

FACTORS AFFECTING SAFETY MANAGEMENT SYSTEM PERFORMANCE: THE MEDIATING ROLE OF SAFETY CULTURE

Zainora Hayat Hudi^{1*}, Omar Musa¹, S. Nadzeer Salehuddin², Zulkipli Che Ani², M. Azrul M Ali²

¹Faculty of Business and Technology, UNITAR International University, Malaysia

²Royal Malaysian Air Force, Malaysia

*Corresponding author, zainora@unitar.my

ABSTRACT

This research deals with an analysis of Safety Management System performance (SMSP) in a military aviation organization which is the Royal Malaysian Air Force (RMAF). Specifically, the scope of analysis addresses the factors of Organizational Identity (OI), Organizational Behavior (OB) and Situational Awareness (SA) and how these affects the SMS Performance. The interest is to investigate whether Safety Culture (SC) plays a significant mediating role that affects the SMSP. The study population consisted of pilots and engineers from different air bases throughout the country. The results indicate that OI, SA and SC showed significant impact on the RMAF's SMSP. However, Safety Culture was found to have a significant mediating effect only for Organizational Identity and Situational Awareness.

Keywords: Safety Management Systems, Organizational Identity, Organizational Behavior, Situational Awareness, Safety Culture

INTRODUCTION

Safety Management Systems (SMS) is outlined as a scientific approach to managing safety, together with structures, responsibilities, policies and procedures of the organization (Flight Safety Foundation, 2005). The Royal Malaysian Airforce (RMAF) has adopted SMS in all their bases since 2010. Nevertheless, even though RMAF had taken the necessary precaution steps to prevent aviation mishaps, military aircraft accidents and incidents still occurs as before the implementation of RMAF SMS (RMAF Inspectorate Annual Report, 2016). The following table gives the overview of RMAF accident/ incident rates (RMAF Inspectorate Annual Report, 2016) for the period of 3 years before the implementation of SMS and 3 years after it was implemented:

Table 1: RMAF Aviation Accident and Incident Rate

Ser	Year	Total Hours Flown (Hours)	Accident	Accident Rate (%)	Incident	Incident Rate (%)	Overall Rate (%)
1.	2010	41,413.4	1	0.24	8	1.93	2.17
2.	2011	36,826.8	0	0.0	7	1.90	1.90
3.	2012	36,943.2	0	0.0	6	1.62	1.62
4.	2013	34,398.6	3	0.87	5	1.45	2.33
5.	2014	31,130.0	0	0.0	4	1.28	1.61
6.	2015	34,639.2	0	0.0	3	0.87	0.87
7.	2016	25,223.8	4	1.59	3	1.19	2.78

Improving the SMSP in terms of flight safety is therefore crucial to avoid loss of aircrew life, government/ public assets and the RMAF image as a credible aviation organization. Therefore, this research is intended to study the important organizational factors that might affect the performance of RMAF's SMSP. The research will benefit towards improving the safety culture where organizational factors play an important role to the performance of SMS. Continuous improvement in flight safety will lead to a high-performance culture enabling the RMAF to perform its mandate more effectively.

LITERATURE REVIEW

Theory Y and Theory X (McGregor, 1960) is used in this study. 'Theory X' and 'Theory Y' are the theory of human motivation and management. They were created and developed by Douglas McGregor in the 1960s. These theories describe two different models of workforce motivation used by managers in human resource management, organizational behavior, organizational communication and organizational development.

Literature review of related works has shown that some studies have been made towards establishing the various individual and organizational factors that contributes to effective safety management systems performance especially in aviation. Chen and Chen (2014) reported that the dimensions of aviation safety climate can be arranged into seven themes: safety promotion and training, commands and documentation, response plan and emergency preparedness, executive management commitment, safety management strategy, safety oversight, and audit about aviation safety. In a study conducted by O'Connor, O'Dea, Kennedy and Buttrey (2011) revealed that supervision/management, safety systems, operations personnel, communication, rule/procedures, education/training, resources and risk were among the most commonly used dimensions of any aviation safety climate which is closely related to safety culture. Zhang, Wang,

Luo and Tang (2013), Oster, Strong and Zorn (2013), and Sieberichs and Kluge (2016) also identified the human factor as another frequently used dimension for aviation safety. Remawi, Bates and Dix (2011) has also identified the crucial role of aviation employees' attitude to safety culture as very important to effective implementation of safety management systems performance. The constructs adopted in this current study has sought to incorporate the various dimensions as captured in the above studies into three factors: organizational identity, organizational behaviour and situational awareness that influences the safety culture thus contributing to the Malaysian Air Force SMSP.

The underlying assumption of our model is that OI, OB, and SA can influence the flow of SC among the RMAF personnel, thereby improving their awareness and attitude about work, whereby influences the SMSP. A better understanding of these relationships can allow RMAF managers to know their personnel identification towards the organizational safety culture, and to shape their safety management in improving their performance.

ORGANIZATIONAL IDENTITY (OI)

The attainment of an organizational is principally relies on its employee behavior. To relates the employee in strengthening its organization objectives are the influence of the OI itself and by the influenced of the employee identification. OI has a reciprocal relationship with individual, OI can affect individual behavior and individual behavior can affect OI (Pratt & Foreman, 2000). This strong relationship as accordance to the study might result a strong connectivity in influencing the SMSP among RMAF personnel.

