



THE COVID-19 CRISIS AND ITS IMPACT ON CHANGES IN AIR TRANSPORT

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Abstract

The aim of this paper is to identify the effects of the corona crisis on air transport and the changes that this crisis has brought. It deals with the analysis of selected airlines, navigation service providers and airports from the EU (Slovakia, the Czech Republic, France), the United Kingdom, the USA and the United Arab Emirates, whose economic indicators as well as economic and operational results show how the measures in place affect their operation. The aim of this paper is to provide a comprehensive view of how air transport has changed as a result of the pandemic COVID-19, as well as to make proposals for revitalization measures to help the aviation sector.

Keywords

COVID-19, aviation, measures, airports, air navigation service providers, airlines

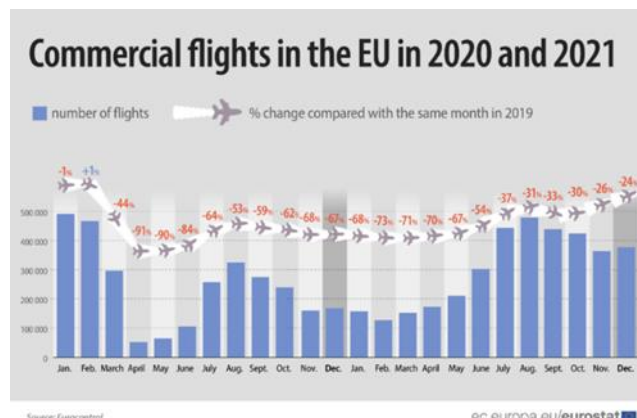
1. INTRODUCTION

Air traffic has been affected in the past by various events that have significantly affected usual traffic. However, none of them had as much impact as the COVID-19 pandemic. During the crisis, civil air transport reached a complete bottom. The mobility of people was limited and the only flights that could be operated were flights due to the repatriation of citizens. Following the ban on civil flights in the Slovak Republic on the 13 March 2020, the first repatriation flight from the United Kingdom took place on the 24 March 2020. [1].

2. GLOBAL IMPACT ON AIR TRANSPORT

2.1. Airlines

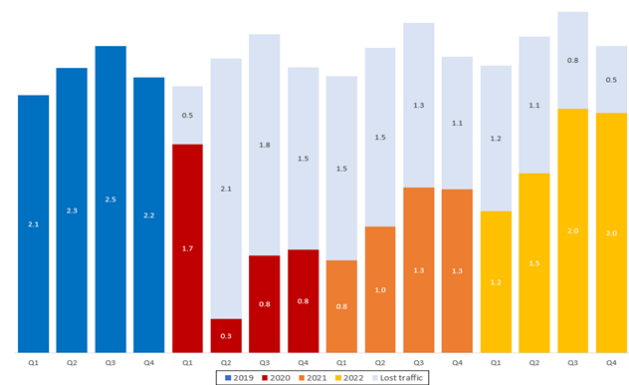
In the pre-pandemic years, airlines were experiencing strong economic growth, but in 2020 revenues fell by as much as 55%. Although the situation is estimated to have improved significantly in 2021, it will still lag the values of 2019. [2]



Picture 1 Commercial flights in the EU. Source: [3]

2.2. Airports

The pandemic dramatically reduced airport activity and reduced their aeronautical and non-aeronautical revenues. During the pandemic, the airports were closed or operated only to a limited extent. In most cases, airports remained open only for repatriation flights or freight [4].



Picture 2 Quarterly global passenger traffic projection compared to pre-COVID-19 forecast (2019–2022, in billions of passengers). Source: [5]

2.3. Air navigation service providers

Although the work intensity of air navigation service providers has declined, it remains necessary to maintain a high quality and secure highly qualified workforce, which required high and fixed costs. With the decline in air traffic during the pandemic, the revenues of air navigation service providers also fell. However, the crisis has caused some airlines using air navigation services to postpone or stop paying at all [6].

