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Article

Airline Market Risks and Management Discussion and Analysis (MD&A): A Thematic Study

Ming Cheng[1], Ryan Jenson Boe[2], Chien-tsung Lu[3*], Haoruo Fu[2], Mengyi Wei[2]

[1]College of Safety Science & Engineering, Civil Aviation University of China, China
Email: figocm@163.com, Orcid id: https://orcid.org/0000-0002-2198-3523

[2]School of Aviation & Transportation, Purdue University, United States
Email: boe0@purdue.edu, Orcid id: https://orcid.org/0009-0009-6243-0253

[*3]School of Aviation, Southern Illinois University Carbondale, United States
Email: ctlu@purdue.edu, Orcid id: https://orcid.org/0000-0002-9435-7427

[2]School of Aviation & Transportation, Purdue University, United States
Email: fu361@purdue.edu, Orcid id: https://orcid.org/0009-0003-6790-0230

[2]School of Aviation & Transportation, Purdue University, United States
Email: wei205@purdue.edu

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Abstract.

This research endeavors to assess airline executive decision-making coping with critical crises during the pandemic by scrutinizing the Market Risks and Management Discussion and Analysis (MD&A) sections within the 10-K financial reports. This study delves into the quarterly financial reports (10-Q) of Delta Air Lines (DAL) spanning from the 1st quarter (Q1) of 2020 to the second quarter (Q2) of 2023 and discovered primary challenges and market risks that were of concern to top executives. To underscore the significance of top executives' decision-making activities within a chosen airline, this research project explores significant discussions disclosed in the financial reports. The findings show "revenue", "cost", and "fleet" were three most discussed topics while "liquidity, asset, and payable accounts", "failing cost-saving strategies and poor Return on Investment (ROI)", "policy changes in ticket cancellation and frequent flyer program", "failing new technology", and "proprietary data security" emerged as the top five market risks during the COVID-19 pandemic. Executives responded to these challenges by implementing corresponding strategies aimed at ensuring sustainability, such as labor downsizing, reforms to retirement plans, flight frequency reduction, simplification of aging fleets, cancellation of aircraft orders, cost-reduction initiatives, and adjustments to routes and hubs, among other measures. Noticeably, frequent flyer loyalty program remained lucrative.

Keywords: CASM, crisis, market risk, pandemic MD&A, sustainability.
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1. Introduction

The global aviation industry has weathered numerous challenges amid the pandemic, experiencing financial ebbs and flows. Most major airlines faced financial setbacks due to complications or external factors beyond their control. The COVID-19 pandemic, in particular, dealt a severe blow to the aviation industry and the financial sustainability of every airline. Notably, major carriers such as Delta Air Lines in the United States (U.S.) transitioned from being formidable forces in the U.S. aviation landscape to incurring significant losses within a few years. The pronounced financial rollercoaster spanning 2020 to 2023 underscores the profound impact of COVID-19 on this essential mode of transportation (International Civil Aviation Organization [1]. Top executives' decisions directly result in an airline's financial performance, resilience, and survival, specifically, during a crisis ranging from conflicts within the cabin to broader challenges like a global pandemic.

2. Background

To effectively equip the necessary workforce for the anticipated resurgence in the airline market, the strategic decisions of top executives are pivotal in integrating both quantitative data and qualitative insights. For instance, in 2023, Cheng, Hosty, Xu, and Lu undertook an exploration of economic datasets sourced from repositories such as the Federal Reserve Economic Data (FRED), Department of Transportation (DoT) among other vital outlets. Their objective was to forecast the trajectory of market recovery amidst the challenges posed by the ongoing pandemic. In so doing, airline industry was able to prepare sufficient manpower to regain market share. Using VOSviewer for data visualization and Minitab for conducting multivariate regression analysis, they discovered an array of interrelated variables essential for forecasting airline market recovery. Notably, Real Disposable Personal Income (RDPI), Gross Domestic Product (GDP), and Net Domestic Product (NDP) prevailed as highly correlated factors in this investigation. While many existing mathematical analyses have been adopted, non-quantitative documentations are equally important and should be reviewed such as meeting minutes of the sessions of Market Risks and Management Decision & Analysis (MD&A) archived in the 10-K financial reports.

