AIR TRAFFIC AND THE AVIATION INDUSTRY DURING COVID-19: CONSEQUENCES OF THE PANDEMIC

Ilir Mehmedi
Mother Teresa University, Skopje, North Macedonia, ilir.mehmedi@unt.edu.mk
Suzana Mehmedi
Ministry of Foreign Affairs, North Macedonia, suzana.mehmedi@mfa.gov.mk

Abstract: The COVID-19 pandemic has caused an unparalleled disruption in the aviation industry, marking an unprecedented reduction in flight numbers from March to May 2020. Since then, the aviation sector has been grappling with the challenges posed by this crisis, highlighting its significant vulnerability to external shocks. Despite encountering previous aviation crises, the impact of COVID-19 stands out as unprecedented in modern aviation history. While there was a modest recovery in global passenger traffic in 2021, with 2.3 billion passengers recorded, representing a 49 percent decrease from pre-pandemic levels in 2019, this improvement was compared to the substantial 60 percent decline observed in 2020. However, global airline seat capacity surged by 20 percent during this period, surpassing the growth in passenger demand. As a result, the overall passenger load factor dropped to 68 percent in 2021, down from 82 percent in 2019. Airlines worldwide faced significant losses, totaling $324 billion in 2021, following losses of $372 billion in 2020. The aviation industry has been severely affected by the COVID-19 pandemic, witnessing unprecedented declines in passenger volume and airline revenue. In response to the pandemic, governments implemented various non-pharmaceutical measures to control local outbreaks in the early stages, with air transportation identified as a significant contributor to the spread of COVID-19. This led to the imposition of flight bans by countries and regions during the initial waves of the pandemic, exacerbating the challenges faced by the aviation sector..
Keywords: aviation sector, crisis, passengers, vaccines, government interventions, air transportation

1. INTRODUCTION

The COVID-19 pandemic has had an unprecedented impact globally, causing widespread economic and social upheaval. While historical epidemics like cholera, the Spanish flu, and SARS have occurred, none have brought the world to a halt like COVID-19. The pandemic swiftly led to universal restrictions and triggered significant disruptions across every sector of the economy. Particularly hard-hit were contact-intensive services such as tourism, which experienced a dramatic decline in activity during the peak of the initial wave in the second quarter of 2020, dropping by 25% compared to pre-COVID-19 levels (Deb, 2021). In contrast, sectors more tied to economic cycles, like industry and construction, saw relatively smaller declines of -19% and -15%, respectively. Services that relied on high-skilled workers and were amenable to remote work, such as information and communication technology (ICT), finance, and real estate, experienced even lesser contractions, with declines of less than -10%.

Tourism, being one of the most vulnerable sectors to the impact of COVID-19, suffered significantly, leading to a crisis in air transport as well. Despite having faced previous crises like the World Trade Center attacks, volcanic ash clouds, and the 2008 financial crisis, the aviation industry had never undergone such a profound revolution as that brought about by COVID-19. Among the hardest-hit industries, the aviation sector experienced an unprecedented decline in air passengers, resulting in the suspension of operations for most airlines. Some companies were compelled to cease operations entirely and ground their fleets, leading to substantial job losses across the sector.

Furthermore, the pandemic prompted significant shifts in passenger behavior, such as increased concerns about health and safety, leading to changes in travel preferences and patterns. This transformation has posed significant challenges for the aviation industry as it seeks to adapt to the new normal and navigate its recovery in the post-pandemic world.

2. AVIATION AND COVID-19

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 as a pandemic, prompting numerous countries to implement travel restrictions in efforts to curb the spread of the virus. Consequently, there was a drastic decline in flight numbers and revenues across the aviation sector virtually overnight. The International Civil Aviation Organization (ICAO) estimates a staggering 60% decrease in global passenger numbers for the year 2020, causing severe repercussions throughout the industry (see Figure 1). Such a substantial drop has never been witnessed before, even during past events that significantly impacted the air transportation system and its associated demand.

As of May 2021, there has been a noticeable increase in seat capacity in Europe, indicating a gradual recovery. In North America, there was a less pronounced initial drop in seat capacity at the onset of the pandemic, followed by a steady growth trajectory since April 2020.

