

# Covid-19: A Disaster While Also an Opportunity for the U.S. Airline Industry

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## ABSTRACT

The U.S. airline industry faces a significant recession due to the Covid-19 pandemic. It is well-known that the outbreak of the Covid-19 pandemic has imposed many damages in the U.S. airline industry, both from the decline of passengers taking the flight and the decline of the U.S. flights. The Covid-19 pandemic also has negative impacts on airport services and airline companies, mainly due to the loss of capacity to provide airport services and the sharp decline in the revenue generated by the U.S. airline companies. This paper aims to analyze the impacts of the Covid-19 pandemic on the U.S. airline industry (Freight & Passenger). Specifically, it investigates the impacts of the Covid-19 pandemic on the U.S. airport services and the relationship of the Covid-19 on the airports to the size of these airports, as well as the relation of the social distancing measures to the recession of the U.S. airline industry. In this context, social distancing is defined as the effective distancing that people need to keep to reduce the spread of the Covid-19 virus. Some data comparing the situation of the U.S. airline industry before and in the pandemic is used to test the hypothesis that the social distancing measures have contributed to the recession of the U.S. airline industry. The results suggest a positive relationship between the social distancing measures and the recession of the U.S. airline industry. On this basis, some suggestions on how to help the U.S. airline industry recover from the pandemic more efficiently will be provided. Government intervention, airline companies' reactions, and passenger preference are the primary attempts to help the U.S. airline industry recover from the Covid-19 pandemic.

**Keywords:** *Coronavirus, Airline Industry, Air Rravel Operations, Airport Service.*

## 1. INTRODUCTION

The COVID-19 pandemic has caused a huge impact on the global air transport industry, and the pressure will continue to be transmitted to airlines, major manufacturers, industrial chains, airports, service companies, etc., and it is impossible to predict how long this impact will last. Airlines and aircraft leasing companies have adjusted their aircraft introduction plans, reduced capital expenditures, and continued to strengthen risk management and cash flow management. In order to cope with the spread of the epidemic, many countries have to take measures to close borders and restrict travel. The spread of the epidemic has forced airlines to cut flights on a large scale. Large-scale airlines have caused unprecedented damage. Due to the different anti-epidemic policies and border management policies introduced by various countries, the passenger and cargo aviation industries have been affected to varying degrees.

The United States, as one of the largest trading countries, is of course no exception. Especially in the passenger aviation industry, people's willingness to travel has dropped sharply, and telecommuting has become more and more common, resulting in a sharp drop in passenger traffic in the past two years. In addition, U.S. domestic air travel operations and commercial airport services have also been affected by the outbreak and have changed their operating strategies in order to save costs and minimize losses. In the face of the normalization of the epidemic, the government and airlines need to work together to find more innovative and efficient operation strategies to increase profitability and recover from the epidemic as soon as possible. For example, government aid is crucial for the airline industry to remain profitable on paper and for airlines to control the scale of layoffs.

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The real-time impact of the epidemic on the US airline sector using trading-day frequency data from US airlines and a statistical method to local forecasting has been quantified. According to the analysis, a 1% COVID-19 shock would cause American Airlines' stock to plummet 0.1 percentage points immediately. Furthermore, the shock's effects continued until the next day, with most airline stock values falling by as much as 0.6 percent after fifteen days. The report also said that the Covid's negative impact on American Airlines stock prices was attributable to a drop in air travel induced by COVID-19, rather than an increase in airline variable costs, which cut revenue and weakened American Airlines. The profitability of a corporation, which eventually leads to a drop in the stock price [1]. Under the Coronavirus Aid, Relief, and Economic Security (CARES) Act, this report examines the impact of COVID-19 on domestic air travel operations and commercial airport services in the United States. The measure aims to offer financial aid to airlines so that they may continue to serve domestic cities they serviced prior to the epidemic. Air traffic data from the United States Bureau of Transportation Statistics was used in the study. According to the survey's findings, the number of outgoing flights in 2020 will be 71.5 percent fewer than in 2019. As airlines updated their networks, the number of domestic markets served between commercial airports in the United States declined by 32.1 percent. Domestic aviation service was reduced in a variety of ways. Even with the CARES Act protections in place, these data show how U.S. airlines' responses to COVID-19 are hurting service at U.S. airports [2]. The influence of covid on the commercial aviation business in the United States is examined in this article. Commercial airplane transportation of deceased and living donor kidney transplants has been the topic of research. The study compared planned flights during the current year to flights a year earlier using national flight data from the United States. There was a 65.1 percent reduction in flights between HVA-OP in the renal transport network, and OPO levels varied substantially. Logistics and cold ischemia time are affected by fewer flights and longer wait periods. This findings might drive the hunt for creative methods to KT transportation as the influence of the epidemic on the aviation sector continues to develop [3].

