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Low-Cost Airline Pilots on Exercising Fuel-Loading Policies Designed to Minimize Carrying Extra Fuel during Flight: A Phenomenological Exploration Study

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Abstract: The purpose of this study was to explore low-cost carrier (LCC) pilots' lived experiences of exercising their airlines' fuel-loading policies designed to minimize carrying extra (discretionary) fuel during flight. Using a phenomenological approach, data were collected through semi-structured interviews with seven Part 121 LCC pilots in the United States. Participants were recruited through purposive snowball sampling, and the data were analyzed using Creswell's (2013) data analysis spiral. Participants described FAA oversight and the joint responsibility between captains and dispatchers as important aspects of their airlines' fuel-loading policies designed to minimize extra fuel. However, many expressed concerns that such policies reduced the range of options available in unexpected operational situations. Participants also described additional workload and time pressure associated with calculating, requesting, and justifying additional fuel, particularly during delays and disruptions. Overall, the findings suggest that conservative fuel-loading policies may be experienced as a source of psychological stress and highlight the challenges pilots face in balancing fuel-efficiency objectives with operational demands.

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Introduction

Fuel is one of the largest operating costs in the airline industry, prompting airlines to continuously seek ways to improve efficiency and reduce fuel consumption (Ates et al., 2018). Consequently, airlines have adopted various fuel-conservation initiatives to improve operational efficiency and reduce operating costs (Trincheiras, 2016). One such strategy involves reducing discretionary fuel (also referred to as extra fuel or pilot-added fuel) (De Winter, 2013). Discretionary fuel refers to fuel loaded beyond regulatory and operational requirements to provide additional flexibility in managing unforeseen operational circumstances and is typically added at the discretion of the pilot-in-command (ICAO, 2012; EASA, 2016). Previous studies have shown that reducing excess discretionary fuel, much of which may remain unused upon arrival, can generate substantial cost savings and environmental benefits (Ryerson et al., 2015; Hao et al., 2016; Cho et al., 2020).

However, fuel-efficiency initiatives must be considered alongside flight-safety requirements in airline operations (Jeon et al., 2022). While airline management often seeks to improve fuel efficiency and reduce operating costs, pilots tend to place greater emphasis on safety considerations. This tension highlights the need for caution when implementing aggressive fuel-efficiency measures, as excessive emphasis on fuel savings may reduce operational flexibility and raise safety concerns (Jeon et al., 2022). For example, investigations of Ryanair's fuel-management practices following a series of fuel-related emergency declarations found that aircraft often operated with minimum fuel reserves (CIAIAC, 2013; Jeon et al., 2022). These investigations also raised concerns that operating with minimal fuel margins could increase operational vulnerability when multiple aircraft are affected by the same disruption (Jeon et al., 2022).

From a pilot's perspective, policies intended to improve efficiency may have implications that extend beyond fuel savings in airline operations. This concern is particularly important because commercial airline pilots may experience physical, mental, and social health difficulties associated with work-related stress (Cullen et al., 2021). The Federal Aviation Administration (FAA) (2022) reported that stress can adversely affect pilots' concentration, judgment, and performance. Harris (2011) categorized stress factors in the cockpit into two groups: psychological stressors (e.g., workload, fatigue, occupational stress, and jet lag) and physiological stressors (e.g., noise, vibration, temperature, and atmosphere). Unlike physiological stressors, psychological stressors may be influenced by organizational and managerial practices (Harris, 2011). Organizational efforts to improve efficiency and reduce costs may sometimes create pressure for pilots, particularly when operational decisions involve trade-offs between efficiency and safety (Goh et al., 2012).

These concerns are not only discussed in the human factors literature but have also attracted public attention following aviation accidents. One example is the accident involving Pegasus Airlines, a low-cost carrier based in Turkey, at Istanbul Sabiha Gökçen International Airport on February 5, 2020. A Boeing 737-800 overran the runway during landing, resulting in three fatalities and 179 injuries (T.R. Presidential Official Gazette, 2022). Following the accident, media reports drew attention to the fact that two network carrier flights operating before the Pegasus flight had performed go-arounds because of adverse weather, whereas the

Pegasus crew continued the approach. This led to public discussion about whether the airline's fuel-loading policy, which emphasized minimizing discretionary fuel, could have influenced the crew's decision-making by discouraging a go-around and the additional fuel consumption it would require (Ozbek, 2020; Simsek, 2020).

