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The Impact of the Ukraine-Russia Conflict on the Aviation Sector: February-May 2022

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Abstract

Aviation; it is a global sector that affects many areas such as education, trade, tourism, and is also affected by many situations such as epidemics, economic fluctuations, political disagreements and military intervention. For this reason, the disagreement between Ukraine and Russia also quietly affects the aviation industry. Although disagreements seem to continue between the two countries, issues such as the closure of airspaces, changes in flight costs as a result of changing routes, the situation of aircraft and component manufacturers, tourism and aviation security concern aviation globally. In this study, which was conducted to reveal the impact of the Ukraine-Russia conflict on the aviation sector, case study research, one of the qualitative research methods, was used. In a four-month period, sources such as newspaper news, internet news sites, websites of authorities were scanned, and it was tried to reveal how the conflict was reflected in the aviation industry. This method was chosen considering that it is suitable for this study in terms of revealing what happened in the past, how people were affected, how the processes took place, and what the results were. Between February 24 and March 2, when the disagreements between the two countries began, all flights to Ukraine were stopped, while air traffic in neighbouring countries decreased. International passenger traffic of Russian airlines decreased by at least four times in March 2022 compared to March 2021, and by sixteen times compared to March 2019. The Ukraine-Russia conflict also negatively affected the flight times of passenger flights between East and West. As a result of the study, the great impact of the four-month period, which is thought to be short, on the aviation sector has been tried to be revealed.

1. Introduction

Although aviation is a global sector that contributes to technological, economic and social developments between countries at both national and international level, it is affected by all kinds of economic, political, social and technological developments taking place around it. An example of this is the effects of the Covid-19 pandemic, which started at the end of 2019, on the aviation industry. The aviation sector, which has not yet overcome the negative effects of the Covid-19 pandemic, is experiencing the negative effects of the conflict between Russia and Ukraine that started in February 2022.

With the beginning of the Russia-Ukraine conflict, sanctions against Russia were started to be implemented, especially by western countries. On February 24, European air traffic stopped flights to Ukraine, European Union airspace was closed to Russian planes (Euronews, 2022). As a result, other airlines had to divert their planes to different airspaces. Airline companies and passengers flying over Russian airspace to save time and fuel were adversely affected by this

situation. However, rising fuel prices also affected flight costs. Other sanctions, such as the prohibition of the supply of civilian aircraft-spares parts to Russia, the obligation to terminate the contracts of companies that lease aircraft to Russia, and the prohibition of aircraft maintenance-insurance services, have also begun to be implemented. Although these sanctions are aimed at disarming Russia, aircraft parts manufacturers, airline companies and businesses providing aircraft maintenance and insurance services have been adversely affected financially.

She gave advice to the citizens of Russia, who faced heavy sanctions as a result of the disagreement between Ukraine and Russia, not to go to the countries that imposed sanctions. This has had a negative impact on the tourism sector, as the majority of tourists in Europe, Asia and the Middle East are Russian tourists.

In addition to the factors mentioned above such as airspace, rerouting and costs, aircraft and aircraft component manufacturers were also affected by this conflict. Especially

large engine manufacturers and military aircraft manufacturers were adversely affected in both countries.

Within the scope of this study, the effect of the conflict between Ukraine and Russia on the aviation sector in the period of February-May 2022 was examined. The problems experienced by the sector with the closure of airspaces and changing routes were determined, and answers were sought to questions such as how this situation affected the costs, how it was reflected on the aircraft manufacturers, and its return to the tourism sector. When the literature was searched, no other study was found in the field, since the conflict started a short time ago and is still ongoing. In addition, there is no answer in the literature to the question of how similar political problems between other countries recently affected the aviation industry. It is thought that this study is important in terms of completing this deficiency in the literature and revealing the negative effects of political disagreements on the aviation industry.