The effects of covid on passenger and freight airlines in the United States are examined in this article. The study concentrated on headcount and earnings. Time series econometric models and datasets from the US

Bureau of Transportation Statistics are used in the study technique. Due to fewer consumers and travel restrictions, it faced earnings losses and enormous layoffs. Because of fewer travelers during the epidemic and the US government's control of Covid-19, passenger airlines have faced major reductions in staff and profitability. In contrast, during the epidemic, due to a rise in the delivery of anti-epidemic products, American Cargo Airlines' total number of employees and earnings climbed dramatically compared to the non-epidemic period [4]. Some focused on aspects of the pandemic recovery that are unique to the US aviation industry, recognizing our industry's interdependence. As the sector seeks to recover from its worst crisis in history, all stakeholders have the opportunity to learn from one another and gain future agility [5]. Some aims to examine how uncertainty shocks affect airline employment in the context of the current global pandemic. The airline industry has faced many threats throughout its history, but none as swift and severe as the spread of COVID-19. During uncertainty shocks and industry downturns, one constant is that airline labor bears the brunt of the decline. The post-stimulus effects on airline labor are unknown as the industry reduces capacity in response to increased travel restrictions. The dynamics of historical uncertainty shocks to the industry are investigated using time series analysis. During uncertainty, the estimated job loss is nearly 7% of the airline workforce, with an upper bound of more than 13%. Significant airline employment suffers the most, while low-cost and regional airline employment suffers the least. Employees involved in passenger handling and flight operations are the hardest hit, while management employees fare slightly better during these uncertain times. Furthermore, it is estimated that recovery from uncertainty shocks will take between 4 and 6 years. Overall, the labor impacts of uncertain events on the airline industry are significant, and they provide insight into the expected industry job loss from COVID-19. The airline industry has experienced a decrease in roughly 60–80% capacity at significant carriers. As demand wains, further reductions by airlines are on the horizon. The indefinite timeline for removing social distancing and travel restrictions has increased uncertainty for the industry. Uncertainty is a critical driver in numerous recessions, and economic shocks can propagate over time. When there is uncertainty in an economy, investors tend to reduce their investment, and producers tend to reduce their production to avoid potential risks. An increase in uncertainty tends to reduce actual activity in an economy. Globalization has created an interwoven system of economies connected by the robust air transportation networks [6].

From the standpoint of passengers, this article examines the impact of government-imposed travel limitations on the US airline business during the COVID-19 epidemic. Based on data collected by passengers and airlines on social media, the research created four

indicators. These four indicators track how travel limitations influence the passenger-airline relationship in real time. According to research, each airline reacts differently to COVID-19 travel limitations from the perspective of passengers, therefore airlines and passengers may utilize this information to better their decision-making [7]. Cirium is a website that supplies us with real-time data to assist us forecast when airlines will resume service. American Airlines, like all other airlines, has been irreparably impacted by covid. The influence of supply, demand, and cash flow on the prognosis for the US airline market is examined in this article. It examines demand in the United States, government involvement, fleet storage in the United States, seat alterations in the United States, airline scheduling in the United States, airline cash flow in the United States, post-recovery investments, and the United States' recovery timeframe [8].

Researcher focuses on the steps that the government should do to enhance the aviation industry's long-term growth under the impact of covid. The substantial decline in demand for passenger air travel as a result of the COVID-19 epidemic and containment efforts poses a major danger to the profitability of many airline firms, several of which are already in jeopardy. According to the article, governments should stimulate investment in green transitions to strengthen the aviation industry's long-term resilience, such as by making corporate-level support choices based on environmental improvements. In addition, solutions to solve the COVID-19 aviation problem should be integrated into several OECD nations' low-carbon transition programs, which are either being implemented or being discussed [9]. Research examines and outlines COVID-19's financial and operational effects on the aviation sector, suggests an evolving risk management strategy to the resumption of aviation operations, and emphasizes the supportive work that airlines must give. The influence of Covid-19 on the aviation insurance business is also discussed, as well as how larger strategic risk management methods have changed in response [10].

