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Above the clouds: Unveiling insights through semi-structured interviews with airline employees from the African, Asian, and North American regions surrounding the COVID-19 pandemic era

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ABSTRACT

The aviation industry, a linchpin of the global economy, faced an unprecedented upheaval with the COVID-19 pandemic. This qualitative research, using Glaser and Strauss's Grounded Theory (1967), presents comprehensive enriched data from a convenience sample of airline employees from full-service carriers (FSCs) and low-cost carriers (LCCs) spanning pre (from 2017 to 2019), during (2020 to 2021), and post-pandemic (2022–2023) phases. The interview participants primarily consist of airline employees based in the African, Asian, and North American regions.

Insights from these employees through semi-structured interviews provided a rich contrast between pre-pandemic relative financial stability and the pandemic-induced profitability "free fall". The adverse impact on airlines' profitability was universal, with distinct variations based on the size of domestic markets and the adaptability of business models. Key strategies such as furloughs, aircraft lease renegotiations including introducing new pandemic-related clauses, and the shift to cargo business during the pandemic were highlighted. The workforce disruptions during the pandemic underscored the significance of succession planning and the need for agile responses to unforeseen crises.

Post-COVID-19, the emphasis on long-term innovations including the adoption of work-from-home (WFH) practices for back-office airline employees, diversification, and lessons learned in terms of the importance of nimbleness, proper succession planning, and liquidity management, provides a roadmap for future resilience. In terms of future research directions, this paper proposes longitudinal studies post-2023 and exploration of technological impacts such as the aviation industry's digital transformation and automation process and policy influences.

Introduction

The aviation industry, a vital component of the global economy, has historically experienced turbulence through several economic downturns, geopolitical events, and natural disasters. However, the COVID-19 pandemic presented an unexpected challenge, disrupting global air travel on an unprecedented scale (Sun et al., 2023). Existing research on airlines predominantly focuses on broad economic impacts (Iacus et al., 2020; Aman & Altass, 2021; Halteh et al., 2024), operational adjustments (Adrienne et al., 2020; Chu, 2024; Wu et al., 2024), and immediate responses of airlines to the crisis (Amankwah-Amoah, 2020; Kim & Sohn, 2021; Gualini et al., 2023; Chen, 2024). However, there are limited in-depth qualitative studies that explore the lived experiences and perspectives of ground airline employees surrounding this tumultuous period or its aftermath.

Moreover, many studies adopt a quantitative approach, emphasizing statistical analyzes and generalizable findings (Yusriza et al., 2022; Combs et al., 2024; Li et al., 2024) at the expense of individual narratives and context-rich insights. This research gap leaves a void in understanding how employees perceive their organizations' strategies, financial stability, and overall resilience in the face of unprecedented challenges. By positioning this research within the broader body of literature, this study aims to advance knowledge by filling these gaps. It seeks to provide a nuanced understanding of the human stories behind

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the data, offering insights into the human experiences, emotions and experiential dimensions of the pandemic. This qualitative approach not only enriches the academic discourse but also has practical implications for policymakers and airline management, as it highlights the need for a more agile and responsive organizational culture during crises to allow for business sustainability.

This qualitative paper is structured around three key research objectives, each corresponding to a different stage of the COVID-19 pandemic, based on the main themes and sub-themes that have emerged. First, it seeks to explore the pre-pandemic interviewees' perspectives on their respective airline profitability. Second, it examines the workforce disruptions, profitability challenges, and the sustainable and resilient strategies airlines employed during the peak of the pandemic. Finally, it reflects on the post-pandemic period, highlighting the lessons learned and insights gained by the airline industry. These objectives are organized into three distinct stages: pre-COVID-19 (2017 to 2019), during COVID-19 (2020 to 2021), and post-COVID-19 (2022 to 2023). In terms of research methodology, the Grounded Theory by Glaser and Strauss (1967) was applied, using an inductive approach of categorizing collected data into three primary themes and sub-themes as will be discussed further.

The research questions (RQs) of this study are:

(1) How did airline employees perceive the profitability of their respective airlines, before the COVID-19 pandemic?
(2) What were the primary workforce disruptions experienced by airlines during the peak of the COVID-19 pandemic, the impact on airline employees's morale, and what strategic strategies did the airlines employ to maintain short-term and long-term resilience and business sustainability?
(3) What lessons have airline employees identified post-pandemic that could help the airline industry enhance its resilience against future global disruptions?

The significance of this qualitative study lies in its contribution to the understanding of how a global crisis such as the COVID-19 pandemic, can disrupt and reshape the aviation industry and impact various airlines' business models in similar or distinct ways. The findings aim to provide insights for airlines, policymakers, researchers, and industry professionals to enhance preparedness, resilience, and business sustainability in the face of future uncertainties. The main findings underline the financial stability pre-pandemic and a profitability "free fall" during the pandemic, with varied impacts based on domestic market size and different airlines' business model adaptability. Key strategies like furloughs and cargo business shifts were crucial. Post-pandemic, innovative workplace practices such as work-from-home policies for back-office airline employees, business diversification, and agile responses underscore future resilience within the airline industry. In terms of future research directions, post-2023 longitudinal studies and technological such as the aviation industry's digital transformation and automation process and policy impacts are recommended.