2. Methods

In this article, which aims to examine the effects of the Ukraine-Russia conflict on aviation, case study has been chosen as the method. A case study is a methodological approach that involves in-depth examination of a limited system using multiple data collection to gather systematic information about how it works (Chmiliar, 2010). It is a qualitative research approach in which one or more situations are analyzed in depth by data collection tools such as audio-visuals, documents, reports that contain multiple sources, and situations and themes related to the situation are defined in a time-limited time. With the data obtained with this method, it reveals why the event occurred in that way and what should be focused on in future studies (Davey, 2009).

In this context, ~~in this study~~, the data about the dispute selected as the subject of the study between February 2022 and May 2022 were compiled from the news and reports. Within the framework of the collected data, the effects of this conflict on aviation, the closure of airspaces, the change of flight routes, the changes in flight costs, the effects on aviation security and finally its effects on tourism were completed.

3. Airspace Closure

Airspace is the mass of the atmosphere over any land or body of water, the dimensions of which are determined by various laws, rules and treaties (ICAO, 2001). According to the International Civil Aviation Convention (Chicago Convention), signed in Chicago in 1944, each state has absolute sovereignty over its airspace in its own country/region (ICAO, 2013). The concept of airspace has also become important in the Ukraine-Russia conflict (IFALFA, 2022) and has affected the political and economic balances between the countries. As a result of the conflict between Ukraine and Russia, sanctions against Russia from western

countries continued increasingly. According to the data shared by Eurocontrol, between February 24 and March 2, when the European air traffic disputes began, all flights to Ukraine were stopped, while there were decreases in air traffic in neighbouring countries (Haber.Aero, 2022). The Russian airline industry was adversely affected by the closing of the European Union's airspace to Russian aircraft.

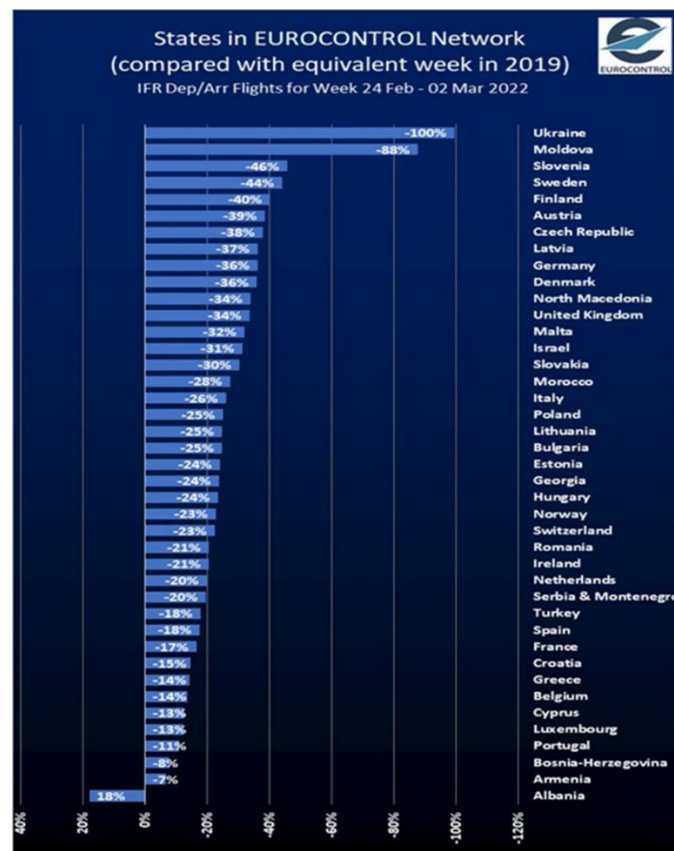


Figure 1. Comparison of IFR flight data from February 24 to March 2 2022 with the same period of 2019 (Eurocontrol, 2022)

As seen in Figure 1, Moldova was followed by Slovenia, Sweden, Finland and Austria, which had an 88% decrease in the number of landings and take-offs compared to the same period of 2019. As seen in the list, Turkey experienced a decrease of 18%. Eurocontrol General Manager Eamonn Brennan explained: "There is no traffic in Ukraine, there is almost no traffic in Moldova". In this period, Armenia with 7% and Bosnia and Herzegovina with 8% were the countries that experienced the least decline.

