Proceedings of the International Conference on Industrial Engineering and Operations Management

Publisher: IEOM Society International, USA DOI: 10.46254/AP06.20250111
Published: August 5, 2025

Relationship Between Safety Culture and Safety Performance in SME Malaysia

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Abstract

This study assesses the current safety culture level among Small and Medium Enterprises (SMEs) in Malaysia, which comprise approximately 97.4% of the total business establishments. Despite the significant workforce in SMEs, safety-related research, particularly on safety culture, remains limited in Malaysia. A survey was conducted using a 37-item questionnaire addressing six (6) key safety culture constructs, covering both organizational and human domains, with responses collected from 263 participants across various sectors. The analysis indicates that both employers and employees demonstrate proactive engagement in implementing safety culture practices. However, the lowest score was observed in the "Rewards and Recognition" factor, suggesting an area for improvement to further enhance workplace safety culture. Strengthening social recognition can foster positive safety behaviors driven by a genuine commitment among workers. The grand mean score of 3.76 suggests that SMEs are still in the early stages of developing a proactive safety culture. Hypothesis testing using Partial Least Squares Structural Equation Modeling (PLS-SEM) revealed a strong correlation (r = 0.733) between safety culture and safety performance, supported by a high effect size, emphasizing the critical role of safety culture in driving improved safety performance within SMEs.

Keywords
Safety Culture Dimension, Safety Level, SME, SmartPLS-SEM, Malaysia.

1. Introduction

As Malaysia's economy develops rapidly, driven by the significant contribution of SMEs, occupational safety in these enterprises has often been neglected (Tappura, Susanna, et al., 2023). SMEs account for 97.4% of Malaysia's industries (Department of Statistics Malaysia, 2022), but they face challenges in adhering to formal safety management systems, laws, and regulations. SMEs often lack access to resource supports and relevant risk prevention information (Lopatina, 2013). In 2012, Basic Occupational Health programmes were introduced to guide SMEs in occupational health. Department of Safety and Health (DOSH) Malaysia approaches in implementing programs for example by making it necessary for enterprise to appoint an OSH Coordinator as well as highlighting several qualified training centers to conduct the OSH Coordinator course (DOSH, 2024). The implementation of Occupational Safety and Health Administration (OSHA) standards in small and medium enterprises (SMEs) in Malaysia is still in its early stages

There is a lack of accidents and diseases statistics from DOSH Malaysia regarding occupational safety and health level specific to SMEs. The absence of this data is attributed to SMEs' limited resources, leading to the underestimation of the costs of occupational accidents and diseases. Additionally, underreporting of incidents due to factors like low worker education, lack of safety consciousness, informal safety procedures, and poor basic safety management further complicates the situation (Probst et al., 2008; Probst & Estrada, 2010; Vinodkumar & Bhasi, 2010; W. Alias et al., 2022). The Department of Statistics Malaysia also does not analysed data by firm size, making it challenging to draw conclusive statements about SME-related accidents and costs (Department of Statistics Malaysia, 2022). Although a study by Rahlin et al. (2016) analysed safety incidents and Social Security Organization (SOCSO) claim trends to justify SME-related accident counts, it is out-dated in the post-Covid era.

Small and medium enterprises (SMEs) play a vital role in Malaysia's economy, contributing approximately 38.2% to the national GDP. However, despite their economic importance, occupational safety within SMEs remains largely under-researched and inadequately addressed. A weak safety culture in these organizations has been linked to a high incidence of workplace injuries and accidents, with Hong et al. (2011) reporting that 80% of such incidents occur within SMEs. This gap in knowledge and practice hinders efforts to effectively manage safety risks and improve overall safety performance. In particular, there is a lack of empirical evidence on the factors influencing worker safety performance in Malaysian SMEs. Therefore, it is essential to investigate the key determinants of safety performance in this sector to inform the development of targeted safety interventions and policies.

1.1 Objectives

The main objectives for this research are to identify current safety level in Malaysia's SME enterprise. Then a quantitative analysis is conducted to examine the relationship between safety culture and safety performance, providing empirical evidence of the impact of safety culture on safety performance.