On the qualitative side, the 10-K reports are comprehensive annual reports which provide detailed information about a company's financial performance in addition to critical sessions of executive conversations and considerations, namely Management Discussion and Analysis (MD&A), Market Risks, and other must-disclosed information. Effective business decision-making stands as a critical pillar for airlines, particularly in safeguarding their financial well-being and asset value. Whether addressing strategies to mitigate financial costs or engaging in comprehensive business competition, these decisions elicit substantial responses from executives who must act swiftly to minimize or alleviate prevailing risks. For instance, on April 9, 2017, Dr. David Dao, a Kentucky physician, was forcibly removed from United Express Flight 3411 from Chicago to Louisville, sparking controversy. The initial apology from United was lackluster. The repercussions were evident in the stock market, with United Airlines' stock price dropping from \$70.55 to \$69.07 per share on April 10, 2017. A genuine apology from chief executive officer Munoz on April 11 expressed remorse for the harrowing incident, pledging to prevent a recurrence [2]. Subsequently, the stock price rebounded to \$69.13 on April 11 and \$76.41 per share on May 16, 2017, accompanied by reduced low-price daily trading shares, signaling a positive shift in investor confidence [3]. Another case involving Delta Air Lines on April 23, 2017, exemplifies the time-sensitive nature of such decisions. During a flight from Maui to Los Angeles, a Southern California family was asked to vacate the plane when attempting to utilize a seat purchased for their teenage son for their 2-year-old child [4]. While the TSA allows on-site name changes, Delta's crew decision didn't align with passengers' interests. Delta's initial response to this incident lacked responsibility in leadership, crisis communication, decision-making, risk management, media relations, social concern, and relational intelligence. Later, the CEO's timely apology effectively mitigated both reputational damage and potential revenue losses, ceasing public empathy for the passengers. The United Airlines and Delta Air Lines cases underscore the critical importance of effective crisis management and decision-making in the airline industry. The aforementioned cases illustrate the diverse nature of crises and their potential impacts on an airline's operational and financial stability. Swift and responsible decision-making is crucial in mitigating the adverse effects of such crises safeguarding reputation and financial health.

Clearly, in the intricate landscape of high-stakes aviation operations, unforeseen events loom as potential disruptors capable of profoundly affecting revenue, profit, stock price, net asset value and the overall survival prospects of airlines. Along the same lines, in pursuit of a deeper understanding of decision-making processes responding to calamities during the pandemic, two research questions emerge:

1. What market risks have been deliberated by the airline executives amidst the pandemic?
2. Which key events have been deliberated upon by the airline executives amidst the pandemic?

3. Technical Methodology

By delving into the 10-K reports of Delta Air Lines, this study seeks to unravel the Delta Air Lines' primarily discussed challenges, placing a specific focus on the sessions of Risk Factors and Management Discussion and Analysis (MD&A) during the pandemic. The objective is to delineate the thematic focuses concerned by top executives between Q1 2020 and Q2 2023 in order to understand the importance of executive decisions reacted to critical events. Documents of Market Risks and MD&A sessions of Delta Air Lines' quarterly financial reports, 10-Q fillings, were downloaded from Securities and Exchange Commission (SEC) and airline websites. Inductive analysis helped enrich informative tables containing thematic subjects, which are provided to stakeholders for a quick reference. VOSviewer was used to visualize qualitative data and mirror thematic topics and executive strategies.

4. Findings

The researchers conducted an inductive analysis of the Market Risks as well as Management Discussion and Analysis (MD&A) the sections found within Delta Air Lines' 10-K filings, covering the timeframe from Q1 2020 to Q2 2023. This period was characterized by significant challenges endured by the global airline industry in response to the pandemic.

4.1 Market Risks – a Thematic View

For the Market Risks session, Delta faced significant risks, including travel restrictions, infected employees, flexible cancellation policy, revenue losses, operational cost, short term debts/account payables, and failure of cost-saving initiatives. In particular, changes in customer behavior, increasing Cost per Available Seat Mile (CASM), and impacts on alliance partners also interrupted scheduled operations leading to a vicious circle. Specific market risks such as debts, cost saving strategies, and insufficient liquidity value were identified between Q2 2020 and Q3 2020. Noticeably, one of the major market risks was associated proprietary data security spanning from Q1 2021 to Q3 2022 with marker uncertainty around the pandemic's duration. In later quarters, risks shifted to realizing returns on investments (ROI), decreasing asset value, and heavily invested cost-saving technologies not performing as expected. These risk factors (poor ROI, lowered asset value, failing investment in technology) were largely unchanged in Delta's 10-Q filings from Q4 2021 through Q2 2023. Table 1 below presents a quick overview in terms of major market risks.