Measures to protect the aviation sector, which forms are significant part of the national economy, have not been implemented uniformly and differed in scope or different

timings. The most significant aid was State aid, which was provided under three different schemes:

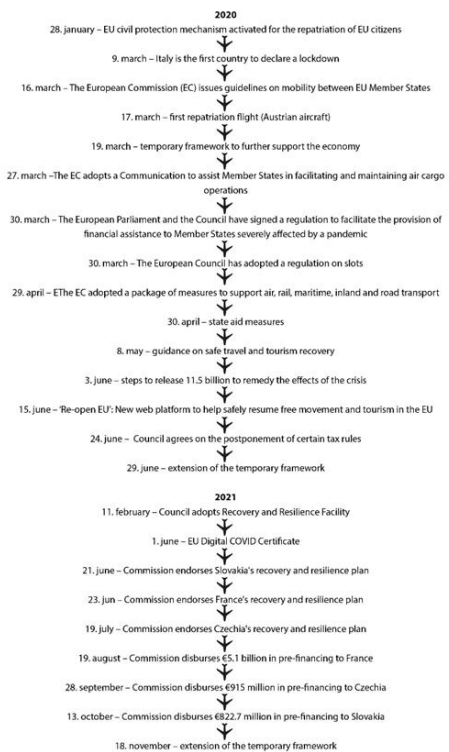
- ad hoc - targeted at one airline perceived as a "national interest",
- support for individual airlines in the wider context of overall corporate schemes,
- industrial programs available to all companies in the air transport sector.

Some countries, such as the United Kingdom or the United States, have applied sectoral air transport schemes. The United States has provided financial support to airlines through a law called Coronavirus Aid, Relief, and Economic Security Act (CARES Act). As a result of this law, as early as December 2020, seven major airlines secured loans of approximately \$ 20 billion [7].

Another measure was a temporary exemption from the airport's slots, when airlines did not have to use at least 80% of their slots to ensure that the right to these slots was maintained in the next flight season. This prevented "ghost flights" that were unecological and uneconomical. The European Commission has reduced this limit to 50%. The measure was later extended until the 29 October 2022 and was also increased to 64% as the pandemic situation improved [8].

On the 26 March 2020, the European Commission issued guidelines to facilitate air freight operations. These operations were to be exempted from the night curfew and airport time limits. In order to speed up and simplify air freight transport, this guideline allows the use of civil aircraft for the transport of cargo and relieves the crews of these aircraft from travel restrictions, provided that they show no signs of coronavirus infection [9].

The pandemic has forced airlines to reduce their costs through their aircraft. As far as possible, airlines began deploying smaller aircraft on each route, which had a chance to fill up. The average aircraft capacity dropped from 146 seats to 141 in 2021. Long-range aircraft such as the Airbus A330 or Boeing B777 suffered the most [10].



Picture 3 Global capacity share by aircraft type, February 2020. Source: [10]

Types of state aid:

- direct grants and tax benefits,
- subsidized state guarantees for bank loans,
- public and private loans with preferential interest rates,
- existing credit capacities and their use,
- additional flexibility to allow the state to provide short-term export credit insurance if needed,
- recapitalization [12].

3. ANALYSIS OF THE ECONOMIC AND POLICY MEASURES TAKEN ON THE AIR TRANSPORT AND THEIR EFFICIENCY

The paper evaluates a selected airline, airport and air navigation service provider from European Union countries (Slovak Republic - Air Explore, M. R. Štefánik Airport, LPS SR, Czech Republic - Smartwings, Václav Havel Airport in Prague, ANS CR, France - Air France , Charles de Gaulle Airport (DSNA), United Kingdom - British Airways, Heathrow Airport, NATS, United States - American Airline, Los Angeles Airport, FAA ATO and the United Arab Emirates - Emirates, Dubai Airport and GANS. The analysis is based on several indicators (total revenue, (loss) / profit before tax, number of passengers carried / number of flights handled, total costs, EBIDA and total cost ratio). The most important selected indicator is the total cost ratio, which shows the overall efficiency of the company [13]. Financial data in other currencies used in the analysis were converted into euros using the average annual exchange rate in the given year. The values were drawn from the annual reports of the companies, which were available at the time of writing.