Albert, Ashforth and Dutton (2000), stated that "the beauty of the identity and identification concepts is that they provide a way of accounting for the agency of human action within an organizational framework". OI is seen as a basis for employee identification with the organization (Schultz, Hatch, & Larsen, 2000). According to Patchen's (1970), (cited in Witting, 2006), in identification theory, identification includes 3 elements for example feeling of commonality with the organization, attitudinal and activity support for the organization, and perception of shared characteristic with alternative structure members. This is consistent with Cheney and Tompkins' (1987) who declared that employee's perceptions of an organization's culture might influence the degree to that staff identity with the organization. OI will influence each the satisfaction and behavior of staff and effectiveness of organization (Albert et. al., 2000, Ashforth & Mael, 1989).

Positive OI factors will create results for the work relation of good culture and behavior in the field of safety, including motivation, performance and satisfaction, as well as the effectiveness of safety management systems in the RMAF. In relations to the above literature review, it is foreseen that OI might affect the overall views of the employee towards the organizational objectives; in RMAF aviation safety context, the main objectives is the successfulness of SMS implementation in reducing the aviation mishaps i.e. aircraft accidents and incidents. According to Witting (2006), "a strong organizational identity has a positive influence on knowledge, attitude and regarding the organizational objectives". Therefore, it is relevance and significant to consider OI as one of the important elements that might affect the performance of an organization objectives.

ORGANIZATIONAL BEHAVIOR (OB)

OB is a study that determines the way people interact in groups in creating to more efficient organization. Motivation is a portion of OB which has a positive influence on the performance of an organization. Wiley (1997) mention that according to Abraham Maslow's Hierarchy of Needs Theory, workplace behavior is posited to be determined by a person's current need state in certain universal need categories. A second type of personality perspective considers the influence of a small set of psychological motives on behavior and performance. This perspective focuses on achievement motives. Mohammad Ather, Aktaruzzaman Khan and Hoque (2011) on the other hand mentioned that theories of motivation are expectancy theory, equity theory and goal setting theory attempt to focus process on the perspective of motivation.

Hudson, (2007), argue that intrinsic motivation may be more powerful than extrinsic motivation, thus even if behavioral changes occur, the underlying values and beliefs of individuals may remain unchanged. As articulated by Herzberg's (1966), Graham and Messner (1998), Tietjen and Myers (1998) and Wilson (2018), explains that motivating factors are intrinsic factors in the workplace, including achievement, achievement recognition, self-help, responsibility, and growth or progress, these factors may contribute to job satisfaction, but will not cause job dissatisfaction in the workplace. These extrinsic factors consist of company policies, administration, supervision, interpersonal relationships, working conditions, salaries, status and safety. Employees are valuable assets and generally it is agreeable that a motivated employee has a significant impact on the organization.

There are a lot of accidents theories that was developed to relate how OB can contribute to a major mishap in aviation. Domino Theory (Bird, 1974) and the Swiss Cheese Model of Error Causation (Reason, 2000) were among the contemporary accident model and theories that were based on organizational behavioral aspects. In the context of both theories developed, the OB comprise of latent factors which includes unsafe supervision, organizational influences and social environment (Uryan, 2010). Uryan (2010) had also established that both Bird (1974) and Reason (2000) had conclude that aviation mishaps are the result contributed by a series of events, which involve collective organizational factors, in which had caused the ultimate causation i.e. individual's unsafe action.

SITUATIONAL AWARENESS (SA)

Nguyen, Lim, Nguyen, Gordon-Brown and Nahavandi (2019) stated that SA is a vital component in human information processing and crucial in aviation staffs' decision-making processes. Endsley and Garland (2000) detailed that SA is an approach to understanding the cognitive processes involved in decision making in comprehensive and dynamic environments and SA has its origin in aviation. Having SA is an essential indication of knowing what is happening in the environment and the alertness regarding the potential risk that might be faced. Daily activities require a dynamic update of the situation to function effectively. The high level of SA is the most important aspect to consider in the field of aviation. As stated by Milanovich, Driskell, Stout and Salas (1998) (cited in Masys, 2005), SA should be considered as an essential requirement for competent

performance in dynamic environments with inaccurate and incomplete SAs often resulting in dangerous and fatal consequences.

Flin (1996) has outlined SA as a method of recognition, designation and continuing observation of the environment setting. As articulated by Endsley (1999), SA encompasses three elements; perception of elements in the current situation, comprehension of current situation and projection of future status. The information perceived, comprehended and projected is a function of not only the cognitive limitation of the aircrew but also socio-technical elements of the system (environment). As mentioned by Entin and Entin (2000), the coordination and data exchange inside a team atmosphere are related to the formation of shared SA.

Endsley and Garland (2000) explained that most researchers and practitioners have considered SA to be essential for accurate decision-making and performance in various areas of work such as air traffic control, nuclear power plants, aviation, medicinal and driving. SA is a cognitive construct that refers to the understanding of external events and is defined as the perception of elements in the environment in the volume of time and space, understanding their senses and their projection which will lead to improved decision-making and productivity (Endsley, 2017).