Subsequent reports on the investigation confirmed that two aircraft had performed go-arounds shortly before the Pegasus flight attempted to land because of adverse weather conditions (Durgut, 2022). Media reports citing the official investigation identified several contributing factors to the accident, including pilot error (i.e., excessive approach speed), lightning-induced stress that increased the crew's urgency to land, the air traffic controllers' failure to advise a go-around, and the lack of a runway end safety area (RESA) at the airport (Durgut, 2022; Tursucu, 2022). However, the official investigation did not identify fuel-related pressure as a contributing factor in the accident (Durgut, 2022). Although these concerns remain speculative, the Pegasus accident sparked a wider debate about whether conservative fuel-management practices can create operational pressure for pilots working in low-cost airline environments.

Despite this public debate, little empirical research has examined pilots' perspectives on conservative fuel-loading policies. Existing studies have primarily examined the economic, operational, and environmental implications of fuel-loading policies, focusing on issues such as fuel savings, cost efficiency, and emissions reduction (Hao et al., 2016; Tabernier et al., 2021). By contrast, relatively little attention has been devoted to understanding how pilots perceive and experience these policies. One notable exception is the survey conducted by Goose Recruitment and FlightGlobal (2020), in which many participating pilots identified management pressure to reduce fuel consumption as a significant source of occupational stress. These findings suggest the need for a more comprehensive understanding of how pilots perceive fuel-conservation policies and whether such policies are experienced as a source of operational pressure.

Accordingly, this phenomenological study explores how low-cost airline pilots experience their airlines' fuel-loading policies designed to minimize carrying extra fuel. By focusing on pilots' lived experiences, the study provides insight into the relationship between fuel-conservation practices, operational pressure, and pilots' decision-making in low-cost carrier operations. For the purpose of this study, extra fuel or discretionary fuel refers to fuel carried above the regulatory minimum established under 14 CFR §121.639, not to the mandated final reserve.

In alignment with this purpose, the following overarching research question guided this study: What are the lived experiences of low-cost airline pilots in exercising the fuel-loading policies designed to minimize carrying extra fuel? To delve into specific aspects of this central inquiry, the following sub-questions were formulated: (RQ1) How do low-cost airline pilots perceive the potential benefits of their airline's fuel-loading policy designed to minimize carrying extra fuel? (RQ2) How do low-cost airline pilots perceive the potential problems of their airline's fuel-loading policy? and (RQ3) How do low-cost airline pilots describe the pressures they experience from airline management regarding the fuel-loading policy?

Regulatory Framework Governing Fuel-Loading Policies

The fuel-loading policies adopted by Part 121 low-cost carriers (LCCs) are shaped primarily by U.S. federal regulations and guidance issued by the International Civil Aviation Organization (ICAO). These regulations establish minimum fuel reserves, define fuel-planning practices, and influence the extent to which pilots may request additional fuel. The following section outlines the regulatory framework relevant to fuel-loading decisions in Part 121 operations.

At the domestic level, 14 CFR §121.639 establishes the minimum fuel requirements for Part 121 domestic operations. Aircraft must carry sufficient fuel to reach the planned destination, proceed to an alternate airport when required, and continue flying for an additional 45 minutes at normal cruising consumption (14 C.F.R. § 121.639, 2026). For international flag operations, 14 CFR §121.645 imposes more stringent fuel-planning requirements. These requirements include a contingency fuel allowance equivalent to 10% of planned trip fuel in addition to the prescribed minimum fuel reserves (14 C.F.R. § 121.645, 2026).