3.1. Slovak republic

As part of the pandemic, Air Explore was forced to lay off its employees, reduce costs and recorded a dramatic drop in flights. Its total revenue in 2019 was almost the same as its costs, but these rose sharply after the outbreak of the pandemic [14].

At the time of writing, the annual report of 2021 was not yet available. However, the figures show that M. R. Štefánik Airport was already at a loss before the start of the pandemic, and in 2020 its loss deepened despite a 10% cost reduction. Airport costs increased by almost 62% in 2020 [15].

LPS SR handled almost 800,000 fewer flights in 2020 than in 2019. The loss in 2020 reached 18.3 million euros and the total cost ratio increased by almost 65% compared to 2019 [16].

3.2. Czech republic

At the time of writing, the Smartwings annual report 2021 has not been issued and the 2020 annual report did not contain enough data. In 2019, Smartwings' total revenues were almost the same as costs. In 2020, total revenues fell sharply. Total cost ratio in 2019 remained just below 100%, which puts the company in a more advantageous position [17].

Almost 4.4 million passengers passed through Václav Havel Airport in Prague in 2021, which is an increase of 19.7% compared to 2020, but a decrease of 75.4% compared to 2019 [18].

ANS CR reports from 2020 and 2021 were not issued. In 2019, however, they handled 95,000 flights and their total cost ratio was 95.43% [19].

3.3. France

In 2019, Air France KLM had an annual operating profit of around € 750 million and carried more than 104 million passengers [20]. As a result of measures to prevent the spread of coronavirus and restrict mobility, the company had to reduce its activities, which led to significant losses. In 2020, sales fell by 60.3%, which means that the annual operating loss amounted to -3.7 billion euros [21]. Only 34,065,000 passengers were carried in this year. According to the total cost ratio indicator, Air France's costs rose disproportionately in terms of profits in 2020. Although they fell in 2021, they still failed to return to pre-pandemic levels.

The decrease in passengers at Charles de Gaulle Airport was very significant, reaching 60.4% between 2019 and 2020. The EBITDA indicator shows an increase of 583 million euros compared to 2020 compared to 2021 [22]. Although Charles de Gaulle Airport's costs increased, it managed to maintain good total cost ratio values and made a profit during the pandemic.

At the time of writing, the DSNV air navigation service provider did not have the necessary data from the 2020 and 2021 annual reports published.

3.4. United Kingdom

British Airways' total revenues in 2020 deteriorated by 69.9% compared to 2019 [23]. During the first six months of the year, passenger capacity remained low. Compared to the equivalent

period in 2019, it was only 14%. Although profits are kept low, it appears that losses at the end of 2021 may no longer be as high as in 2020 [24]. Although British Airways had relatively good total cost ratio results before the pandemic, total cost ratio rose sharply in the first half of 2021, to 229.22%.

In 2021, the number of passengers at Heathrow Airport fell by 2.7 million, because of stricter measures than in the European Union. Operating costs decreased by 17% in 2020 compared to 2019, while EBITDA decreased by 86.1% over the same period [25]. The airport's total cost ratio rose by almost half in 2020, but the company still managed to keep its profit in positive territory. Subsequently, in 2021, the total cost ratio fell to 68.37%.

In the case of NATS, an important figure in this case is the fact that in the annual report the fiscal year ends on 31 March. Because of this, at first sight, data may be skewed over the years. Due to restrictions on international air traffic and restrictions on mobility, there was a decrease in flights by 73%. While in 2020 it was 2.48 million flights, in 2021 it was only 661,000, although the difference between 2020 and 2019 does not seem so different [26].

3.5. United States of America

American Airlines' total capacity decreased by 24.7% in 2021 compared to 2019. EBITDA in 2021 increased by 61.07% compared to 2020 [27]. Total cost ratio rose by 66.81% in 2020, but in 2021 approached the percentage of 2019 again.