Table 1. Market Risks - (Q1 2020 ~ Q2 2023)

Quarter	Market Risks
Q1, 2020	• **Travel Restriction**: Significant travel restrictions domestically and internationally • **Infected Employees**: Negative operational impacts due to employee sickness • **Cancellation Policy**: Loss of revenue due to travel cancellation and waiver of change fees [5]
Q2, 2020	• **Subsidiary Airlines**: Adverse impacts at Delta Connection carriers (regional airlines) affecting the customer experience • **Passenger Travel Behavior**: Unknowns if COVID-19 will result in permanent changes in customer behavior • **Liquidity**: Insufficient liquidity could be an issue in the future due to significant debt taken on [6]
Q3, 2020	• **Cost-Saving**: Cost-savings methods taken will not ever make up for the loss in revenue due to drop in ticket sales • **Account Payables**: Failure to qualify with covenants for debt obligations could have a negative operational impact • **International Partners**: Impacts being faced by major international airline partners poses significant risks to Delta's market share internationally [7]
Q4, 2020	• **Pandemic**: It cannot be predicted how long the pandemic will persist, or when vaccines will be widely available to turn around the pandemic. • **Proprietary Data Security**: Breaches or lapses in security involving proprietary data could have serious risks for the airline's ongoing operation [8]
Q1, 2021	• Noted that risk factors remain unchanged from Q4, 2020 (10-K) [9]
Q2, 2021	• Noted that risk factors remain unchanged from Q4, 2020 (10-K) [10]
Q3, 2021	• Noted that risk factors remain unchanged from Q4, 2020 (10-K) [11]
Q4, 2021	• **Failing Cost-Saving Strategies**: All cost-savings measures will never make up for the lost revenue experienced • **Payable Accounts**: Have many significant fixed obligations at this time including leases, airport property, and other cash obligations • **SkyMiles**: This program requires company to maintain a minimum level of liquidity, which could have an impact on recovery strategies [12]
Q1, 2022	• Noted that risk factors remain unchanged from Q4, 2021 (10-K) [13]
Q2, 2022	• Noted that risk factors remain unchanged from Q4, 2021 (10-K) [14]
Q3, 2022	• Noted that risk factors remain unchanged from Q4, 2021 (10-K) [15]
Q4, 2022	• **Failing New Tech**: Failure of new technologies being used to perform business efficiently could have a significant cost on the operation of the business

	• **Poor ROI**: Relationships or investments in airlines around the world may not produce expected returns, especially given the lag in international travel mentioned in MD&A • **Low Asset Value**: May never fully realize the value of long-term assets like aircraft due to the need for early retirement to streamline operations. Retirement of these assets is an impairment on the operational results. [16]
Q1, 2023	• Noted that risk factors remain unchanged from Q4, 2022 (10-K) [17]
Q2, 2023	• Noted that risk factors remain unchanged from Q4, 2022 (10-K) [18]

Figure 1 below provides an overview of the clustered market risks based on the corresponding frequencies. It highlights that among the discussed market risks impacting the sustainability of Delta Air Lines, risk groups such as "liquidity, asset, and payable accounts" (14 counts), "failing cost-saving strategies and poor ROI" (8 counts), "policy changes in ticket cancellation and frequent flyer program" (5 counts), "failing new technology" (4 counts), and "proprietary data security" (4 counts) emerged as the top five risk groups during the pandemic crisis.

