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Navigating turbulence — Resilience and strategies of major U.S. airlines in business continuity, operations, and sustainability

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Abstract---This paper examines the resilience and adaptability of U.S. airlines—Southwest, American, and Delta—from 2017 to 2022 amid challenges like the COVID-19 pandemic and fluctuating fuel prices. Southwest has upheld profitability through its low-fare model, while American has leveraged its international network for recovery, and Delta has swiftly rebounded with strong operational strategies. By analyzing their unique approaches and strategic responses, this study highlights the importance of adaptability, technology investment, and sustainability in crisis recovery. The findings provide insights applicable not only to the airline industry but also to other sectors navigating similar challenges, emphasizing informed strategic choices and resilience in dynamic environments.

Keywords---Performance, Sustainability, Finance, COVID, Strategy.

INTRODUCTION

The COVID-19 pandemic has created an unprecedented crisis for the global airline industry (Dunn, 2020). In response, governments worldwide have implemented travel bans, lockdowns, and shutdowns to enforce social distancing measures, aiming to curb the rapid spread of the virus and protect the integrity of national healthcare systems (Albers and Rundshagen, 2020). As a result, the travel and hospitality sector—especially airlines—find themselves in a precarious position, with over 60 percent of the world’s commercial aircraft currently grounded (Hollinger, 2020). The International Air Transport Association (IATA, 2020) projects that airline passenger revenues will plummet by \$314 billion in 2020, reflecting a staggering 55 percent decline compared to 2019.

The airline industry is a vital component of the global economy, facilitating cross-border travel, commerce, and cultural exchange. Over the past several years,

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major U.S. airlines, including Southwest, American, and Delta, have navigated a landscape fraught with both opportunities and challenges. The period from 2017 to 2022 serves as a compelling study, showcasing the resilience and adaptability of these carriers as they contended with unprecedented operational hurdles, including the global COVID-19 pandemic, fluctuating fuel prices, and regulatory shifts.

The purpose of this paper is to examine the distinct approaches of Southwest, American, and Delta Airlines in achieving operational efficiency, financial resilience, and sustainability within the U.S. airline industry. It aims to analyze how effective Business Continuity Management practices—such as risk mitigation, fleet modernization, operational agility, and strategic planning—enable these airlines to withstand external shocks like the COVID-19 pandemic, economic fluctuations, fuel price volatility, and environmental regulations. By exploring their strategies and recovery efforts, this paper seeks to highlight the critical role of Business Continuity Management in ensuring organizational resilience, continuous service delivery, and long-term sustainability in a highly volatile industry landscape.

Southwest's low-cost, efficient model exemplifies how operational simplicity and cost control can support continuous service delivery during disruptions, reinforcing the importance of flexible and resilient business strategies. American Airlines' need to strategically reposition itself in response to financial vulnerabilities underscores the value of comprehensive risk assessment and adaptive planning—core components of Business Continuity Management—that enable recovery and sustainment during external crises. Meanwhile, Delta's expansive fleet and strategic operational approaches demonstrate how diversity and robust resource management underpin resilience, allowing the airline to rebound swiftly from disruptions like the pandemic. Collectively, these examples underscore that effective Business Continuity practices—through strategic resource allocation, risk mitigation, and operational agility—are vital for maintaining stability and competitive advantage in a volatile industry landscape.

This paper undertakes an in-depth analysis of these three major airlines, examining their unique operational models, financial performances, strategic responses to crises, and commitments to sustainability. By unpacking the complexities of their journeys during this critical period, we can gain valuable insights into the factors that contribute to resilience in the highly competitive airline sector and understand how these carriers are positioning themselves for future growth in an evolving landscape.

This paper contributes to understanding how major U.S. airlines—Southwest, American, and Delta—leverage Business Continuity Management practices to navigate unprecedented external shocks, notably the COVID-19 pandemic. By examining their strategic approaches—including risk mitigation, fleet modernization, operational agility, and adaptive planning—the study highlights the vital role of Business Continuity Management in fostering organizational resilience, ensuring uninterrupted service delivery, and promoting long-term sustainability within a highly volatile industry. The analysis demonstrates that proactive risk assessment, resource diversification, and flexible business

strategies are essential for airlines to withstand disruptions such as economic downturns, fuel price fluctuations, and regulatory changes. Ultimately, this research underscores that effective Business Continuity Management practices are fundamental for maintaining industry stability, competitiveness, and societal contribution amid ongoing uncertainties, thereby offering valuable insights into resilience strategies applicable across the airline sector.

LITERATURE REVIEW

Impact of the COVID-19 Pandemic on the Airline Sector

The COVID-19 outbreak, first identified in December 2019 in Wuhan, China (Jiang et al., 2020), has led to significant disruptions across various industries. The virus's human-to-human transmission prompted widespread social distancing measures aimed at curbing its rapid spread. Among the sectors most severely affected is the tourism industry, particularly the airline sector, which has faced unprecedented challenges due to restrictions on customer-facing services (Dunn, 2020).

The COVID-19 pandemic has had a far-reaching impact on communities and countries worldwide, leading to a substantial decline in global economic activity in 2020 (Chi and Ziebart, 2024; Samitas et al., 2022; Chi et al., 2025). These disruptions highlight the crucial importance of assessing the integrity of reported earnings and the transparency of financial statements to promote reliable and transparent financial reporting (Chi, 2021).

The COVID-19 pandemic has thrust the air transportation industry into a period of unprecedented crisis and uncertainty. The dire outlook for the sector has stretched its resilience to the breaking point, as it grapples with challenges and disruptions of a magnitude that the aviation industry has never encountered before (Suk and Kim 2021).

In times of crises, organizations strive to safeguard vital resources—such as financial capital, employees, and supply chains—while also working to mitigate the damage caused by adverse business conditions (Wenzel et al., 2020). Several studies have examined the pandemic's impact on economic decisions and employment disruptions within the airline industry (Sobieralski, 2020). Furthermore, Albers and Rundshagen (2020) conducted a content analysis of 148 news articles to explore the strategic responses of European carriers to COVID-19.

IATA has projected that air travel will not fully recover until 2024 (IATA, 2020). In 2020, North American carriers are estimated to incur losses of \$24 billion, contributing to an overall global loss of \$84 billion (Shapiro, 2020). Major U.S. airlines faced significant financial setbacks, with the six largest carriers alone reporting losses totaling \$35 billion for the year. Furthermore, a recent study by the International Civil Aviation Organization (ICAO) revealed that only 1.8 billion passengers traveled in 2020, a sharp decline from 4.5 billion in 2019, resulting in a staggering combined loss of approximately \$370 billion for airlines worldwide (Wood, 2021).

Business Continuity Management

Business Continuity Management is a comprehensive, proactive management approach rooted in both disaster recovery and crisis management theories (Elliott et al., 2002). It is designed to facilitate ongoing risk management practices, serving as a strategic tool that, when effectively implemented, enhances confidence that organizational processes, services, and outputs can be maintained despite increased risks (Paton, 2009). Business Continuity Management aims to identify vulnerabilities and manage incidents that could potentially disrupt or damage critical business operations, thereby reducing their impact and ensuring timely recovery (Pearson and Mitroff, 1993).