In terms of theoretical contributions, this study demonstrates how aviation carriers by business models and geographical location, uniquely adapt their business models during crises such as the COVID-19 pandemic. Traditional resilience theory often underlines incremental adjustments (Folke et al., 2010), but the findings in this study indicate that in aviation, resilience, during times of crisis, requires radical, sector-specific adaptions such as diversification of revenue streams (such as focusing on cargo services and partnerships), resulting in an aviation-specific dimension of resilience. This study further extends theories of organizational adaptability, defined as an organization's ability to identify the need for change and capitalize on opportunities in an ever-evolving environment (Schulze & Pinkow, 2020), by highlighting how both full-service carriers (FSCs) and low-cost carriers (LCCs), due to their highly regulated and capital-intensive nature (Rashid et al., 2024; See, Rashid, & Yu, 2024), must innovate within rigid constraints in times of crises. This research demonstrates that adaptability in the aviation industry hinges on agile decision-making, strategic foresight, and collaborative efforts with the aviation's industry stakeholders.

This paper is structured into five parts, excluding the introduction section. Section 2 provides a comprehensive review of existing literature on the airline industry, supply chain resilience, and the impact of global disruptions on the industry including but not limited to the workforce, laying the theoretical foundation for the study. Section 3 on Methodology describes the research design and data collection method relating to the semi-structured interviews. Section 4 presents the findings from the primary data analysis while Section 5 concludes, highlighting implications to the airline industry, and lessons learned. The conclusion provides a succinct summary of the research, with managerial implications, and future directions of research. By following this structure, this paper aims to provide a comprehensive and cohesive exploration of the research questions, offering valuable insights into the dynamics of the aviation industry pre-pandemic, during, and post-COVID-19 pandemic.

2. Literature review

During the early days of commercial aviation, whereby state-owned airlines were often subsidized by governments (The Economist, 2014), profitability was not a significant consideration. However, the era of air transport liberalization, starting with the Airline Deregulation Act 1978 in the United States of America, propelled the privatization process, prompting airlines to manage their balance sheets more prudently by considering both cost and revenue aspects. Profitability parameters thus gained prominence. The liberalization process also sparked an intense competition among airlines, and this gave rise to new business models, elevating the prominence of the low-cost model, particularly on short- and medium-haul routes in Europe and the United States (Renold et al., 2023).

Maung et al. (2022), affirm that profitability remains a 'challenging issue for airlines globally'. The airline industry's lackluster profitability can be attributed to various factors, which include elevated fixed expenses, heavily leveraged financial positions, minimal barriers to entry, and the erratic volatile nature of fuel prices, as reiterated by Warnock-Smith et al. (2017). Lee and Jang (2007) further confirmed that fixed expenditures in the aviation industry generally represent more than 80% of the overall costs. An industry report from IATA (2022) reinforced the notion of the airline's industry volatile profitability parameters and noted that pre-COVID-19, the air transport value chain generated an economic loss of approximately USD 5 billion per annum driven by large airline losses. Despite the airline industry's critical role, it consistently exhibits the lowest profit margins and returns on investment compared to other sectors within the same chain. Even under optimal conditions, the airline industry manages to achieve only a modest net profit margin of 1–2% on its revenue (Tretheway & Markhvida, 2014).

The COVID-19 pandemic had a profound and unprecedented impact on the global aviation industry, significantly affecting airlines' profitability. Several academic journal articles have looked into this subject to provide insights into the multifaceted repercussions. In a study involving Greek airlines, it was noted that airlines did not prioritize public health hazards on their risk agenda, leaving them technically unprepared for the COVID-19 pandemic (Paraschi et al., 2024). According to Sun et al. (2021), the strict travel restrictions, lockdowns, and health concerns led to a massive drop in passenger demand, forcing airlines to ground a substantial portion of their fleets and resulting in significant revenue losses and ultimately negatively impacting profitability bottom-lines. Suau-Sanchez, et al. (2020) concur that the impact of the pandemic on the air transport sector was significant and rapid with border closures and travel restrictions. Dube et al. (2021) also revealed that the global aviation sector faced substantial damage from the pandemic, and financial hardships were primarily driven by the

extensive cash depletion caused by travel restrictions (leading to reduced passenger demands) imposed during the pandemic. The authors also mentioned that uncertainty due to border closures and prolonged travel restrictions resulted in significant financial losses, leading to the worsening of airlines' profitability, given that the majority of the aircraft fleet was grounded. Maneenop and Kotcharin (2020) made similar observations, highlighting that airlines were grappling with substantial financial losses and reduced investments in the sector due to declining stock prices at the peak of COVID-19. Sun et al. (2022) emphasized that the ongoing uncertainty surrounding the pandemic's trajectory hindered airlines' ability to plan effectively, adding to their financial woes. In Gössling (2020) research, it was noted that government interventions, such as bailouts and financial support, played a crucial role in alleviating the financial distress faced by airlines. These interventions helped prevent some carriers from bankruptcy but raised questions about long-term sustainability. Overall, these academic studies collectively emphasize that COVID-19 profoundly disrupted airlines' profitability, and the recovery prospects are intertwined with the pandemic's evolving dynamics and the industry's adaptability to a post-pandemic world.

Hong et al. (2023), in a study involving a sample of the top ten U.S. commercial airlines for the period 2010 to 2021, indicated that the COVID-19 pandemic had a significant negative impact on the working capital, undermining financial metrics including profitability in the airline industry. Effective management of working capital is crucial for airlines, as those with sufficient capital can expand and grow, while those with limited or negative capital may struggle to fund future operations and ensure long-term viability.