The purpose of the research is to organize and analyze the relevant research results of the U.S. aviation industry after the outbreak, and to put forward constructive suggestions to help the U.S. aviation industry recover faster. The research focuses on the different impacts of Covid-19 on the passenger and cargo aviation industries. It also discusses the changes and innovations in airport operations and commercial airport services in the United States in the context of the normalization of the pandemic. After a systematic analysis, feasible recommendations for the recovery of the aviation industry were made to the airlines and the government in the United States.

## **2. IMPACT OF COVID-19 ON U.S. CARGO AND PASSENGER AIRLINES**

S Many countries have temporarily closed their borders to limit the spread of the virus due to the ongoing outbreak of the coronavirus. In addition, multiple restrictions and regulations have been promulgated have greatly restricted the free movement of individuals, all of which have dealt a huge blow to the cargo and passenger aviation industry. The estimated revenue loss of airlines worldwide in 2020 due to the coronavirus outbreak is 370 billion USD (statista, 2021) [11]. The United States is certainly no exception.

### ***2.1. Passenger aviation industry***

The airline business in the United States has been much harder than other industries like financial markets, with the industry presently undergoing its steepest downturn since World War II. I, according to data provided by the Transportation Security Administration (TSA), as of April 16, 2020, U.S. airports had screened fewer than 100,000 passengers, compared to 2.6 million on the same day in 2019, which indicates a 96% drop in air passengers. The figure below showed the U.S. Airline Passenger Traffic, Percentage Change 2019 versus 2020.

### ***2.2. Cargo aviation industry***

According to the International Air Transport Association, only about 1% of global trade is carried by air, but this 1% accounts for 35% of global trade in value. However, compared with passenger transport, the epidemic has less impact on the air cargo market, and the impact has been mixed. The North American air cargo market, for example, sent a positive signal: air cargo demand in the region grew by 5% in November 2020, indicating signs of recovery from the prolonged pandemic. On the positive side, the prolonged Covid-19 pandemic has also accelerated the global transition to e-commerce, which is sure to benefit all freight providers. The latest research from IBM indicates that the pandemic may have accelerated the global transition to e-commerce by five years. Especially for freighter planes dedicated to carrying cargo, the surge in e-commerce and the reduction in passenger aircraft cargo volumes due to a significant reduction in passenger flights are huge positives for the accelerated transition to e-commerce..

## **3. IMPACT OF COVID-19 ON U.S. AIRLINE OPERATIONS AND COMMERCIAL AIRPORT SERVICES**

The impact of Covid-19 on the domestic U.S. air travel operations and commercial airport service. With the outbreak of Covid-19, the U.S. airline has been hit hard, and air transportation is almost at a standstill. The U.S. government is imposing some measures to maintain the

social distancing and curb the spread of Covid-19. As a result, there is a sharp decline in the passengers taking the flight, and the number of flights also experiences a sharp decrease. According to the U.S. Bureau of Transportation Statistics, the performed departures of the U.S airports decreased by approximately 71.5% in May 2020 compared to May 2019. Additionally, the performed departures of larger primary airports have declined more than that of small non-primary departures, partly due to their more significant number of flights. Moreover, airport-based markets have decreased more in multi-airport cities than in single-airport cities; there is a decline of 38.5% in multi-airport cities compared to a decline of 15.8% in single-airport cities.

Since the outbreak of Covid-19, many in-person activities have shifted to online activities. Meanwhile, with travel restrictions in place and the highly contagious nature of Covid-19, people are uneasy about travel in afraid of getting affected by the Covid-19 virus. As a result, air travel begins to plummet worldwide by mid-March 2020 due to the sharp decline of air travel demand. There is a net loss of \$5.2 billion in the airline industry in the first quarter of 2020 worldwide, which indicates the huge revenue loss of the airline industry (BTS, 2020a). In order to help the U.S. airline industry overcome the challenges facing the global Covid-19 pandemic, the U.S. government signed the Coronavirus Aid, Relief and Economic Security (CARES) Act into law and intervened in the U.S. airline market. The U.S. government provided a total of \$50 billion to passenger carriers, and \$8 billion was provided to cargo carriers through combining payroll support, loans, loan guarantees (U.S. Congress, 2020). All of the ten largest passenger carriers in the U.S. signed agreements with the U.S. government to receive financial support from the U.S. government. Consequently, those who have signed agreements and received financial support from the U.S. government must follow some requirements. For instance, they are not permitted to reduce employees' wages or involuntary workers'. Some carriers are also required to maintain a sufficient number of airline services to the domestic cities.