In addition, FAA OpSpec B343 (Performance-Based Contingency Fuel Requirements for Flag Operations) provides an alternative to the 10% contingency fuel requirement specified in §121.645(b)(2) for eligible Part 121 operators. Rather than relying on a fixed percentage of trip fuel, operators may calculate contingency fuel using statistical analyses based on aircraft type, route characteristics, and historical operational performance (FAA, 2016). Although these regulations establish the minimum fuel standards for dispatch, they do not prevent airlines from adopting internal fuel-management policies that influence discretionary fuel loading by flight crews. As a result, airlines have considerable flexibility in how they handle requests for additional fuel.

At the international level, fuel-planning requirements are guided by ICAO Annex 6, Part I, which sets the standards for international commercial air transport operations (ICAO, 2018). Under Section 4.3.6, operators must ensure that aircraft carry sufficient fuel not only to complete the planned flight safely but also to account for potential disruptions. These may include adverse weather conditions, air traffic management delays, and other factors that could affect the planned operation (ICAO, 2018).

ICAO Annex 6 also refers operators to the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976) for additional guidance on fuel management (ICAO, 2018). The manual outlines fuel-planning practices designed to support safe and efficient operations and discusses both prescriptive and performance-based approaches to fuel management (ICAO, 2012).

Collectively, these U.S. and international regulations establish the minimum fuel requirements that airlines must meet while allowing some flexibility in how fuel is planned and carried. Consequently, fuel-loading decisions are shaped not only by regulatory requirements but also by airline policies and the judgment of flight crews. Understanding this balance is particularly important regarding low-cost carrier operations, where pressures for fuel efficiency may interact with pilots’ discretionary fuel decisions.

Methodology

This phenomenological study was conducted in accordance with ethical research standards and received approval from the Saint Louis University Institutional Review Board (Protocol No. 32546). All participants provided informed consent prior to participation.

Purposive snowball sampling strategies were used to identify and recruit seven participants for the study. Participants were recruited through an announcement posted on Flight Safety Information (http://www.fsinfo.org/), an electronic aviation news platform widely used by commercial pilots. Interested individuals completed a brief Qualtrics survey to determine their eligibility for the study. Those who met the inclusion criteria and indicated a willingness to participate were subsequently contacted to arrange an interview. Participants were also invited to refer other eligible pilots who might be interested in taking part in the study.

All participants were male and identified as White/Caucasian; four were captains and three were first officers. Participants ranged in age from 25 to 55 years. Each held an Airline Transport Pilot (ATP) certificate and was employed by Part 121 low-cost carriers (LCCs) operating in the United States at the time of the study. The sample included pilots from three different LCCs, allowing the study to capture experiences under different organizational approaches to fuel loading. To protect participant confidentiality, the names of the participating airlines are not reported. Table 1 shows the flight hours completed by the participants and their respective ages. In addition, participants were asked to self-assess their level of knowledge related to the research topic using a 10-point Likert scale, where a score of 1 represented no knowledge and 10 indicated a high level of knowledge. All participants reported some familiarity with the topic and rated their knowledge between 5 and 10.

Table 1

Participants Flights Hours and Age

Participant	Age	Flight Hours
#1	25	1735
#2	32	3500
#3	36	7300
#4	41	13,200
#5	45	15,000+
#6	54	10,900
#7	55	25,000+

Data were collected through semi-structured interviews conducted via Zoom, each lasting between 20 and 30 minutes. Interview transcripts were analyzed using Creswell's (2013) data analysis spiral, with Atlas.Ti and Microsoft Word used to develop codes and memos.

Consistent with Lincoln and Guba's (1985) framework, several steps were taken to enhance the trustworthiness of the collected data. Both authors coded the interview transcripts independently and identified largely similar themes across the dataset. In addition, participants were invited to review their transcripts via email, and no corrections were reported. These procedures were complemented by thick description of the participants and ongoing researcher reflexivity. Throughout the study, the authors reflected on how their professional backgrounds in aviation might have influenced the interpretation of the data.

Results and Findings

In the first stage of analysis, we applied three coding approaches to better understand the data: initial coding (recording first impressions of the text), in vivo coding (using the participants' own words as codes), and descriptive coding (assigning short labels that summarize the content). This process generated 158 codes and 55 memos. Figure 1 provides an example of the code cloud produced in this stage.