Russian airlines were most affected by these sanctions of European countries (Haber.Aero, 2022). The data shared by the authorities are as follows (IATA):



Figure 2. Status of tickets sold from Russia for future trips (IATA, 2022).

Figure 2 shows that domestic ticket sales in Russia decreased by 50%. In this period, there was a 25% decrease in ticket sales for international flights and this continued.

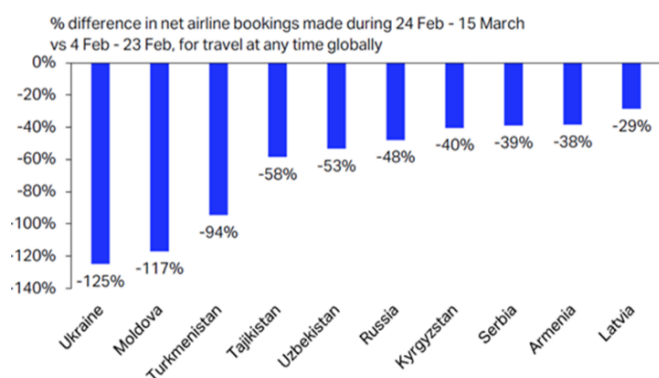


Figure 3. The ten countries most adversely affected by air travel demand in the Ukraine-Russia conflict. Source: (IATA,2022)

Figure 3 also shows the decline in the number of airline reservations of the ten countries most negatively affected by the demand for air travel from the Ukraine-Russia conflict. According to this graph of IATA, the country with the biggest decrease in the number of reservations was Ukraine, while Lithuania was the tenth affected country. The closure of the airspace has changed the routes and created troublesome processes for those who use the airline.

4. Changed Flight Routes

Airlines try to find the most suitable route between two destinations in order to fly their passengers safely, while minimizing fuel and other costs. This includes route planning. While considering the cost and time criteria, on the other hand, route planning is made according to the weather conditions and the rotation of the world. In crises experienced in aviation, especially in cases where airspaces are affected, routes are changed according to the instant situation of the flight.

In this dispute, according to the news in the Russian press, (Russian Association of Tour Operators, 2022) Russian

airlines' international passenger traffic decreased at least four times in March 2022 compared to March 2021, and sixteen times compared to March 2019. Domestic flights and flights to Central Asian countries continued. While many airline companies were affected by the sanctions policies of European countries against Russia, regional flights were less affected.

The Ukraine-Russia conflicts negatively affected the flight times of passenger flights between the East and the West. The closure of Russia's airspace caused the journey from London to Tokyo to be extended by 4 hours and 30 minutes. At the same time, the flight time, which took 9 hours and 30 minutes when traveling from Tokyo to Helsinki over the Russian airspace, increased to 13 hours due to the new route. Table 1 contains other data on the changed routes.

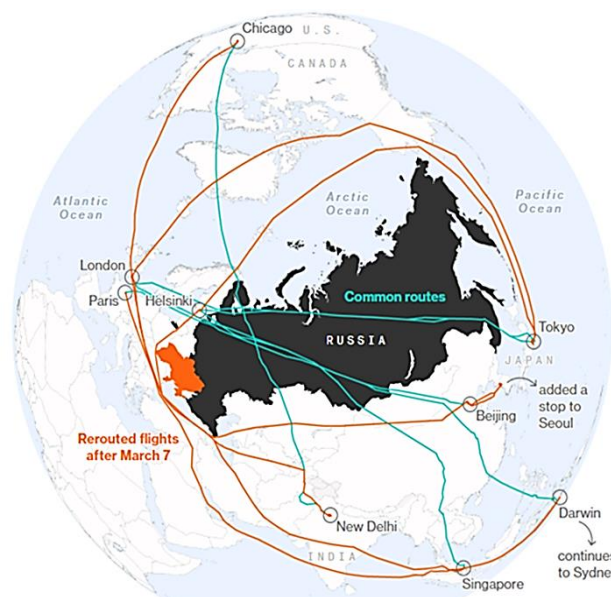


Figure 4. Changing travel routes of the six Airlines (Flightradar24, 2022).