Although it is not clear how long the Covid-19 pandemic will last, the experts still believe that the impacts of Covid-19 on the U.S. airline industry will be long-term. The industry leaders predict that it will take at least 3-6 years for the whole airline industry to recover (Josephs , 2020 ; Sobieralski , 2020). Previous uncertain activities such as 911 and the financial crisis of 2008 can provide us an insight into the recovery of the airline industry from future impacts. For example, Sobieralski (2020) uses past uncertainty shocks to predict U.S. airline employment reductions related to COVID-19 and an estimated 7% (or 32,000 employees) post-pandemic reduction in airline workforces. Commercial airport services will also change with air travel operations since airports need to integrate the resources to serve

passengers efficiently. The analysis of the impacts of Covid-19 on the U.S. airline industry will help the U.S. airline carriers to recover and develop their airline services.

## **4. SOLUTIONS TO MAKE THE U.S. AIRLINE INDUSTRY RECOVER FASTER FROM COVID-19**

### ***4.1. Cargo and passenger aviation industry***

As time passes and vaccination rates increase, the pandemic will ease and the economy will begin to recover. And how the aviation industry can recover faster and better from the epidemic has become a topic of public discussion. To recover and thrive in a post-COVID-19 world, airlines will need to work together to aggressively reform. Because the duration and severity of the outbreak is highly uncertain, and each country's response policies and border opening speeds vary, new operational strategies will need to cater to the needs of a changing world. Especially under the restrictions of various travel bans, it may be difficult for most people to return to their original travel habits in a short period of time.

IATA predicts that global air passenger demand (measured in revenue passenger kilometers or RPKs) will not return to pre-pandemic levels until 2024, a year later than previous forecasts. The recovery for short-haul travel is still expected to be faster than for long-haul travel. As a result, passenger numbers will recover faster than air passenger demand in RPKs. However, it may be more realistic to expect demand to return to pre-pandemic levels, perhaps in 2024. There are two main reasons why passenger traffic is difficult to recover. One is the reduction in official travel. Corporate travel budgets will be very limited, and even in a better economy, companies will still face financial pressures. Furthermore, while GDP growth has historically been highly correlated with air travel, the survey shows that this link has weakened, especially when it comes to business travel, and video conferencing appears to have emerged as an effective alternative to face-to-face meetings. The second reason is the lack of consumer confidence. While demand for visiting relatives and friends and leisure travel has been pent up, consumer confidence is weaker over concerns about job security and rising unemployment, as well as the risk of contracting the virus. About 55% of respondents to IATA's June passenger survey did not plan to travel in 2020.

Passenger airlines can consider taking these steps to recover from the outbreak. The first is to strengthen epidemic prevention and control and maintain the stability of production organization. Public air transport is at the front line of epidemic prevention and control and is an important part of the public emergency response system. In order to meet major transportation needs such

as epidemic prevention materials, medical staff, and patient transfer, airlines need to strengthen transportation organization guarantees, comprehensively provide transportation services during the epidemic prevention and control period, and provide basic civil aviation transportation guarantees necessary during the epidemic period. At the same time, scientifically reduce the capacity, and decisively shrink the market of the routes with severe drop in passenger demand; make timely adjustments to the route layout, put the capacity to the market with high demand, and strive to increase the flight density of the high-quality route market and digest the capacity. Optimize the flight plan for international routes, adjust the capacity allocation, and minimize the loss of business operations while ensuring the accessibility of the route network. During the epidemic prevention and control period, due to business decline, airlines can strengthen internal management in corporate culture, employee training, business process optimization, etc., to improve company cohesion and employee professionalism.