In the second stage, we carefully reviewed seven verbatim transcripts, from which we identified 93 statements and 717 codes. We then grouped the codes by their meaning, which allowed us to identify four themes. Table 2 presents these themes together with the three most significant codes used to define each of them. Themes 1 and 2 correspond to RQ1 and RQ2 and explore pilots' perceptions of the benefits and challenges of fuel-loading policies. Theme 3 addresses RQ3 by examining participants' experiences of management pressure. Theme 4 complements these themes by providing insight into the broader operational context in which fuel-loading decisions take place.

Figure 1

Codes Cloud Sample

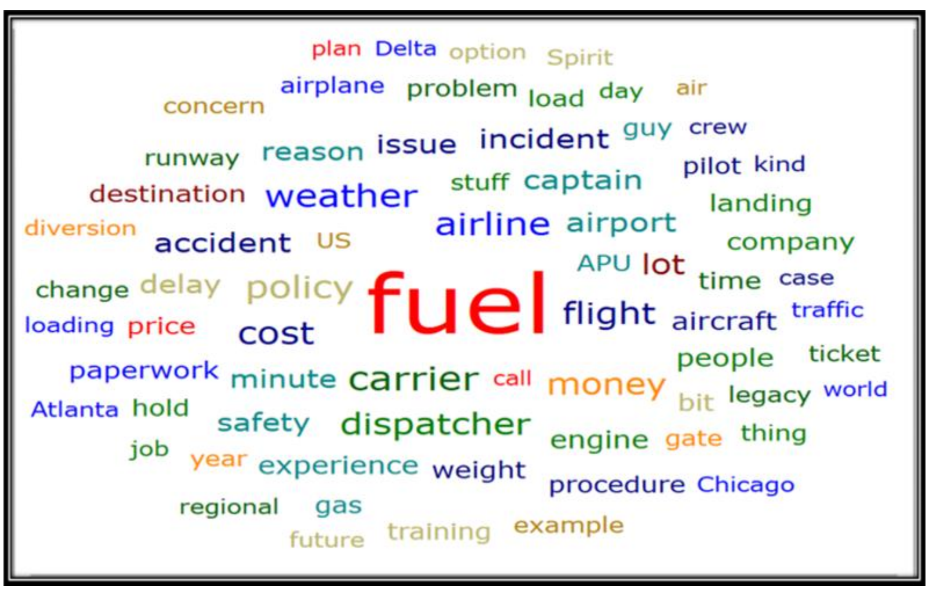

Table 2

Themes and Selected Codes

Themes	Codes
Fuel Management	• Potential for Diversions • Standard IFR Fuel Loading Policies • Joint Responsibility between Captain and Dispatcher
Psychological Stress	• Distraction from Pre-Flight Duties • Limited Options - Forced to Make Decision • Delay in Reaching Destination
Cost and Competition	• Pressure to Minimize Costs • Fuel Tankering • Need to Remain Competitive
Operational Challenges	• Markets with Inadequate Safety Infrastructure • Lack of IT Infrastructure Investment and Personnel • Busier Schedule and Flying into More Airports

Theme 1: Fuel Management

Related to both RQ1 and RQ2, fuel management emerged as a central theme in participants' discussions of both the benefits and challenges of fuel-loading policies. Three codes contributed to this theme: potential for diversions, standard IFR fuel-loading policies, and joint responsibility between the captain and dispatcher.

Potential for Diversions

Several pilots reported feeling pressured to comply with fuel-loading policies that prioritize minimizing the amount of extra fuel carried on board, as insufficient fuel could increase the likelihood of diversions. As one pilot argued, "Any time you reduce fuel load, there's always the potential for diversion, which, in my opinion, should be the worst-case scenario for a fuel loading issue." Another pilot shared an experience where they had to divert due to runway changes and holding patterns at the airport. Furthermore, a pilot with extensive flight experience expressed concern about the safety implications of not having enough pilot extra fuel on board, stating, "I believe it becomes a safety issue because when we're in a position where we don't forecast, or we don't have an extra cushion of fuel, which turns into a diversion." Another pilot highlighted the reliability issues associated with limited fuel, stating, "And the negative side of it is reliability because your choices now are only to divert because you don't have..."