2. Literature Review

2.1 SME in Malaysia

Small and medium enterprises (SME) are crucial to the business landscape in Southeast Asia, serving as the backbone of economic activity in the region (Daties & Peilouw, 2023). Six (6) ASEAN countries consisting Singapore, Malaysia, Thailand, Philippines, Vietnam, and Indonesia have specific criteria for defining SMEs based on the revenues, assets, or number of employees (Martin, 2009). In Indonesia, SMEs contribute significantly to the economy, with the highest internet economy growth and the largest GDP contribution from SMEs at 61%. In Malaysia, SMEs are overseen by SME Corp Malaysia, which aims to elevate micro, small, and medium enterprises (MSMEs) to higher levels through business transformation, internationalization, digitalization, and effective coordination. SMEs makes up 97.4% of business establishments in Malaysia, contributing 38.2% to GDP, and providing employment for 7.3 million people (Organisation for Economic Co-operation and Development, 2022). Given the significant employment provided by SMEs, it is essential to foster a strong safety culture to protect the health and welfare of workers.

2.2 Safety Factor Constructs

Research by Cheyne et al. (2002); Lu (2022) and Omar Alrehaili (2016) reflects the inconsistency of the definition of safety culture., showing that the understanding of safety culture varies significantly depending on context and perspective. This indistinctness often leads to varied interpretations and implementation approaches, making it

challenging to establish a unified safety standard. However, research by Jafri (2024) offers a more structured understanding by breaking down safety culture into six (6) key factors as shows in Table 1.

Table 1. Six (6) safety culture factor description

Factor	Safety Culture Factor, Jafri et. al, 2024
F1	Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents
F2	Leadership and Communication
F3	Rewards and Recognition
F4	Attitudes towards OSH Improvements
F5	Employees' Competences
F6	Education on OSH

The current practice of safety in the SME industry is often reactive rather than proactive, with measures typically implemented only after accidents or incidents occur. This limited approach stems from several challenges commonly faced by SMEs, including low worker education, lack of safety consciousness, informal safety procedures, and weak safety management systems.. Addressing the safety culture within SMEs is crucial for reducing accidents and improving overall safety performance.

2.2.1 Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents

Monitoring workplace behavior and encouraging the reporting of accidents or near misses are essential components of a strong safety culture. An open and transparent reporting environment promotes accountability and empowers individuals to share safety concerns without fear of retribution, thereby enhancing hazard awareness and risk management practices (Sellers, 2011). Effective reporting systems, when supported by proactive leadership and a well-established reporting culture, can lead to higher reporting rates and the early identification of latent conditions and causal factors that may contribute to serious incidents. For instance, research conducted by Whale & Naweed (2013) demonstrated a 30% increase in incident reporting following the implementation of targeted interventions, reflecting a measurable improvement in safety awareness and organizational culture. Thus, developing the first hypothesis.

Hypothesis 1: There is a significant relationship between safety factor and monitoring behaviour, reporting and analysis of past incident.

2.2.2 Leadership and Communication

Research has shown that active managerial engagement, targeted OSH training and government initiatives such as those led by the Department of Occupational Safety and Health (DOSH) can significantly enhance OSH compliance in SMEs (Cigularov et al., 2010). Management plays a critical role in fostering safe work practices, and participation in OSH-related training has been found to improve compliance levels (Al Mawli et al., 2021). However, the implementation of effective OSH practices is often constrained by limited funding and a lack of technical expertise (Champoux & Brun, 2003; Zulkifly, 2018)Addressing these challenges through strategic interventions and strengthened leadership and communication is essential for promoting safety awareness and reducing workplace incidents. Accordingly, the following hypothesis is proposed:

Hypothesis 2: There is a significant relationship between safety culture and leadership and communication.

2.2.3 Rewards and Recognition

Rewards can be considered a form of tangible motivation, often involving physical or material incentives. In contrast, recognition is more aligned with moral and ethical values, as it acknowledges and appreciates an individual's efforts as well as contributions in a meaningful way. Recognition fosters a deeper sense of purpose and belonging, encouraging individuals to uphold positive behaviors out of a genuine commitment to shared values and principles (Houette & Mueller-Hirth, 2022). Social recognition increasing workers' dignity and individual values that goes beyond a mere facade of legal compliance to truly value workers' contributions and dignity (Kusmayadi et al., 2023). Rites and ceremonies in a company offer chances for employees to be publicly acknowledged and appreciated for their commitment to safety. These events also show that safety is important to the company. By giving feedback, offering rewards, and providing social recognition, the company creates stories and examples that illustrate the importance of safety in the workplace (Fell-Carlson, 2004). As discussion above, the following hypothesis is developed.