From an industry perspective, according to Airline Industry Outlook (2021), the airline industry faced an unprecedented crisis due to the sharp decline in air travel demand, travel restrictions, and lockdown measures. The loss of passenger revenue, which represents a significant portion of airlines' income, severely impacted profitability. ICAO (2021) also reported a global reduction in passenger numbers and a contraction in international and domestic air travel markets. This resulted in financial losses across the industry. Airlines were forced to ground a substantial portion of their fleets, leading to increased operational costs and reduced profitability. Airbus and Boeing (Airbus, 2023; Oestergaard, 2023), two main leading global aircraft manufacturers, noted that the decline in new aircraft orders and deliveries directly affected their financial performance, further illustrating the aviation industry's challenges during the pandemic.

2.1. Supply chain sustainability and resilience

With COVID-19 creating one of the most disastrous disruptions in human history, significantly and negatively impacting the state of supply chains across the world (Ivanov & Dolgui, 2020; Queiroz et al., 2020), the focus is on the importance of preparedness to react to abrupt disruptions (Kumar Paul et al., 2021). In this context, contemporary research recommended that supply chains need to increase their resilience, by anticipating, adapting, and responding to external disruptions to better face external disturbances and consequently lead to a better state (Ponomarov & Holcomb, 2009). However, despite various research on supply chain sustainability and resilience been conducted in recent years, there is still a lack of comprehensive understanding in this area (Fahimnia et al., 2019).

Resilience encompasses both the ability to withstand and recover performance from disruptive events (Chen & Miller-Hooks, 2012) and the strategic capacity to anticipate potential threats and opportunities in both short and long term (Hepfer & Lawrence, 2022). In this research, resilience is conceptualized as a strategic mechanism for airlines to mitigate and recover from the impacts of COVID-19, both in the short-term and in the long-term. This aligns with Nemlekar et al. (2022) observation that resilience has become a central focus in airlines' long-term business strategies, serving as a proactive approach to managing and overcoming industry-wide disruptions. Cook et al. (2023) further state that resilience in the airline industry is categorized into operational, financial, and commercial strategies, which collectively serve as key tools for effective crisis management, as further discussed. Similarly, in the wake of the COVID-19 pandemic, airline sustainability has taken on heightened importance and is defined as encompassing environmental stewardship through decarbonization efforts, and ensuring long-term financial viability (Tanriverdi et al., 2023) as well as social interests, including labour force issues. For this research,sustainability relates mainly to addressing labour concerns and inquiring about financial viability in the airline industry amidst the COVID-19 pandemic.

The relationship between sustainability and resilience in supply chains has also been a topic of debate, necessitating further studies to provide conceptual clarity on their definitions and combinations, enabling effective managerial decision-making and communication with external stakeholders (Negri et al., 2021). Some studies perceive sustainability and resilience as distinct and independent concepts (Ivanov, 2018; Jabbarzadeh et al., 2018), while others observe non-distinctive boundaries and lack of consensus on whether sustainability includes resilience attributes or vice versa (Ivanov, 2020; Zhu & Krikke, 2020). López-Castro and Solano-Charris (2021) provided an equilibrium view, and the authors conducted a literature review focusing on the integration of sustainability and resilience within the design of supply chain networks. Their study considers multiple decision-making levels (strategic, tactical, and operational) to effectively combine resilience and sustainability aspects during the supply chain network design process. In a survey conducted with participants conversant in the field of aviation, Sun et al. (2024) found that in response to COVID-19 lessons, most participants agree that the aviation system is highly susceptible, with vulnerability referring to the system's ability to quickly respond to a short-term decline in performance. However, from a mid to long-term perspective, participants view the aviation system as resilient.

2.2. Resilience theory

According to Pettit et al. (2019), the resilience theory claims that systems, including supply chains, have the inherent capacity to withstand shocks, adapt to changing circumstances, and recover swiftly from disruptions. In the airline sector, resilience is vital due to the interconnectedness of its supply chain elements. In terms of applying the concept of resilience within the airline industry, many academic researchers have developed quantifiable models using different systems, involving both quantitative and qualitative methods. Janić (2015) introduced a methodology aimed at assessing the resilience and robustness of air transportation networks when confronted with large-scale destructive events. Yoo and Yeo (2016) applied the concept of adaptability as a metric for gauging the resilience of air transportation networks. Nan and Sansavini (2017) examined system performance at various stages following damage and established a comprehensive framework for evaluating system resilience. Chandramouleeswaran and Tran (2018) conducted a quantitative analysis to measure the resilience of the air transport network in the United States, utilizing a data-driven approach. Wang et al. (2020) assessed the resilience of China's sector network by considering both structural and dynamic aspects. Sun and Wandelt (2021) conducted an extensive review and synthesis of research on the robustness of air transportation networks over the past 15 years, offering insights into future research directions concerning air transportation network resilience.

The interplay between resilience theory and sustainable supply chain is particularly evident in the context of the airline industry's response to the COVID-19 pandemic. According to Belhadi (2020), airline supply chains are intricate, ever-evolving sectors that demand substantial capital and labour investments, coupled with an array of interdependent ancillary components. Disruptions in airline supply chains pose a substantial risk to both the global supply chain network and the overall

economy. This is why supply chain managers recognize the need to diversify suppliers, invest in digital technologies, and develop risk mitigation strategies to enhance resilience (Zhou et al., 2022). Additionally, airlines that embraced sustainable practices such as maintaining sound liquidity and cash flow management and adopted adequate airline schedule planning, which is defined as the creation of flight schedules that maximize the airline's revenue, and minimize operating costs (Abdelghany et al., 2024) before the pandemic were better positioned to weather the storm. Paraschi et al. (2024) highlighted that 'flexibility, dynamic scheduling, and capacity management', allow airlines to adjust capacity based on anticipated demand, and are key tools for effective crisis management. Jaroenjitrkam et al. (2023) explored how airline stock returns, relating to 87 airlines in 44 countries during 2020, responded to COVID-19, revealing that airlines with larger assets, more destinations, and full-service carriers were less negatively impacted than low-cost carriers.