Standard IFR Fuel Loading Policies

Some pilots noted that the FAA extensively reviews the fuel manuals of US airlines for safety purposes. Therefore, they do not believe that fuel-loading policies aimed at minimizing the extra fuel carried on board would pose a problem for US airlines. As one pilot argued, "Here in the US, you know, we have oversight from the FAA, and all of our policies are manuals the FAA approves. Maybe it's different in other countries." Another pilot shared that they do not consider low-cost carriers to be less safe than network carriers, as they all have to adhere to strict FAA guidelines. Furthermore, one pilot mentioned that fuel loads are frequently near the FAA minimum, which strictly requires 45 minutes of cruise fuel after reaching the alternate airport, leaving no room for discretionary extras. However, it is usually a couple of thousand pounds over that, which is enough to complete the flight and circle back if necessary. The participant added, "It's very uncommon for me to see the bare minimum fuel in the fuel loading for that flight."

Joint Responsibility between Captain and Dispatcher

Several participants mentioned that determining the appropriate fuel amount for the aircraft is a joint responsibility of the pilot and the dispatcher. As one participant stated, "Our fuel loading is primarily initially determined by dispatchers, obviously, and they create their fuel load that they effectively suggest for the flight. If the captain disagrees with that, they can coordinate with the dispatcher and request extra fuel. But as of right now, our captains are not allowed to put more than 300 lb of extra fuel on board without consulting with the dispatcher." Another pilot shared that they had positive experiences with their dispatchers and that they were accommodating when asked for additional fuel, as long as there was a valid reason. The participant explained, "Well, like I said, our dispatchers have been pretty good. I haven't had a negative experience. If I ask for it [extra fuel] with a reason, they're more than happy to give it." The fuel policy, as one pilot mentioned, requires the captain and the dispatcher to come to an agreement, indicating that it is a joint responsibility between them.

Theme 2: Psychological Stress Factors

Related to RQ2, participants frequently described psychological stress as one of the main challenges associated with conservative fuel-loading policies. Three key codes contributed to this theme: limited options when making decisions, distraction from pre-flight duties, and delays in reaching the destination.

Limited Options - Forced to Make Decision

Several pilots expressed feeling restricted by policies and procedures that limit the amount of fuel they can carry, leaving them with few options during unforeseen circumstances mid-flight. For instance, one participant described that limited options were the most significant challenge, saying, "I mean, I just don't, I no longer have the options that I used to, and I mean, I'm allowed to add a little bit extra fuel, and I do on a regular basis. But you know, it worries me." The participant further explained that limited fuel margins often required rapid decision making, leaving little time to troubleshoot problems or consult maintenance personnel. Similarly, another pilot remarked that, during a flight, everything is a time-sensitive decision, and having more fuel would enable them to make better decisions. As an example, the participant described how extra fuel could allow a diversion to a coastal airport with a longer runway and fewer hazards. This participant added that the limited amount of fuel available made it challenging to make strategic decisions during the flight.

Distraction from Pre-Flight Duties

Some pilots reported that computing the exact amount of fuel required for the flight disrupted their preflight duties. One participant explained that when they first implemented the minimum extra fuel policy, they frequently contacted dispatchers to request additional fuel, which took away from their pre-flight tasks. The participant further stated that during the initial phase of the policy, these calls to the dispatchers were time-consuming and presented a challenge for ultra-low-cost carriers. Another participant described that the biggest challenge was obtaining approval from the various parties involved, including the captain and dispatcher, to amend the flight plan. However, the participant also viewed this process as an important safety safeguard within the system: "The biggest issue is just who you have to get approval from, I think at the end of the day. But that's, that's another check or safety on the system. The captain has to agree. The dispatcher has to agree. We have to amend the flight plan."