The implementation of Business Continuity Management provides organizations with a vital opportunity to protect against various risks (Boin and McConnell, 2007). Beyond individual organizational benefits, Business Continuity Management strategies also bolster societal resilience by supporting continuous employment, service delivery, and economic contributions (Smith, 2005). Adequate allocation of financial and human resources, along with managerial commitment, are essential for effective Business Continuity Management execution (Elliott et al., 2002). Since risks, critical processes, and resources vary among organizations, Business Continuity Management procedures should be tailored accordingly to meet specific organizational needs (Boin and McConnell, 2007).

Net Income

To accurately assess a company's ability to optimize operational efficiency and generate sustainable profits, it is essential to consider key performance indicators, with net income being a crucial metric. Often referred to as the "bottom line," net income represents the profit remaining after deducting all expenses—including operating costs, interest, taxes, and depreciation—from total revenue (Chi and Ziebart, 2023).

This figure provides valuable insights into the company's core profitability by reflecting the difference between revenue generated through its activities and the expenses incurred to produce that revenue. A positive net income indicates financial health, signifying resources available for reinvestment, dividend payments, or debt repayment.

Conversely, a negative net income, or loss, may indicate operational inefficiencies or strategic issues within the company. Such outcomes can erode investor confidence, lead to a decline in stock prices, and result in higher borrowing costs. These factors highlight the critical importance of sustaining healthy profitability levels to ensure long-term financial stability.

METHODOLOGY

This study adopts a quantitative, qualitative, and comparative case study approach to analyze the logistical efficiency and social responsibility of three leading U.S. Airlines companies— Southwest, American, and Delta —over a six-year period from 2017 to 2022. The analysis spans the pre-pandemic expansion,

the economic disruption of 2020, and the subsequent post-pandemic recovery phase.

Data were collected primarily from the firms' publicly available annual reports (Form 10-K filings) (Southwest, 2023; American, 2023; Delta, 2023). Financial indicators analyzed include net income, consistent with standard measures used in corporate finance and accounting literature (Barth and Landsman, 2010; Siahhaan et al., 2016).

Descriptive statistics and trend analysis were utilized to systematically evaluate and compare the performance trajectories of each company over time. Changes in financial metrics were quantified in both absolute and percentage terms to assess growth patterns, volatility, and operational efficiency. Visual tools such as line graphs and tables were employed to effectively illustrate trends and highlight significant differences among the companies.

Complementing the quantitative analysis, a qualitative approach was adopted to examine each firm's sustainability initiatives, drawing on disclosures from annual reports and publicly accessible ESG (Environmental, Social, and Governance) documentation. The interpretation of findings underscores the critical role of organizational adaptability and resource reconfiguration in maintaining competitive advantage amidst turbulent conditions.

This mixed-methods framework offers a holistic perspective on how each organization navigated pandemic-related disruptions, thereby enriching academic insights and informing practical strategic considerations within the financial services industry.

ANALYSIS OF SOUTHWEST, AMERICAN, AND DELTA'S AIRLINE BUSINESS MODELS (Southwest, SEC, 2023; American, SEC, 2023; Delta, SEC, 2023).

The pandemic is prompting airlines to reevaluate their hub-and-spoke network structures, the markets they serve, and the frequency and composition of their fleets (Vinod, 2021). Southwest, American, and Delta underscore the critical role of adaptability, strategic technology investments, and sustainability in successful crisis recovery, as detailed below.

Southwest Airlines: A Major Low-Fare Carrier

Southwest Airlines is a prominent player in the aviation sector of the United States, widely recognized for its low-cost fares and unique business model. Between 2017 and 2022, the airline maneuvered through various obstacles that challenged its operational efficacy. Although Southwest can be classified among the largest airlines in the U.S., it distinguishes itself as the predominant 'low-fare' carrier. This analysis will investigate the intricate facets of Southwest Airlines, examining changes in profitability, growth trajectories, operational efficiency, and other significant metrics, amidst external challenges such as the COVID-19 pandemic and regulatory changes. The airline's strategic responses to both industry-wide and localized hurdles offer a roadmap of adaptive measures critical in maintaining its competitive edge in an increasingly challenging aviation market.

Unique Operational Model: Efficiency and Cost Control

What sets Southwest Airlines apart from its competitors in the passenger airline market is its distinct operational model that prioritizes efficiency and cost control. Unlike other national airlines that may operate a more varied fleet, Southwest employs a single aircraft type—the Boeing 737 family—across its routes. This strategy enables the airline to streamline its scheduling and training processes, significantly reducing operational costs. With a commitment to low fares, Southwest has carved out a sizeable niche not just domestically, but in international air travel dynamics as well. Furthermore, their careful selection of destination airports, which often includes secondary airports that are less congested, contributes to quicker turnarounds and further operational efficiency. By focusing on these key areas, Southwest Airlines can maintain its low-cost philosophy while successfully transporting more passengers than many of its international peers.

The Impact of the COVID-19 Pandemic and Regulatory Challenges

The onset of the COVID-19 pandemic in March 2020 proved to be an unprecedented challenge for Southwest Airlines and the entire airline industry. With travel restrictions in place and public fear of infection rampant, the airline recorded a staggering loss of \$3.8 billion in 2020, marking it the only year in the six-year period analyzed where the airline reported negative net income. Concurrently, the grounding of the Boeing 737 MAX by the FAA due to safety concerns posed additional operational challenges. Although none of the aircraft involved in the reported crashes were owned by Southwest, the grounding of the MAX fleet meant the airline had to rely on older, less fuel-efficient models, leading to increased operational costs and scheduling complexities. The combined impact of these regulatory and health crises created a tumultuous environment that profoundly tested Southwest's operational resilience and adaptability.

Adapting to Industry Changes: Parking Planes and Financial Losses

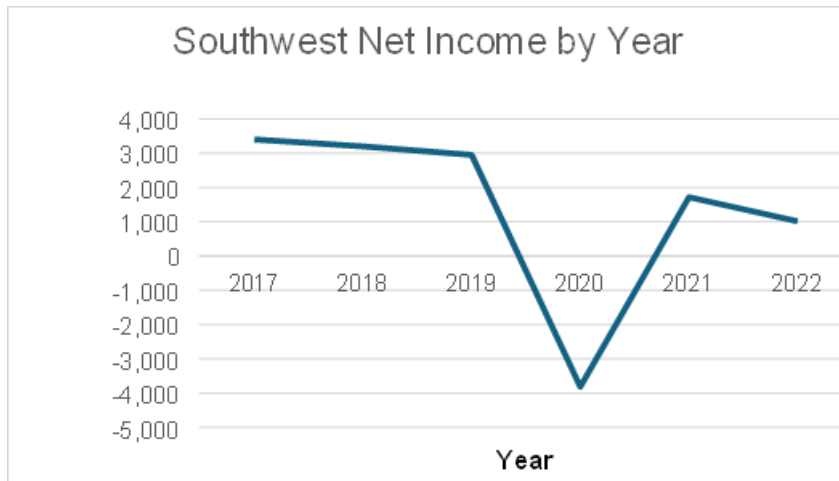
As travel demand plummeted, Southwest Airlines, like its competitors, was forced to make significant operational adjustments in response to the pandemic. To control losses, the airline parked a substantial number of its aircraft due to insufficient demand, in turn leading to immediate declines in both revenue and growth opportunities. Table 1 illustrates the company's net income trends from 2017 to 2022. In the early years, from 2017 to 2019, Southwest maintained strong profitability, with net income consistently around \$3,000 million, indicating stable performance during this period. However, in 2020, there was a sharp decline, with net income plummeting to approximately -4,000 million. This drastic drop aligns with the global impact of the COVID-19 pandemic, which severely affected the airline industry due to travel restrictions, reduced passenger demand, and operational disruptions. This period also underscored the broader industry challenges, as many airlines struggled with similar dilemmas, resulting in widespread layoffs, route cancellations, and financial distress.