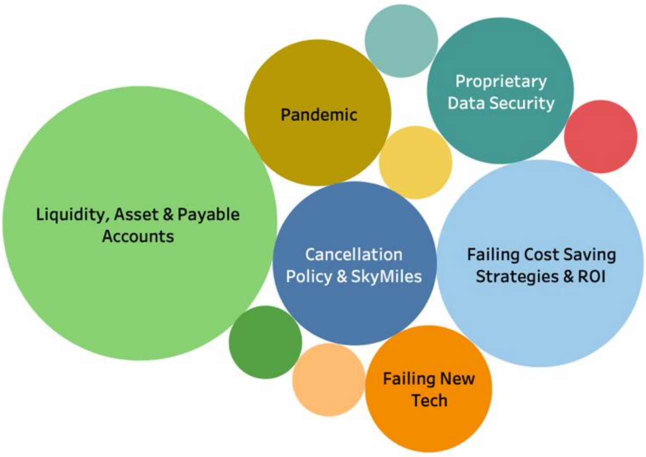

Figure 1. Clustered Market Risks

4.2 Key Strategies and Concerns

Delta implemented new procedures in Q1 2020 to retain customers and improve their experience like SkyMiles extensions and onboard services. While Delta expected pandemic impact to get worse in Q2 2020, a company-wide hiring freeze and a plan of 25% reduction in work hours for management were enacted in addition to fleet reorganization in Q2 2020. Also, in Q2 2020, Delta offered pay protection to COVID-affected employees while the flight capacity was reduced by 85% in compared to that in Q2 2019. Delta parked almost 600 aircraft in Q2 2020 to reduce costs, including retirements of certain aircraft models. To protect passengers and prevent disease infections, Delta blocked middle seats in Q3 2020 through April 30, 2021. Also, in Q3 2020, approximately 500 Delta aircraft were removed from active service due to the lack of passengers. For operating revenue, it was 60% lower in Q1 2021 than that in Q1 2019. Specifically, Delta planned to spend $30 million in Q1 2021 to address carbon neutrality. Cash flow was $1.9 billion in Q2 2021, including $2.5 billion from payroll grants. Delta's operating expenses were 39% lower in Q2 2021 than that in Q2 2019 and had $1.5 billion pre-tax income in Q3 2021, including $1.8 billion benefit from Payroll Support Program Extension (PSP3) grants, while Delta encountered a 7~10% increase in non-fuel costs during 2022. The critical topics discussed during Q1 and Q2 2023 were more related to Earnings Before Income Taxes (EBIT), Cost per Available Seat Mile

(CASM), debt, and cash flow. Remarkably, Delta's SkyMiles® earned $1.7 billion remuneration from American Express (Amex®) in Q2 2023. Table 2 below presents a quick overview of the key events extracted from MD&As.

Table 2. Key Concerns and Strategies - MD&As (Q1 2020 ~ Q2 2023)

Quarter	Focused Discussions and Strategies
Q1, 2020	• **Frequent Flyer Program**: Implementing new procedures for customer experience (SkyMiles extensions, onboard services) • **Market Forecast**: Expect impact to get worse in June, see some modest recovery by September 2020 • **Idling Operation**: 25% reduction in work hours for management • **Hiring Freeze**: Company-wide [5]
Q2, 2020	• **Pay Protection**: employees who have COVID-19 • **Capacity**: It was reduced by 85% compared to Q2, 2019. • **Aircraft Stored**: Parked 600 aircraft to reduce cost • **Aircraft Retirement**: retirements of MD80s, MD90s, B777s [6]
Q3, 2020	• **Passenger Protection**: Blocking middle seats • **Employee Protection**: On-site COVID testing offered for employees at all hubs • **Aircraft Retirement and Stored**: Approximately 500 aircraft were removed from "active service" [7]
Q4, 2020	• **Passenger Protection**: Blocking middle seats through April 30, 2021 • **Aircraft Retirement**: 227 aircraft retired in 2020 • **Aircraft Stored**: 125 parked temporarily • **Discretionary Spendings**: all were delayed or eliminated [8]
Q1, 2021	• **Revenue**: Operating revenue for this quarter is 60% lower than Q1 2019 • **Carbon Neutrality Plans**: Plan to spend $30 million in 2021 to address carbon neutrality plans [9]
Q2, 2021	• **Cash Flow**: Operating activities netted $1.9 billion in cash flow, including $2.5 billion from payroll support program grants • **Operating Expense**: It was 39% lower than in Q2, 2019 • **Non-operating Expense**: It was lower than Q2, 2019, but were offset by new debt interest obligations [10]
Q3, 2021	• **EBIT[1]**: It was $1.5 billion, which included the $1.8 billion in benefit from the remaining Payroll Support Program Extension (PSP3) grant • **Non-operating Expense**: It was $673 million, which was $549 million higher than Q3, 2019 • **Investment**: $384 million in cash outflow for investing activities into new technology and airport enhancements [11]
Q4, 2021	• **Inflation**: Leveraging greater scale, efficiency, and higher asset utilization to combat increasing inflation • **CASM[2]**: Cost per available seat mile (CASM) was decreased by 2% from 2019, partially due to capacity reductions • **Operating Expense**: Expect a 7 to 10% increase in non-fuel unit costs during 2022 [12]
Q1, 2022	• **EBIT**: Operating loss in this quarter represents a $615 million improvement over Q1, 2021 • **Operating Expense**: Fuel expenses for the quarter were increased by $1.1 billion due to world events • **Market Forecast**: Optimistic about the recovery of business travel; cannot fully predict its pace [13]
Q2, 2022	• **Revenue**: Higher third-party sales from refineries aided in the quarterly operating revenue 94% increase over Q2, 2021