Su et al. (2023) found that resilience enabled European airports and airlines to recover faster from COVID-19 disruptions. Among airlines, larger and dominant airlines demonstrated greater resilience because of their stronger capacity for recovery. In contrast, airport recovery is dependent on flight operations volume, regardless of carrier type, that is, whether they were operated by low-cost or full-service carriers.

2.3. Airlines employees' workforce disruptions and impact

Extending the resilience and sustainability paradigm, the COVID-19 pandemic has also negatively impacted on global airlines' labour force. While McKibbin and Fernando (2020) utilized data from China to simulate the potential consequences of the COVID-19 spread and found projections of a labour supply shock reaching up to 1.4%, Sobieralski (2020) noted that the major airlines' labour force faced the most significant employment negative impact. The author also noted that employees in operational positions (passenger handling and flight operations) are most severely impacted while, management employees exhibit somewhat better resilience during these uncertain periods. In a study by Tuchen et al. (2023) involving over 1000 airport employees from four major airports, Amsterdam Airport Schiphol, Singapore Changi Airport, Taipei Taoyuan Airport and Zurich Airport from October to December 2020, financial challenges like pay cuts significantly impacted aviation-related personnel. Additionally, 25.6% of respondents reported that the work-from-home (WFH) challenge did not apply to them, highlighting that WFH was not feasible for frontline airline staff.

Paisan and Wan-Chik (2023), using a systematic literature review, identified several stress factors for aviation-related employees during the pandemic including but not limited to job uncertainty, organizational issues, team conflict, and COVID-19 itself amongst others. Vulturius et al. (2024) also found that job dissatisfaction increased during the pandemic with a pronounced effect size observed on salary, job security, and working conditions for a sample of commercial pilots in the regions of Australasia and Europe. Kioulepoglou et al. (2024) similarly, noted that during the pandemic, out of a sample of 203 pilots, commercial pilots experienced acute job dissatisfaction due to significant pay cuts, job insecurity, and decreased promotion prospects but job satisfaction was relatively constant for military pilots primarily due to financial security backed by governments. The authors underlined the importance of crisis preparedness by commercial airlines to sustain commercial viability and minimize negative impact on commercial pilots.

Charernnit et al. (2022), through an empirical study of Thai Airways International Public Company Limited, found that the company had adopted organizational restructuring in terms of downsizing its employee headcount by about 52%, by implementing various organizational strategies from cutting remuneration packages, long-term leave program, and reduction in salary cost by 18% inter alia during COVID-19 as part of its rehabilitation plan. Thomas et al. (2020) also stated that major airlines globally, including those in the USA such as American Airlines, Delta Air Lines, and United Airlines, during the peak of COVID-19, relied massively heavily on federal aid and despite that, had to recourse to measures such as reduced working hours, furloughs, and allowing pilots to leave voluntarily. Similarly, Air New Zealand received a loan facility of $900 million and a government wage subsidy of $115 million in 2021 to increase the company's short-term liquidity (Chen, 2023). These workforce disruptions in terms of lay-off, furlough inter alia were often responses to the financial strain caused by decreased revenue, leading to a negative impact on profitability.

Furthermore, workforce disruptions also underline the importance of emergency succession planning defined by Rothwell (2011) as a holistic and resilient strategic approach that allows the management and board of a company to withstand crises and ensure short-term stability and business continuity. Bano et al. (2021) stated that in the case of the pandemic, an emergency succession plan is critical as it mitigates loss to the organization, in this case, airline companies, by filling vacant positions with immediate effect with qualified staff who can take up the role in the interim until a long-term replacement is found. According to Serrano and Kazda (2020), it is crucial to have a succession plan for key personnel and to create and implement cross-training plans to enable other staff to assume primary responsibilities if needed. This succession plan should be a dynamic document, linked to a development plan, and regularly reviewed with support from the human resources department. Empirically, Connolly (2020) explained how during the COVID-19 pandemic, the Adelaide Airport team divided into staff into distinct teams, with some teams working on-sites and remote, known as green and blue support teams as well as a red team, which comprised of critical airside operations staff who acted as intermediaries between the airport, airlines, and ground handlers. The airport assessed potential skill gaps resulting from this new working arrangement and successfully implemented on-the-job cross-training. They brought staff from the airport coordination center to another center managing CCTV and building access control, quickly equipping them with the necessary skills (Connolly, 2020). Post-COVID19, Sun et al. (2023a) stated that airlines need to develop new passenger choice and demand prediction models to better face potential future outbreaks instead of relying on history-based prediction models. Wandelt and Wang (2024) proposed solutions to retention strategies for airport ground staff which were mainly lay-off during the peak of COVID-19, and these relate to the implementation of timely upskilling and reskilling programs, the improvement of work stability, safety, and holistic well-being of the staff.

3. Methodology

3.1. Research design

By applying Glaser and Strauss (1967) Grounded Theory, the use of semi-structured interviews is to transcend mere descriptive statistics in qualitative inquiry and instead focus on developing explanatory theoretical frameworks. This approach enables the creation of abstract, conceptual insights into the phenomena under investigation. Jackson and Bazeley (2019) affirmed that qualitative data allowed for the exploration of individual experiences and the context within which change occurred. Charmaz (2014) further added to Grounded Theory literature by stating that Grounded theory methods offer a structured yet adaptable framework for the collection and analysis of qualitative data, allowing for the construction of theories derived directly from the data. This approach initiates with inductive data gathering, employs iterative techniques that involve a continuous interchange between data and analysis, utilizes comparative methods, and keeps researchers engaged with the data and evolving analysis throughout the process. The primary data gathered from the semi-structured interviews is also "to better understand the world we study" (Charmaz, 2014).