Following this downturn, in 2021, a notable recovery occurred, with net income rebounding to around \$2,000 million, reflecting the airline's strategic cost management and adaptation to evolving travel demands. Nevertheless, in 2022, despite the recovery, net income slightly declined compared to 2021, suggesting

ongoing challenges, possibly due to fluctuating fuel prices, labor costs, and post-pandemic adjustments.

Overall, these fluctuations highlight Southwest's resilience in navigating financial turbulence, with operational strategies such as cost control and workforce restructuring playing a critical role in its recovery efforts.

Table 1 – Southwest Airlines' Net Income Fluctuations



Commitments to Sustainability: Modernizing the Fleet

In recent years, Southwest Airlines has increasingly committed to sustainability through the modernization of its fleet. With environmental concerns at the forefront of global discourse, the airline has focused on acquiring new aircraft equipped with cleaner-burning engines that improve fuel efficiency. As mentioned, Southwest exclusively utilizes Boeing 737 aircraft, including the 737-700, 737-800, and the more modern 737 MAX 8. In 2021, as pandemic restrictions eased and the grounding of the MAX series concluded, Southwest capitalized on the opportunity to enhance its fleet further. The acquisition of additional MAX aircraft is a strategic move aimed at not only fostering operational efficiency but also minimizing the airline's carbon footprint. The comprehensive retirement of older models, particularly the 737-700 series, reflects Southwest's proactive steps toward sustainability, ultimately aligning with industry trends focused on environmental responsibility. Table 2 illustrates that all Boeing 737-800 models have been retained, while Southwest Airlines is transitioning from the 700 series to the MAX series.

Table 2 illustrates the composition of Southwest Airlines' fleet in 2021 and 2023, highlighting changes in the distribution of aircraft models. First, the number of Boeing 737-800 aircraft remained constant at 207 in both years, indicating that Southwest Airlines has retained all of these aircraft without increasing or reducing their count.

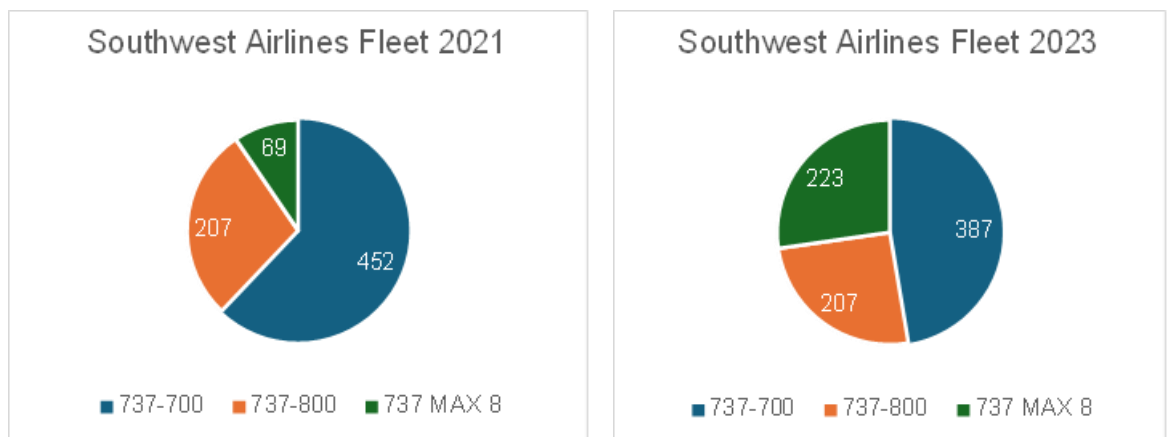
However, a notable shift is observed in the Boeing 737-700 and 737 MAX 8 models. In 2021, Southwest had 452 Boeing 737-700 aircraft, but by 2023, this

number had decreased to 387. This suggests that the airline is gradually phasing out the 737-700 model.

At the same time, the number of Boeing 737 MAX 8 aircraft has significantly increased. In 2021, Southwest had only 69 of these planes, whereas by 2023, the count had risen to 223. This indicates that Southwest Airlines is actively transitioning from the older 737-700 series to the more modern and fuel-efficient 737 MAX 8 model.

Overall, while the fleet size has remained similar, Southwest Airlines is clearly shifting toward a more updated fleet by reducing its reliance on older aircraft and increasing its adoption of the Boeing 737 MAX 8. This strategic shift likely aims to improve fuel efficiency, reduce operational costs, and enhance overall fleet performance.

Table 2 – Retention and Replacement of Boeing Aircraft Models in Southwest Airlines' Fleet



American Airlines: Competing on an International Scale

American Airlines holds a significant place among international carriers based in the United States and is often compared to other major airlines like Delta and United Airlines. During the analyzed timeframe of 2017 to 2022, American Airlines faced multiple challenges, both unique to its operational model and global, such as the massive impact of the COVID-19 pandemic on air travel. Navigating through these challenges not only affected financial performance but also forced American Airlines to rethink and adapt its operational strategies to remain competitive within a rapidly evolving airline industry.

Innovative Connection Services and Cost Efficiency

One of the defining features of American Airlines is its unique connection service, which relies on contracted third-party operators under the “American Eagle” brand. This operational model optimizes cost-efficiency by deploying smaller, more fuel-efficient aircraft to regional markets before funneling passengers into

American's larger intercontinental flights. This strategy allows American Airlines to maintain a robust flight network while benefiting from reduced operational complexity and costs. The financial impact of external factors, such as jet fuel prices, is crucial to understanding the efficiency of this model. For example, American Airlines reported that even a minor increase of one cent in fuel costs could result in a \$45 million increase in expenses across both American and American Eagle operations, underscoring the importance of fuel efficiency in its overall operational strategy. Table 3 provides a visual representation of American Airlines' jet fuel costs from 2017 to 2022, complemented by a bar chart illustrating the percentage of American Eagle passengers connected to primary American Airlines flights, highlighting the airline's network and operational dynamics.