At Los Angeles Airport, at the end of fiscal year 2021, which runs from 1 July, total passenger carried was 29,05 million, 53.7% below fiscal 2020 and 67% below pre-pandemic levels in 2019 [28]. Although the total cost ratio increased slightly after the pandemic, its values were below 70% throughout the pandemic.

As the US air navigation service provider ATO is part of the FAA, which is made up of many other similar organizational units, insufficient information was found to carry out further analysis following the example of other companies.

F. United Arab Emirates

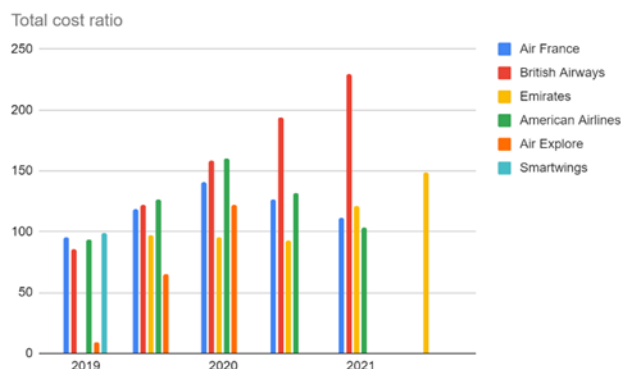
Emirates carried 6.6 million passengers in 2020/2021, down 88% and seating capacity down 83%. The airline's total cost ratio increased sharply only in the fiscal year 2020/2021, by as much as 51.08% to 148.41% compared to the fiscal year 2018/2019 [29].

Neither Dubai Airport nor the air navigation service provider GANS had any annual reports published and therefore it was not possible to analyze and compare these companies with the others.

4. ANALYSIS OF SELECTED COMPANIES

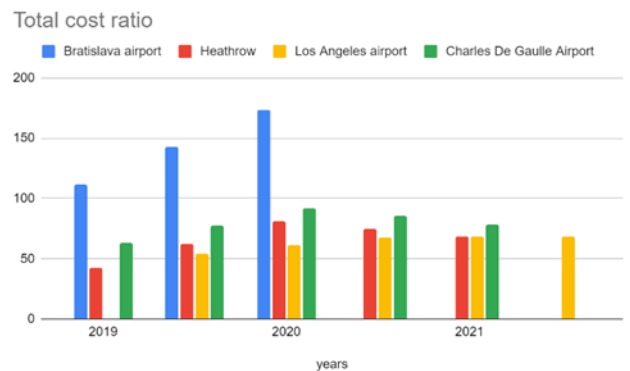
Every company tried to deal with the COVID-19 crisis as best as they could, and it is clear from the above data that most would have managed it very hard or not at all without providing a helping hand from the government. The European Union's most significant response to mitigating the impact of the pandemic has been to apply the Temporary Framework. However, it was difficult to balance the state aid so as not to distort competition. This was shown by the example of Air France, which had to give

up its 18 slots at Orly airport in favour of a competing company precisely because of the imbalance. The European Commission also distinguished between different types of State aid, which included subsidized interest rates on loans, recapitalization measures and state loan guarantees that could be linked to additional conditions, which the French Government took advantage of and conditional on the environmental conditions that Air France had to accept. The United States, like the European Union, has responded by helping the aviation sector by temporarily abolishing fees and providing financial assistance under the CARES law. Thanks to this assistance, anti-pandemic measures began to climb back to pre-pandemic levels around mid-2021 as demand for domestic flights. From the countries compared, it seems that the United Arab Emirates has best managed the pandemic situation precisely because of its efforts to raise people's awareness, which has meant rapid vaccination of people and the possibility of cancelling measures more quickly. The Emirates Group based its tactics on gaining people's trust, and the measures put in place were conditional on protecting the health of passengers and employees at a high level. The individual indicators taken from the annual reports are reflected in the graphs below. However, some figures may appear skewed due to different start and end dates for the fiscal year. The figures are shown in millions except for total cost ratio values and the financial figures are given in euros. However, the ability to manage a pandemic is best illustrated by the total cost ratio indicator, which unifies the data into comparable quantities.