A significant concern since the outset of the crisis has been the survival of the air transportation industry amidst the sudden and drastic decline in demand. In Europe, various countries stepped in to provide financial assistance to airlinesSome of this assistance was conditional on environmental efforts, such as reducing emissions or gradually eliminating short-haul flights, which could be substituted with train travel. Furthermore, in early April 2020, the 41 Member States of EUROCONTROL agreed to temporarily postpone the billing of route charges in the EUROCONTROL Multilateral Route Charges System for April, May, June, and July 2020, with payments rescheduled to commence in November 2020. The significant drop in demand resulting from the COVID-19 crisis also severely impacted the revenues and cash flow of European Air Navigation Service Providers (ANSPs), as they primarily rely on specific charges for flights within controlled airspace. EUROCONTROL introduced a loan facility of €1.3 billion to assist ANSPs experiencing substantial revenue declines due to the decrease in air traffic. Ten countries opted to participate in this loan program, with repayment scheduled by the end of March 2022.

3. FLIGHT CANCELLETIONS

In both Europe and the United States, government regulations dictate that airlines must refund fares for canceled flights. However, many airlines have chosen to provide vouchers or travel credits instead, typically with an expiration date by the year's end. Despite lobbying efforts from industry representatives to relax regulations allowing for the issuance of travel credits, the U.S. Department of Transportation has affirmed that airlines are required to offer refunds for canceled flights. Currently, travel vouchers are acceptable when passengers voluntarily cancel their plans due to factors like travel advisories, stay-at-home orders, and other restrictions. Despite numerous cancellations, thousands of nearly-empty "ghost flights" have continued to operate to maintain landing slots. As of May 4, 2020, the aviation sector globally experienced a significant 80% decrease in flight movements across all regions, including America, Europe, Asia-Pacific, and the Middle East. In early March 2020, around 10% of all flights were canceled compared to the previous year. As the pandemic progressed, late March saw a further decline of 40-60% in flight movements, with international flights being the most severely impacted. By April 2020, over 80% of flight movements were restricted worldwide. Research indicates that the global recovery of passenger demand to pre-COVID-19 levels is estimated to take approximately 2.4 years, with optimistic projections suggesting a recovery by mid-2022 and pessimistic estimates extending the timeline to 2026. Significant regional variations are observed, with the Asia-Pacific region having the shortest estimated average recovery time of 2.2 years, followed by North America at 2.5 years, and Europe at 2.7 years. In terms of air freight demand, a shorter average global recovery time of 2.2 years is predicted compared to passenger demand. On a regional level, Europe and North America have similar average recovery times of 2.2 years, while the Asia-Pacific region is forecasted to recover faster in 2.1 years. In 2022, the recovery of travel demand outpaced airlines' capacity to promptly rehire pilots and ground staff, resulting in several months of widespread delays and cancellations across the United States and Europe (Bartle J.R., Lutte R.K., Leuenberger D.Z., 2021).

4. HOW COVID-19 IMPACTED COMMERCIAL AIR TRANSPORT

In early 2020, the International Air Transport Association (IATA) painted a grim picture for the aviation industry, projecting significant revenue losses ranging from US$63 to 113 billion due to dwindling passenger numbers. This outlook was revised upwards just days later to an astounding $200 billion bailout necessity, as the pandemic's impact intensified. Subsequent estimates forecasted even steeper revenue declines, reaching $314 billion by April, alongside a 48% drop in passenger traffic for the year.

The COVID-19 pandemic has precipitated unprecedented challenges for the airline industry, prompting drastic measures to mitigate financial strain (Corbet et al., 2022). Airlines have resorted to controversial actions such as withholding refunds and deferring payments, while European carriers have managed to defer air traffic control charges, underscoring the industry's desperate efforts to weather the storm. The crisis hit with full force in March, as flight numbers plummeted drastically compared to the previous year, despite lower fuel prices. Analysts anticipate significant industry restructuring, with airlines expected to downsize fleets and implement cost-cutting measures. By mid-2020, the number of inactive aircraft soared, necessitating runway closures to accommodate the surplus. Globally, passenger capacity plummeted, with the International Civil Aviation Organization (ICAO) forecasting a staggering 1.2 billion fewer travelers by September 2020. The financial toll has been immense, with European carriers alone facing a $10 billion bill for canceled flights.

