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Linking Psychological and Organizational Contexts to the Mental Health and Psychological Well-being of Malaysian Aviation Pilots

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Abstract
The aviation industry's health and well-being programs fail of meeting human and safety needs, a gap worsened by the COVID-19 pandemic. This study examines how psychological factors and organizational settings affect Malaysian aviation pilots' mental health using the Job Demand-Resources (JD-R) Theory. It explores safety climate as a key organizational resource and job burnout as a psychological demand. Quantitative analysis reveals that improving safety climate and reducing burnout significantly enhance pilot's mental health. The findings underline the importance of integrated organizational strategies to support pilot well-being and ensure operational safety amid ongoing industry challenges.

Keywords: Job Demands-Resources Theory; Safety Climate; Job Burnout; Mental Health

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1.0 Introduction

Worker health, well-being, and stress management are of critical importance in high-reliability, safety-critical systems like aviation. Aviation is a complicated transportation system, and safety is of paramount importance because aircraft failure often involves casualties. Since aviation transportation is a highly sophisticated system, many factors, such as human error, aircraft mechanical failure, extreme weather, unreasonable company policy, or a combination of them, can result in incidents. According to the European Union Aviation Safety Agency (EASA), accident statistics indicate that approximately one-quarter of accidents and serious incidents involving large commercial aircraft are attributed to human factors or performance issues (EASA, 2020). The classification of accident causes includes "State of Wellbeing & Fitness for Duty," which is identified as a top priority core safety issue. Following the Germanwings 9525 accident in 2015, there has been an intensified emphasis on addressing pilot suicide and effectively detecting and managing mental health issues among pilots. In response to these concerns, EASA also implemented new regulations aimed at enhancing the management of pilot mental fitness (EASA, 2020).

Given these concerns, aviation organizations must advance an integrated approach to health, well-being, and safety culture (Cahill et al., 2022). This involves aligning safety climate with job burnout, as reflected in the concepts of mental health and well-being. Importantly, such an approach depends on fostering trust and implementing proper protections to ensure that aviation pilots feel safe in

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regularly reporting their well-being levels and challenges, as well as their impact on operational safety. Despite these efforts, critics argue that there has been insufficient emphasis on prevention and the promotion of positive well-being. Furthermore, the well-being of other aviation workers beyond pilots has also been overlooked (Cahill et al., 2022).

This issue has become even more urgent in the context of COVID-19. The pandemic has had a profound impact on aviation workers, pilots and the industry (Flight Safety Foundation, 2020). Many aviation workers and pilots have faced job loss or reduced pay, and as recent COVID-19 studies indicate, financial insecurity and job loss are significant risk factors for depression and anxiety. Furthermore, EASA has highlighted specific safety concerns arising from the pandemic, including the risk of skills and knowledge degradation due to a lack of recent practice, as well as the mental well-being of aviation professionals (EASA, 2020). The COVID-19 pandemic is emerging as a psychological contamination that threatens the survival of the aviation industry, acting as a significant source of stress, anxiety, and reduced motivation among personnel, which could directly impact aviation safety (ICAO, 2021). Before the COVID-19 pandemic, significant evidence highlighted the impact of work-related stress on pilots' well-being (Demerouti et al., 2018; Cahill et al., 2018; Cullen et al., 2020), including issues such as disengagement, burnout, and depression (Wu et al., 2016; Demerouti et al., 2018; Cahill et al., 2018, 2021). More recently, the aviation industry and pilot groups have prioritized promoting positive well-being and encouraging healthy behaviours among aviation professionals (Cullen et al., 2020; Flight Safety Foundation, 2020). While recent studies have examined depression levels in pilots (Pasha & Stokes, 2018; Wu et al., 2016) and coping strategies (Joan et al., 2021), the connection between mental health outcomes and the interaction between psychological and organizational contexts remains largely unexplored.

