AIDS Epidemic. Geneva: WHO.
- Wilson, M. E. & Chen, L. H. (2020). Travellers Give Wings to Novel Coronavirus (2019-nCoV). *Journal of Travel Medicine*, 27(2), 1-3.

- Yolun, M. (2012). İspanyol Gribinin Dünya ve Osmanlı Devleti Üzerindeki Etkileri. Master Thesis. Adıyaman: Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü.
- Yosef, E. B. (2006). The Evolution of the US Airline Industry: Theory, Strategy and Policy. Berlin: Springer.