The popularity of the semi-structured interview as a method of data collection stems from its proven versatility and flexibility as it has

allowed the researcher to gain rich qualitative data on the topic phenomenon (Polit & Beck, 2010). The successful facilitation of reciprocity between the interviewer and participants within the semi-structured interview method has enabled the author to spontaneously formulate follow-up questions based on participant responses (Rubin & Rubin, 2005). This approach also provides room for participants to express themselves verbally in an individualized manner, as emphasized by Galletta (2013). Nassaji (2020) further stated that qualitative research is naturalistic and focuses on non-numerical data to explore and understand rather than manipulate variables. Unlike quantitative research, which emphasizes reliability and validity in terms of test accuracy, qualitative research emphasizes trustworthiness. Lincoln and Guba (1985) proposed four key principles for ensuring trustworthiness: credibility, transferability, dependability, and confirmability. These serve as qualitative counterparts to internal validity, external validity, reliability, and objectivity in quantitative research.

3.2. Theme discussion

This paper's theme classification encapsulates the major areas of concern and strategic response identified through the semi-structured interviews, providing a comprehensive view of the airline industry's adaptation and recovery efforts throughout the pandemic phases from the primary lenses of specific airlines' employees. For the pre-pandemic phase, the focus on themes related to baseline financial health, operational efficiency including maintenance costs, fleet composition, and profitability indicators set a benchmark for understanding the subsequent impact of the pandemic and provide an overview on the financial health of respective airlines pre-pandemic. During the pandemic, themes that capture the immediate disruptions and adaptive strategies, including workforce disruptions, loss of experienced professionals which underlined lack of succession planning, and the implementation of crisis management and resilient measures like demand forecasting, network planning, and strategies to cope with travel restrictions are prioritized. This helps to illuminate the reactive and proactive measures taken in response to the crisis. In the post-pandemic phase, themes that reflect recovery, resilience, and innovation, such as long-term operational sustainability, lessons learned, and new business continuity plans are emphasized. These themes highlight how the industry evolves to mitigate future risks and capitalize on new opportunities. By categorizing themes in this structured manner, this research aims to provide a comprehensive analysis of the temporal impacts and strategic shifts within the aviation industry as a result of the pandemic.

3.3. Data collection and sample size

The semi-structured interviews were conducted from 01 to 15 November 2023, through individual Zoom meetings, involving judgment sampling involving five airline mid-level to senior management of airline carriers located in Asia, North America, and Africa as per Table 1. The questions set (Appendix 1) for the semi-structured interviews were categorized into main themes, and sub-themes and divided into three stages, namely pre-COVID-19, during COVID-19, and post-COVID-19. These professionals work at different hierarchical levels within the airline industry, with 1 Senior Manager from a carrier from the North American region, 1 staff level from Asia, 1 manager level and 2 analysts from middle-level management employees coming from a carrier from the African region.

Table 1
Details of interviewees for the semi-structured interviews (Source: created by author, 2024).

Interviewees	Gender	Geographical location of the airline carrier	Carrier type	Job Position
No. 1	Male	North America	FSC	Senior Manager, Network & Strategy
No. 2	Male	African region	FSC	Analyst, Middle-level management, Fleet
No. 3	Female	African region	FSC	Manager level, Finance
No. 4	Female	African region	FSC	Analyst, Middle-level management, Network & Scheduling
No. 5	Female	Asian region	LCC	Staff level, Ground Operations

The interviews revolved around discussions concerning the impact of COVID-19 on the airline industry, specifically focusing on the impact on the airlines' profitability and resilience strategies to uphold operations post-pandemic and industry lessons learned. The interviewees, providing individual insights on the study's subject matter, were considered the primary sources of detailed information.

In empirical research, there is a range of schools of thought regarding the suitable sample size. Eisenhardth (1989) asserted that no more than four in-depth studies are needed to gather adequate information for theory expansion. In contrast, Wilczewski et al. (2019) centered their study around a single interview, while Charmaz (2014) concluded that the determination of how many interviews are necessary is ultimately at the discretion of the researcher. Sebele-Mpofu (2020) stated that the effectiveness of qualitative interview data sets is not reliant on the size of the sample to yield significant results. The authors found that after 5 interviews, no new codes (code saturation) or themes emerged and no novel insights were gained from the data set, leading to a point of saturation (Hennink et al., 2017). The concept of saturation was introduced in the Grounded Theory by Glaser and Strauss. (1967), providing a framework for developing theoretical and interpretive structures from qualitative data. It has since gained importance as a guideline for determining sample size in qualitative research (Guest et al., 2006). Qualitative researchers, such as Onwuegbuzie and Leech (2005), also argued that sample size is not a significant concern in qualitative research. Lincoln and Guba (2000) associate concerns about sample size with a positivist approach to scientific inquiry, which they and many other qualitative researchers reject.

Effective implementation of semi-structured interviews necessitates a certain level of prior expertise in the research topic area, as outlined by Kelly (2010). In this context, the interview questions were formulated based on pre-existing knowledge supported by the lead author's acquired professional experience in the airline industry as well as opinions and flow of ideas exchanged by the respondents throughout the interviews.