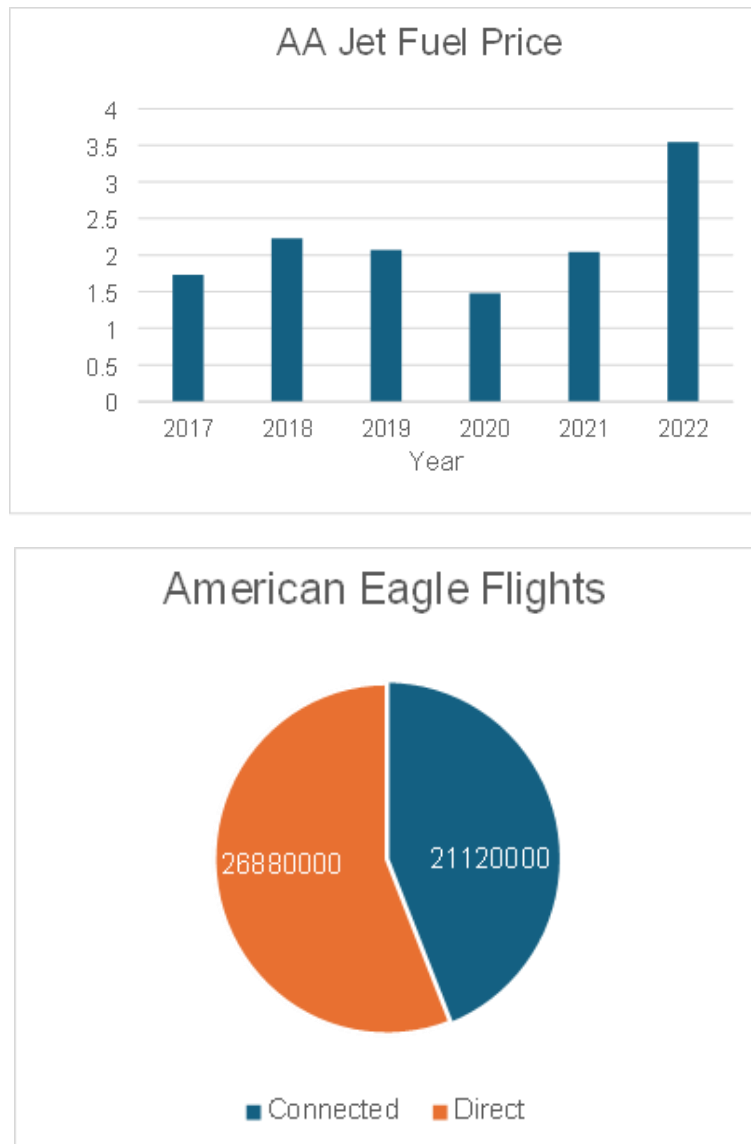
The American Eagle Flights pie chart illustrates the division of flights into direct and connected routes. It shows that 26.88 million flights (the majority) are direct, while 21.12 million are connected flights. This confirms that a substantial portion of American Eagle's operations involve funneling regional passengers into American Airlines' larger flight network. By using smaller, fuel-efficient aircraft for regional routes, American Eagle minimizes fuel costs and enhances network efficiency.

The AA Jet Fuel Price bar chart highlights fluctuating fuel costs from 2017 to 2022, with a notable spike in 2022. Prices remained relatively stable between 2017 and 2019 but dropped significantly in 2020, likely due to the pandemic-driven decline in air travel demand. However, prices surged in 2022, exceeding 3.5 per gallon, which would have significantly increased operating expenses for American Airlines.

Given the statement that a one-cent increase in fuel prices leads to a \$45 million rise in costs across American Airlines and American Eagle, the chart emphasizes the critical importance of fuel efficiency. With jet fuel prices rising, the use of smaller, fuel-efficient aircraft in American Eagle's regional operations becomes even more essential for cost control.

The combination of both graphs underscores American Airlines' reliance on American Eagle for cost efficiency and connectivity while demonstrating the financial vulnerability of the airline to fuel price fluctuations. The airline's strategy of using regional flights to connect passengers to major routes helps balance operational costs, especially during periods of high fuel prices.

Table 3 – Jet Fuel Costs and American Eagle Passenger Connections for American Airlines



Navigating the Pandemic: Financial Strain and Recovery

Throughout the COVID-19 pandemic, American Airlines experienced significant disruptions that severely hampered financial performance. The airline experienced operational losses in its two most challenging years, 2020 and 2021, as illustrated in Table 4. These losses were primarily attributed to strict travel restrictions and a significant decline in passenger confidence. Unlike smaller airlines that primarily serve nearby international destinations, American Airlines' extensive global network complicated recovery efforts as each international market faced unique regulatory landscapes. The financial ramifications were

pronounced, requiring the airline to implement aggressive cost-cutting measures, including workforce reductions, capacity adjustments, and a reevaluation of route networks, to navigate through these trying times.

Table 4 illustrates the company's net income trends from 2017 to 2022, showcasing significant fluctuations influenced by both internal strategies and external factors. In the early years, from 2017 to 2019, American Airlines experienced consistent profitability, with net income steadily increasing to nearly \$2 billion by 2019. This growth suggests a strong operational performance driven by effective cost management, high passenger demand, and favorable economic conditions.

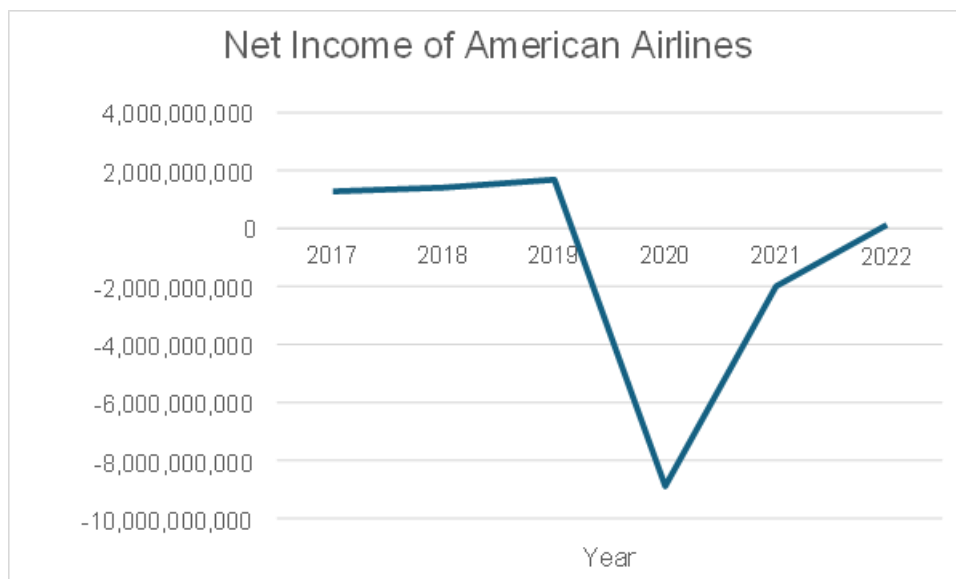
However, in 2020, a dramatic decline occurred, with net income plunging to approximately -\$9 billion. This steep loss reflects the severe impact of the COVID-19 pandemic, which led to widespread travel restrictions, a sharp drop in passenger demand, and significant operational disruptions. The airline industry faced unprecedented challenges, and American Airlines was no exception, grappling with grounded fleets, reduced routes, and increased debt to maintain liquidity.