SAFETY CULTURE (SC)

SC is a manner of how safety is seen, appreciated and prioritized within the organization. This reflects the true commitment to safety at all levels of the organization. It is also described as "how an organization acts when no one sees it". SC is often considered a sub-group of organizational culture, where beliefs and values are particularly relevant to safety issues (Clarke, 2003). In order to achieve acceptable safety indicators, organizations need both a safety management system and a healthy computer. Organizational practices affecting the performance and reliability of safety systems are in fact related to how safety is managed in aeronautical organizations, leading to a "good" or "lax" SC (Kletz, 2018; Reason, 2000).

McDonald, Corrigan, Daly and Cromie (2000), had established three main concepts that have a central role in explaining what the organizational role towards aviation safety is. The three concepts are the philosophy of SMS, safety climate and finally is the SC in an organization. McDonald et al. (2000) had also identified that climate related to the perception of an organization whilst SC is a more global concept.

SAFETY MANAGEMENT SYSTEM PERFORMANCE (SMSP)

Kim and Choi (2016) mentioned that, to successfully operate SMS, the SC factors such as the level of staff awareness, safety attitude and belief must be combined. SMS strategies encompass the organization's, internal safety environment and performance, external regulation and standard, cost factor, the organization's resource capability, stakeholder's influence and organization's culture of commitment resulting in safety decision and action, Kevin Loebbaka and Lewis (2009). According to Santos-Reyes & Beard, (2002), (cited by Hsin Lin, 2012), the execution of the SMS and its performance can become an important interrogation point by the competent authority for aviation. Flight Safety Foundation, (2005), (cited by Hsin Lin, 2012), mentioned that leadership and answerableness ought to be the key factors within the implementation of SMS, particularly within the development of SC for the airline. As stated by Kevin Loebbaka and Lewis, (2009), managers

who themselves involves in the creation, implementation, rewards and recognition of the SMS will generate an effective organization. SMS is an important dimension of SC for two reasons: effective SMS as a set of strategies, functions and roles, as well as compliance with external security regulations, (Álvarez-Santos, Miguel-Dávila, Herrera, & Nieto, 2018; Li, & Guldenmund, 2018). The successful execution of SMS requires the combination of mature SC factors such as the members' awareness attitude, confidence and enthusiasm, Kim and Choi (2016). The implementation of SMS with a positive organizational SC will generate and improve the SMSP in RMAF.

Therefore, this study aims to examines the relationship between organizational identity, organizational, situational awareness, safety culture and safety management system performance. The hypotheses are;

- H1: OB will be positively associated with SC
- H2: OB will be positively associated with SMSP
- H3: OI will be positively associated with SC
- H4: OI will be positively associated with SMSP
- H5: SA will be positively associated with SC
- H6: SA will be positively associated with SMSP
- H7: SC will be positively associated with SMSP

MEDIATING ROLE OF SAFETY CULTURE (SC)

According to Snape and Redman, (2010), personal success should be a means of achieving profitable organizational performance. Organ (2018) believed that the conduct of an organization's citizenship is an individual's behavior and that, since its choice, is not directly defined in the organization's official reward system, it poses difficulties in improving effectiveness and efficiency of the organization's performance. According to Seibokaite and Endriulaitiene, (2012) individual effects (personality traits) and organizations (which are considered a safe and motivated work environment) are important factors in performance at work. A study by Feng Jing, Avery, and Bergsteiner, (2011) reported that the organizational climate (OC) has a direct effect on group performance.

Qayoom & Hadikusumo, (2019) proved that the safety culture is significantly related to safety performance of the organization at the middle management and operational level. Endsley (1988) states that SA is formally defined as "perceptions of the elements in the environment in quantity of time and space, understanding the meaning and projection of their status in the near future". High SA levels can be considered the most important aspect of successful SMS performance in aviation. Hughes, Newstead, Anund, Shu & Falkmer (2015) reports that the development of human factors skills (such as communication, effective teamwork, task management, SA, writing procedures) is applicable for work, to have a positive impact on safety and efficiency of the maintenance operation. Otherwise the team must have the time to obtain the necessary SA for team coordination or the state of the human machine interface to SMSP. This variable is considered important to support the hypothesis.

Hopkins (2006) found that, SA emerged as an approach to transform the SC. SA is recognizing what is going on around you from where you are, where you are considering yourself or something

around you is a threat to your health and safety. Hopfl (1994) states that the SC is an interpretive tool to explore how an entrepreneur successfully launches the SA program by creating a culture and an employee who is more aware of the situation. According to Joy and Griffiths (2005), SA is a cultural approach to safety, but also a form of safety assessment and has been characterized as an informal evaluation of daily tasks. Therefore, the hypotheses can be constructed as below:

- H8: SC mediates the relationship between OB and SMSP
- H9: SC mediates the relationship between OI and SMSP
- H10: SC mediates the relationship between SA and SMSP

METHODOLOGY

A questionnaire was designed in which the first part is getting the demographic background of the respondents. Using validated constructs from previous research, the second part looks at the relationships between Organizational Identity (Brickson, 2002),(Hsin Lin,2012), Organizational Behavior (Williams & Anderson,1991), (Teh & Yong 2011), Safety Culture (Hsin Lin,2012) and SMSP (Hsin Lin, 2012,). The target population employed in this research are RMAF pilots and engineers who are serving in Klang Valley, Kuantan Air Base, Butterworth Air Base, Gong Kedak Air Base and Kuching Air Base. A non-probability sampling technique was chosen which convenience sampling were used in this research. Data was collected through cross-sectional survey using questionnaires distributed among the RMAF pilots and engineers. The collected data were then analyzed using SmartPLS 3 (Partial Least Squares).