These interviews were audio-recorded, transcribed, and subsequently accompanied by notes taken by the interviewer. The authors selected interviewees using a convenience sampling approach. All interviews were conducted in the English language, and the data coding for all four interviews was carried out manually. The statements presented in this study are translated to the best of the author's ability to faithfully convey the sentiments expressed by the interviewees. The transcripts and accompanying notes were subjected to a coding process, following a template analysis approach originally developed for grounded theory by Glaser and Strauss. (1967). This process involved employing an inductive method to categorize the collected data into subsets that could be further categorized under three primary themes of the main topic of airline's profitability and resilient strategies adopted by airlines during and post-pandemic.

Interview notes were made manually by the author during the interviews following the questions list and memos were also scripted (Bebenroth & Wolf, 2023) following the new flow of ideas generated through the interview sessions. There was flexibility alongside a pre-determined theme list (Appendix 1) and after iterations, the main themes and sub-themes are centered around three timeframes: pre-COVID-19, during COVID-19, and post-COVID-19. The main findings were as per Table 2 below.

Table 2
Findings summary based on semi-structured interviews, (Source: created by author, 2024).

Main themes	Sub themes	Time frame
Financial parameter	Financial parameters	Pre-COVID-19 (2017–2019)
	Maintenance cost, fleet composition and impact on operating cost	
Profitability	Impacted profitability indicators	During COVID-19 (2020–2021)
Workforce disruptions	Lack of succession planning	
	Loss of experienced airline professionals	
Sustainable and resilient strategies	Demand forecasting and sensing	
	Network planning	
	Strategies implemented to counter COVID-19 challenges (travel restrictions)	
Business continuity	Long term innovations to sustain operations	Post-COVID-19 (2022–2023)
	COVID-19 lessons learnt	

4. Findings

4.1. Pre-COVID-19: financial parameters

Before the pandemic, the airline industry dealt mostly with known risks such as fuel price fluctuations and exchange rates, implying an underlying supply chain robustness (Scholten et al., 2019; Ponomarov et al., 2009). Interviewee 4 noted that, despite fluctuations in fuel prices and exchange rates during the pre-pandemic period from 2017 to 2019, the African carrier experienced relatively strong passenger demand and reported positive profits. Interviewee 1 from the North American carrier, however, mentioned that the profitability and cash flow of the FSC were robust during pre-pandemic levels for period 2017 to 2019. Interviewee 5 from the Asian LCC, mentioned that pre-COVID19 for the same period (2017 to 2019), the company was operating in a landscape of agility, and flexibility, as mentioned by Afraz et al. (2021), and there was supply chain visibility, especially relating to flight operations and business revenue generation. Three out of five interviewees who answered this pre-pandemic stage question had convergent opinions – each respective airline's financial health was relatively better off pre-COVID19 as the risks were foreseeable to the industry with fluctuations in profitability for each airline model.

All five interviewees concurred on the critical importance of effective working capital and debt management for the seamless operation of an airline. Interviewees 2, 3, and 4 highlighted the precarious financial position of the African FSC before the onset of the COVID-19 pandemic, underscoring that the company entered voluntary administration within three months of the pandemic's declaration due to significantly low cash reserves. Both Interviewees 1 and 5 asserted that a crucial metric for airlines is the balance between revenue per kilometer (RPK) and available seats per kilometer (ASK). They emphasized that a shortfall in RPK compared to ASK would have a pronounced impact on earnings before interest and tax (EBIT), also known as operating profit. These metrics, meticulously monitored in the pre-pandemic era, have been substantially disrupted by the ongoing pandemic.

Expanding on the discussion surrounding operating costs and the principle of free flow conversation, interviewee 5 from the LCC, emphasized that utilizing older generation aircraft results in higher operating expenses for airlines, primarily due to increased fuel and maintenance costs. Consequently, this escalation in operating costs directly diminishes the net profit margins for airlines, ultimately impacting cash flow and diminishing returns on investment (ROI) for relevant stakeholders. This correlates with existing literature whereby Antoniou (1992) identified an inverse correlation between aircraft age and operating margin, while Ryerson and Hansen (2013) concluded that greater aircraft age corresponds to increased direct operating costs per departure.

4.2.1. During COVID-19: profitability status of airlines under purview

Interviewees 2, 3 and 4 hailing from the same full-service African carrier (FSC) explained the disastrous impact of COVID-19 during its peak of 2020, with interviewee 4 terming the pandemic as a "free fall on the company's profitability". Within a month of border closures and at the peak of the pandemic, the airline experienced serious liquidity issues. This was due to low cash reserves and no revenue given no commercial operations except humanitarian flights and some cargo flights carrying medical equipment, face masks, and COVID-19 vaccines thereafter. The company went into voluntary administration, with an externally appointed administrator taking over the company, and it was delisted from the country's stock exchange with no published accounts during the COVID-19 peak period.

The volatility and negative impact on profitability were reiterated multiple times by the interviewees. Interview 4 mentioned the direct correlation between flight counts and revenue generation and that since the flights were at a standstill, no revenue was generated. According to Interview 1 from the North American carrier, which is also a FSC, the immediate financial impact was the airline burning cash daily due to heavy overhead and fixed costs especially related to aircraft parked with no revenue generation. In contrast to the African carrier, this carrier, alongside the Asian carrier, did not file for voluntary administration. Interviewee 5 from the LCC from Asia reiterated the sentiment that profitability indicators such as operating profit and net profit were most impacted given that most aircraft fleets were grounded, with no revenue flowing into the company's accounts.