Following this downturn, in 2021, a partial recovery is evident, with net income improving to around -\$2 billion. Although the airline remained in negative territory, the reduced loss indicates the effectiveness of strategic measures such as cost-cutting initiatives, government financial support through relief programs, and the gradual return of air travel demand as pandemic restrictions eased.

By 2022, American Airlines returned to profitability, achieving a positive net income of nearly \$1 billion. This recovery can be attributed to increased vaccination rates, the rebound in both domestic and international travel, and improved operational efficiencies. Additionally, the airline's focus on restructuring its debt and optimizing its route network likely contributed to this financial turnaround.

Overall, the data highlights the airline's financial volatility, particularly during the pandemic. Nevertheless, American Airlines' ability to recover from substantial losses demonstrates resilience and strategic adaptability in response to industry-wide disruptions.

Table 4 – American Airlines' Net Income Fluctuations



Financial Vulnerabilities Amid Recovery Efforts

American Airlines' financial vulnerability has heightened in the wake of the pandemic, as highlighted in its SEC filings. The airline reported a marked decrease in stockholder equity as a result of needing to secure external financing during the economic downturn, as shown in Table 5. Table 5 illustrates the fluctuations in the company's equity from 2017 to 2022, highlighting the significant impact of financial decisions and external economic conditions. In the early years, from 2017 to 2019, American Airlines experienced a strong upward trend in stockholder equity, rising from around \$0 to approximately \$12 billion. This growth reflects robust financial performance, supported by consistent profitability, efficient asset management, and effective capital allocation strategies. The increasing equity indicates that the company was generating strong returns, reinvesting profits, and maintaining investor confidence.

However, in 2020, a dramatic shift occurred, with stockholder equity plummeting from around \$12 billion to approximately - \$7 billion. This sharp decline coincides with the global outbreak of the COVID-19 pandemic, which forced American Airlines to secure substantial external financing to maintain liquidity during the crisis. The need to cover operational costs, debt obligations, and workforce-related expenses amid reduced revenue led to increased liabilities, which significantly eroded equity.

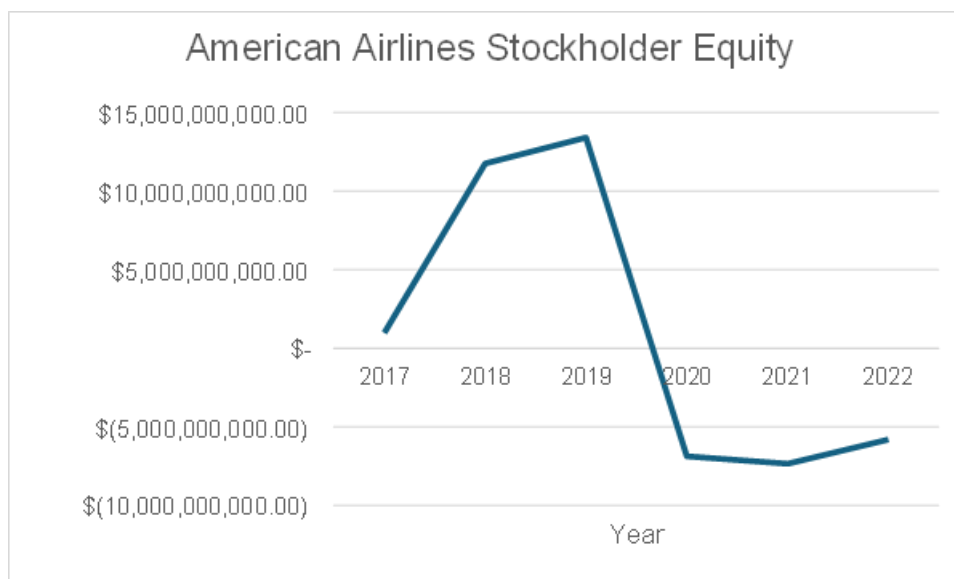
Following this decline, in 2021, the downward trend continued slightly, with equity dipping further to nearly - \$8 billion. Although the company began implementing cost-cutting measures and benefited from government relief programs, the lingering effects of the pandemic, such as reduced travel demand and high debt levels, continued to strain financial resources.

By 2022, a modest recovery is observed, with stockholder equity improving slightly but still remaining in negative territory. This improvement suggests that American Airlines began stabilizing its financial position, likely through debt restructuring, improved revenue streams from increased travel demand, and strategic operational adjustments aimed at restoring profitability.

Overall, the airline reported a marked decrease in stockholder equity primarily due to the need to secure external financing during the economic downturn. Nevertheless, the slight recovery in 2022 indicates the beginning of a potential rebound, driven by the company's efforts to manage its financial obligations and adapt to post-pandemic market conditions.

Moreover, American stated in its 2022 filings that there was uncertainty surrounding future financing needs, leaving it at a potential disadvantage for opportunistic investments. The implications of this financial instability extend beyond immediate recovery efforts, as American Airlines expressed concern about the long-term impact of its debt burdens on future growth and competitiveness. These fiscal challenges have shaped the airline's strategic responses in positioning itself for eventual recovery within a volatile industry landscape.

Table 5 – American Airlines' Stockholder Equity Decrease Due to External Financing Amid Pandemic Challenges



Sustainable Fleet Modernization: Phasing Out Older Aircraft

In an effort to bolster sustainability while navigating the complexities of contemporary aviation challenges, American Airlines is proactively modernizing its fleet. The strategy includes phasing out older aircraft, which tend to be less fuel-efficient, in favor of newer models like the Boeing 737 MAX, Boeing 787, and Airbus A320neo. With 182 modern aircraft on order, American is poised to enhance operational efficiency while addressing environmental concerns

regarding air travel. Additionally, the retention of retired aircraft in storage allows American Airlines to retain flexibility for future operational demands, whether due to unexpected spikes in passenger traffic or potential groundings of primary fleet aircraft. This prudent approach reflects a commitment to maintaining a modern, efficient fleet that aligns with both economic objectives and sustainability goals, a crucial aspect of competing in today's environmentally conscious market.

Delta Airlines: A Leader in Global Air Travel

Delta Airlines is often referred to as America's unofficial "flagship carrier," and it ranks among the largest airlines worldwide. With operations primarily centered at Atlanta International Airport—considered the busiest in the world—Delta has built an extensive domestic and international flight network. The airline's rapid growth and adaptability are underscored by its large fleet and the strategic decisions made between 2017 and 2022, as Delta navigated through the operational challenges presented by economic fluctuations and an unprecedented global health crisis.

Diverse Fleet and Operational Leverage

Delta Airlines boasts the largest active fleet among global airlines, with just under one thousand primary service aircraft supplemented by additional orders to expand or replace aging models. This diverse fleet includes a range of aircraft types, such as the Boeing 717 and 757, which provide Delta with a unique advantage in negotiating terms with aircraft manufacturers. This positioning is evident in Boeing's commitment to developing the upcoming 797 model as part of its ongoing partnership with Delta. The airline's operational leverage extends into regional connectivity through a fleet of 442 regional aircraft managed by third-party carriers, which enables Delta to maximize its passenger traffic while managing costs efficiently. These aircraft are CRJ and Embraer planes, which as of 2020 additional CRJ-900 aircraft were on order to modernize and expand the fleet.