Table 1. Travel times (Flightradar24, 2022)

Airlines	Departures	Arrivals	Flight time	Delay
Air France	Beijing	Paris	11 h 55 m	6 h 5 m
Japan Airlines	London	Tokyo	11 h 55 m	4 h 30 m
Finnair	Helsinki	Tokyo	9 h 30 m	3 h 30 m
Finnair	Singapore	Helsinki	11 h 50 m	1 h 25 m
United	Chicago	New Delhi	14 h 35 m	1 h
Qantas	Sydney	London	23 h 20 m	30 m

Due to the extended flight times and rising oil prices, it was inevitable that fuel and service costs would rise. All other airlines, as well as the airlines that experienced delays, were adversely affected by all these increased costs.

Since many companies did not use or did not want to use Russia's huge airspace, they had to fly from different routes to longer distances and costly. As a result, it has been observed that flight times are prolonged in the northern hemisphere. The Ukrainian-Russian disputes caused the distance between the western countries to open and diplomatic tensions. Many countries have expelled Russian diplomats from the country. It has been observed that the planes sent for the deported diplomats to return to Russia encountered altered routes. The plane that came to pick up the diplomats in Madrid and Athens had to travel thousands of extra kilometers.

**Figure 5.** Delayed flight attempted for diplomats

This flight was first made from Moscow to Madrid. The flight, which took 3409 km in open European airspace, increased to 7086 km due to closed airspaces. When it came to Athens after Madrid, the plane, which had a 2383 km route in normal time, changed its route to 3729 km due to this conflict. While the distance between Athens and Moscow was 2203 km before, it increased to 4348 km after the disagreement. Thus, the route changes caused an additional 7168 km increase due to the closed airspaces. With this effect of changing routes, flight costs affect not only the countries

where the conflict is experienced and the countries around them, but also the entire aviation industry.

5. Changes in Flight Costs

Airlines and all other stakeholders in the aviation industry are engaged in business and ultimately want to make a profit. They want to minimize their costs in order to make a profit. The costs of airline companies consist of components such as fuel, personnel, fleet renewal, maintenance, ground services, wear and tear, insurance, tax, fees, catering services, advertising and airport use. Increases in these components are also observed in the crises in the aviation sector.

One of the negative effects of the Ukraine-Russia conflict on the aviation sector is the changes in flight costs. In the statement made by the international credit rating agency Fitch Ratings, it was stated that the increasing tension between Ukraine and Russia hindered the recovery of the European aviation sector. In addition, it was stated that airline companies in Europe were adversely affected by the record-breaking increase in energy prices in the recent period and the mutual sanctions between western countries and Russia. In the Fitch statement, which stated that the flight traffic of airlines in Europe is expected to return to its pre-epidemic level in 2019 only in 2024, it is emphasized that the increase in commodity prices and inflation may make it difficult for airlines to meet the increased costs and pass it on to consumers (AnadoluAjans, 2022).

Fraport's CEO, Stefan Schulte, said in a statement that German airport services provider Fraport is operating in St. He stated that he would not be able to sell his airport stake in St. Petersburg before 2025. In Schulte's statement, he explained that the possible sale of the airport on the planned date would be conditional and would not help to stop the Ukraine-Russia conflict, which would mean an extra gain for Russia. Stefan Schulte stated that his concessions are linked to a sales ban until 2025. Answering questions about the concerns that military planes might take off from the civil airport, Schulte explained that they only have a 25 percent stake in the airport operation. He also stated that air traffic controllers have a say in landing and taking off at airports (Haber.Aero, 2022).