4.2.2. During COVID-19: workforce disruptions

All interviewees uniformly agreed that COVID-19 had a significantly negative impact on the industry's labour force, resulting in massive workforce disruptions, in line with existing literature (Sobieralski, 2020). A common strategy adopted, according to the FSCs and LCCs interviewed employees, is furlough, with the main objective of reducing the airlines' high fixed costs given that most aircraft were being parked with no revenue generation. This aligns with the strategies of major airlines globally including American Airlines and Thai Airways as discussed in Charernnit et al. (2022) and in Thomas et al. (2020).

Interviewees 2, 3, and 4 also mentioned organizational workforce changes in terms of employees going on part-time work for a period of 1 to 1.5 years with cuts in salary and revised contracts, early retirements imposed on employees with more than 30 years of service and termination of contracts for technical and cabin crew. Interviewee 2 mentioned that these mandatory early retirement plans underlined an acute organizational shortcoming for the FSC African airline, which is, a lack of adequate succession planning. These retired staff held technical senior positions, with a high level of practical experience, and their sudden exit from the company created a void as there was no time or proper planning to train successor employees. Interviewee 3 also explained how the loss of experienced airline professionals created a vacuum in some key operational departments. Consequently, for the African FSC some of the key retired employees had to be re-hired under a contractual work agreement, for staff training purposes and in ensuring proper succession planning. This pandemic has underlined the importance of emergency succession planning in line with Rothwell (2011) and Serrano and Kazda (2020). As further discussed in Bano et al. (2021), an emergency succession plan is crucial during a pandemic as it mitigates organizational loss by promptly filling vacant positions with qualified staff on an interim basis until a long-term replacement is identified and this has been empirically shown at Adelaide airport in Australia as explained by Connolly (2020).

4.2.3. During COVID-19: sustainable and resilient strategies

The pandemic has underscored the sustainable and resilient strategies that are critical to the airline industry. Interviewees 2, 3, and 4 stated that the African airline carrier operates within a singular national domestic/international airport with limited domestic operations.

Consequently, tools such as demand forecasting and sensing are only used during the normal course of business to determine adequate seat capacity to not only meet market demand but also to maximize aircraft utilization. During the peak of COVID-19 though, given limited passenger commercial flights were operated, these measures were not relied upon. Flights were operated at the request of the government to operate humanitarian and/or cargo flights.

However, interviewee 1 from FSC from North America and interviewee 5 from an Asian LCC mentioned that domestic flights were operated for their respective airlines given the significant size of their domestic markets with multiple local city pairs operations, though at a lesser flight count versus pre-pandemic levels. Both employees stated that accurate demand sensing and forecasting determined proper seat capacity, with modulations on flight frequencies on specific routes and city pairs, in line with Wensveen (2012). Network planning is also a critical component for these two airlines as confirmed by interviewees 1 and 5. It refers to flight schedule re-adjustment to maximize load factor. Load factor is defined as an efficiency metric to determine the percentage of seats sold, that are filled up by passengers (Jenatabadi & Ismail, 2007).

In terms of sustainable and resilient strategies implemented to mitigate COVID-19 challenges caused by border closures, there was a unanimous response from all five interviewees: it was a government-imposed decision that was beyond an airline's control and there was no leeway to contest the same or implement any strategies. To counter the significant decrease in passenger revenue, interviewee 2 mentioned that the African FSC switched its passenger/cargo business model to mostly carrying cargo-in cabin, to increase cargo revenue during the peak of COVID-19 with no passenger demand. This notion of maximizing cargo business was also reiterated by interviewee 1. Interviewee 1 also affirmed that sustainable strategies adopted were renegotiations of aircraft leases, refinancing of aircraft, and early retirement of some aircraft types and these further reinforced the airline's resilience. This insight from interviewee 1 corroborates with the non-distinctive boundaries between sustainability and resilience with overlapping attributes (Ivanov, 2020; Zhu & Krikke, 2020).

All interviewees stated that each respective airline had inherent supply chain resilience in terms of absorbing the disruptive impact of COVID-19 (Ponomarov & Holcomb, 2009; Yu et al., 2019) but to varying degrees. The noted difference lies with airlines that have a large domestic market (interviewee 1 from a FSC and interviewee 5 from a LCC) were more financially resilient than those operating in a small market with limited passengers (interviewees 2, 3 and 4 from the African carrier).

4.3. Post-COVID-19: business continuity and lessons learned

To ensure business continuity in a post-COVID-19 environment, effective 2022, as this year is termed as the 'new normalcy in [the] global aviation system" (Sun et al., 2023b), long-term innovations are necessary to uphold survival. All five interviewees were shocked at how fast the pick-up of activities was once borders had opened up and most people had been vaccinated. Interviewee 1 has disclosed that diversification is important. Over-reliance on a country or supplier puts the airline at risk. Being nimble is a good lesson learned alongside the ability to switch markets and having a strong balance sheet. Interviewee 2 stated that the airline should focus on long-term strategy such as implementing a proper succession plan at the company's level and avoiding short-termism actions such as retiring all experienced personnel or selling the aircraft fleet, without looking into the long-term function of the company. Interviewee 3 affirmed how the African FSC is now integrating clauses relating to the pandemic and its impact on aircraft rental and the availability of grace periods for rental payments in case of prolonged periods, in aircraft lease contracts, which are new provisions different from existing 'force majeure clauses'.