Table 6 visually represents the composition of aircraft used in Delta's regional operations. The fleet consists of five different aircraft types: CRJ 200, CRJ 700, CRJ 900, Embraer 170, and Embraer 175. Each segment of the pie chart indicates the proportion of each aircraft model within the regional fleet.

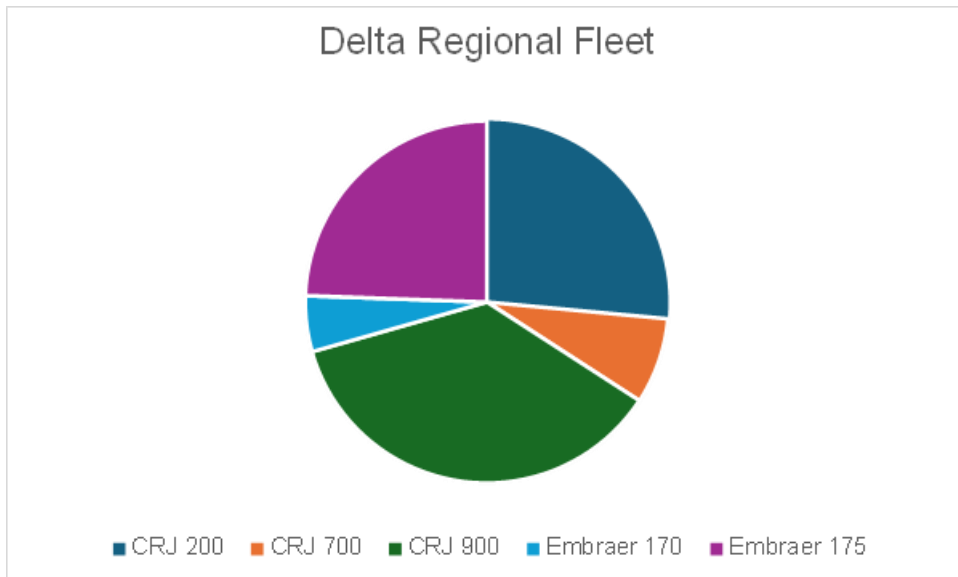
In line with sustainability goals, Delta is investing in new CRJ-900 aircraft to replace aging planes. This strategic shift is important because it helps introduce newer, more fuel-efficient models, thereby reducing both carbon emissions and operational costs. Furthermore, the CRJ-900 provides better fuel efficiency per seat compared to older regional aircraft, such as the CRJ-200 and CRJ-700. By replacing outdated models, Delta ensures that its fleet remains both environmentally friendly and cost-effective.

Not only does the CRJ-900 improve fuel efficiency, but it also enhances regional service capacity. Specifically, this aircraft offers a higher passenger capacity than the CRJ-200 and CRJ-700, allowing Delta to accommodate more customers per flight. Additionally, it provides greater operational flexibility, enabling Delta to optimize routes and reduce costs while maintaining service reliability. As a result,

this fleet expansion contributes to both sustainability efforts and business growth.

Overall, the pie chart demonstrates Delta's diverse regional fleet, while the investment in new CRJ-900 aircraft highlights a commitment to modernizing operations, improving efficiency, and supporting sustainability efforts. This transition is crucial because it enables Delta to maintain a competitive and eco-friendly regional service network, ensuring long-term success in an evolving aviation industry.

Table 6 – Delta Airlines’ Regional Aircraft Fleet Expansion and Orders



Resilience During the Pandemic: A Successful Rebound

The COVID-19 pandemic presented unprecedented difficulties for the airline industry, yet Delta Airlines demonstrated remarkable resilience compared to its competitors. Although Delta experienced a loss in 2020, as shown in Table 7, it began to recover in 2021, highlighting a significant turnaround compared to many airlines that continued to struggle during that period.

Table 7 illustrates Delta Air Lines' net income trends from 2017 to 2022, highlighting significant fluctuations over the years. To begin with, from 2017 to 2019, Delta Air Lines experienced steady growth in net income. The company's profitability increased each year, reaching its highest point in 2019. This suggests that the airline was performing well, benefiting from strong passenger demand, operational efficiency, and favorable economic conditions.

However, in 2020, there was a dramatic and unprecedented decline, with the airline reporting a massive net loss. This sharp downturn can be attributed to the COVID-19 pandemic, which severely disrupted global air travel. Travel restrictions, lockdowns, and a sharp decline in passenger demand forced airlines

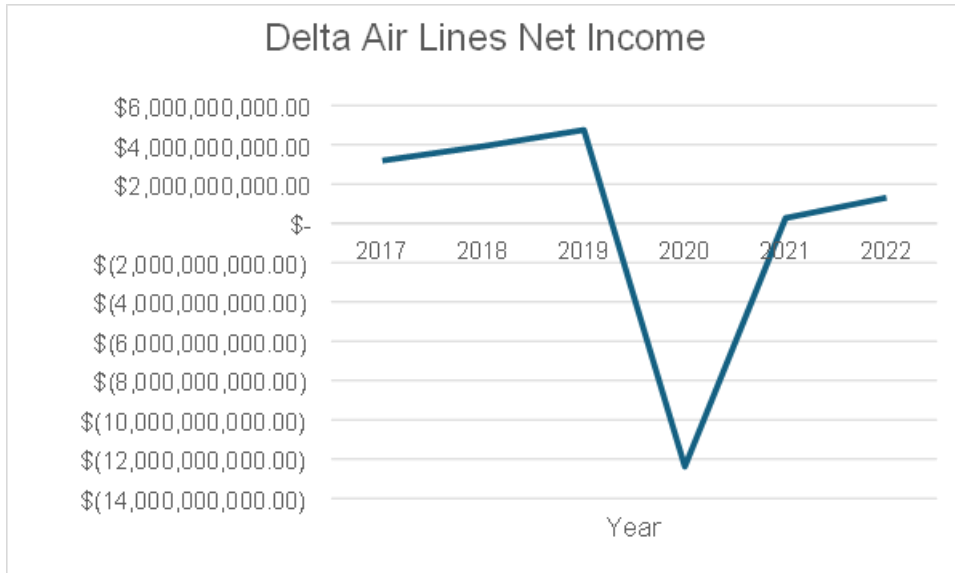
to cut flights, leading to significant financial losses. Delta, like many other airlines, faced a challenging period, dealing with plummeting revenues and increased operational costs despite reduced operations.

Fortunately, beginning in 2021, the airline saw a significant rebound in net income. As travel restrictions eased and passenger demand started to recover, Delta's financial performance improved considerably. By 2022, the company continued its upward trend, showing further gains in profitability. Nevertheless, despite this recovery, the net income had not yet returned to the peak levels seen before the pandemic.

Overall, the graph highlights the severe financial impact of the pandemic on Delta Air Lines, with a sharp decline in 2020 followed by a gradual recovery in the following years. The data underscores the resilience of the airline industry, demonstrating its ability to recover from economic downturns and external shocks.