Therefore, most studies focusing on the well-being of aviation workers primarily concentrate on pilots. Pilots represent a distinct occupational group, carrying a professional responsibility to ensure the safety of the aircraft and its occupants. During their work, pilots must manually control the aircraft during critical phases of flight, operate complex onboard systems, collaborate closely with crew members and air traffic control, and navigate increasing automation and time-sensitive emergencies (Evangelia et al., 2019). Additionally, they often work rotating and lengthy shifts in challenging environmental conditions characterized by low humidity, limited space, noise, and varying light levels. Pilots undergo rigorous training, which includes regular flight simulations and actual flight tests. These intrinsic factors of the aviation environment necessitate that pilots maintain good physical and psychological health.

A 2016 study on pilot mental health revealed that 12.6% of respondents screened positive for depression using the PHQ-9 (Wu et al., 2016). Additionally, a systematic review of 20 studies investigating depression in airline pilots found that the prevalence of major depressive disorder among commercial airline pilots ranged from 1.9% to 12.6% (Pasha & Stokes, 2018). More recently, an anonymous online survey conducted among commercial pilots in 2018 and early 2019 indicated that 17.6% of respondents screened positive for depression on the PHQ-9 (Cahill et al., 2021). However, research on pilots has primarily focused on issues like fatigue or other specific health-related outcomes, often overlooking psychological health and well-being. This oversight is concerning because diminished psychological health, such as burnout, is linked to performance decrements. A recent study on burnout in pilots (Demerouti et al., 2018) highlighted that both work resources (e.g., a supportive work environment and development opportunities) and personal resources (e.g., personality traits and coping abilities) can buffer the effects of job demands (e.g., home/work conflict and future uncertainty) on job strain, including burnout.

This research aims to:

1. This study analyses how job burnout affects the mental health and psychological well-being of Malaysian aviation pilots.
2. The study aims to evaluate how a safety climate within an organizational framework impacts Malaysian aviation pilots' mental health and psychological well-being.
3. This study aims to determine if job burnout as a psychological factor or safety climate as an organizational factor exerts more influence on Malaysian aviation pilots' mental health and psychological well-being.

2.0 Literature Review

2.1 Mental Health

The World Health Organization (WHO) defines mental health as "a state of well-being in which an individual recognizes their abilities, can manage the normal stresses of life, works productively and fruitfully, and contributes to their community" (Zhao et al., 2023). Previous studies have indicated a gradual decrease in the flight accident rate attributed to equipment failure, with human factors emerging as the primary contributors to aviation accidents (Kharoufah et al., 2018). Pilots, as crucial members of the aviation industry, encounter substantial psychological pressure due to the demands of their work environment and responsibilities (Cahill et al., 2021). The mental health of pilots significantly influences essential qualities such as their flying skills, decision-making abilities, and emergency response capabilities.

Numerous studies have shown that mental health issues among pilots, including anxiety, depression, insomnia, and psychosis, are major contributors to aviation accidents (Mulder et al., 2018). Consequently, research has increasingly focused on the mental health of pilots, highlighting the necessity to address the psychological challenges they face to enhance overall aviation safety (Miao et al., 2024). This shift in focus underscores the importance of implementing effective mental health support systems and promoting well-being initiatives within the aviation industry to mitigate the risks associated with human factors.

Proficient pilots adeptly handle unforeseen flight scenarios, ensuring safe flights, while poor mental health impairs judgment and operational capabilities, directly threatening flight safety. The tragic event of Germanwings Flight 9525 in 2015 exemplifies this risk, as the co-pilot's deliberate actions resulted in the deaths of 150 passengers and crew. The subsequent investigation revealed that the co-pilot had experienced a psychotic depressive episode that began in 2014 (Pasha et al., 2018). Similarly, incidents like the 1999 EgyptAir

crash underscore the significant impact of pilots' mental health on flight safety. These events highlight the urgent need for the aviation industry to prioritize mental health support and preventive measures to safeguard against such devastating outcomes. Therefore, maintaining the mental health of pilots is a fundamental prerequisite for ensuring flight safety.