Delay in Reaching Destination

Delays in reaching the destination were also described as a source of stress. As one pilot explained, "If we experience any delay, we're put in a hold. If we're in a hold for more than 15 minutes, we have to divert to an alternate destination, which consumes a significant amount of fuel." Another pilot stated that when there are delays boarding, bad weather, issues with the aircraft, or anything else, he does not want any additional stress or tasks. In his own words, "I don't need that extra headache. I don't need that extra item that I've really got to do an extra check on."

Theme 3: Cost and Competition

Related to RQ3, participants described how cost-reduction efforts and competitive pressures influenced both the development of fuel-loading policies and their experiences operating under them. Three codes contributed to this theme: pressure to minimize costs, fuel tankering, and the need to remain competitive.

Pressure to Minimize Costs

The study revealed that LCC pilots may be under significant pressure to reduce fuel costs while maintaining safety and adhering to fuel-loading policies. One pilot acknowledged that there is "pressure" to reduce fuel load and that they are required to inform the company if they are overfilled so that the company can "work with the fuel" or prevent it from happening in the future. Another pilot noted that cost pressures are ubiquitous and that any measure to save operating costs provides a competitive advantage. An experienced pilot expressed that the fuel policy had added pressure and complexity to their job, stating that they had to keep an "extra eye on" the fuel load, whereas before, having extra fuel was never an issue. Another pilot mentioned changes in procedures, specifically regarding when they are allowed to shut down an engine and do a single-engine taxi, which has changed in the last few years.

Fuel Tankering

The study also highlighted the practice of fuel tankering, whereby airlines carry extra fuel to save on refueling costs at the destination. Pilots reported that fuel tankering was a prevalent practice among LCCs and that they were expected to follow it in order to reduce costs. One pilot explained that the practice of tankering fuel had become more common lately. He gave an example of carrying 10,000 lb extra fuel on a flight from Atlanta to Chicago because fuel was cheaper in Atlanta, and it was more cost-effective to fill up there and burn more fuel on the way to Chicago than to fill up in Chicago. Another pilot gave an example of carrying 25,000-26,000 lb of fuel from Orlando to Charleston, West Virginia, and only taking on minimal fuel in West Virginia due to the extreme cost.

Need to Remain Competitive

The study revealed that LCC pilots' experiences in exercising their airlines' fuel-loading policies were shaped by the need to remain competitive while minimizing costs. One pilot expressed that all airlines are becoming increasingly competitive in minimizing fuel costs and believed that this trend would continue. Another pilot mentioned that any measure to save operating costs would provide a competitive advantage. A pilot remarked that their airline aimed to be efficient in multiple areas, not just in their fuel policy, to keep overhead low and remain competitive. Another pilot stated that their airline's fuel policy helped them stay competitive in the market by achieving their objectives. A pilot argued that carrying less extra fuel would give their airline a significant competitive advantage.

Theme 4: Operational Challenges

Although not directly linked to a specific research question, participants were also asked to describe challenges associated with the LCC business model beyond conservative fuel-loading policies to provide broader context for the study findings. Three codes contributed to this theme: lack of IT infrastructure and personnel, markets with inadequate safety infrastructure, and busier schedules associated with operating into a greater number of airports.

Lack of IT Infrastructure and Personnel

A few pilots noted that the insufficient investment in both IT infrastructure and staff was a major operational difficulty. One pilot commented that low-cost carriers have limited network support and investment in technology to aid in network maintenance. As a result, the carriers often have more passengers on the same flight, which can lead to longer boarding and deplaning times, as well as potential passenger discomfort. Another pilot suggested that investing more money in certain areas, such as IT infrastructure and staffing, could help reduce future expenses. They stated a need for better IT systems and more schedulers while noting that adding more employees would incur more expenditure.