Additionally, to cope with the sudden financial strain, airlines resorted to controversial measures like withholding refunds and deferring payments (Corbet et al., 2022). Meanwhile, European carriers managed to defer air traffic control charges, reflecting the industry's desperate efforts to weather the storm. Despite early signs of trouble, the full extent of the crisis hit in March, with flight numbers plummeting drastically compared to the previous year. Even with lower fuel prices, airlines struggled to offset the revenue decline. Analysts predict a significant restructuring of the industry, with airlines expected to downsize fleets and implement cost-cutting measures. By mid-2020, the number of inactive aircraft soared, with runway closures necessary to accommodate the surplus. Passenger capacity plummeted globally, with the International Civil Aviation Organization (ICAO) forecasting a staggering 1.2 billion fewer travelers by September 2020. The financial toll was immense, with European carriers alone facing a $10 billion bill for canceled flights.

Looking ahead, recovery remains uncertain, with projections indicating a lengthy recovery period. While airlines grapple with unprecedented losses, aerospace manufacturers like Airbus and Boeing face their own challenges, with production rates slashed due to reduced demand. Despite vaccination efforts and evolving travel protocols, a return to pre-pandemic levels is expected to take several years, reshaping the industry in the process.

4.1. Airports

The global aviation industry has been significantly impacted by the COVID-19 pandemic, with airports facing widespread disruptions and changes across various aspects of their operations and growth trajectories. Here are some key observations regarding the pandemic's effects on airports:

The COVID-19 pandemic has prompted airlines worldwide to take extraordinary measures to cope with decreased demand and financial strain. Airlines have opted to store numerous inactive aircraft at designated facilities such as the Southern California Logistics Airport and Roswell International Air Center, effectively grounding surplus aircraft (Bouwer, Saxon, & Wittkamp, 2021). Additionally, major airports like Frankfurt Airport, Hartsfield–Jackson Atlanta International Airport, and Tulsa International Airport have repurposed their runways and taxiways as storage areas for grounded aircraft, with carriers like Lufthansa, Delta Air Lines, and American Airlines participating in this initiative to optimize space amidst declining air traffic. The reduction in passenger traffic has been significant, with some regions experiencing up to a 95% decline in major aviation markets by mid-April 2020. This unprecedented reduction has posed considerable financial and operational challenges for airports worldwide, necessitating swift adjustments to adapt to the new circumstances.

Project Accelerations and Shutdowns: In response to decreased passenger volumes, certain airports expedited renovation and development projects. For instance, Salt Lake City International Airport fast-tracked its redevelopment project by as much as two years, leading to substantial cost savings. In contrast, Westchester County Airport in the United States temporarily halted operations for a significant runway repaving endeavor due to reduced flight activity. Financial Ramifications: UK airports scrapped expansion initiatives valued at £1 billion owing to dwindling passenger figures. ACI Europe highlighted the precarious financial condition of 193 European airports, particularly regional ones, which face the threat of insolvency due to pandemic-related travel restrictions and decreased traffic.

Shifts in Rankings: Despite experiencing notably reduced traffic, airports like Dallas/Fort Worth International Airport (DFW) ascended to the top position as the world's busiest airport by aircraft movements. Conversely, major hubs such as Dubai International Airport fell out of the top 10 rankings for total passengers.

Summer 2022 Challenges: The summer of 2022 brought additional challenges for airports, with many facing extensive delays and a surge in flight cancellations due to ongoing pandemic repercussions. Amsterdam Airport Schiphol, for instance, experienced a downturn in air traffic, leading to staffing shortages and disruptions in baggage handling operations, resulting in lengthy queues. In summary, the COVID-19 pandemic presented unprecedented challenges for airports worldwide, prompting swift adaptations to cope with reduced passenger demand, implement stringent safety measures, and make operational adjustments to ensure resilience in the face of ongoing uncertainties.