	• **International Revenue**: It has lagged domestic, but has returned to 80% of 2019 levels • **CASM**: It increased 44% from Q2, 2021 levels due to ongoing cost increases (inflation, fuel prices, etc.) [14]
Q3, 2022	• **Market Forecast**: Consumer demand was 2% higher than Q3, 2019 despite 11% less capacity • **Market Forecast**: Business travel expected to see a large resurgence during December 2022 • **Revenue**: International revenue has recovered to 97% of 2019 levels, though recovery will continue to lag domestic for the foreseeable future [15]
Q4, 2022	• **Market Forecast**: Management believes comparison of financial results to both 2021 and 2019 provides a more accurate snapshot of COVID impacts and current rates of recovery for the company • **Operating Expense**: An overall 35% increase in fuel costs in 2022 • **EBIT**: Lower operating income by $3 billion compared to 2019 levels • **Revenue**: Premium-related products improved due to a greater mix in seats on aircraft following the retirement of certain fleets in 2020 [16]
Q1, 2023	• **Revenue**: It was increased by 36% over Q1, 2022 • **EBIT**: Higher yields (better operational efficiency) and significantly increased travel demand observed • **CASM**: It increased by 9% over Q1, 2022 due to ongoing cost increases (inflation) and was offset by an 18% capacity increase • **Cash Flow**: Operational activities yielded a strong $2.2 billion in cash flow for the quarter [17]
Q2, 2023	• **Debt**: The quarter saw a $1.8 billion cash outflow to pay for aircraft leases and other debt obligations • **CASM**: It decreased 9% from Q2, 2022 as fuel prices subsided and capacity increased 17% • **Frequent Flyer Program**: SkyMiles® earned $1.7 billion remuneration from American Express (Amex®) for the quarter, which was a 22% increase from Q2, 2022 [18]

1 EBIT: Earnings Before Income Taxes

2 CASM: Cost per Available Seat Mile

Figure 2 below outlines the highlighted key clustered events along with their corresponding frequencies, which shows "revenue", "cost", and "fleet" were three most discussed events during the top executives' meetings.