Markets with Inadequate Safety Infrastructure

A group of participants mentioned that operating in markets with inadequate safety infrastructure was another challenge they faced. As one pilot pointed out, low-cost carriers are sometimes required to fly to markets that require significant safety improvements. Meanwhile, another pilot noted that larger, established airlines control the majority of the routes, making it difficult for low-cost carriers to break into the market. They advised that low-cost carriers must find a unique area to specialize in and operate in that region. They also cautioned that established airlines would try to eliminate competition if they felt threatened. As they put it, "knowing that as soon as a legacy carrier feels threatened, they're going to bring down the hammer and pretty much wipe us out in that market."

Busier Schedule and Flying into more Airports

The pilots also mentioned that their busy schedule, which forced them to fly into more airports, generated another operational problem. One individual stated that legacy airlines like United, American, and Delta have an advantage in recovering from weather events or other disruptions because they operate through a hub-and-spoke system. This makes it easier for them to rebuild their schedules. In contrast, low-cost carriers use a point-to-point system, which makes it harder for them to recover from disruptions. This system makes it more challenging to rebuild schedules, as noted by the same pilot: "Our schedules are so much harder to rebuild when we have a problem." Another pilot noted that the low-cost carrier model's success depends on efficiency, as they need to use their airplanes fully. This leads to a busier schedule, which can present its own set of challenges. As he put it, "I mean, you have a busier schedule, right? The low-cost carrier model survives by efficiency. Your airplanes need to be used."

Overall, the majority of pilots in this study expressed concerns about low-cost airlines' fuel-loading policies designed to minimize carrying extra fuel, describing them as reducing the range of options available during unexpected operational situations. One experienced pilot stated, "I don't think it's realistic because the pilots that they have while sounding good on paper, don't accurately reflect what is happening out on the line. So essentially, they're making business decisions based on bad information and bad data. And the other issue is, I believe it becomes a safety issue because when we're in a position where we don't forecast, or we don't have an extra cushion of fuel that turns into a diversion." Another experienced pilot reported no direct experience with incidents or accidents attributable to the policy but expressed concern about being "backed into a corner" due to task loading and accepting a light fuel load at touchdown. A pilot in the study mentioned that "naturally, that [minimum fuel-loading policy] is going to add some risk to the overall operation."

However, some pilots in the study were of the opinion that the low-cost airlines' fuel-loading policies were not a safety issue. As one pilot explained, "The risk is obviously more of a business risk than a safety risk because we have our policy at 45 minutes of fuel left over." Another pilot described how their airline's fuel-loading policy was transparent about adding extra fuel, with minimum fuel requirements varying for different aircraft types. "So, it's very uncommon for me to see the bare minimum fuel in the fuel loading for that flight," the pilot noted.

Discussion

The findings of this study provide insight into how low-cost carrier pilots experience fuel-loading policies designed to minimize discretionary fuel. The discussion considers the findings in relation to the three research sub-questions.

Regarding RQ1 (perceived benefits), participants generally viewed FAA oversight and the shared responsibility between captains and dispatchers as important safeguards in the fuel-planning process at their airlines. For many, these institutional and regulatory features provided a degree of confidence in the policies they were asked to follow.

Regarding RQ2 (perceived problems), many participants expressed concern that fuel-loading policies designed to minimize discretionary fuel could reduce operational flexibility during unexpected situations. This finding is consistent with Jeon et al. (2022), who argued that aggressive fuel-efficiency initiatives may reduce pilots' operational flexibility. Similarly, concerns identified in investigations of Ryanair's fuel-management practices suggested that operating with minimal fuel reserves may increase vulnerability when multiple aircraft are affected by the same disruption (CIAIAC, 2013; Ryerson et al., 2015). The present findings extend this literature by demonstrating how such concerns are experienced by pilots in day-to-day operations.

Participants also described experiences consistent with psychological stress, further informing RQ2. They reported feeling constrained by limited fuel margins during unforeseen situations and described the additional workload associated with calculating, requesting, and justifying discretionary fuel. These experiences are consistent with Harris's (2011) argument that psychological stressors may arise not only from operational conditions but also from organizational practices. The findings also resemble those reported by Goose Recruitment and FlightGlobal (2020), in which management pressure to reduce fuel consumption was identified as a significant source of occupational stress among pilots.