Hypothesis 3: There is a significant relationship between safety factor and rewards and recognition.

2.2.4 Attitudes towards OSH Improvements

Worker attitudes toward Occupational Safety and Health (OSH) play a critical role in shaping safety behaviors within the workplace. A positive attitude has been shown to enhance employees' sense of security and motivation, thereby contributing to improved safety practices and overall compliance (Damayanti, 2023). Furthermore, a proactive safety attitude is positively associated with the adoption of innovative safety measures, indicating that fostering constructive perceptions of OSH can support both compliance and the continuous improvement of safety systems in the industry (Sanni, T. O. et al., 2022). These researches construct the following hypothesis.
Hypothesis 4: There is a significant relationship between safety factor and attitudes toward OSH improvement.

2.2.5 Employees' Competences

Cagno & Micheli (2014) examined the role of OSH officer interventions in SMEs, highlighting that these enterprises often face more challenging OSH conditions compared to larger organizations. SMEs typically operate with limited physical, financial, and organizational resources, which constrain their ability to implement comprehensive safety measures. Therefore, it is essential for SMEs to strategically allocate their limited resources by selecting and implementing only the most effective and context-appropriate OSH interventions. In this regard, experienced safety officers play a crucial role in assessing an organization's capacity to improve its safety protocols, thereby helping to optimize resource use and avoid ineffective or unnecessary interventions. This also affects safety culture in the industries thus listing the fifth hypothesis.
Hypothesis 5: There is significant relationship between safety culture and employee's competences.

2.2.6 Education on OSH

Training plays a pivotal role in shaping workers' safety awareness and behaviors. Lingard & Yesilyurt (2003) found that training enhances individuals' recognition of their own behavior as a critical factor in preventing occupational injuries, while also increasing their perceived susceptibility to workplace accidents. Similarly, Asivandzadeh et al., (2020) emphasized that engaging training methods such as involving workers in discussions, sharing experiences, and highlighting the importance of safety can positively influence safety behavior and foster a stronger safety culture. However, despite the availability of occupational health and safety (OHS) training, Dias & Santos, (2024) argue that greater attention must be given to tailoring training content to sector-specific needs and ensuring that instructional methods effectively transmit knowledge. Well-structured, context-specific, and regularly updated training programs are essential for cultivating a robust safety culture and reducing workplace accidents. Above discussion develop the next hypothesis.
Hypothesis 6: There is a significant relationship between safety factor and education on OSH.

2.3 Safety culture and Safety Performance

Studies indicate that companies that cultivate a positive safety culture and climate generally achieve better safety performance results. This includes lower accident rates, enhanced safety compliance, increased reporting of near misses, and improved safety communication. Fostering a safety-oriented culture allows organizations to establish a workplace where safety is a primary concern, resulting in improved safety performance and overall organizational achievement (Tappura, Haapavirta, et al., 2023). Organizations with a positive safety culture tend to have employees who are more engaged in safety practices, leading to a safer work environment and enhanced safety performance. Therefore, investing in developing and maintaining a positive safety culture within an organization can have a direct impact on safety performance outcomes, ultimately contributing to a safer and more productive work environment (Deepak & Mahesh, 2019). Through a comprehensive understanding of the relationship between safety culture and safety performance, businesses may enhance their ability to manage safety risks, avoid incidents, and continuously improve safety results. Thus the last hypothesis developed.
Hypothesis 7: There is a significant relationship between safety culture and safety performance.

This study follow the studies discussed above but group all safety constructs into one (1), represent safety culture as a whole as shown in Figure 1.