4.2. Cargo airlines and freight forwarders

The freight forwarding and air cargo segments have emerged as resilient sectors amidst the COVID-19 pandemic challenges. Here's a rephrased version:

Profitability: Despite the pandemic's economic downturn, both freight forwarders and air cargo carriers managed to achieve healthy profits. Freight forwarders saw a 4% profit margin, while air cargo carriers achieved an even higher margin of 9%. These sectors were among the few in aviation to turn a profit in 2020.

Increased Demand: Disruptions in global supply chains led to a surge in demand for freight forwarding services and air cargo transportation. With traditional transportation modes facing delays, businesses turned to air cargo for timely delivery. This demand surge boosted revenues and profitability for both sectors.

Flexibility and Adaptability: Freight forwarders and air cargo carriers showed flexibility in adjusting operations to meet changing market demands. They implemented innovative solutions to streamline processes and optimize route networks, staying proactive in addressing pandemic challenges.

Investments in Technology: Strategic investments in technology, infrastructure, and fleet expansion have positioned these sectors for long-term success. Leveraging digital platforms, automation, and data analytics enhanced operational efficiency and customer service levels.

Overall, the freight forwarding and air cargo sectors have demonstrated resilience through profitability, adaptability to market shifts, and strategic investments. Moving forward continued innovation and flexibility will be crucial for navigating the post-pandemic landscape. Before the COVID-19 pandemic, the freight forwarding subsector exhibited strong and relatively consistent performance. Between 2012 and 2019, it maintained an average annual economic profit of $2 billion, with a margin of 2.2%. Despite its stability, the market was characterized by fragmentation, with the top five companies holding a modest 27% revenue share in 2019. During the pandemic, there was a surge in demand for air cargo, initially fueled by the urgent need for personal protective equipment (PPE) and medications. Subsequently, challenges in the ocean-shipping supply chain and a boom in e-commerce sales further heightened the demand for air cargo services. The grounding of passenger planes globally had a significant impact on the air cargo supply. With reduced belly capacity in passenger aircraft, the supply of air cargo was constrained, leading to increased rates for air cargo services. This, in turn, contributed to enhanced profitability for freight forwarders.

Despite the adversities, air cargo yields witnessed a substantial 40% year-on-year increase in 2020, followed by an additional 15% rise in the subsequent year. Additionally, load factors improved by ten percentage points in 2021 compared to 2019, signaling greater efficiency in cargo transportation. Looking ahead, while cargo yields are anticipated to decrease over the next two to three years, they are forecasted to remain above 2019 levels due to persistent disparities between supply and demand. This indicates ongoing opportunities for profitability within the freight forwarding and air cargo sectors. Overall, the resilience and profitability demonstrated by the freight forwarding and air cargo subsectors during the pandemic underscore their significance in global supply chains and logistics. Their ability to adapt to challenging market conditions and capitalize on emerging opportunities highlights their pivotal role in facilitating the movement of goods worldwide. (Bartle J.R., Lutte R.K., Leuenberger D.Z.2021).

5. CONSEQUENCES OF THE PANDEMIC

In the realm of sustainability within the aviation sector, the COVID-19 pandemic has served as a stark reminder of the industry's need to adapt and confront a range of challenges, spanning from health-related protocols to sustainability initiatives. The text provided outlines several key areas of concern: Health and Vaccination Certificates: Despite the establishment of standards for health and vaccination certificates, issues such as fraud and the temporary validity of immunity persist. To effectively contain the spread of the virus, there is a pressing need for unified standards and consistent implementation of these certificates. Network Planning and Pricing Strategies: Airlines are compelled to reassess their network planning and pricing strategies in light of fluctuating demand patterns and uncertainties in flight operations. With the potential decline in business travelers, airlines may need to adjust pricing structures between non-stop and connecting flights and reconsider their fleet compositions to optimize efficiency.