RESULT

There was a total of 226 respondents involved in giving their response of which 117 of it comprise of RMAF pilots while the remaining 109 comprise of RMAF engineers. The research model was tested based on structural equation modeling using Partial Least Squares (PLS). This research used this statistical technique to test the predictive ability of customer satisfaction. The Smart PLS software version 3.0 (Ringle, Wende & Becker, 2015) was used to analyze the data with the application of bootstrapping procedures to determine the significant level of factor loading and path coefficient. According to Anderson and Gerbing (1988) two stages of procedures to assess the model, this study evaluated both measurement model and the structural model.

An outer model identified the relationships between unobserved construct and its underlying items (Henseler, Christian, Ringle & Sinkovics, 2009). The reliability of scale was tested based on the factor loading of items composite reliability and Cronbach's alpha (Henseler et al., 2009). Then the convergent validity which was decided on the values of Average Variance Extracted (AVE) (Hair, Ringle & Sarstedt, 2011). The discriminant validity was evaluated by comparing the square root of AVE of constructs with correlations between other constructs (Fornell & Larcker, 1981). Based on Table 2, the measurement model is satisfactory. All items under study loaded highly on relevant constructs and their loadings exceeded the cut-off value of 0.5 (Table 2) (Anderson and Gerbing, 1988). Therefore, the reliability of individual items is sufficient. The values of composite reliability and Cronbach alpha for OB, OI, SA, SC and SMSP surpassed the minimum cut-off point of 0.70 as

recommended by Chin (2010) and Nunnally (1978) (Table 2). Therefore, all five constructs meet the requirement of construct reliability.

For the convergent validity, the values of AVE must exceed the recommended value of 0.50 (Hair et al., 2013). All the values of AVE for all constructs exceeded 0.50 (Table 3). This indicates that each construct was able to explain more than 50% of variance in each respective indicator. The convergent validity was supported. Table 3 showed that the square root of AVE is greater than correlations between constructs in rows and columns which provide adequate support for discriminant validity (Fornel & Larcker, 1981).

Table 4 and Figure 1 shows the results of the structural model from PLS output. OI, and SA are significantly associated with SC ($\beta=0.274$, $p<0.001$), ($\beta=0.250$, $p<0.001$), respectively and explaining 20% variation in SC. OI, SA and SC are significantly associated with SMP ($\beta=0.144$, $p<0.001$), ($\beta=0.177$, $p<0.001$), ($\beta=0.476$, $p<0.001$). Therefore, the results support the hypothesis 3, 4, 5, 6 and 7. Hypothesis 1 and 2 were not supported (Table 4).

The mediating hypotheses were also supported showing that SC mediates the relationship between OI and SMSP ($\beta=0.118$, $p<0.001$), and SC also significantly mediates the relationship between SA and SMSP ($\beta=0.119$, $p<0.001$). SC did not mediate the relationship between OB and SMP (Table 4).

The coefficients of determination (R^2) are 20% for SC and 40.9% for SMSP. It can be interpreted that OB, OI, SA and SC explain 40.9% total variation in SMSP.

Stone-Geisser's Q^2 value (Geisser, 1975) was used to evaluate the predictive ability of the model. Value greater than zero indicate that the model has predictive ability (Fornell & Cha, 1994). In this study the Q^2 for SC and SMSP were 0.119 and 0.259 respectively (Table 5). The Q^2 values are greater than zero, therefore it can be concluded that the structural model has predictive relevance (Fornell & Cha, 1994)

Table 2: Construct reliability and convergent validity

CONSTRUCT	LOADINGS	C R	C A	AVE
<i>Organization Identity</i>		0.915	0.878	0.764
SB13	0.814			
SB14	0.865			
SB15	0.897			
SB16	0.836			
<i>Organization</i>		0.894	0.815	0.701
SB22	0.787			
SB23	0.862			
SB24	0.828			
SB25	0.859			
<i>Situation Awareness</i>		0.909	0.875	0.710
SB32	0.756			

SB33	0.815			
SB34	0.859			
SB35	0.775			
SB36	0.876			
<i>Safety Culture</i>		0.947	0.935	0.721
SB41	0.750			
SB42	0.843			
SB43	0.831			
SB44	0.833			
SB45	0.861			
SB46	0.856			
SB47	0.802			
SB48	0.860			
<i>Safety Management</i>		0.929	0.908	0.718
<i>System Performance</i>				
SP2	0.757			
SP3	0.827			
SP4	0.874			
SP5	0.865			
SP6	0.863			
SP7	0.778			

Notes. AVE=Average Variance Extracted, CR=Composite Reliability, CA=Cronbach's Alpha,

Table 3: Discriminant validity (Fornell-Larcker Criterion)

	OB	OI	SA	SC	SMSP
OB	0.837				
OI	0.586	0.874			
SA	0.494	0.519	0.843		
SC	0.274	0.302	0.488	0.849	
SMSP	0.435	0.440	0.569	0.662	0.847