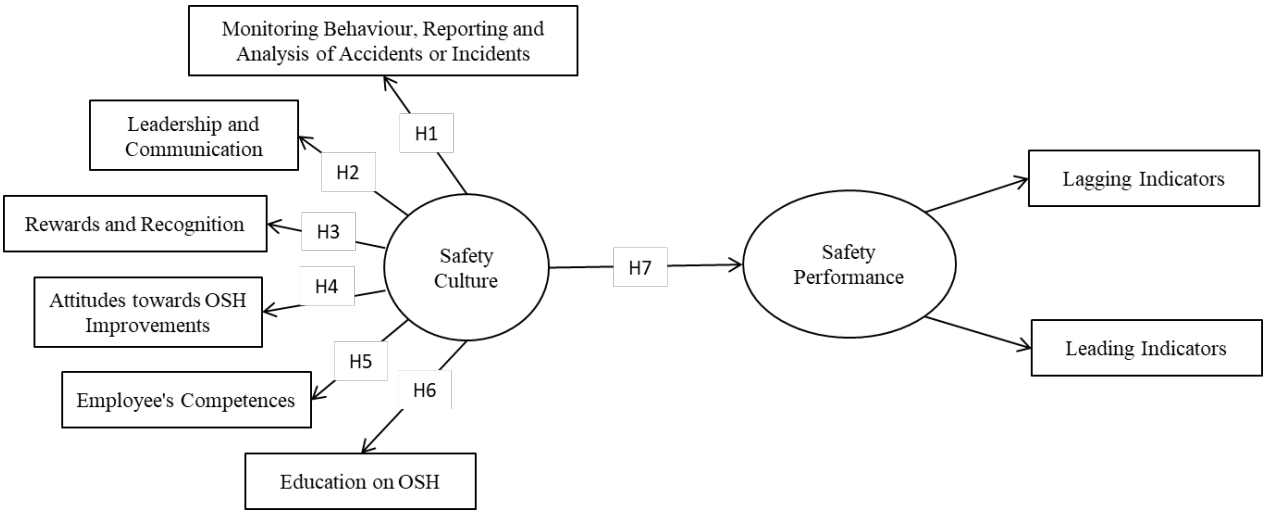

Figure 1. Conceptual framework

3. Methodology

The current research employed a quantitative method for data collection and analysis. Traditionally, safety culture and safety performance were assessed through a questionnaire survey (Guldenmund, 2007). This study employed a stratified random sampling technique, ensuring representation across various occupational levels within SMEs, including both managerial staff and general workers. Data cleaning procedures were carried out in Microsoft Excel prior to any measurements to ensure consistency and suitability of the data for subsequent analysis. IBM SPSS Version 27 was then utilized to generate the descriptive statistics to aid in visualizing the demography of respondents as well as to conduct mean analysis for each factors score. Lastly, SmartPLS-Sem is used to analyse the relationship between safety culture and safety performance.

3.1 Questionnaire Survey

The questionnaire, a widely used and cost-effective data collection method, was employed in this study to assess the safety culture perceptions of workers in Small and Medium Enterprises (SMEs). The survey consisted of three sections. The first section collected demographic data, including personal (e.g., gender, age), educational (e.g., education level, profession, length of employment), work-related (e.g., employee status, working level), and organizational attributes (e.g., company size, sector, region, OSH budget, ISO certification). The second section assessed safety culture using a validated and reliable instrument developed by Jafri (2024) selected for its relevance to the Malaysian SME context. This section included 37 items across six key safety culture dimensions, measured on a 5-point Likert scale ranging from '1 = Strongly Disagree' to '5 = Strongly Agree.' The Likert scale was chosen to reduce respondent fatigue while ensuring consistent and analyzable data."

3.2 Data Collection

The workers in the SMEs sector across Malaysia were the focus group of the sample. To facilitate distribution, the questionnaire was transformed into a Google Form. This platform enables efficient data collection, processing, and customization for both researchers and participants (Ball, 2019). Subsequently, the Google link was shared with DOSH Malaysia, who then disseminated it to all SMEs organizations in Malaysia. G*Power version 3.1.9.7 was used to calculate the minimum required sample size for this study. Based on the analysis, a minimum of 34 respondents was needed to achieve sufficient statistical power. A total of 263 responses were collected, which exceeds the minimum requirement. Additionally, Partial Least Squares Structural Equation Modeling (PLS-SEM) typically requires an optimum sample size of 100 to produce reliable results. Therefore, the sample size obtained in this study is considered adequate statistical analysis and PLS-SEM. The questionnaire survey was conducted over a period of three (3) months from December 2023 to March 2024.