2.2 Psychological Well-being

Aviation pilots are responsible for managing air operations across various sectors, including passenger transport, aerial work, and air freight. This profession entails coping with heavy workloads and navigating situations that generate high levels of stress, which can lead to psychological challenges that negatively impact their well-being. Research supports this concern; for instance, Wu et al. (2016) found that 12% of pilots reported experiencing periods of depression, while 4% reported having suicidal thoughts. Similarly, Demerouti et al. (2018) revealed that 40% of commercial airline pilots exhibited very high levels of burnout symptoms. These findings underscore the pressing need for mental health support and interventions tailored to the unique challenges faced by pilots.

Since the Germanwings Flight 9525 incident, aviation health agencies worldwide have developed well-being guidelines to assist pilots in managing their physical, mental, and social health. The Germanwings Flight 9525 crash is a tragic example of an aviation incident caused by human factors. This accident occurred when the co-pilot attempted suicide during his flight, a mental health disorder that the aviation health agency failed to identify (Branch, 2021).

In Indonesia, human factors have also been implicated in several plane crashes. For instance, the Lion Air Flight JT 904 crash in the Bali Sea was linked to the pilot experiencing hallucinations during landing (Torrence, 2018). Another notable incident is the AirAsia Flight QZ 8501 crash in the Java Sea, which resulted from miscommunication between the two pilots (Bellamy, 2015). The most recent incident involved a Boeing 737-800NG aircraft owned by China Airlines, which crashed in March 2022. An analysis of the Flight Data Recorder and Cockpit Voice Recorder revealed evidence suggesting that the pilot deliberately crashed the plane (BBC News, 2022).

These incidents underscore the critical need for pilots' well-being and intervention within the aviation industry to prevent such tragedies in the future. Well-being is defined as a holistic state in which individuals feel happy and fulfilled, characterized by good health, education, and financial stability. It involves maintaining an optimistic outlook, being free from worry, possessing a sense of spirituality or religious faith, demonstrating confidence, and having self-awareness and insight (Wenas et al., 2022).

2.3 Job Burnout

The concept of job burnout was first introduced by Freudenberger in psychology to describe a state of overwhelming exhaustion that occurs when work demands excessively exceed an individual's capabilities, energy, and resources (Yanzeng et al., 2024). This phenomenon is characterized by feelings of fatigue, reduced motivation, and a diminished sense of accomplishment, often resulting from prolonged stress in the workplace (Yanzeng et al., 2024). Although several conceptualizations exist to capture burnout, they generally agree that it consists of two main symptoms: high levels of exhaustion and a distant or cynical attitude towards work (Evangelia et al., 2019).

In the current study, the Oldenburg Burnout Inventory (OLBI; Demerouti et al., 2001, 2003) is utilized, which conceptualizes burnout as a syndrome characterized by work-related negative experiences, including feelings of exhaustion and disengagement from work. Exhaustion refers to general feelings of emptiness, being overtaxed by work, a strong need for rest, and a state of physical fatigue. In contrast, disengagement involves distancing oneself from the tasks and content of one's work, leading to negative, cynical attitudes and behaviours toward work in general (Evangelia et al., 2019). Individuals experiencing high levels of job burnout often feel a continuous drain on their emotional and mental resources, particularly when they perceive a deficit in personal resources. This depletion may cause them to refrain from investing additional effort in maintaining safety, potentially leading to non-compliance with safety regulations, neglect of safety procedures, and disregard for safety risks.

2.4 Safety Climate

In the context of organizational context, safety climate serves as a crucial organizational resource that encourages members to engage in behaviours that protect their safety and health (Griffin & Curcuruto, 2016). However, the positive relationship between safety climate and safety behaviours may be weakened if workers' motivation to comply with safety protocols is compromised due to high psychological demands stemming from job burnout. Conversely, the potential negative effects of job burnout can be alleviated if employees perceive that their organization provides adequate resources. An organization with a positive safety climate will typically offer resources such as protection and support for the health and well-being of its members (Leitão et al., 2021; Taylor et al., 2019).

The current study aims to make three distinct contributions to the literature on safety climate and well-being. First, an emerging stream of research indicates that safety climate has implications for both employee safety and well-being (Taylor et al., 2019). However, safety climate research has largely overlooked the psychological context of individual employees when examining the effects of safety climate on their occupational safety behaviours and well-being across both work and personal domains. This oversight is significant because psychological demands from work can drain employee resources and impair both cognitive and motor functioning, further compromising performance and adaptability. These effects are likely to be particularly pronounced among employees in high-demand occupational contexts, such as the aviation industry.

