THE EFFECTS OF PILOT SAFETY BEHAVIOURS ON PERCEPTIONS OF ORGANISATIONAL SAFETY CULTURE: A CASE STUDY OF ROYAL THAI ARMY PILOTS

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(Received: March 12, 2021; Revised: April 28, 2021; Accepted: April 30, 2021)

Abstract

This study examined the pilot safety behaviours' effects on the perception of organisational safety culture among Royal Thai Army pilots. Data were collected from a sample of 202 Royal Thai Army pilots. A questionnaire was used as a research instrument to collect data. Data collected were then analysed using descriptive statistics and stepwise regression analysis. This study indicated that the four dimensions of safety behaviour, namely: intra-family relationship, job characteristics, health, and self-discipline are moderately correlated with the organisation's perceived safety culture (r = 0.59). The regression analysis shows that the safety behaviours in terms of self-discipline in aviation and job characteristics affected the organisation's perceived safety culture with a statistical significance level of 0.05.

Keywords: Safety Behaviours, Pilot, Safety Culture, Royal Thai Army, Safety Management System

Introduction

The airspace is a shared resource for both civil and military aviation, and many air navigation facilities and services are provided for and used by both sectors (ICAO, 2013). Further, the use of airspace and behaviours of human resources from both civil and military aviation is subject to similar principles, which foster the safety, regularity, and efficiency of civil aviation and the requirements of military air traffic. In general, the objectives of military operations in this sector are to support national security and defence and build and maintain the readiness of State aviation capabilities.

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Statement of Research Problem

Safety culture is fundamental for the proper running of organisational operations. Security in the aviation industry entails the willingness and ability of an entity to uphold welfare and create risk awareness to manage its functions. Safety culture mainly manifests through the consistency in which a company runs its activities and protection issues. An organisation's ability to prioritise and align safety issues with its broader objectives and employees' concerns show that it can adequately influence each individual's actions towards ensuring safety in the workplace (Uryan, 2010). Most of the studies related to aviation safety are conducted within the context of the civil aviation sector. However, different operational contexts between the civil and military contexts may impact the pilots' safety culture and behaviours in different ways.

Purposes of the Research

1. To study the level of the Royal Thai Army pilots' safety behaviour;
2. To study the level of the Royal Thai Army pilots' perception of their safety culture; and
3. To study the Royal Thai Army pilots' safety behaviour on their perception of safety culture within the Royal Thai Army.

Scope of the Research

The population in this study was 220 Royal Thai Army fixed-wing and rotary-wing pilots. The questionnaire contained three sections: Demographic information, Safety Behaviours of Pilot, and Perception of Organisational Safety Culture.

Literature Review

1. Safety Behaviours of Pilot

Neal and Griffin (2002) suggested that safety climate is one of the potential predictors of safety behaviour. They identified other potential predictors of safety behaviour as supportive leadership and conscientiousness. Neal and Griffin also (2002) suggested that conscientiousness predicted safety motivation, safety compliance, and safe participation. Other studies have indicated that a critical component of conscientiousness is self-efficacy (Chen, 2014). In other studies, Neal and Griffin (2006) found that perceptions of safety and motivation to perform work functions safely significantly influenced self-reports of a task and

contextual safety performance, namely: safety compliance and safety participation. Supinta Muengsringam (2009) conducted a study examining the flight safety behaviours among Royal Thai Army pilots whose psychological characteristics, socioeconomic characteristics, and social and psychological characteristics are different. The study also pointed out the relationship between psychological and social factors relating to Royal Thai Army pilots' flight safety behaviours. The results showed that pilots with greater perceptions of organisational safety climate performed statistically better in terms of in-flight safety behaviours. Besides, pilots with high self-control scores tend to behave more safely and scored more highly in terms of flight safety behaviours. Supinta Muengsringam (2009) suggests that pilots' safety behaviours are the actions and mannerisms made by pilots being influenced by safety compliance and safety participation to adjust to working environments with situational awareness to prevent incidents and accidents. Four dimensions potentially construct the safety behaviours: intra-family relations, job characteristics, personal health, and self-discipline.