Factors contributing to Delta's quicker recovery included its diversified business model, extensive international network, and proactive management of operational costs. Delta's financial performance during this time underscores the effectiveness of its adaptable strategies in navigating through turbulent periods and focusing on future growth potential.

Table 7 – Delta Airlines' Net Income Fluctuations



Risk Management: Navigating Safety and Financial Challenges

Delta Airlines faces a variety of inherent risks that could impact its operational stability, most notably threats to its reputation and public confidence in air travel. Safety concerns can have profound consequences for the aviation industry, as the events of September 11th demonstrated. In their risk disclosures, Delta emphasized the potential for security issues to significantly hamper the air travel

sector. Additionally, the fluctuation of fuel costs and changes in labor markets present ongoing financial challenges that require careful management. The volatility of fuel prices, particularly during post-pandemic recovery, complicates budgeting and forecasting efforts, making it essential for Delta to adopt strategic measures to ensure operational continuity.

Commitment to Sustainability: Fleet Upgrades and Fuel Efficiency

As the aviation industry increasingly focuses on sustainability and environmental responsibility, Delta Airlines is taking significant steps to update its fleet with more fuel-efficient aircraft. The acquisition of CRJ-900 models, among others, is aimed at modernizing its regional service while supporting sustainability objectives. Delta's proactive approach to upgrading its fleet is part of a broader trend within the airline industry to address concerns about climate change and carbon emissions. By investing in newer technologies and fuel-efficient engines, Delta aims to not only reduce operational costs but also position itself as a leader in sustainable aviation. This forward-thinking approach will be critical for Delta's long-term competitiveness as regulatory pressures and consumer expectations regarding sustainability continue to rise.

Comparison of Southwest, American, and Delta Airlines: Resilience, Strategies, and

The U.S. airline industry is characterized by diverse business models, operational strategies, and competitive approaches. This comparison focuses on three major airlines—Southwest, American, and Delta—examining their resilience and adaptability from operational, financial, and sustainability perspectives over the period from 2017 to 2022.

Operational Models

As Southwest Airlines primarily operates as a low-cost carrier, its business model relies heavily on simplicity. By utilizing a single aircraft type (Boeing 737), the airline is able to reduce training and maintenance costs, and its quick turnaround strategies enable it to offer a unique point-to-point service model. In addition, its simplified operational structure allows Southwest to quickly adapt to changing market conditions, further enhancing its operational efficiency.

This operational efficiency is also a result of the airline's focus on connecting less congested secondary airports to major city hubs, which reduces the complexity and costs associated with traditional hub-and-spoke systems. Furthermore, by maintaining a single aircraft type, Southwest is able to streamline its operations and improve its overall efficiency.

On the other hand, American Airlines operates a complex network that includes former regional airlines under the “American Eagle” brand. This operational strategy enables the airline to connect smaller regional markets to major international destinations, providing customers with a wider range of travel options. However, this complexity also introduces challenges in managing operational costs, especially during fuel price fluctuations.

To address these challenges, American has implemented various cost-cutting measures and strategic financial restructuring. The airline's decision to invest in

more fuel-efficient aircraft and modernize its fleet has also helped to improve its operational efficiency. As a result, American Airlines has been able to reduce its costs and improve its overall performance.

Delta Airlines, on the other hand, has adopted a hybrid approach that combines elements of low-cost and legacy carriers. This operational strategy enables the airline to adapt to changing market conditions, and its commitment to operational excellence has resulted in a sophisticated fleet management process. By leveraging both owned and leased aircraft, Delta is able to better manage its costs and respond quickly to capacity demands.

Furthermore, Delta's hybrid approach also allows the airline to balance its revenue streams and reduce its dependence on any one market. This flexibility has been particularly important in recent years, as the airline has navigated the challenges posed by the COVID-19 pandemic. Table 8 provides a comprehensive comparison of the operational approaches of the three major U.S. airlines (Southwest, SEC, 2023; American, SEC, 2023; Delta, SEC, 2023).

Table 8 – Operational Models of Southwest, American, and Delta Airlines (2017–2022)

Airline	Business Model	Key Operational Features	Efficiency Strategy	Adaptability to Market Changes	Challenges/Benefits
Southwest Airlines	Low-cost carrier	Single aircraft type (Boeing 737 family), point-to-point service	Quick turnarounds, use of secondary airports, streamlined training and maintenance	High – Simplified structure enables rapid response to demand shifts	Benefits: Reduced costs, operational simplicity; Challenges: Limited international reach.
American Airlines	Complex network with regional	Hub-and-spoke system, American Eagle brand for regional connectivity	Cost-cutting measures, investment in fuel-efficient aircraft (e.g., Boeing 737 MAX, 787, A320neo), fleet modernization	Moderate – Requires restructuring to adapt due to network complexity	Benefits: Wide travel options, strong international connectivity; Challenges: Higher costs during fuel price fluctuations.
Delta Airlines	Hybrid (low-cost and legacy)	Diverse fleet (Boeing 717, 757, etc.), regional	Sophisticated fleet management, balancing	High – Flexibility in revenue streams and	Benefits: Balanced revenue, operational flexibility;

Airline	Business Model	Key Operational Features	Efficiency Strategy	Adaptability to Market Changes	Challenges/Benefits
		connectivity via third-party carriers, owned/leased aircraft	owned and leased aircraft	capacity adjustments	Challenges: Managing diverse fleet complexity.

Financial Performance

As the COVID-19 pandemic affected air travel globally, each airline faced significant financial challenges. However, while Southwest Airlines demonstrated resilience with consistent profitability until the onset of COVID-19, American Airlines and Delta Airlines struggled to adapt to the new market conditions.

American Airlines, in particular, recorded severe losses during the pandemic, with net income plummeting to approximately -\$9 billion in 2020. Recovery was gradual, requiring strategic financial restructuring and aggressive cost-cutting measures. By 2022, American had returned to profitability but remained focused on addressing its financial vulnerabilities.

In contrast, Southwest Airlines was able to navigate the pandemic's financial challenges more effectively. Although the airline posted a significant loss in 2020, it rebounded more quickly than its competitors, achieving profitability in 2021 and further growth in 2022. Southwest's focus on operational efficiency, coupled with its commitment to sustainability, has positioned the airline for long-term success.

Delta Airlines also managed to navigate the financial challenges posed by the pandemic, showing losses in 2020 but achieving profitability in 2021 and further growth in 2022. Delta's extensive international network and diverse revenue streams contributed significantly to its faster recovery.

Table 9 summarizes the financial outcomes and resilience of the three airlines, focusing on the impact of the COVID-19 pandemic and subsequent recovery (Southwest, SEC, 2023; American, SEC, 2023; Delta, SEC, 2023).