In addition, passenger airlines can also adjust product structure and increase cash flow. For example, suspend the provision of products and services that do not meet the epidemic period (including preferential services, VIP waiting, in-flight meals, etc.), and optimize the product structure. Develop new sales products in a timely manner, warm up the market through extension, pre-sale, and preferential packages, and increase cash flow by launching travel products, insurance sales, and mixed business operations. For example, an airline's in-flight mall provided employees and customers with online mobile phone purchase services during the epidemic, selling necessities such as disinfectants, masks, and food. During the epidemic, daily sales continued to hit new highs. Change the sales policy, provide preferential treatment to passengers who change or cancel their tickets, and retain existing customers who have purchased tickets.

Contrary to passenger aviation, the strategic value of cargo aviation has been highlighted in the epidemic, and air cargo has ushered in new opportunities for development. After the outbreak of the new crown epidemic, due to the reduction and suspension of passenger flights, the belly capacity of passenger aircraft has been greatly reduced, and international air logistics has experienced staged capacity shortages. Improving air cargo capacity can be achieved by stabilizing the supply chain, strengthening international cooperation, improving the air cargo hub network, and improving the air cargo standard system. In terms of policies, airlines can be encouraged to deploy capacity quickly and efficiently by simplifying administrative approval procedures, canceling the time limit for cargo flights during peak hours, and guiding airlines to use passenger aircraft capacity to meet freight demand.

According to Cirium, it is predicted that the U.S. airline industry will take more than two years to recover, and the speed of recovery depends on the establishment of consumer confidence. A healthy airline needs a healthy and confident society and a healthy economy. With the outbreak of the Covid-19 pandemic, 20% of the U.S. economy is at risk. Millions of U.S. citizens will be affected, 10 million have filed for unemployment benefits, more than 700,000 have been reported lost, and U.S. federal revenue could drop by 50% in the near term. However, the good news from an airline industry perspective is that, according to 2019 research, most U.S. airline passengers appear to be in jobs with a low risk of unemployment.

Among business travelers, 72% are in some professional job, which is more likely to put them at low risk of unemployment; 58% of leisure travelers work professionally and have a low risk of unemployment. All airlines will focus on areas that will bring recovery generation and efficiency. Tech companies selling technology, ancillary products, and solutions will need to think about making it as easy as possible for airlines to test, install and operate it.

In order to promote the sustainable development of the aviation industry, government policy should prioritize industry-wide measures and competition. The U.S. government should mainly concentrate on balancing the need to support and the risk of distorting competition. Where company-specific support measures are needed and implemented, they should not tilt the playing field against the rest of the airline industry. It should also focus on keeping the business dynamic and allowing exits. Since demand is more likely to be structurally different and potentially lower than before the crisis, the government should facilitate restructuring and avoid supporting unavailable companies, supporting unemployed workers instead. It is also significant for the U.S. government to encourage investment in green transitions to improve the long-term resilience of the aviation industry, for example, by making corporate-level support decisions based on environmental improvements. Moreover, addressing sustainability issues across the aviation value chain, including aircraft manufacturers and airports. As cooperation across sectors and with other policies is critical, policies to address the Covid-19 crisis in aviation should be incorporated into low-carbon transition strategies implemented or under discussion in the U.S.

#### ***4.2. Airline operations and commercial airport services***

Given the highly fragmented profitability and productivity of companies in this industry, the risk of government intervention negatively affecting business dynamics and productivity could be particularly acute for air transport. As demand is likely to remain subdued in

the medium term, the industry has begun to adapt and downsize. In this case, the government should allow scaling down rather than fighting back, with particular care to facilitate the restructuring or exit of the least efficient firms while targeting efficient use of public resources. Policy interventions should encourage investment to improve aviation sustainability. The government needs to provide a smooth transition for unemployed workers during the restructuring process. In addition to lowering costs for companies, the job retention scheme protects airline workers' earnings at the height of the crisis. As uncertainties about the cost of health measures and the shape of commercial flight resumption are resolved, job retention plans need to be adjusted to accommodate targeted jobs that are feasible but at risk of being terminated. At the same time, the government needs to focus on supporting aviation workers who risk losing their jobs rather than supporting specific jobs.