Competition and Policy Responses: The pandemic has brought to the forefront challenges surrounding competition within the airline industry, including concerns about subsidies to state-owned airlines and waivers of slot requirements at major hub airports. Policymakers must develop clear guidelines to address these issues and ensure fair competition across the industry. Sustainability: Given the significant contribution of the transportation sector, including aviation, to carbon emissions and climate change, there is an urgent need to reimagine aviation through a sustainability lens. While studies on sustainability abound, there is a risk that they remain purely theoretical without tangible policy implications. Practical pathways, potentially leveraging game-theoretic models, are essential to drive meaningful progress towards sustainable aviation. In summary, the post-pandemic recovery period presents a unique opportunity for the aviation industry to confront these challenges head-on and make substantial strides towards sustainability and resilience. However, achieving meaningful change will require collaborative efforts from various stakeholders, including policymakers, airlines, and industry experts (Abeyratne, 2021).

6. CONCLUSIONS

The COVID-19 pandemic has had a significant impact on society, with the aviation sector being particularly hard hit. It not only led to a substantial decrease in air travel demand but also emphasized the role of aviation in the transmission of infectious diseases. Without substantial changes to our lifestyles and travel practices, similar

challenges may arise in the future. In 2020, the International Civil Aviation Organisation (ICAO) projected a 60% drop in global air passenger traffic compared to the previous year. Within the United States, air traffic in the CONUS region saw a decrease of 33.5%, resulting in 5.3 million fewer flights. Similarly, in Europe's ECAC region, there was a 55.2% decline, equating to 6.1 million fewer flights compared to 2019. The more significant decrease in European traffic can be attributed to differences in market composition and various pandemic containment measures implemented by individual countries. Domestic air travel was less affected than international travel on both sides of the Atlantic. In the US, domestic flights constituted a much larger proportion (85.6%) compared to Europe (28.4%), resulting in a comparatively smaller overall reduction in air traffic in the US. However, the substantial proportion of international traffic in Europe (71.6% in 2019) posed challenges for recovery due to varying quarantine and testing requirements among European countries. The lowest point for air traffic was reached in April 2020, with both the US CONUS area and Europe experiencing a decline to 65% and 90% below 2019 levels, respectively. Although the US encountered a second wave of COVID-19 cases between July and September 2020, air traffic in both regions started to rebound during the summer months. The pandemic has highlighted the aviation industry's susceptibility to global health crises and underscored the importance of coordinated efforts to address future challenges (Choi J.H.(2021). As we navigate the recovery phase, it's crucial to implement measures prioritizing safety, sustainability, and resilience in air travel.

REFERENCES

Abeyratne R. (2021). Air Transport and Pandemic Law. Springer;. Continuing air transport post COVID-19: The regulatory response;95–118.

Alaminos-Torres A., Martinez-Lorca M., Sifre De Sola I., López-Ejeda N., & Dolores Marrodán (2021). M. Psychological distress in Spanish airline pilots during the aviation crisis caused by the COVID-19 pandemic and psychometric analysis of the 12-item general health questionnaire. Ergonomics;1–12.

Bartle J.R., & Lutte R.K. (2021). Leuenberger D.Z. Sustainability and air freight transportation: Lessons from the global pandemic. Sustainability;13(7):3738

Bouwer, J., Saxon, S., & Wittkamp, N. (2021). Back to the future? Airline sector poised for change post-COVID-19. McKinsey and Company.

Byrne, R., & Adler, E. (2021). State aid to airports and airlines. In Research Handbook on European State Aid Law. Edward Elgar Publishing.

Choi J.H. (2021). Changes in airport operating procedures and implications for airport strategies post-COVID-19. J. Air Trans. Manage;94

Corbet S., Hou Y., Hu Y., & Oxley L. (2022). Did COVID-19 tourism sector supports alleviate investor fear? Ann. Tourism Res;95

Deb S. (2021). Analyzing airlines stock price volatility during COVID-19 pandemic through internet search data. Int. J. Finance & Econ.

Drogoul F., & Cabon P. (2021). Post COVID-19 fatigue management for ATCOs. Springer; 319–323.

Hemmings P., Mulheron M., Murphy R.J., & Prescott M. (2021). Investigating the impact of COVID-19 disruption on the decarbonisation agenda at airports: Grounded or ready for take-off? Sustainability;13(21):12235.

Hruby, M. (2021). COVID-19 and the aviation industry: Economic impacts and policy responses.