Note: Diagonals represent the square root of AVE while off-diagonals represent the correlation

Table 4: Summary of structural model

Hypothesis	Path Coefficients	Beta	Sample Mean	Standard Deviation	T Statistics	Decision
H1	OB → SC	0.044	0.051	0.065	0.675	Not Supported

H2	OB → SMSP	-0.016	-0.012	0.060	0.275	Not Supported
H3	OI → SC	0.274	0.242	0.078	3.169	Supported
H4	OI → SMSP	0.144	0.140	0.067	2.148	Supported
H5	SA → SC	0.250	0.254	0.071	3.544	Supported
H6	SA → SMSP	0.177	0.180	0.071	2.505	Supported
H7	SC → SMSP	0.476	0.476	0.053	9.006	Supported
H8	OB → SC → SMSP	0.021	0.025	0.032	0.661	Not Supported
H9	OI → SC → SMSP	0.118	0.115	0.039	3.023	Supported
H10	SA → SC → SMSP	0.119	0.120	0.034	3.479	Supported

Table 5: R-Square and Q-Square Values

	R Square	Interpretation	Q-Square
SC	0.200	Substantial	0.119
SMSP	0.409	Substantial	0.259

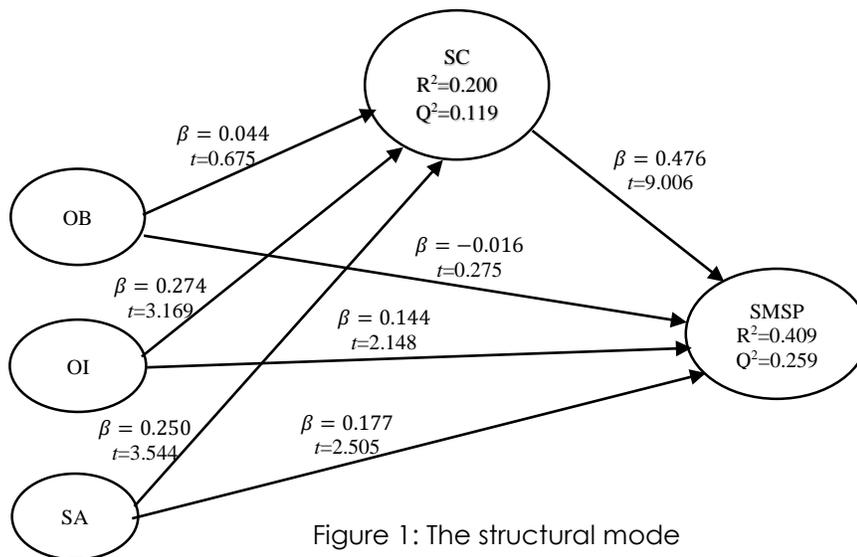


Figure 1: The structural mode

CONCLUSION

The results showed that OI and SA significantly positively associated with SC, but OB does not significantly associate with SC. This may suggest that, OB plays a lesser role in a highly regulated environment like the RMAF. Secondly, OI and SA are positively associated with the performance of the SMSP. OB also did not significantly associate with SMSP. Third, SC significantly positively associated with the performance of Safety management system. Finally, OI and SA through the mediation of SC positively contributed significantly to the performance of the SMSP in the RMAF. Overall, the findings point to the strong role of OI and SA to influence the SC. The RMAF is therefore recommended to formulate policies and activities that will increase staff motivation and job satisfaction that will strengthen their organizational identification towards the RMAF.

The results of this study were only limited to only RMAF pilots and engineers at selected RMAF bases. In order to strengthen the credibility of the results, a bigger sample coming from all the bases could be performed. The study can also be conducted in a more holistic manner, involving officers at different levels of management in all RMAF bases. A theoretical extension could be to investigate other possible organizational factors such as the role of top management commitment and leadership.

A similar study could also be done at other Military organizations such as the Royal Malaysian Navy and a comparative analysis could yield some interesting insights towards contributing to the overall effectiveness of Safety Management Systems performance of the Malaysian Armed Forces.

To generalise the contribution of this study towards other non-aviation sectors, the results obtained could help organisations prioritise on those areas most likely to improve safety performance. It could also provide future guidance towards engaging and managing commitment to established standards in safety management systems, as well as guidance for reviewing, auditing or investigating an organisation's safety management processes.

REFERENCES

- A. Crumpton M. (2013), " Keeping the motivation going ", The Bottom Line, Vol. 26 Iss 4 pp. 144 - 146
- A.J. Masys, (2005), "A systemic perspective of situation awarenessAn analysis of the 2002 mid-air collision over Überlingen, Germany", Disaster Prevention and Management: An International Journal, Vol. 14 Iss 4 pp. 548 - 557
- Albert, S., Ashforth, B. E., & Dutton, J. E. (2000). Organizational identity and identification: Charting new waters and building new bridges. *Academy of management review*, 25(1), 13-17.
- Álvarez-Santos, J., Miguel-Dávila, J. Á., Herrera, L., & Nieto, M. (2018). Safety Management System in TQM environments. *Safety science*, 101, 135-143.
- Amaratunga, D., & Baldry, D. (2002). Performance measurement in facilities management and its relationships with management theory and motivation. *Facilities*, 20(10), 327-336.
- Anderson, J. C. & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and