In a statement by the International Air Transport Association (IATA), it was predicted that Russia's military attack on Ukraine and retaliatory airspace closures would have a negative impact on the air cargo industry. However, this impact is expected to be low, as only 0.6% of global air transported cargo in 2021 is linked to Russia. Publishing January 2022 data for global air cargo markets, IATA general manager Willie Walsh stated that the 2.7% increase in demand in January remained below expectations after 9.3% in December 2021. It has been said that this likely reflects a shift towards the more normal 4.9% growth rate expected for 2022. Looking at the following periods, it has been stated that the cargo markets are expected to be affected by the Ukraine-Russia conflict (Airport-Technology, 2022).

Ukraine and Russia have a significant impact on the global economy. This global influence has manifested itself due to the disagreement between Ukraine and Russia. Flight and cargo costs have increased as most commercial air travel and freight flight routes have been redefined. Ukraine and Russia are major suppliers in a number of commodity markets in the global economy. Together, these two countries account for around 30% of wheat, 20% of corn, mineral fertilizers and natural gas, and 11% of oil in global exports. In addition, worldwide supply chains are dependent on metal exports from Ukraine and Russia. Russia is a major supplier of palladium, which is used in catalytic converters for automobiles, and nickel, which is used in the

manufacture of steel and batteries. Ukraine and Russia are also sources of noble gases such as argon and neon used in semiconductor production, and large producers of titanium sponges used in aircraft. Both countries have significant uranium reserves globally. The prices of many of these commodities have

risen sharply since the beginning of the war, although there was no significant cut in production or export volumes, as shown in Figure 6. Many multinational companies had to suspend their operations in Ukraine and Russia due to the increase in operating expenses affected by flight costs (OECD, 2022).

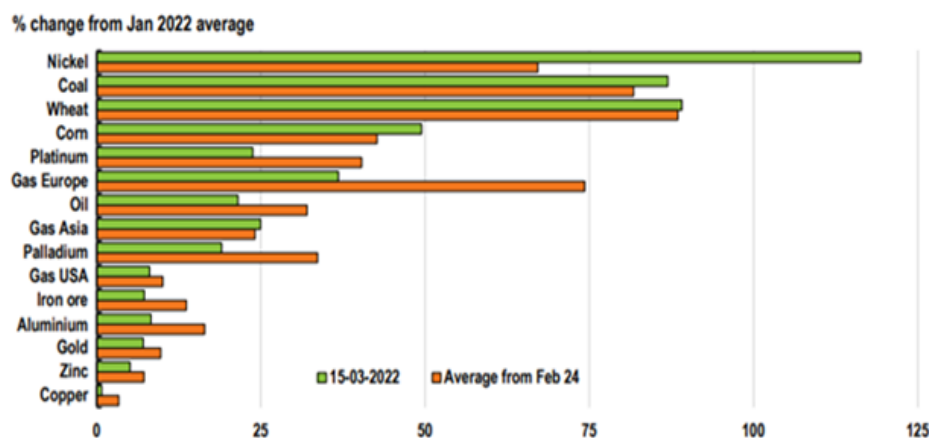


Figure 6. The sharp rise in prices of Russia and Ukraine's main exports (OECD, 2022).

In addition to these effects on the global economy, the aviation industry, which has not yet completely recovered from the effects of the Covid-19 epidemic, has faced numerous difficulties due to the disagreement between Ukraine and Russia. According to GlobalData, the pandemic has negatively impacted global

revenue from full-service and low-cost airlines (Investmentmonitor,2022). Data from Globaldata, shown in Figure 7, shows that the industry saw steady growth in the pre-pandemic years, but global revenues from full-service and low-cost airlines fell sharply in 2020.