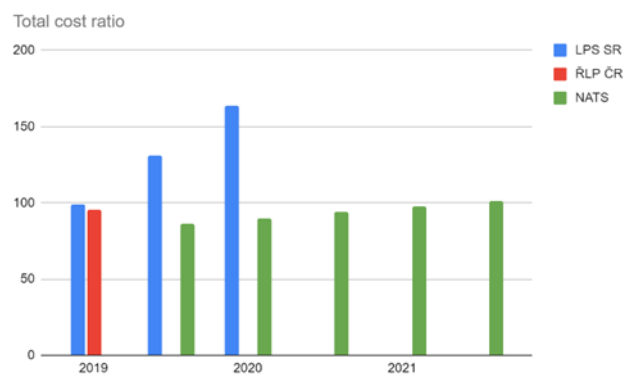
Picture 5 Airlines – Total Cost Ratio Source: Author's

According to the total cost ratio indicator, we can see how most airlines have increased revenues. The highest value is shown by British Airways, but this figure is skewed by the fact that the available results of the year were only available for the first half of the year, during which restrictions still prevailed, so it is assumed that this value will be adjusted after a comprehensive annual report. The imaginary curves of American Airlines and Air France are again very similar, copying the shape of the inverted letter V. Emirates is again distorted by the different beginning of the fiscal year.



Picture 6 Airports – Total Cost Ratio Source: Author's

The imaginary curves of Paris and London airports are very similar. It is very likely that Bratislava Airport will have a similar curve, but it will appear only after the publication of the annual report for 2021. However, this airport has the highest cost - airport costs exceeded profits and according to the imaginary curve, airport management was not efficient enough even before the pandemic, while during the situation worsened.



Picture 7 Air navigation service providers – total cost ratio Source: Author's

The imaginary curve shows how total cost ratio rose sharply within the management of the Air Traffic Services of the Slovak Republic, while NATS values rose only slowly and remained below 100%, which means that their management is profitable.

According to the results of the analysis and comparison, American Airlines is the one that is the fastest to recover from pandemic restrictions. Emirates could be a comparable company, but due to a lack of information due to a different fiscal year schedule, we can only estimate this situation.

From the point of view of airports, the imaginary curves of Charles de Gaulle Airport and London Heathrow Airport were the best. Both data sets for these airports showed similar behaviour, which could have been expected at the time from a pandemic situation.

It is not possible to obtain relevant and authoritative results within air navigation service providers due to the lack of information from the annual reports which best describe the economic performance of the companies concerned.

The cost values revealed that, of the airlines being compared, American Airlines and Air France, which increased their costs in 2020 but were gradually declining again to profitable levels, managed the pandemic situation best. According to the total cost ratio indicator, Paris and London airports handled the pandemic very similarly and, despite the increase, are returning to the values of 2019. Within the available data on navigation service providers, we can only evaluate the English provider, NATS, tendency.

5. OBJECTIVES AND METHODOLOGY

The aim of this paper was to examine the impact of the pandemic on the air transport and to evaluate the effectiveness of the measures taken. Subsequently, thanks to the information gathered, propose several revitalization measures that could help the aviation industry to better achieve pre-pandemic conditions and build greater resilience to similar crises that could occur in the future.

The method of analysis with comparison was used in achieving the set goals.

6. PROPOSAL FOR REVITALIZATION MEASURES FOR THE AIR TRANSPORT SECTOR

6.1. Financial reserves

This measure could apply to all three aviation sectors that we have addressed in this paper. As can be seen from the first part, several events have had a negative impact on the air transport in its relatively short history. Some events are very difficult to predict and therefore airlines should strengthen their resilience to such situations. They could increase their cash reserves, either voluntarily or through regulation, thus reducing the need for rescue packages each time a crisis strikes. They should also work to make their operations more agile - that is, they could improve their ability to reduce supply quickly and cost-effectively when demand suddenly falls, by increasing the variability of their cost base.