- recommended two-Step approach. *Psychological Bulletin*, 103(3), 411-423.
- Ashforth, B. E., & Mael, F. (1989). Social identity theory and the organization. *Academy of management review*, 14(1), 20-39.
- Bird, F. (1974). *Management guide to loss control*. Institute Press, Atlanta
- Brickson, S. L. (2002). *Organizational identity orientation: making the link between organizational identity and organizational behavior* (Doctoral dissertation, Harvard University).
- Caldwell, C., & Hayes, L. A. (2016). Self-efficacy and self-awareness: moral insights to increased leader effectiveness. *Journal of Management Development*, 35(9), 1163-1173.
- Carmeli, A. (2005). The relationship between organizational culture and withdrawal intentions and behavior. *International Journal of Manpower*, 26(2), 177-195.
- Chen, C. F., & Chen, S. C. (2014). Investigating the effects of job demands and job resources on cabin crew safety behaviors. *Tourism Management*, 41, 45-52..
- Cheney, G., & Tompkins, P. K. (1987). Coming to terms with organizational identification and commitment. *Communication Studies*, 38(1), 1-15.
- Chin, W. W., & Dibbern, J. (2010). An introduction to a permutation-based procedure for multi-group PLS analysis: Results of tests of differences on simulated data and a cross cultural analysis of the sourcing of information system services between Germany and the USA. In *Handbook of parti*. In *Handbook of Partial Least Squares*, (pp. 171-193).
- Clarke, L. (1975). Organisation behaviour: some organisational influences on leadership behaviour. *Industrial and Commercial Training*, 7(9), 373-376.
- Clarke, S. (2003). The contemporary workforce: Implications for organisational safety culture. *Personnel Review*, 32(1), 40-57.
- Conrad, D., Ghosh, A., & Isaacson, M. (2015). Employee motivation factors: A comparative study of the perceptions between physicians and physician leaders. *International Journal of Public Leadership*, 11(2), 92-106.
- Cooper, M. D. (2000). Towards a model of safety culture. *Safety science*, 36(2), 111-136.
- Donald, I., & Young, S. (1996). Managing safety: an attitudinal-based approach to improving safety in organizations. *Leadership & Organization Development Journal*, 17(4), 13-20.
- Eric D. Carlström Inger Ekman, (2012), "Organizational culture and change: implementing person-centred care", *Journal of Health Organization and Management*, Vol. 26 Iss 2 pp. 175 - 191
- Endsley, M. R. (1988). Design and Evaluation for Situation Awareness Enhancement. *Proceedings of the Human Factors Society Annual Meeting*, 32(2), 97-101.
<https://doi.org/10.1177/154193128803200221>
- Endsley, M. R. (1999). Situation awareness in aviation systems. *Handbook of aviation human factors*, 257-276.
- Endsley, M. R. (2017). Toward a theory of situation awareness in dynamic systems. In *Situational Awareness* (pp. 9-42). Routledge.
- Endsley, M. R. and Garland D. J (Eds.) (2000) *Situation Awareness Analysis and Measurement*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Entin, E. B., & Entin, E. E. (2000, July). Assessing team situation awareness in simulated military missions. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 44, No. 1, pp. 73-76). Sage CA: Los Angeles, CA: SAGE Publications.
- Williams, E. S., Rondeau, K. V., & Francescutti, L. H. (2007). Impact of culture on commitment, satisfaction, and extra-role behaviors among Canadian ER physicians. *Leadership in Health Services*, 20(3), 147-158.
- Falkenburg, K., & Schyns, B. (2007). Work satisfaction, organizational commitment and withdrawal behaviours. *Management Research News*, 30(10), 708-723.