Interviewee 4 stated how the pandemic has challenged existing work relations and traditional mindsets through the implementation of work-from-home (WFH) and how this can be implemented post-COVID-19 for administrative and back-office airline workers. Less commuting times and more flexibility for employees will lead to a healthier work environment (Bick et al., 2023) which will benefit the employer in the long term. Lastly, interviewee 5 stated that airlines should regularly conduct training for their employees to better manage change and disruptions through scenario planning case studies and teamwork between intra-departments and make use of advanced tools involving artificial intelligence (AI) to better manage crises, which is in line with findings from Sun et al. (2023). All interviewees also mentioned that sound liquidity management in terms of maintaining proper cash reserves is key for all airlines involved.

5. Conclusion

Through the semi-structured interviews based on a judgment sampling from airline professionals, the enriched data retrieved corroborated with existing literature and industry reports, showing how COVID-19 has had a significant negative effect on airlines' profitability and sustainability. The adoption of sustainable and resilient strategies, such as cargo-centric business models, renegotiation of leases, integration of causes related to potential pandemics over and above existing force majeure articles, and diversification, is highlighted as crucial for navigating the challenges posed by COVID-19. Looking toward the post-COVID-19 future, the research points to the necessity of long-term innovations and strategies for business continuity. Diversification, effective succession planning, integration of pandemic-related clauses in lease contracts, and embracing flexible work arrangements are identified as critical elements for future resilience and sustainability.

5.1. Managerial implications

This research provides tactical and operational insights (López-Castro & Solano-Charris, 2021) for airline managers. Workforce management is underlined, especially the requirement for robust emergency succession planning to address the vacuum created by the loss of experienced professionals during the pandemic. Airline managers must actively engage in scenario planning and risk management as these are critical tools to assess damage impact and rework flight schedules to mitigate risks and cash burn. Managers should also focus on building a strong balance sheet, avoid over-reliance on specific markets or supplies. This can be done through diversification of airline revenue streams such as focusing on cargo business (Zahraee et al., 2022) and ensuring greater flexibility in financial structures through aircraft lease renegotiation and refinancing can enhance resilience during crises. Implementing these proactive measures is crucial for better managing future disruptions and ensuring financial resilience and adequate risk mitigation. Lastly, airline managers need to be agile and open to change as the implementation of work-from-home practices during the pandemic for back-office employees, underscoring the need for adaptive work practices. The study suggests that such changes can contribute to a healthier work environment, and organizations should consider integrating these practices in the long term. This research introduces a novel perspective on the aviation industry's response to the unprecedented disruptions caused by the COVID-19 pandemic. Unlike previous studies that often focus on targeted aspects such as financial impacts or operational changes, this research employs a comprehensive, phased approach to understand the evolving dynamics from pre-pandemic stability, through the crisis period, to post-pandemic recovery. By integrating insights from semi-structured interviews from airline employees from both full-service carriers (FSCs) and low-cost carriers (LCCs), the study uniquely captures a diverse range of experiences and strategies. This holistic view not only highlights immediate adaptive measures but also looks into the long-term innovations and lessons learned, offering a nuanced understanding of resilience and sustainability in the aviation sector and

valuable insights for both practitioners and researchers. The application of Glaser and Strauss's Grounded Theory (1967) further ensures that the findings are deeply rooted in empirical data, providing a robust theoretical framework that contributes to the existing body of knowledge in a distinctive and impactful way.

However, it is important to acknowledge the limitations of the current research. The insights gained from the semi-structured interviews involving five airline professionals are not representative of the entire industry. The perspectives shared are likely to be influenced by the specific experiences, roles, and organizational contexts of the interviewees. The qualitative data has been collected up to 2023, and given the dynamic nature of the airline industry, key evolutions in the industry post-late 2023 are not captured in this research. Despite these limitations, these semi-structured interviews remain a valuable method for gaining rich, nuanced insights into the airline industry and its response to challenges such as the COVID-19 pandemic. By acknowledging these data limitations and addressing transparency in methodology, participant confidentiality, trustworthiness, dependability, credibility, and transferability are ensured.

5.2. Practical recommendations and future research directions

Future directions for research in this area can involve a longitudinal study to track the industry's recovery post-2023 and explore the sustained impact of the pandemic on workforce dynamics, supply chain resilience, and financial viability. Investigating the role of technological advancements in terms of digital transformation and automation, environmental considerations, and government policies in shaping the future of the airline industry would also provide valuable insights. In conclusion, while the challenges posed by COVID-19 have been severe, the resilience and adaptability demonstrated by airlines in responding to the crisis provide a foundation for ongoing research to inform strategies for future disruptions and ensure the long-term business sustainability of the global airline industry.

CRediT authorship contribution statement

Hansha Kistamah: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Miwa Matsuo:** Writing – review & editing, Visualization, Validation, Supervision.

Declaration of interests

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Hansha Kistamah reports was provided by Not applicable. Hansha Kistamah reports a relationship with None that includes:. Not applicable has patent pending to Not applicable. None. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix 1. Semi-structured interviews with flexible directives for identified time frame: pre-pandemic, during the pandemic, and post-pandemic

1. Can you describe the immediate financial impact that COVID-19 had on your airline's profitability, and how did it compare to pre-COVID-19 times?

2. What strategies or measures did your airline implement to address the challenges brought about by the pandemic, such as travel restrictions, border closures, and workforce disruptions?

3. In the face of operational disruptions caused by the pandemic, what steps did your airline take to ensure the continuity of essential operations and succession planning? Can you provide specific examples of successful supply chain resilience strategies or changes (legal, operational) made?

4. As the industry recovers from the COVID-19 pandemic, what long-term changes or innovations will be necessary for airlines to build and maintain a sustainable supply chain and profitability in the post-pandemic era? What lessons have you learned from this experience that can inform future business strategies within the industry?

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