Moreover, policy interventions to support sustainable investments should target the entire aviation value chain, including aircraft and engine manufacturers and airports. Policies should not spur airline demand for planes. The extra costs could jeopardize the latter's solvency and fail to ensure a steady stream of orders from the planemaker. Furthermore, interventions should not focus on large enterprises. However, they should ensure that young companies and start-ups are included. For example, complementary measures excluding young companies may lead to over-consolidation of the most prominent players. Mission-oriented strategies aim at greening aviation which can be a valuable tool in this regard. The reactions of industrial policy to the COVID-19 crisis in aviation should be part of low-carbon transition strategies implemented or under discussion in the U.S. Such a coherent package of policy measures can help address societal challenges, especially by coordinating all stakeholders and ensuring coherence and complementarity of public and private investments.

## 5. CONCLUSION

In general, this paper mainly analyzes the impacts of the Covid-19 pandemic on the U.S. airline industry from the context of freight and passenger. Some data showing the situation of the U.S. airline industry before and in the Covid-19 pandemic is used. The results suggest a positive relationship between the imposing of the social distancing measures and the recession of the U.S. airline industry is performed. In order to get the U.S. airline industry on the right track and help it recover from the Covid-19 pandemic more efficiently. It is essential for the U.S. federal government, airline companies, and passengers to cooperate to recure the U.S. airline industry and promote the sustainable development of the U.S. airline industry. The Covid-19 pandemic is not only a disaster for the U.S. airline industry but also a good

chance for the U.S. airline industry to transform into a more environmentally friendly and consumer-friendly industry. Good time for the U.S. airline industry to engage in a revolution through recovering from the impacts of the Covid-19 pandemic.

## REFERENCES

- [1] A. Bebonchu, Y. Jules, Quantifying the Impact of the COVID-19 Pandemic on US Airline Stock Prices, 2021, DOI: <https://www.sciencedirect.com/science/article/pii/S096969972100123X>
- [2] Cirium. INDUSTRY TRENDS: COVID-19 impact on US airlines and outlook for recovery, 2020, DOI: <https://www.cirium.com/thoughtcloud/us-airlines-covid-19-outlook/>
- [3] S. Hotlea, S. Mumbowerb, The impact of COVID-19 on domestic U.S. air travel operations and commercial airport service, 2020, DOI: <https://commons.und.edu/avi-fac/8>
- [4] Z. Liang, The Economic Impacts of COVID-19 on the U.S. Airline Industry, 2021, DOI: <https://openrepository.aut.ac.nz/handle/10292/14740>
- [5] P. Monmousseau, A. Marzuoli, E. Feronb, D Delahayea, Impact of Covid-19 on passengers and airlines from passenger measurements: Managing customer satisfaction while putting the US Air Transportation System to sleep, 2020, DOI: <https://www.sciencedirect.com/science/article/pii/S2590198220300907?via%3Dihub>
- [6] OECD, COVID-19 and the aviation industry: Impact and policy responses., 2020, DOI: <https://www.oecd.org/coronavirus/policy-responses/covid-19-and-the-aviation-industry-impact-and-policy-responses-26d521c1/>
- [7] J. Rooley, How COVID-19 has affected the aviation industry and its approach to risk. 2020, DOI: <https://www.google.com/url?q=https://www.wtwco.com/en-GB/Insights/2020/06/how-covid-19-has-affected-the-aviation-industry&sa=D&source=docs&ust=1644609403928508&usg=AOvVaw3-KOIFIEyf17UBFjTceQIr>
- [8] A. T. Strauss, Impact of the COVID-19 pandemic on commercial airlines in the United States and implications for the kidney transplant community., 2020, DOI: <https://onlinelibrary.wiley.com/doi/full/10.1111/ajt.16284>
- [9] P. Fontanet-Pérez, X. H Vázquez, D. Carou, The impact of the COVID-19 crisis on the US airline

market: Are current business models equipped for upcoming changes in the Air Transport Sector? *Case Studies on Transport Policy*, 2022, 10(1), 647–656. DOI: <https://doi.org/10.1016/j.cstp.2022.01.025>

- [10] J. Norman, Long haulers: The US airline industry and moving forward from the covid-19 pandemic, 2021, DOI: <https://doi.org/10.31356/avi-fac008>
- [11] E. Mazareanu, Coronavirus: Impact on the Aviation Industry Worldwide - Statistics & Facts, 2022, DOI: <https://www.statista.com/topics/6178/coronavirus-impact-on-the-aviation-industry-worldwide/#dossierKeyfigures>