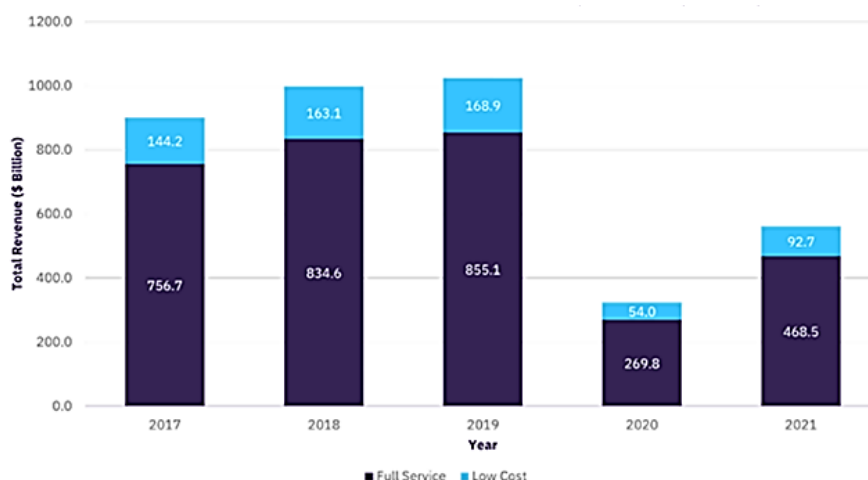


Figure 7. Global revenue from full service and low cost airlines (Globaldata,2022)

This recovery struggle is compounded by the sanctions and airspace restrictions imposed both by and against Russia. With the start of the Ukraine-Russia conflict, Russia retaliated against Canada, the EU, the UK, the USA and various other countries that banned Russian planes from their airspace, and banned the flight in the airspace of thirty-six countries. The reciprocal sanctions and airspace restrictions that have plagued the aviation industry have led to flight cancellations or rerouting, rising airfares, higher fuel costs, and problems with titanium supplies, among other issues. The combination of sanctions and airspace restrictions has forced many airlines to suspend or reroute their flights. Russia's flag carrier airline Aeroflot announced that it has stopped all international flights outside of Belarus, and that the country's second largest airline, S7, has also suspended international flights.

Airlines that avoided flying in Russian airspace had to change routes, while some European companies canceled their flights to Asia entirely. Finnair airlines, whose flights were initially canceled to Japan, China and South Korea, later resumed flights to Seoul, Tokyo and Shanghai, following a route that avoided Russian airspace. At that time, flights to Osaka and Hong Kong were canceled until the end of April. Longer routes and flight diversions have a significant impact on costs, including fuel prices and airline tickets.

This disagreement had a significant impact on fuel prices. According to research by GlobalData, rising fuel costs are thought to affect the profitability of airlines, which are still recovering after the drop in demand caused by the pandemic. Closed airspace means longer flight times, more fuel, more pilot hours, higher costs and therefore higher wages. Higher fares may adversely

affect demand for the airline. Cancellation of flights, extension of routes, rising fuel prices and increasing inflation are just a few of the reasons for the increase in air ticket prices. Data from Google Flights in Figure 8 shows that the prices of flights from Russia have increased as a result of the sanctions. As a result, increasing ticket prices also harm many touristic destinations preferred by Russian tourists. This disagreement had a significant impact on fuel prices. According to research by GlobalData, rising fuel costs are thought to affect the profitability of airlines, which are still recovering after the drop in demand caused by the pandemic. Closed airspace means longer flight times, more fuel, more pilot hours, higher costs and therefore higher wages. Higher fares may adversely affect demand for the airline. Cancellation of flights, extension of routes, rising fuel prices and increasing inflation are just a few of the reasons for the increase in air ticket prices. Data from Google Flights in Figure 8 shows that the prices of flights from Russia have increased as a result of the sanctions. As a result, increasing ticket prices also harm many touristic destinations preferred by Russian tourists.