2. Safety Culture

Many scholars have widely defined safety culture, but the commonly applied definition is from the Advisory Committee on the Safety of Nuclear Installations (ACSNI). According to this institution, organisational safety culture is the product of the individual and attitudes, values, perceptions, behavioural patterns, and competencies that dictate an agency's proficiency and commitment to safety and health management (Valkenburcht, 2013). Since culture is a concept that people can transfer from time to time to various groups, the best definition is shared values, practices, attitudes, and beliefs that govern how an organisation functions. The safety culture model comprises of three components: the safety climate, the safety management system, and safety behaviour. Safety climate refers to the employees' shared attitudes and perceptions regarding workplace safety, and these perceptions determine the extent of reward for role behaviour. Safety climate influences the organisational safety culture because it is about the employees' attitude towards some characteristics of the work environment. Organisations operating under high-risk industries ought to establish an active safety culture since this culture is essential to encourage workers to adjust themselves to conform with workplace safety standards (Davids, 2016). Studies have shown that human error has become more common in the aviation industry, compared to the past. The implication is that a move to influence the workforce's beliefs, behaviour, attitudes, and values can effectively reduce human error.

The five major generally acceptable safety culture indicators include: employee empowerment, organisational commitment, management involvement, reporting systems, and reward systems for minimising staff exposure to risks. The extent to which the middle and upper-level managers individually engage themselves to incorporate safety activities is known as management involvement. These executives' contributions to workplace safety may be through training workers and conducting seminars to highlight critical security operations (Alsowayigh, 2014). The administrators ensure the concerned individuals maintain the proper flow of information in all departments to enable a smooth response to safety needs in emergencies.

A reward system is essential to motivate employees by discouraging unwanted behaviour and encouraging positive contributions. The strategy is possible through the conduct of frequent evaluations of conduct to ascertain its consistency with the company values and the rewards or assigning penalties as a form of punishment (Uryan, 2010). Organisational commitment refers to how the higher-level management recognises that safety is the guiding principle and the core value to its success. The administration's ability to remain committed by developing a positive attitude towards safety through consistently promoting safety is essential in enhancing safety in its operations.

Employee empowerment refers to employees' attitudes or perceptions resulting from taking responsibilities delegated to them by the higher management authority (Valkenburcht, 2013). Workers tend to be highly motivated when they develop a positive attitude towards their roles and work in unity with the management to enhance safety in the organisational operations. Taking responsibility for assigned tasks implies that team members play a crucial role in initiating, promoting, and achieving corporate security targets.

The safety culture issue is paramount in the aviation industry because experts have established that most aircraft accidents result from human error. Therefore, a business' failure to adequately address employees' safety issues may result in the tainting of its reputation (Uryan, 2010). Thus, the organisation's success rests in part on its ability to emphasise safety issues by ensuring that the perceptions of its employees, especially the pilots and other technical personnel, have a connection to upholding safety. An institution that emphasises and supports a safety culture is likely to minimise the potential risks associated with human mistakes that may result in disasters of greater magnitude (Davids,

2016). The aviation industry is leading in maintaining the safety culture by following procedures and instructions as expected.

3. Relationship between Safety Behavior and Safety Management Systems

Experts define safety behaviour as a mode of conduct that moderates the possibility of human error. The security actions also reflect employees' healthy actions in the workplace in complying with safety procedures. In the case of pilots, they should uphold safety behaviour both for their own sake as well as that of their passengers. This behaviour requires developing a right attitude towards their roles (Uryan, 2010). Safety participation in the aviation industry should be practical, inclusive, and interactive for better outcomes. Reporting of faults improves safety because each worker demonstrates accountability for any errors observed during operations. Conversely, safety compliance is a concept concerned with reducing and controlling the risks associated with the functioning of aircraft and aviation activities to some expected levels (Reader *et al*., 2016). Therefore, airline companies or any aviation operators should understand human behaviour principles to adequately mitigate human omissions' effects on aviation safety.