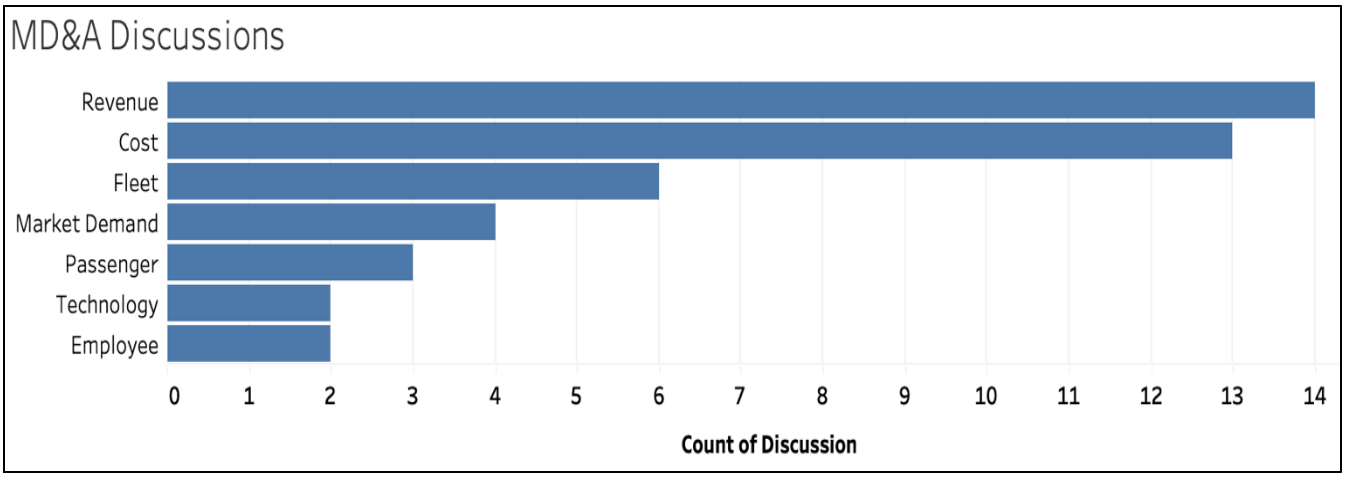

Figure 2. MD&A – Clustered Events with a Corresponding Frequency

4.3 Discussions

Fleet Reorganization. Delta Air Lines had undergone a profound transformation, particularly in its aircraft fleet management. In its 2022 10-Q report, the airline outlined a strategic move to streamline its fleet, aiming to operate fewer aircraft types for cost reduction. This initiative, initiated with the retirement of MD80s, MD90s, and 777s in Q2 2020, highlighted Delta's dedication to improving operational efficiency and ensuring financial health. Delta's fleet strategy entailed the integration of fuel-efficient aircraft, including the Airbus A320neo family and A220s seamlessly aligning with its existing network. This strategic approach anticipated better fuel efficiency and lower operating costs.

Travel Restriction and Premium Products. Route readjustments had occurred, primarily due to the pandemic-induced reduction in passenger volume and subsequently decrease in scheduled flights. In particular, recovery of international markets significantly trailed that of domestic ones. While domestic routes had returned to and exceeded pre-pandemic levels in the early 2023, international routes still saw insufficient ticket sales. This was primarily due to the enforced pandemic-related travel restrictions in many countries, which began to be lifted around early 2023. In addition, Delta prioritized premium product sales (such as priority boarding, seat selection, in-flight meals and beverages, upgrades etc.) ensuring higher profitability and a positive outlook.

Reflecting on Findings. To emphasize the thematic components of the previous findings extracted from MD&A and Operational Risk sessions, VOSviewer [19] was used where research documents were downloaded from Elsevier using the following keywords: "airline" AND "covid" paired with "fleet, "sustainability", "operation", "revenue", "market", "cash", "investment" and "labor" respectively. To showcase the result, the authors use "airline" AND "covid" AND "forecast" to display thematic clusters in Figure 3 and "fleet" in Figure 4. (Note: Both criterions were minimum 30 occurrences in the Title, Abstract, or Keywords sessions of a publication.) Figure 1 shows two clusters related to market forecast including the impact from pandemic to aircraft usage and passenger volume (in red color) and time-series studies for airline industry (in green color). This highlights the foresight of top executives at Delta Air Lines, who anticipated low passenger demand and adjusted aircraft usage accordingly. Many researchers delved into time-series trend analysis, exploring different methodologies such as multivariate regression analysis or Machine Learning for airline market forecast.

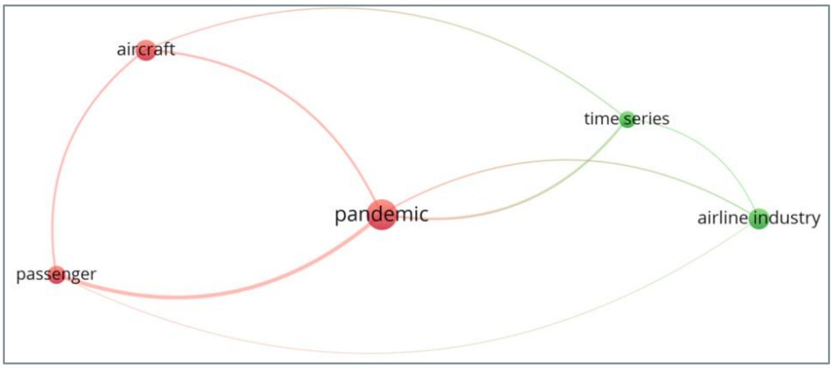

Figure 3. Co-Occurrence Map of Pandemic-Aircraft-Passenger and Airline Industry Market Forecast

Concerning the combination of "airline" and "covid" alongside "fleet," Figure 2 illustrates a co-occurrence map revealing a singular cluster (in red color). This observation is reasonable as the pandemic crisis notably negatively impacts air travel market demand. As the byproduct of the pandemic, relatively low demand leads to operational disruptions and worsens aircraft utilization.