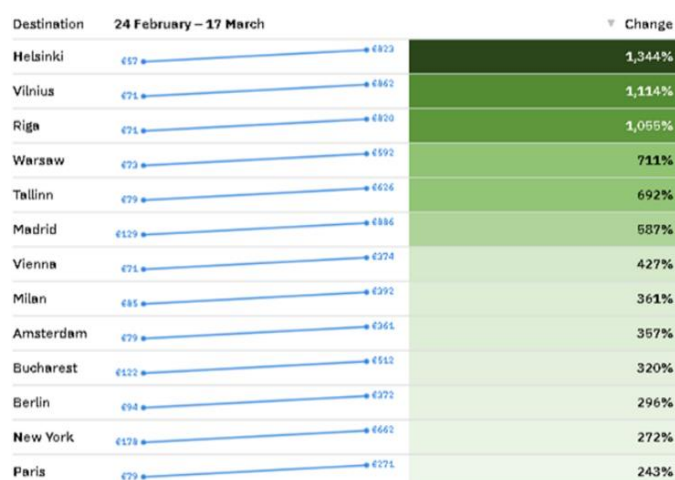


Figure 8. The prices of flights from Russia have increased as a result of the sanctions (Investmentmonitor,2022)

According to research by GlobalData, it has been stated that the ongoing crisis between Ukraine and Russia, which are among the leading producers of titanium, an important metal used in aircraft manufacturing, may interrupt supply in the short term. The Russian company VSMPO-Avista is the main supplier of titanium for Boeing and Airbus. In a recent statement by Airbus, it was stated that geopolitical risks are integrated into titanium procurement policies and therefore they are protected in the short/medium term.

These examples show how the Ukraine-Russia conflict will shape the future outlook of the aviation industry in many ways. It is expected that the hopes of the aviation industry, which has struggled with the negative effects of the Covid-19 epidemic in the last two years, to turn into a new normal will be delayed (Investmentmonitor,2022)

6. The Effects of Ukraine-Russia Conflict on Aviation Security

In the aviation industry, the concept of security is very important as well as the concept of safety. Ensuring flight security gives the airline company powers such as commercial superiority, prestige and preference, as in flight safety. Flight security covers the activities related to the protection of aviation operations without harming the passengers and cargo, aircraft, infrastructure

in the civil aviation system, without being harmed by the physical and cyber dangers that carry criminal elements such as sabotage and terrorist attacks. Situations that threaten flight security have also emerged in the Ukraine-Russia conflict.

Russia has issued NOTAM (Notice to Airmen and Sailors) on February 24, 2022, following the military operation that started in Donbas, eastern Ukraine. In the statement in NOTAM, "Due to the use of weapons and military equipment, the use of airspace on Russia's western border with Ukraine and Belarus has been temporarily suspended due to the high threat to the safety of flights of civilian aircraft." statement is included. With the NOTAM published, it is seen in Figure 9 that the airspace is not used because the civil flights in the Ukrainian airspace pose a potential danger to the civil aviation.



Figure 9. Image from Flightradar24 data tracking website (TRT,2013)

Civil aircraft in Ukraine are also heavily damaged due to intense bombardment. In Figure 10, the "Antonov An-225 Mriya", located in the Antonov aircraft facility in the city of Gostomel, where heavy clashes took place, and divided into two as a result of the bombardments organized by Russia in the first days of the Ukraine-Russia war, is shown in its own hangar.



Figure 10. The final state of AN after the attack (NTV,2022)

These developments also reveal many security threats to aviation in the region. The increased airtime of aircraft also increases the potential for malfunctions in the air. In addition, Hong Kong-based airline company Cathay Pacific has announced that it is about to perform the longest commercial flight in the world. The company stated that after the Ukraine-Russia conflict, many airlines would redirect their New York flights over the Atlantic after bypassing the Russian airspace. This means that the journey is equivalent to 16,668 kilometers. A representative from Cathay Pacific airline told CNN that they always set up emergency routes for possible events or scenarios in the aviation world. He stated that since the Russian and Ukrainian airspaces cannot be used in an emergency, this situation would pose a significant risk for flight safety, by comparing daily flight routes,

they planned the most efficient flight route of the day and lifted their planes (The Gurdian, 2022).