Safety management systems focus on combining the various security functions and components into a comprehensive form that ensures continued welfare improvement, risk control, and assessment of danger management strategies. The definition of a safety management system varies with each industry because management is specific to the activities taking place within a particular setup (Uryan, 2010). In aviation, the safety management system refers to the act of service provision that considers the identification, assessment, and mitigation of safety risks through the relevant organisational structures. The elements of safety management systems include the following: safety policy, which is a written document concerning the organisation's objectives, beliefs, and attitudes concerning safety in its processes. Component two is a safety plan that entails establishing safety processes and standards for mitigation and management of risks. Supporting risks through training, supervision, recruitment, and enhanced organisational assistance improves the safety management processes. The stakeholders should periodically review safety performance to ensure that safety conduct matches the organisation's safety objectives. This may take the form of investigation of safety-related incidents at the workplace (Davids, 2016). The provision of safety feedback is another element that ensures that the

organisation can adequately address the essential improvements and the challenges encountered during the safety management processes to avoid unforeseen failures.

An examination of the safety management system from human factors is essential in providing guidelines on the best approaches to mitigate human-related errors, especially in the airline industry. Providing assessments on the current framework requires adherence to structured formal procedures by the organisation to administer its operations. The organisation must first establish the safety procedures and policies it intends to implement before involving employees (Reader *et al*., 2016). The workers should then receive training on the safety management systems and develop the motivation to enforce the policies, as expected by the management. This development requires self-discipline to meet the expectations. It is essential to examine the safety management system in the context of human factors because the management revolves around people in an organisation. Distinguishing between the operational and structural aspects of the safety management system is one of the possibilities. Here, the functional elements are practices that take place in the context of real-life. At the same time, structural aspects are the formal procedures, policies, guidelines, and databases put in place by companies to manage safety (Alsowayigh, 2014). The two elements are interdependent because, for the people to implement the corporate plans and approaches, they must first put in place preventive measures.

Therefore, the consensus is that the safety management system presents itself in three dimensions: technological, social, and cultural. The social part concerns the interaction between the organisation's staff in various departments that consists of the operations managers, maintenance, incident investigators, and front-line staff. The listed individuals interact in their line of duties, especially on safety-related issues. The technological dimension includes the procedures, tools, information sources, and documents that support safety management (Davids, 2016). The cultural facet encompasses the attitudes, beliefs, perceptions, and values upheld by the corporate staff in maintaining their well-being at work.

Methodology and Methods

1. Population and Data Collection

The population in this study was 220 Royal Thai Army fixed-wing and rotary-wing pilots.

All of the participants were male. The largest age group were 31-35 year olds (52.50%), whilst the least was in the age bracket of 41 years or above above (8.90%). Most had a Bachelor degree (91.2%) and 42.1% had more than 7 years of working experience in the Royal Thai Army. Most of the population (64.90%) were involved in 1 to 2 flight operations per week. However, more than half of the participants did not attend Safety Management System training (69.30%). All of the pilots were sent a questionnaire with a statement that completion of the questionnaire would constitute an informed consent agreement. In total, 202 out of 220 questionnaires returned (a 91.81% response rate).

2. Questionnaire

The questionnaire contained three sections: Demographic information, Safety Behaviours of Pilot, and Perception of Organisational Safety Culture.

2.1 Safety Behaviours of Pilot. This instrument was revised based on the study of Psychosocial Factors related to the Flight Safety Behaviour of Pilots in the Army Aviation Centre by Supinta Muengsringam (2009). The original instrument was written in Thai and conducted in the context of the Royal Thai Army. There were 40 items with a five-point Likert-type scale. The participants were asked to assess the frequency of their safety-related behaviours within the last 3 months by giving a frequency rating score (1, "never" to 5 = "always"). The instrument included four dimensions: Intra-family Relations, Personal Health, Job Characteristics, and Self-discipline. The overall reliability is 0.77.