4. Results and Discussion

Normality Test was conducted to assess whether the data was in normal distribution, Mardia's multivariate kurtosis is commonly employed. In this reserach, Mardia's multivariate skewness and kurtosis were evaluated using an online statistical analysis tool. The results indicate significant deviations from normality, as evidenced by skewness ($\beta = 23.746$, $p < 0.01$) and kurtosis ($\beta = 109.870$, $p < 0.01$). These findings confirm that the assumption of normal distribution is violated, thus Smart Partial Least Square (SmartPLS) is particularly suitable for this context as it does not rely on the assumption of normality.

4.1 Descriptive Statistics

IBM SPSS version 27 is applied to conduct descriptive analysis to understand the demographics of the respondents and followed by analysing the respondent's data. Internal consistency of the questionnaire was ensured through Cronbach's Alpha with value of 0.973. The high alpha score of the survey instrument demonstrates its reliability. Therefore, the questionnaire by Jafri (2024) is deemed a suitable tool for assessing the occupational safety culture of SME workers in Malaysia.

4.2 Safety Level Malaysia's SME

The mean values for each safety culture factors measured are as shown in Table 2. The mean values revealed distinct implementation of safety culture dimensions among the SME companies. Most factors are at the "Proactive" stage (F2, F4, F5, and F6), indicating that these companies are aware of safety issues and are progressively enhancing their safety conditions. However, one factors which is F3 (Rewards and Recognition) remains at the "Calculative" stage, reflecting lower implementation. The F3 (Reward and Recognition) is lagging because companies need to allocate resources to acknowledge safety efforts, which is challenging as resources are scarce and often prioritized for production. To improve these safety factors, strong commitment and support from top management are essential. Overall, Malaysia's SME safety culture level is at the lower side Proactive stage with overall grand mean score of 3.93.

Table 2. Malaysia's SME implementation levels

Factor	Factor Description	SME OVERALL N = 263	Interpretations Based on Hudson Ladder
F1	Monitoring Behaviour, Reporting and Analysis of Accidents Or Incidents	4.14	Generative
F2	Leadership And Communication	4.01	Proactive
F3	Rewards And Recognition	3.61	Calculative
F4	Attitudes Towards Osh Improvements	4.04	Proactive
F5	Employees' Competences	3.90	Proactive
F6	Education On Osh	3.90	Proactive
Grand Mean (Safety Culture Level For Sme Malaysia)		3.93	Proactive

4.3 Measurement Model

We used partial least squares (PLS) modeling using the SmartPLS 4 version (Ringle et al., 2023) as the statistical tool to examine the measurement and structural model as it does not require normality assumption. Structural Equation Modeling (SEM) is also a multivariate analytical technique used to assess the validity of theoretical models and hypotheses based on empirical data. PLS-SEM offers greater flexibility than Covariance-Based SEM (CB-SEM) in modeling complex relationships between observed indicators and latent constructs. While PLS-SEM performs well across various sample sizes, it must still meet minimum sample size requirements to ensure reliable estimation of model parameters, especially in models with complex structures. Additionally, PLS-SEM accommodates both reflective and formative measurement models, making it a widely adopted approach among researchers for analyzing latent constructs.

The evaluation of the measurement and structural models was conducted using a recommended two-stage analytical procedure (Anderson & Gerbing, 1988). Reflective constructs were chosen to ensure that the measures were inter-correlated, one-dimensional, and demonstrated strong internal consistency. In assessing the measurement model, loadings, average variance extracted (AVE), and composite reliability (CR) were evaluated. According to the guidelines (Ramayah et al., 2018), loadings should be ≥ 0.5, AVE should be ≥ 0.5, and CR should be ≥ 0.7 as shown in Table 3.

Table 3. Reliability and validity test.