Regarding RQ3 (management pressure), participants' descriptions suggest that fuel-loading policies are often experienced within a broader organizational context shaped by cost-reduction efforts and competitive pressures. Although some participants viewed fuel-loading policies primarily as business decisions rather than safety issues, others described feeling pressure to operate with minimal discretionary fuel while maintaining sufficient flexibility during unforeseen situations. The practice of fuel tankering further illustrated this issue. Participants noted that pilots may be encouraged to minimize discretionary fuel in some situations while carrying additional fuel in others when doing so offers a cost advantage. This interpretation is consistent with Goh et al. (2012), who argued that organizational efficiency initiatives may create pressure when operational personnel are required to balance economic objectives with operational considerations.

Practical Implications

Several practical implications emerge from these findings. Although participants generally acknowledged the economic rationale behind fuel-conservation efforts, many emphasized the importance of retaining sufficient flexibility when operational conditions change unexpectedly. Preserving this flexibility may be as operationally significant as the fuel savings themselves.

The findings also highlight the importance of effective communication between dispatchers and flight crews. Participants who reported positive working relationships with dispatch personnel generally expressed fewer concerns regarding fuel-loading decisions. Maintaining collaborative decision-making processes may help airlines balance fuel-efficiency goals with pilots' need for confidence when making operational decisions.

More broadly, the findings suggest that the effectiveness of fuel-conservation initiatives may depend not only on economic outcomes but also on how such policies are experienced by operational personnel. Thus, airlines may benefit from considering the human-factors implications of fuel-management policies alongside their financial and environmental objectives.

Research Limitations

This study was delimited to active Part 121 LCC pilots based in the United States, as the researchers' focus was specifically on the regulatory and operational context of domestic U.S. low-cost carrier operations. Several limitations should be considered within these boundaries. First, although the sample size of seven participants is consistent with phenomenological research (Creswell, 2013), it may not reflect the full range of experiences among pilots working in the LCC sector. Second, the study relied entirely on self-reported interview data, which may have influenced how participants described their experiences and concerns. Finally, all participants identified as male and White/Caucasian, which may limit the extent to which the findings reflect the experiences of more diverse pilot populations. Despite these limitations, the study provides insight into how pilots experience fuel-loading policies designed to minimize discretionary fuel and highlights relevant operational and psychological considerations in U.S. LCC operations.

Conclusion

This study explored the lived experiences of seven Part 121 LCC pilots in exercising their airlines' fuel-loading policies designed to minimize extra fuel. Using a phenomenological approach, it sought to understand how such policies are perceived in relation to operational decision-making, psychological stress, and management pressure.

The findings suggest that pilots' experiences with conservative fuel-loading policies are shaped by a combination of regulatory, operational, and organizational factors. Participants generally expressed confidence in the regulatory safeguards that govern fuel-loading policies in the US. However, many also described a perceived tension between fuel-efficiency objectives and the operational flexibility they considered important when responding to unexpected situations. This tension was most evident in participants' descriptions of increased workload and constrained decision-making during flight operations. It was also reflected in discussions of fuel tankering, where pilots are expected to minimize discretionary fuel in some situations while carrying additional fuel in others for economic reasons.

The study indicates that the human dimensions of fuel-conservation policies deserve attention alongside their economic and environmental benefits. Even when fuel-loading policies meet regulatory requirements, pilots may still experience challenges that are not reflected in operational performance data. Therefore, these findings underscore the value of considering pilots' lived experiences when developing and implementing fuel-conservation initiatives in low-cost carrier operations.

As this study adopted a phenomenological approach, it was not intended to establish causal relationships between fuel-loading policies and operational outcomes. Instead, it focused on understanding how pilots experience and make sense of these policies in their day-to-day operations. This focus is important because research on fuel management has devoted relatively little attention to pilots' perspectives. Future research could extend this work by including larger and more diverse samples of pilots. Examining the perspectives of airline managers may also provide a more comprehensive understanding of how fuel-conservation practices are developed and implemented in low-cost airline operations.

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