2.2 Perception of Organisational Safety Culture. This instrument was developed from the study of the effects of safety culture and ethical leadership on safety performance by O'Leary (2016). There were four dimensions: Organisational commitment, Operations Personnel, Informal Safety System, and Formal Safety System. There were 24 items with a five-point Likert scale (1, "strongly disagree" to 5, "strongly agree"). The overall reliability is 0.95.

Data Analysis and Results

1. Pearson Correlation

The results of Pearson correlation showed that each dimension of pilot safety behaviours was positively related to organisational safety perception. The category that correlated the highest was between "Job Characteristics" and Informal Safety System ($r = 0.88$), The correlation between aggregate Safety behaviours of the pilot and perceived organisational safety was positively related ($r = 0.59$).

Table 1 the Pearson correlation values between Safety Behaviour of Pilot and Perception of Organisational Safety Culture

Variables	Organisational commitment	Operations Personnel	Formal Safety System	Informal Safety System	Overall perceived Safety Culture
Intra-family Relations	0.17*	0.10*	0.11*	0.13*	0.14*
Health	0.25**	0.19	0.41**	0.42**	0.41**
Job Characteristics	0.59**	0.52**	0.13**	0.88**	0.31**
Self-discipline	0.51**	0.33**	0.65**	0.64**	0.67**
Overall Safety Behaviours	0.40**	0.32**	0.61**	0.55*	0.59**

2. Stepwise Multiple Regression

The use of stepwise regression is to determine the impact of all dimensions of Safety Behaviours of Pilot on the Perception of Organisational Safety Culture. The result presented in Table 2 shows that "Self-discipline" and "Job Characteristics" had a significant positive effect on the Perception of Organisational Safety Culture and explained 20% of the variance in Perception of Organisational Safety Culture. Moreover, standardised Beta weights were significant ($p < 0.01$) for the two retained variables, as shown in Table 2. The linear regression equation is: $\hat{y} = 1.03 + 0.66x_1 + 0.37x_2$

Table 2 Stepwise Regression

Variable	B	Std. Error	t	Sig.
Constant	1.03	0.17	5.93**	0.00
a. Self-discipline	0.66	0.05	12.86**	0.00
b. Job Characteristics	0.37	0.09	4.15**	0.00
R = 0.67 R^2 = 0.45	Adjusted R^2 = 0.20 Std. Error = 0.27			
** p-value < 0.05				

Discussions and Recommendations

Safety culture and safety behaviour of pilots go hand-in-hand in ensuring the flight operations' safety. The study results confirm that pilots' competencies, individual attitudes, and practices concerning the policies and procedures clearly reflect the organisational safety

culture of an organisation (Alsowayigh, 2014). Pilots' workload varies during the flight but are mostly complicated (Gentili, et al., 2014). Due to the complexity of the cockpit tasks and high pressure, military pilots tend to be vulnerable to errors, which sometimes contributed to incidents and accidents (Dorneich, et al.,2016; Wiegmann & Shappell, 2017). The job characteristics of pilots involve themselves and other personnel, including flight crews and passengers in the aircraft. Thus, healthy behaviour is fundamental. Stress avoidance and the ability to cope with fatigue are essential elements for better performance, which calls for self-discipline and accountability in all pilots' duties (Hooper & O'Hare, 2013). Various studies conducted on pilot errors contributing to aviation accidents indicate that most of these accidents originate from basic human errors, such as ignorance and the pilot's failure to undertake basic operations, classified as safety protocols (Dorneich, et al., 2016). Failure to have an elaborate safety culture contributes to pilots overlooking these basic safety protocols, thus contributing to these accidents.