Baseline value		Loadings		α		CR		AVE	
		≥0.5, 0.6, 0.7, 0.708		≥ 0.7		≥ 0.7		≥ 0.5	
Constructs		1st Order	2nd Order	1st Order	2nd Order	1st Order	2nd Order	1st Order	2nd Order
Safety Culture	F1(1-9)	0.737-0.826	0.825	0.921	0.901	0.922	0.91	0.612	0.67
	F2(1-10)	0.785-0.922	0.851	0.966		0.967		0.769	
	F3(1-5)	0.853-0.923	0.708	0.931		0.935		0.783	
	F4(1-3)	0.90-0.951	0.839	0.925		0.928		0.87	
	F5(1-5)	0.880-0.925	0.871	0.951		0.951		0.836	
	F6(1-5)	0.881-0.926	0.808	0.944		0.945		0.816	
Safety Performance	O1(1-6)	0.836-0.947	0.942	0.965	0.891	0.965	0.904	0.851	0.901
	O2(1-5)	0.868-0.923	0.957	0.943		0.944		0.815	

All items in Table 3 have satisfactory indicator reliability (ranging from 0.737 to 0.951) achieving the threshold value set by (Bryne, 2016) with all AVE scores are higher than 0.5 with range around (0.612-0.870). Therefore, none of the items was dropped. In term of AVE value, of all eight constructs exceeds the threshold value of 0.5, ranging from 0.612 to 0.870. This shows that the measurement model demonstrated adequate convergent validity for both first and second order construct.

There have been arguments on the use of Cronbach's Alpha (α) as a tool to measure reliability. Cronbach's Alpha (α) value is said to underestimate of the true reliability (Hair et al., 2017). Therefore, due to its deficiency, (McNeish, (2017) suggested an alternative reliability test, which is the Composite Reliability Index. (Chin, 1998) considers composite reliability as a more rigorous estimate of reliability compared to Cronbach's alpha, because it is able to determine whether or not the specific indicators are sufficient in their representation of the respective constructs (Fornell & Larcker, 1981). Composite reliability for all constructs exceeded the minimum cut-off value of 0.7 with safety culture score 0.901 while safety performance score 0.891. These results indicate that the measurement model possessed acceptable reliability.

In this study, discriminant validity was assessed using the Heterotrait-Monotrait Ratio of Correlations (HTMT), as recommended by Henseler et al. (2015). To further verify the discriminant validity, a bootstrapping procedure was employed to determine whether the HTMT values significantly differed from 1.00. As shown in Table 4, none of the upper bounds of the 95% confidence intervals exceeded the conservative thresholds of 0.90 or 0.85, providing strong evidence of discriminant validity. The application of the more stringent 0.85 threshold confirms that discriminant validity was successfully established within the measurement model.

Table 4. Discriminant validity

No	Constructs	1	2	3	4	5	6	7
1	Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents							
2	Leadership and Communication	0.753						
3	Rewards and Recognition	0.532	0.701					
4	Attitudes towards OSH Improvements	0.677	0.624	0.533				
5	Employees' Competences	0.631	0.657	0.536	0.788			
6	Education on OSH	0.599	0.546	0.411	0.737	0.827		
7	Lagging Indicator	0.584	0.651	0.433	0.486	0.571	0.544	
8	Leading Indicator	0.716	0.706	0.489	0.584	0.67	0.655	0.843

4.3 Structural Model Assessment

In line with the recommendations of Hair et al. (2022), multivariate skewness and kurtosis were assessed to examine the distributional properties of the data. The results indicated significant deviation from normality, with skewness ($\beta = 23.746$, $p < 0.01$) and kurtosis ($\beta = 109.870$, $p < 0.01$) both exceeding acceptable thresholds. Following the guidelines of Becker et al. (2023), the structural model was evaluated by reporting path coefficients, standard errors, t-values, and p-values, using a 10,000-sample bootstrap resampling procedure. Additionally, acknowledging the critique by Hahn and Ang (2017) that p-values alone may be insufficient for hypothesis testing, a combination of statistical criteria including p-values, confidence intervals, and effect sizes was employed to yield accurate findings. Table 5 only presents the results for the hypothesis testing for the relationship between safety culture and safety performance.