Second, this study extends Maslach and Leiter's (2016) burnout model by demonstrating that the organizational context, represented by safety climate, has implications for understanding the effects of pilots' job burnout on mental health and well-being. Specifically, the present research sheds light on how pilots with impaired psychological contexts can respond to and adapt to evolving conditions in demanding occupational settings. Third, the current study adopts the perspective that safety climate and job burnout are dynamic constructs, necessitating examination of their interplay over time.

2.5 Job Demands-Resources (JD-R) Theory

The Job Demands-Resources (JD-R) theory was initially introduced to identify the work characteristics responsible for employee burnout. According to this model, two broad categories of working conditions can be identified: job demands and job resources. These categories are applicable across various occupations, including those involving work with things, information, or people, making the JD-R theory particularly relevant to pilots' work.

Job demands are defined as the physical, psychological, social, or organizational aspects of a job that require sustained physical and/or psychological effort and are thus associated with specific physiological and/or psychological costs (Demerouti et al., 2001). Examples of job demands include high work pressure, job burnout and emotionally demanding interactions with others.

In contrast, job resources are the physical, psychological, social, or organizational aspects of a job that are functional in achieving work goals, reducing job demands and the associated physiological and psychological costs, or stimulating personal growth, learning, and development (Demerouti et al., 2001). Examples of job resources include autonomy, safety climate, performance feedback, and opportunities for personal growth.

For pilots, increased perceived stress and work demands can lead to the onset of job burnout. As pilots recognize the signs of burnout, they may become more sensitive to the depletion of their resources. When engaged in activities that consume significant physical and cognitive resources such as implementing spontaneous safety changes and addressing safety suggestions while striving to complete flight tasks, they may be more inclined to adopt a passive safety climate. This could manifest as neglecting or avoiding safety behaviours, which includes reducing work enthusiasm and lowering overall mental health and well-being.

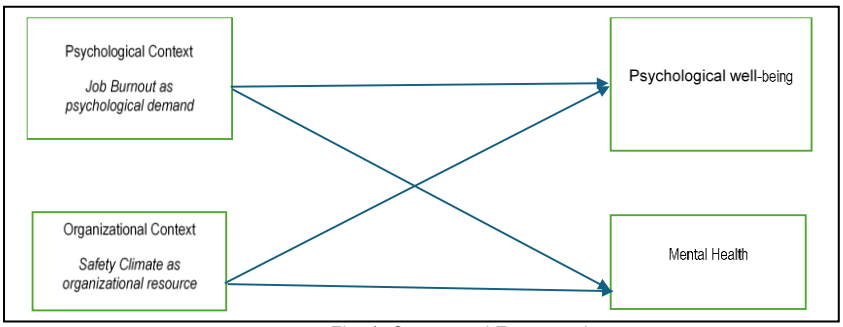

Fig. 1: Conceptual Framework
(Source: Demerouti et al. (2001); Maslach & Leiter (2016))

3.0 Proposition Development

3.1 Proposition 1:

The mental wellness of Malaysian aviation pilots shows a significant correlation with their job burnout psychological context.

The current body of research demonstrates that job burnout negatively impacts employee psychological health, especially in demanding work settings like aviation according to studies by Demerouti et al. (2018) and Wu et al. (2016). The condition of job burnout encompasses emotional exhaustion, depersonalization, and diminished accomplishment which leads to impaired cognitive and emotional functioning according to Maslach & Leiter (2016). These burnout symptoms affect pilots by reducing their capability to handle operational duties which results in deterioration of their psychological health (Cahill et al.,2021). The demands of the aviation industry create conditions through rotating shifts and limited rest which place pilots in high responsibility roles and increase burnout risk. The proposition stands on research which identifies burnout as a major psychological factor that disrupts pilots' mental resilience and well-being.