- Fang Yang, (2011), "Work, motivation and personal characteristics: an in-depth study of six organizations in Ningbo", *Chinese Management Studies*, Vol. 5 Iss 3 pp. 272 - 297
- Feng Jing, F., Avery, G. C., & Bergsteiner, H. (2011). Organizational climate and performance in retail pharmacies. *Leadership & Organization Development Journal*, 32(3), 224-242.
- Ford T., (1999), "Increased awareness", *Aircraft Engineering and Aerospace Technology*, Vol. 71 Iss 4 pp. 362 - 364
- Fornell, C. & Cha, J. (1994). Partial least squares. In R.P. Bagozzi (Ed.) *Advanced Methods of Marketing Research* (pp. 52-78). Cambridge, MA:Blackwell.
- Fornell, C., & Larcker, D. F. (1981). Structural Equation Models with Unobservable Variables And Measurement Error: Algebra and Statistics. *Journal of Marketing Research*.
<https://doi.org/10.2307/3150980>
- Flight Safety Foundation (2005), "Unlocking the potential of a safety management system", *Flight Safety Digest*, Vol. 24, pp. 1-16
- Flin, R. H. (1996). *Sitting in the hot seat: Leaders and teams for critical incident management*. John Wiley & Sons.
- Geisser, S. (1975). A predictive approach to the random effect model. *Biometrika*, 61(1), 101-107
- Gibson, J. A. (1997). *An Investigation of Situation Awareness Using Aviation Incident Reports* (No. AFIT/CI-97-066). AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH.
- Gill, G. K., & Shergill, G. S. (2004). Perceptions of safety management and safety culture in the aviation industry in New Zealand. *Journal of Air Transport Management*, 10(4), 231-237.
- Graham, M. W., & Messner, P. E. (1998). Principals and job satisfaction. *International Journal of Educational Management*, 12(5), 196-202.
- Hair, J. F., Ringle, M. C. & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 9(2), 139-151.
- Harvey, J., Bolam, H., Gregory, D., & Erdos, G. (2001). The effectiveness of training to change safety culture and attitudes within a highly regulated environment. *Personnel Review*, 30(6), 615-636.
- Hatch, M.J. (1993), "The dynamics of organizational culture", *Academy of Management Review*, Vol. 18, pp. 657-93.
- Hatch.M.J and Schultz.M, (2002), *The Dynamic of Organization Identity*, Vol.55(8), pp. 989-1018.
- Hellings, J., Schrooten, W., Klazinga, N. S., & Vleugels, A. (2010). Improving patient safety culture. *International journal of health care quality assurance*, 23(5), 489-506.
- Henseler, J., Christain, M., Ringle, R. & Sinkovics. (2009). The use of partial least square path modeling in international marketing. *Advances in International Marketing*, 20, 277-319.
- Herzberg, F. I. (1966). *Work and the nature of man*.
- Hopfl, H. (1994). Safety culture, corporate culture: Organizational transformation and the commitment to safety. *Disaster Prevention and Management*, 3(3), 49-58
- Hopkins, A. (2006). Studying organisational cultures and their effects on safety. *Safety science*, 44(10), 875-889.
- Hsin Lin, Y. (2012). Modeling the important organizational factors of safety management system performance. *Journal of Modelling in Management*, 7(2), 166-179.
- Hudson, P. (2007). Implementing a safety culture in a major multi-national. *Safety science*, 45(6), 697-722.
- Huey Yiing, L., & Zaman Bin Ahmad, K. (2009). The moderating effects of organizational culture on the relationships between leadership behaviour and organizational commitment and between organizational commitment and job satisfaction and performance. *Leadership*

- & *Organization Development Journal*, 30(1), 53-86.
- Hughes, B. P., Newstead, S., Anund, A., Shu, C. C., & Falkmer, T. (2015). A review of models relevant to road safety. *Accident Analysis & Prevention*, 74, 250-270.
- Joy, J., & Griffiths, D. (2005). National minerals industry safety and health risk assessment guideline. version 3, March, MCA and MISHC, Australia,(2011), Retrieved August 2013 at www.planning.nsw.gov.au.
- Kevin Loebbaka, J., & Lewis, A. (2009). Live or let die: managing safety management system strategies and stakeholders. *Business Strategy Series*, 10(4), 193-198.
- Kim, D. H., & Choi, J. Y. (2016). Measuring Safety Culture to Promote Aviation Safety Culture. *Journal of the Ergonomics Society of Korea*, 35(2).
- Kletz, T. (2018). *An engineer's view of human error*. Routledge.
- Langford, D., Rowlinson, S., & Sawacha, E. (2000). Safety behaviour and safety management: its influence on the attitudes of workers in the UK construction industry. *Engineering, Construction and Architectural Management*, 7(2), 133-140.
- Li, Y., & Guldenmund, F. W. (2018). Safety management systems: A broad overview of the literature. *Safety Science*, 103, 94-123.
- Margolis, S. L. (1999). Organizational identity, future organizational images, and the construction of organizational identification in a merger environment.
- Masys, A. J. (2005). A systemic perspective of situation awareness: An analysis of the 2002 mid-air collision over Überlingen, Germany. *Disaster Prevention and Management: An International Journal*, 14(4), 548-557.
- Maurino, D. E., Reason, J., Johnston, N., & Lee, R. B. (1995). Beyond Aviation Human Factors-Safety in High Technology Systems.
- MacGregor, D. (1960). *The human side of enterprise* (Vol. 21, No. 166.1960). McGraw-Hill: New York.
- McDonald, N., Corrigan, S., Daly, C., & Cromie, S. (2000). Safety management systems and safety culture in aircraft maintenance organisations. *Safety Science*, 34(1-3), 151-176.
- Milanovich, D. M., Driskell, J. E., Stout, R. J., & Salas, E. (1998). Status and cockpit dynamics: A review and empirical study. *Group Dynamics: Theory, Research, and Practice*, 2(3), 155.
- Milne, P. (2007). Motivation, incentives and organisational culture. *Journal of knowledge management*, 11(6), 28-38.
- Mohammad Ather, S., Aktaruzzaman Khan, M., & Hoque, N. (2011). Motivation as conceptualized in traditional and Islamic management. *Humanomics*, 27(2), 121-137.
- Nguyen, T., Lim, C. P., Nguyen, N. D., Gordon-Brown, L., & Nahavandi, S. (2019). A Review of Situation Awareness Assessment Approaches in Aviation Environments. *IEEE Systems Journal*.
- O'Connor, P., O'Dea, A., Kennedy, Q., & Buttrey, S. E. (2011). Measuring safety climate in aviation: A review and recommendations for the future. *Safety Science*, 49(2), 128-138.
- Oster Jr, C. V., Strong, J. S., & Zorn, C. K. (2013). Analyzing aviation safety: Problems, challenges, opportunities. *Research in transportation economics*, 43(1), 148-164.
- Organ, D. W. (2018). Organizational citizenship behavior: recent trends and developments. *Annual Review of Organizational Psychology and Organizational Behavior*, 80, 295-306.
- Patchen, M. (1970). Participation, achievement, and involvement on the job.
- Pourdehnad, J., & Smith, P. A. (2012). Sustainability, organizational learning, and lessons