Table 5. Hypothesis Testing

Hypothesis	Relationship	Std Beta	Std Error	t-value	p-value	BCI LL	BCI UL
H1	SC → SP	0.733	0.044	16.591	0	0.627	0.804

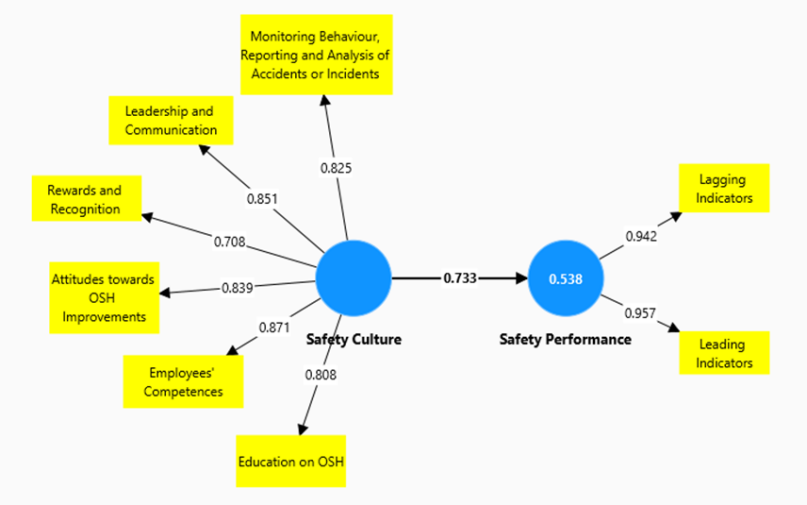

Figure 2. Measurement Model Outcome

Table 5 details the results of hypothesis testing for the relationship between "Safety Culture" (SC) and "Safety Performance" (SP). The standardized beta coefficient (Std Beta) is 0.733 (as illustrated in Figure 2), indicating a strong positive relationship between these constructs (also shows in Figure 2). The t-value of 16.591 is significant (p-value = 0.000), well below the 0.05 threshold, confirming that the relationship is statistically significant. The bootstrapped confidence interval (BCI) ranges from 0.627 to 0.804, which does not cross zero, further validating the hypothesis that a positive relationship exists between Safety Culture and Safety Performance. The findings strongly support the hypothesis that improvements in Safety Culture are associated with enhanced Safety Performance.

The effect size, f2, is essential in SEM as it measures the effects of various exogenous constructs on the endogenous construct. According to Sullivan & Feinn, (2012) besides reporting the p-value, both the substantive significance (effect size) and statistical significance (p-value) are crucial to be reported. In this research, 1.163 f^2 suggested that the predictor (safety culture) has an extremely strong effect on the dependent variable (safety performance). Hypothesis testing using SmartPLS-SEM with a correlation value of 0.733, strongly support the notion that safety culture significantly influences safety performance.

5. Conclusion

In conclusion, SMEs in Malaysia contribute significantly to the national economy and serve as a major source of employment for the local population. However, the implementation of Occupational Safety and Health (OSH) practices within SMEs remains at an early developmental stage. Currently, there is a lack of recorded data on workplace accidents within SMEs in both the Department of Occupational Safety and Health (DOSH) and the Department of Statistics Malaysia (DOSM) databases, leading to limited visibility and oversight of OSH issues in this sector. Furthermore, research focusing on OSH practices in Malaysian SMEs is limited. This study aims to assess the current level of OSH implementation in Malaysian SMEs and to examine the relationship between safety culture and safety performance among SME workers.

Research finding shows the overall Malaysia's SME OSH implementation is in the lower side of proactive implementation. Reward and Recognition yield the lowest implementation in the SMEs, this may due to limited resources and financial support. Although reward and recognition influences safety culture, reward systems are only beneficial when decisions and protocols around the systems are deemed to being fair by those in the organization. Instead of focusing on material incentives, moral values and social recognition may uphold positive behaviors out of a genuine commitment to safety.

This research also revealed that the relationship between safety culture and safety performance exhibited a notably strong correlation, with an effect size f^2 of 1.163. Such a high effect size indicates that safety culture plays a significant role in influencing safety performance, highlighting the importance of fostering a positive safety culture within an organization. The value suggests that safety culture substantially impacts safety performance, contributing

to meaningful improvements in workplace safety outcomes. This finding underscores the critical nature of safety culture as a driving force behind better safety performance metrics and emphasizes the need for organizations to prioritize safety culture initiatives to achieve lasting positive results.

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Istas Fahrurrazi Nusirwan specializes in aircraft guidance & control, numerical modeling and air traffic systems. His doctorate degree covers the design and development of the stability augmentation system for high-speed fighter jet. In academia, he developed a campus wide OBE Analysis system for use by higher learning institutions since 2010. Currently, his research is on the study of air traffic movement in Malaysia with the Civil Aviation Authority Malaysia.