3.2 Propostion 2:

The psychological context of job burnout significantly affects the mental health status of Malaysian aviation pilots.

Research by Demerouti et al. (2018) has demonstrated strong links between burnout and adverse mental health consequences such as depression, anxiety, and cognitive fatigue. Research shows that pilots who face long-term high work demands and limited psychological resources demonstrate more frequent mental health problems (Wu et al., 2016; Pasha & Strokes, 2018). The risk elevates when stress accumulates beyond organizational control due to a lack of effective intervention. Pilot mental health problems frequently result from burnout that remains unchecked. Burnout emerges as more than just a work-related risk because it stands as a major indicator of mental health problems within the aviation sector.

3.3 Proposition 3:

The organizational safety climate context significantly impacts the mental health status of Malaysian aviation pilots.

A robust safety climate where organizational policies and practices reflect a genuine commitment to safety has been associated with improved psychological outcomes among aviation workers (Cullen et al., 2020; ICAO, 2021). When pilots perceive that safety is prioritized and they are valued within the organization, it enhances their sense of control, belonging, and motivation, all of which support

psychological well-being (Evangelia et al., 2019). In contrast, a poor safety climate can heighten stress, disengagement, and emotional fatigue (Cahill et al., 2018). This proposition is therefore built on established research linking organizational support structures with psychological well-being among safety-critical professionals.

3.4 Proposition 4:

The organizational safety climate environment of Malaysian aviation pilots significantly impacts their mental health.

Evidence suggests that organizational culture particularly safety climate has a direct impact on mental health outcomes among pilots (Cahill et al., 2022; Flight Safety Foundation, 2020). A positive safety climate can buffer the psychological impact of job demands, reducing the risks of anxiety and depression. Conversely, when safety protocols are inconsistently enforced or leadership fails to support staff well-being, it can trigger chronic stress and mental health decline. Mental health issues such as fatigue, irritability, and cognitive overload are often symptomatic of systematic organizational neglect. This proposition thus draws from empirical studies highlighting the significance of organizational environment in sustaining pilot mental health.

4.0 Conclusions

This research demonstrates how psychological factors and organizational contexts work together to influence the mental health and psychological well-being of aviation pilots in Malaysia. The Job Demands-Resources (JD-R) theory perspective demonstrates that pilots' mental health outcomes depend heavily on both their job demands and organizational resources. Job burnout and similar psychological strains cause harm to pilots' mental health which results in decreased performance and diminished quality of life.

A supportive organizational context with a positive safety climate crucially supports mental health advancement. Aircraft organizations that emphasize safety and ensure enough resources lead to pilots experiencing lower stress levels while enjoying greater job satisfaction and stronger psychological resilience. However, this study is not without limitations. Researchers cannot determine cause-and-effect relationships between variables due to the cross-sectional study design. The use of self-reported data might lead to response bias because mental health topics in aviation are sensitive by nature. The exclusive research on Malaysian pilots makes it difficult to apply the study results to other cultural or operational aviation environments.

A longitudinal research approach would provide deeper insights into how psychological and organizational factors dynamically affect pilot well-being. Including additional aviation personnel in the research or comparing results from different countries would provide deeper insights. The JD-R framework would provide deeper insights into aviation resilience and well-being if researchers added variables like coping strategies and leadership support as well as work-life balance considerations.

The study results emphasize that aviation stakeholders must develop organizational strategies that strengthen safety culture while actively managing psychological demands. The industry must adopt these practices to protect pilot health while maintaining Malaysia's aviation safety and operational efficiency.

Paper Contribution to Related Field of Study

This study contributes to the field of occupational health psychology and aviation safety by providing empirical evidence on how organizational and psychological factors affect the mental health of aviation pilots. By applying the Job Demands-Resources (JD-R) Theory within the Malaysian aviation context, the research extends theoretical understanding of how safety climate functions as a vital organizational resource and how job burnout acts as a psychological demand. The findings highlight the importance of integrated organizational strategies to improve pilot well-being and operational safety, offering practical implications for airline management, policymakers, and aviation health programs, particularly in post-pandemic recovery efforts.

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