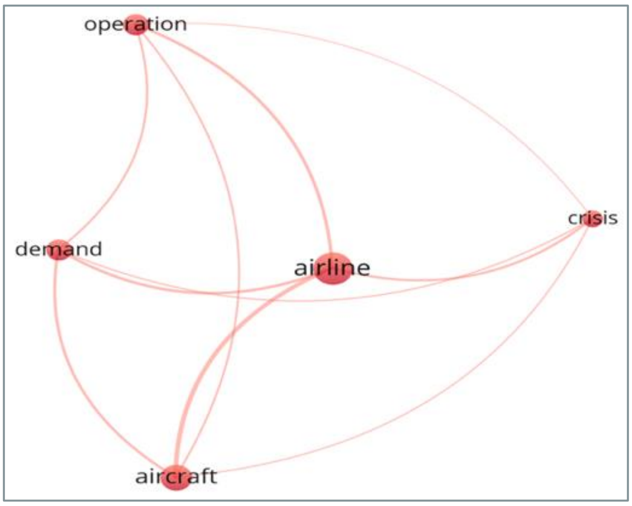

Figure 4. Co-Occurrence Map of Pandemic Crisis-Airline-Demand-Operation-Aircraft

In reflecting on Delta Air Lines' strategic responses during the pandemic, it is essential to consider the broader context of crisis management in the airline industry as there are cases illustrating diverse nature of crises and their potential impacts on financial losses. Similarly, Delta's strategic decisions, such as fleet reorganization and route adjustments, demonstrate a proactive approach to managing market risks and market fluctuations during the pandemic. By drawing lessons from these incidents, Delta navigated the complexities of the crisis, underscoring the significance of preparedness and agility in decision-making.

5. Conclusion

During the height of the pandemic, revenue streams were far from promising for Delta Air Lines. However, every decision made during this period was firmly grounded in the necessity of cost savings. Recognizing the urgent need to mitigate losses, measures such as reductions in employment and flight capacity became necessary decisions. However, failing to implement cost-saving measures had exacerbated the already profound impact from the pandemic, potentially leading to complete business failure. Indeed, timely and significant cuts were imperative for survival. The decisions taken during this critical phase were not only justified but proved to be indispensable. As signs of recovery began to emerge, such as a clear and observable rise in demand or activity within the airline industry, strategic moves to increase employment hours and capacity were pivotal in steering the company towards market recovery. Addressing urgent needs in employment, Delta has taken positive steps by reinstating profit-sharing bonuses for employee retention. Moreover, the hiring of 25,000 new employees in 2022 signaled a robust resurgence in commercial airline activity. With this observation, it is reasonable to anticipate a continued upward trajectory in 2024. The significant increase in employment not only underscores Delta's commitment to growth but also serves as a positive indicator of a promising future. These decisive actions and their resulting outcomes strengthen the airline's resilience and strategic acumen in navigating the unprecedented challenges posed by the COVID-19 pandemic.

5.1 Future Study

While this study examined Delta Air Lines' quarterly financial reports to uncover significant topics and market risks amid the pandemic, a subsequent study could focus on a comparative analysis involving other airlines. Moreover, the authors restricted their search to documents published by Elsevier; therefore, expanding the scope to include additional publications from different publishers would provide a more comprehensive overview. Another future research could delve into examining how different airlines have adapted their strategies over time. Furthermore, crisis management actions taken by different airlines during the pandemic should be re-evaluated for any short-sightedness that could help airlines' future decision-making when dealing with unforeseen situations. Lastly, investigating the shifts in consumer behavior and preferences in air travel, influenced by the pandemic, could further inform strategic decision-making for airlines in the evolving market landscape.

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