Table 9 – Financial Performance of Southwest, American, and Delta Airlines (2017–2022)

Airline	2017–2019 Net Income Trend (in billions USD)	2020 Net Income (in billions USD)	2021 Net Income (in billions USD)	2022 Net Income (in billions USD)	Recovery Strategy	Resilience Rating
Southwest Airlines	Consistent profitability (~\$3.2B avg.)	-4	2	1.8	Cost control, workforce restructuring,	High

Airline	2017–2019 Net Income Trend (in billions USD)	2020 Net Income (in billions USD)	2021 Net Income (in billions USD)	2022 Net Income (in billions USD)	Recovery Strategy	Resilience Rating
					sustainability focus	
American Airlines	Steady growth (up to \$2B)	-9	-2	1	Financial restructuring, aggressive cost-cutting	Moderate
Delta Airlines	Steady growth (up to \$4B)	-12	3	3.5	Leveraged international network, diverse revenue streams	High

Sustainability Efforts

As the airline industry continues to evolve, sustainability has become an increasingly important factor in airline operations. In this context, each of the three airlines has implemented various initiatives aimed at reducing its environmental impact.

Southwest Airlines has committed to sustainability through fleet modernization and transitioning to more fuel-efficient aircraft, such as the 737 MAX series. This initiative reflects its adaptability and willingness to address environmental concerns while preserving its low-cost model.

Furthermore, Southwest's focus on sustainability also extends to its efforts to reduce waste and increase energy efficiency at airports and in its operations.

American Airlines has also phased out older, less fuel-efficient aircraft and invested in new models to meet corporate sustainability goals. By investing in more fuel-efficient aircraft and modernizing its fleet, the airline aims to reduce its carbon emissions and improve its overall environmental performance. In addition to these efforts, American has also implemented various programs aimed at reducing waste and increasing energy efficiency throughout its operations.

Delta Airlines positions itself as a leader in sustainable aviation, actively modernizing its fleet with more fuel-efficient aircraft, including the CRJ-900 and Airbus A220. Delta's commitment to sustainability extends beyond just fleet upgrades, involving strategies to reduce overall carbon emissions and improve operational efficiency. Table 10 outlines the sustainability initiatives and fleet modernization strategies of the three airlines (Southwest, SEC, 2023; American, SEC, 2023; Delta, SEC, 2023).

Table 10 – Sustainability Efforts of Southwest, American, and Delta Airlines
(2017–2022)

Airline	Sustainability Focus	Fleet Modernization	Key Initiatives	Environmental Impact Goal
Southwest Airlines	Fleet modernization	Transition from Boeing 737-700 to 737 MAX 8	Reducing waste, increasing energy efficiency at airports and operations	Minimize carbon footprint with fuel-efficient aircraft while maintaining low-cost model.
American Airlines	Phasing out older aircraft	Investment in Boeing 737 MAX, 787, Airbus A320neo (182 aircraft on order)	Waste reduction programs, energy efficiency improvements across operations	Reduce carbon emissions and enhance environmental performance through fleet upgrades.
Delta Airlines	Leadership in sustainable aviation	Adoption of CRJ-900 and Airbus A220 for regional and mainline fleets	Fleet upgrades, comprehensive carbon emission reduction strategies, operational efficiency improvements	Lead the industry in eco-friendly operations with reduced overall carbon footprint.

DISCUSSION

Effective Business Continuity Management practices help organizations to alleviate the impact of disruptions, recover operations swiftly, and sustain societal and economic contributions by ensuring the continuity of employment, services, and economic activities (Paton, 2009).

Business Continuity Management is particularly vital given the sector’s exposure to external shocks such as the COVID-19 pandemic, economic downturns, fuel price volatility, and environmental regulations. The pandemic exemplified how airlines like Southwest, American, and Delta had to adapt rapidly to sustain their operations, financial health, and strategic objectives. For instance, American Airlines responded to the crisis by restructuring debt, enhancing revenue streams through operational adjustments, and modernizing its fleet to improve efficiency and sustainability. These measures align with Business Continuity Management principles, emphasizing risk identification and mitigation, resource allocation, and strategic planning to ensure resilience amid ongoing industry volatility (American, 2023).

Moreover, the strategic fleet modernization efforts—such as American’s phasing out of older aircraft and Delta’s investment in fuel-efficient regional planes—are integral components of Business Continuity Management. Modernizing fleets reduces operational risks associated with maintenance, fuel costs, and environmental compliance, thus enhancing operational continuity and resilience (Smith, 2005). These initiatives not only support environmental sustainability but

also serve as risk mitigation strategies, ensuring the airlines can respond effectively to market and regulatory changes.

Furthermore, resilience during the pandemic was also driven by operational agility—demonstrated by Delta’s diversified network and fleet management practices, and Southwest’s simplified, point-to-point model. These operational strategies reflect a Business Continuity Management approach that prioritizes flexibility and adaptability, critical for weathering external shocks and market fluctuations (Woltjer et al., 2022). Delta’s extensive international network and fleet diversity, combined with its investment in new aircraft, exemplify how Business Continuity Management principles underpin strategic resilience by enabling rapid response and recovery.

Business Continuity Management provides a framework for airlines to proactively manage risks, adapt operationally, and sustain critical processes during crises. The experiences of American, Delta, and Southwest during their recovery phases highlight the importance of integrating Business Continuity Management strategies—such as fleet modernization, operational flexibility, and financial restructuring—to achieve resilience and ensure long-term organizational sustainability in a volatile industry landscape.

IMPLICATIONS

Theoretical Implications

This study contributes to the broader understanding of resilience and adaptability within the airline industry through the lens of Business Continuity Management. Business Continuity Management emphasizes the importance of proactive planning, strategic resource allocation, and operational agility to withstand external shocks (Pearson and Mitroff, 1993). By analyzing the strategies employed by Southwest, American, and Delta Airlines during the tumultuous period from 2017 to 2022, the research underscores that organizational resilience is rooted in dynamic capabilities such as fleet modernization, diversification of revenue streams, and flexible operational models. The findings align with the theoretical premise that resilience is cultivated through continuous risk assessment, adaptation, and strategic innovation (Paton, 2009; Wenzel et al., 2020). Additionally, the study extends existing frameworks by illustrating how industry-specific factors—such as fleet composition and network design—interact with BCM principles to influence organizational outcomes during crises.

Practical Implications

The findings highlight that effective Business Continuity Management is essential for airline resilience. Southwest’s reliance on a single aircraft type enhances operational agility, while American’s fleet modernization reduces vulnerabilities. Delta’s diversified network and fleet management improve adaptability and recovery speed. Strategic financial restructuring, fleet upgrades, and operational flexibility—key Business Continuity Management components—are crucial for maintaining service continuity during crises. These strategies support long-term sustainability, competitiveness, and industry resilience amid ongoing disruptions.

CONCLUSION

Effective Business Continuity Management practices are essential for airlines to navigate the complex and volatile landscape of the industry. By proactively identifying risks, modernizing fleets, and fostering operational agility, airlines like American, Delta, and Southwest enhance their resilience against external shocks such as economic downturns, fuel price volatility, and environmental regulations. The COVID-19 pandemic underscored the necessity of strategic adaptations—such as debt restructuring, fleet modernization, and diversified networks—that align with BCM principles to ensure swift recovery and sustained operations. These approaches not only mitigate operational risks but also support long-term sustainability and societal contribution, reaffirming the importance of integrated resilience strategies in securing the future stability and growth of the airline industry.

Statements and Declarations

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