The personal attitude related to self-discipline is identified as one of the main factors contributing to decisional errors among pilots. When pilots have conflicting attitudes about safety and impending dangers, they tend to make inappropriate decisions, which translate to costly mistakes (Belaid, Braithwaite, & Rashid, 2017). Generally, pilots who perceive safety as an essential element tend to be wary and cautious of factors that may compromise their safety and passengers. Furthermore, the pilot's perception of safety and understanding of the safety culture helps them in effectively constructing a safety climate characterised by open communication (Salas, Maurino, & Curtis, 2016). Therefore, the pilot's perception of the safety culture directly influences their likeliness to follow the laid-down safety protocols and the probability of overlooking violations and errors made by other operations personnel, some of which have dire consequences on safety (Howell, 2019). In this case, the willingness to undertake safety protocols, such as the SMS among pilots, and the general perception towards embracing change should be addressed. A potential challenge could be that individuals are trained to perceive safety differently depending on the industry in which they operate**.** This study indicates that most of the Royal Thai Army pilots have not undertaken the SMS training. The finding can be interpreted that the perceptions and attitudes on the safety behaviours and safety culture of the Royal Thai Army pilots may be affected. Such perceptions and attitudes may be increased by encouraging the Informed and Learning cultures (Stolzer et al., 2011). The management also has a crucial role in providing up to

date knowledge and training about the safety management system to personnel involved in the system's safety as a whole.

Research suggests that personal attitude, and perception of safety measures, based on the safety culture's expectations, influence the pilots' commitment to safety and their tendency to use the available safety tools (Salas, Maurino, & Curtis, 2016). By dealing with these attitudes, the safety culture helps to shape pilots' behaviour in various ways. The first way is by improving personal thinking, which helps them take charge of their behaviour and frame this accordingly. Secondly, the behavioural change allows individuals, including pilots, to overcome their performance limitations, meaning that they become more productive and aware of the commonly occurring dangers in their environment (Homan, Rantz, & Balden, 2019). Finally, improving the pilot attitudes towards safety cultures aids in enhancing the overall acceptance of safety rules that pilots need to follow.

The potential learning opportunities for applying this approach to the Royal Thai Army could be through a review of its Flight Safety Management. This can be the stimulation of the leadership role to motivate the pilots to act safely. It can be supported by the results from Adjekum, D. K. (2017) 's research, which indicates a positive direct effect of self-efficacy on safety participation and a positive effect when mediated by safety motivation. It may be implied for the development of leadership in the training programme. It may offset the rather nondirect effect of SMS policy implementation on safety participation in the model.

The primary role of air safety management is to prevent accidents by increasing safety awareness. Implementation of the safety management system guidelines is crucial in mitigating possible problems that infringe on safety. As defined earlier, the organisation then gradually develops and embraces the safety culture. Therefore, all the stakeholders are responsible for participating in continuous improvement of the organisational operations to minimise failures (Davids, 2016). Cooperation from employees enhances the development of proper safety behaviour among the pilots because they can be sure of everyone's support.

Conclusions

Despite the high status attached to the aviation industry, it is considered to be one of the high-risk industries, considering the level of casualties and damage to property that is usually associated with an accident. Based on these facts, effective organisational factors, such as safety culture, can help make this high-risk industry somewhat safer (Morrow &

Coplen, 2017). The concept of safety culture developed following numerous disastrous accidents is based on developing values and regulations that ensure safety is upheld in the industry. Additionally, safety culture helps shape the behaviour of pilots, who are the centrepieces of the concept, by improving their perceptions, attitudes, and belief of the practicality and effectiveness of safety rules in the industry (Adjekum, 2014). Safety culture is evident in the consistency in which an organisation runs its activities and safety issues. Safety behaviour is reflected in the healthy actions of individuals in the workplace in complying with the security procedures. Therefore, the organisation's best approach is to compliment good work and provide guidance on the best way to go about minimising mistakes. A practical method to reduce aviation accidents is to increase understanding in the contribution of humans to these accidents. Investigators should not attribute failures to specific individuals, but should scrutinise the system holistically to determine the root cause and provide lasting, sustainable solutions.

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