- learned from aviation. *The Learning Organization*, 19(1), 77-86.
- Pratt, M. G., & Foreman, P. O. (2000). The beauty of and barriers to organizational theories of identity. *Academy of Management Review*, 25(1), 141-143.
- PU 9301-002 RMAF Safety Management System (2013)
- Qayoom, A., & Hadikusumo, B. H. (2019). Multilevel safety culture affecting organization safety performance: a system dynamic approach. *Engineering, Construction and Architectural Management*.
- Reason, J. (2000). Human error: models and management. *Bmj*, 320(7237), 768-770.
- Remawi, H., Bates, P., Dix, I., (2011). The relationship between the implementation of a Safety Management System and the attitudes of employees towards unsafe acts in aviation. *Safety Sci.* 49 (5), 625–632. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0925753510002456>.
- Ringle, C., Wende, S., & Becker, J. (2015). SmartPLS 3. Retrieved From <https://doi.org/http://www.smartpls.com>
- Sands, J., Lee, K. H., Rae, K., & Gadenne, D. L. (2015). Associations between organisations' motivated workforce and environmental performance. *Journal of Accounting & Organizational Change*.
- Santos-Reyes, J., & Beard, A. N. (2002). Assessing safety management systems. *Journal of Loss Prevention in the Process Industries*, 15(2), 77-95.
- Seibokaite, L., & Endriulaitiene, A. (2012). The role of personality traits, work motivation and organizational safety climate in risky occupational performance of professional drivers. *Baltic Journal of Management*, 7(1), 103-118.
- Shahin, A., Shabani Naftchali, J., & Khazaei Pool, J. (2014). Developing a model for the influence of perceived organizational climate on organizational citizenship behaviour and organizational performance based on balanced score card. *International Journal of Productivity and Performance Management*, 63(3), 290-307.
- Schultz, M., Hatch, M. J., & Larsen, M. H. (Eds.). (2000). *The expressive organization: Linking identity, reputation, and the corporate brand: Linking identity, reputation, and the corporate brand*. OUP Oxford.
- Sieberichs, S., & Kluge, A. (2016). Good Sleep Quality and Ways to Control Fatigue Risks in Aviation—An Empirical Study with Commercial Airline Pilots. In *Advances in Physical Ergonomics and Human Factors* (pp. 191-201). Springer, Cham.
- Snape, E., & Redman, T. (2010). HRM practices, organizational citizenship behaviour, and performance: A multi-level analysis. *Journal of management studies*, 47(7), 1219-1247.
- Soeters, J. L., & Boer, P. C. (2000). Culture and flight safety in military aviation. *The International Journal of Aviation Psychology*, 10(2), 111-133.
- Sutton, A., Williams, H. M., & Allinson, C. W. (2015). A longitudinal, mixed method evaluation of self-awareness training in the workplace. *European Journal of Training and Development*, 39(7), 610-627.
- Teh, P. L., & Yong, C. C. (2011). Knowledge sharing in IS personnel: Organizational behavior's perspective. *Journal of Computer Information Systems*, 51(4), 11-21.
- Tietjen, M. A., & Myers, R. M. (1998). Motivation and job satisfaction. *Management decision*, 36(4), 226-231.
- Tracy H Porter Kelly Diane RiesenmyDailFields , (2016)," Work environment and employee motivation to lead Moderating effects of personal characteristics ", *American Journal of Business*, Vol.31 Iss 2 pp. 66 - 84
- Uryan, Y. (2010). Organizational Safety Culture And Individual Safety Behavior: A Case Study Of

- The Turkish National Police Aviation Department.
- von Thaden, T. L., & Gibbons, A. M. (2008). The safety culture indicator scale measurement system (SCISMS). *National Technical Information Service Final Report*, 1-57.
- Wiley, C. (1997). What motivates employees according to over 40 years of motivation surveys. *International journal of manpower*, 18(3), 263-280.
- Williams, L. J., & Anderson, S. E. (1994). An alternative approach to method effects by using latent-variable models: Applications in organizational behavior research. *Journal of Applied Psychology*, 79(3), 323.
- Wilson, F. M. (2018). *Organizational behaviour and work: a critical introduction*. Oxford university press.
- Witting, M. (2006). *Relations between organizational identity, identification and organizational objectives: An empirical study in municipalities* (Master's thesis, University of Twente).
- Yildirim Uryan (2010), *Organizational Safety Culture and Individual Safety: A Case Study Of The Turkish National Police Aviation Department*
- Zhang, M. M., Wang, Y. Y., Luo, M., & Tang, W. Z. (2013). Human Factor Analysis Model of Civil Aviation Incidents Based on Bayesian Network. In *Advanced Materials Research* (Vol. 756, pp. 3074-3078). Trans Tech Publications.