Figure 11. "Antonov An-225 Mriya", which was divided into two as a result of the bombardments organized by Russia (NTV,2022)

7. Impact On Tourism

While the countries that have experienced a decline in tourism in the last two years due to the Covid-19 pandemic have not yet recovered, the conflict between Ukraine and Russia has negatively affected the sector globally. With the beginning of this conflict, many countries started to apply deterrent sanctions against Russia. In response to this situation, Russia advised its citizens not to go to these countries. The data disclosed by GlobalData's Tourism Demands and Flows Database shows that the most preferred countries by Russian tourists are Turkey, China, Kazakhstan, Thailand, United Arab Emirates (UAE), Spain, Azerbaijan, Ukraine, Georgia and Italy, respectively. This behavior of Russia, which constitutes a large part of the tourist rate in European, Asian and Middle Eastern countries, has greatly affected tourism (Investmentmonitor, 2022) In addition, thousands of Russian and Ukrainian tourists have been stranded in Thailand as multiple airlines have canceled their return flights (BBC,2022).

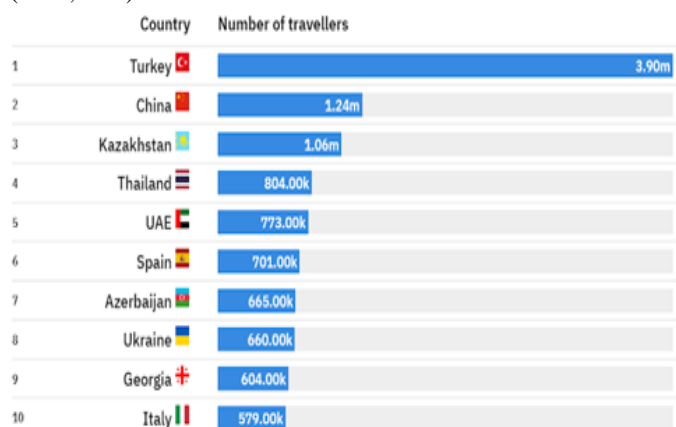


Figure 12. Top ten international departure number from Russia in 2021 (GlobalData, 2022)

Experts say that the industry cannot cope with this situation, which is only a short time away from the opening of the tourism season, and that a joint support and coordination is needed on a global scale. Considering the increase in energy and basic needs costs, inflation and employment around the world, it will be very difficult to predict the future of the tourism sector (Yeditepe, 2022).

Looking at the statistics of 6 million 750 thousand tourists coming to Turkey in 2021, Russia ranks first and Ukraine ranks third. Mehmet Gem, Chairman of the Board of Directors of the Travel Agencies Managers Association (SAYD), said that Turkey has lost two of its biggest markets in the tourism sector and that these markets will not be replaced in a short time until the tourism season, and that Turkey's tourism will experience a 40% loss this year. (Haberturk,2022)

President of Aegean Touristic Enterprises and Accommodations Union, stated that the ministry focused on Germany, England, Central Asia, Azerbaijan and Iran and the Middle East market together with Nevruz in order to compensate for market losses (Haberturk,2022)

8. Conclusion

Fighting the Covid-19 epidemic, aviation faced a new crisis in 2022. The disagreement that arose between Ukraine and Russia had a significant impact on the aviation industry, as well as on the people of Ukraine, Ukraine and all sectors in the world. Both countries have suffered many losses in the field of military aviation. Aviation is a sector that has dynamics in many fields, including political, economic, socio-cultural, between countries in the world. Even countries, institutions and companies that have superiority in the fields of production, marketing and passenger transportation in the field of aviation are affected by the emerging crises. Balances in aviation are like the butterfly effect. Due to the increasing fuel costs and the closure of the airspaces of the two countries with this disagreement, the extended routes put the airline companies in a difficult situation. These events, which affected each other one after the other, caused the routes to change afterward and had a significant impact on flight costs, aviation safety and tourism. The most important of these was a 25% decrease in ticket sales on international flights, and this affected the aviation industry all over the world.

In this study, which was carried out using the qualitative research method, aviation developments related to this dispute between February and May were examined with the situation research management. The study will contribute to other studies to be carried out as it is seen that the conflict between these two countries will continue and will continue to affect the aviation industry.

Ethical approval

Not applicable.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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