6.2. Extension of focus

The US aviation market is specific in that a significant proportion of passengers are business travellers who travel exclusively for work at various conferences or other business trips. However, the pandemic and travel restrictions have forced companies to adapt to restrictions and restrict travel for work. Almost everything was done online. People have become accustomed to this regime and there has been a decline in this category of passengers even after restrictions have been lifted. In this case, to compensate for such a decrease, US airlines could consider expanding capacity to other passenger categories. Increasing their focus on holiday travel would mean reconfiguring the aircraft cabin to accommodate more economy class tourists and less capacity for business and premium class seats.

6.3. Hygiene and customer service

During the pandemic, Emirates sought to restore customer confidence by providing free COVID-19 medical coverage to all passengers and by raising the possibility of changing the flight date at no additional charge. Despite the fact that travel

arrangements are being relaxed and many countries no longer impose any entry conditions on COVID-19, airlines should focus on ensuring in-flight hygiene and thorough disinfection so that passengers can feel safe. They should also be flexible about the changes that can be brought about by seemingly ending crises or other events that could affect the air transport. It is precisely such companies that will be focused on customer service and will elegantly and clearly solve the operational problems that will be sought.

6.4. Cost effectiveness and safety

The duration and scale of the pandemic have forced companies to reduce their costs, not just in air transport, and to find ways to deal with the situation as best they can. Airlines, airports, and air navigation service providers should consider their cost structures and adapt their strategies after the end of the pandemic to be more cost effective. However, regardless of efficiency, safety should remain a priority.

6.5. Events

Václav Havel Airport in Prague held weekend programs on its premises for families with children to attract them to the airport. The events were educationally entertaining. These events could be a great way to promote airports, which could also serve to regain demand for air services. Through such programs, people could learn more about the hygiene or other measures, benefits, or services that the airport and airlines provide, and thus build trust and create demand. In this way, concerns about aircraft infections as well as current flying concerns could be alleviated in potential future passengers. Ultimately, the key will be the interaction with people, whether in the form of various events or advertisements.

6.6. Digitalization

The idea of increased digitization began to develop long ago, but the high costs discouraged many companies and airports from the implementation of modern technology as long as the current regime was sufficient. However, the coronary crisis has forced airports to take steps that have led to greater hygiene, maintaining sufficient spacing and minimizing the gathering of people in one place, for example while waiting in the baggage advice. More advanced technologies have speeded up the passenger handling process and have also brought benefits in terms of contactlessness and the ability to have all the necessary documents with you in digital form without the need for unnecessary paper waste.

6.7. Multi-source financing

Successful companies that want to establish themselves and stay in the market must be flexible and ready to respond to various obstacles. The crisis caused by COVID-19 has caused a significant outage in the main activities of airlines, airports, and air navigation service providers. All these sectors should focus on attracting other financial resources thanks to the products offered as the main one. A good example is the already mentioned Prague Airport, which was able to increase its non-air revenues in a non-standard way by holding events for families with children. There could be various trainings and

other activities within air navigation service providers to help them increase their profits.

6.8. Fleet modifications

The original idea of designing the huge aircraft was a congested network, which meant an increased risk of possible collisions. The routes on which several smaller aircraft flew daily have been replaced by a smaller number of large transport aircraft, and this has led, among other things, to a reduction in the workload of navigation service providers. The pandemic has forced air carriers to consider, among other things, reducing costs by disposing of old or overpriced aircraft. British Airways also removed the last Boeing 747 from its fleet, and 14 aircraft "retired" in the Emirates. Despite the fact that Emirates immediately added three new A380s to its fleet, we can see from the results of their total cost ratio in 2020/2021 that they were largely unable to cover their costs effectively.

7. CONCLUSION

The results show that although the aviation sector was one of the hardest hits by the pandemic. It began to recover relatively quickly and regain growth. It is slowly returning to pre-pandemic times and gaining a foothold in the market. Returning customer confidence and better efficiency in responding to operational challenges are key elements of a complete return to the limelight.

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