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Hierarchical Safety Culture Model For Malaysia: A Confirmatory Study

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ABSTRACT: *The study investigated safety culture in Malaysia, defined by the Health and Safety Laboratory as the blend of attitudes, values, and perceptions impacting workplace behaviour. The aim of this study was to develop of a national Occupational Safety and Health (OSH) culture model. This endeavour aligns with the OSH Master Plan 2021–2025 (OSHMP25), Vision Zero initiatives, and the UN sustainable development goals (SDGs). Confirmatory Factor Analysis (CFA) was used to investigate hierarchical nature of safety culture and its low order factors within organisations in Malaysia. The data was collected at two OSH events: KeJaRI 4.0, and APOSHO. Of 1,500 distributed surveys across these programmes, 625 were returned, and upon data screening 536 cleaned data was used for CFA. IBM® SPSS was used for data screening and basic statistical analysis, while SmartPLS 4.0 was used for CFA to identify critical safety culture factors in Malaysia context. Six key factors were identified accounting for 37 items: "Leadership and Communication", "Monitoring Behaviour, Reporting, and Analysis of Accidents or Incidents", "Attitudes towards OSH Improvements", "Education on OSH", "Rewards and Recognition", and "Employees' Competences". The study emphasised the need for Malaysian organisations to enhance these aspects of safety culture, which could lead to better OSH performance, increased productivity, and profitability. These insights are significant for policymakers and OSH professionals, offering a roadmap for cultivating a stronger safety culture in the workplace.*

Keywords: *Safety Culture, Safety Performance, OSH Level in Malaysia, Confirmatory Factor Analysis*

1.0 INTRODUCTION

Occupational Safety and Health (OSH) is defined by the International Labour Organisation (ILO) as the optimal level of a worker's physical, mental, and social well-being (Forastieri, 2014). It emphasises the creation and maintenance of workplace conditions that reduce potential workplace hazards and encourages the adaptation of the occupational environment to employees' physical and mental capacities.

OSH is an essential component of any workplace. It ensures a safe environment and promotes healthy practises. Employers are responsible for establishing safe and healthy working conditions and fostering a positive work environment, which can increase employee satisfaction and, as a result, productivity. Employers' OSH provisions include providing competent personnel with training for safe task execution and allocating resources to prevent accidents and incidents (Friend & Kohn, 2010). Employers have to consider OSH as a culture, not just a priority.

The Department of Occupational Safety and Health (DOSH) is a department under the Ministry of Human Resources. This department is responsible for ensuring the safety, health, and welfare of people at work as well as protecting other people from the safety and health hazards arising from the work activities. The Occupational Safety and Health Master Plan (OSHMP) was implemented by DOSH, which includes consistent key performance indicators (KPIs), such as lowering fatality and injury rates and increasing reporting of occupational diseases. OSHMP aims to achieve these KPIs by establishing strategic thrusts and programmes under each strategy. Through its programmes, including promoting OSH in the public sector and reinforcing self- regulation practises, the OSHMP hopes to instil a positive OSH culture in Malaysian workplaces. DOSH Malaysia also advocates for occupational safety and health education and awareness programmes.

The 2021 Annual Report on Occupational Accidents and Diseases in Malaysia, published by the DOSH, revealed that the manufacturing sector has the highest injury rate of 3.20 per 1,000 workers compared with the construction sector injury rate of 1.98 per 1000 workers. However, the construction sector has the highest fatality rate of 6.30 per 100,000 workers compared with the manufacturing sector rate of 2.60 per 100,000 workers (DOSH Annual Report, 2021). Several factors contribute to high rate of occupational accidents. These include a lack of safety awareness, which leads to many organisations failing to foster a strong OSH culture. As a result, employees may be unaware of workplace risks or lack knowledge about how to mitigate them. Furthermore, small organisations frequently face resource constraints, which can impede the implementation of effective safety programmes. Finally, government enforcement of occupational safety and health regulations is frequently perceived as lax, which means that smaller companies may face minimal consequences for safety violations.

Although Malaysia's occupational accident rate and occupational fatality rate was reduced significantly in 2021 (compared with 2014), building and fostering a positive OSH culture and accident-free workplace environment still remains the greatest challenge. This study sought to address this challenge with main objective of developing a safety culture model that aligns with Malaysia's OSH culture, incorporating key elements derived from the OSHMP, thus nurturing positive OSH culture. Furthermore, this study identified primary factors (drivers) to achieve a high level of OSH culture among organisations in Malaysia.

2.0 SAFETY CULTURE MODEL

For more than three decades, the concept of "safety culture" has been extensively researched and interpreted within safety discourse. However, there is no global agreement on its definition or content. According to Cooper (2016), there were 51 distinct definitions of safety culture and 30 distinct definitions of safety climate. Although these terms are frequently used interchangeably, they refer to distinct aspects. Safety culture is a long-term corporate ethos that influences safety management, whereas safety climate reflects current shared perceptions.

Cole et al. (2013) presented a comprehensive compilation of safety culture definitions. It is critical to recognise that different perspectives and interpretations of safety culture exist. These definitions emphasised four main criteria: (a) the impact of organisational values and beliefs on safety practises, (b) the necessity of leadership and employee participation, (c) the incorporation of safety into regular work operations, and (d) the creation of a learning environment that promotes continual improvement. These concepts, taken together, highlight the multidimensional characteristics of safety culture concept and its critical relevance in ensuring a safe and healthy work environment.

Guldenmund (2000) defined safety culture as those aspects of the organisational culture which will impact on attitudes and behaviour related to increasing or decreasing risk whereas Cooper (2000) further detailed safety culture as a product of multiple goal-directed interactions between people (psychological), jobs (behavioural), and the organisational (situational). Similarly, Elkhweldi et al. (2018) concluded that safety culture is a sub-set of organisational culture which had been described as “who and what we are, what we find important, and how we go about doing things around here” (p. x). Kim and Song (2016) highlighted five aspects of safety culture: information, learning, reporting, justness and flexible.

Van Nunen et al. (2022) clearly defined and segregated safety culture of an organisation as a reflection of the broad spectrum of established safety-related human, organisational or contextual, and technological aspects prevailing in the entire organisation. It entails non-observable, less tangible factors; the values and attitude of individuals in relation to safety, and the shared perceptions of safety. All these safety-related aspects interact with each other in a dynamic way.

Cooper (2016), Bisbey et al. (2019), and van Nunen et al. (2022) proposed that a safety culture model incorporates different aspects of safety culture, such as leadership commitment, employee involvement, communication, training, and education, as well as hazard detection and reporting, safety performance measurement, continuous improvement, and organisational learning. The model emphasised the importance of top management's commitment to cultivating a positive safety culture and involving employees at all levels in safety-related activities. It also emphasises the need for creating good communication channels to promote information sharing and event reporting. Furthermore, the model emphasises the importance of giving proper training and instruction to employees to improve their knowledge and abilities regarding safety practices. It promotes a proactive approach to hazard identification and reporting, encouraging employees to actively participate in detecting possible risks and near-miss situations.

3.0 METHODOLOGY

The final survey instrument used in this study was meticulously developed and with revised items after exploratory factor analysis (EFA) from Hafizah et al. (2023). For the pilot test, the questionnaire was distributed to 20 participants, and feedback was received from 6 participants. Feedback on the clarity, relevance, and completeness of the questionnaire was analysed and thoroughly reviewed. The questionnaire was then revised based on the feedback received during the pilot test, addressing any ambiguous or confusing questions and ensuring alignment with research objectives. The survey was self-administered to collect data using a combination of online and manual methods. The targeted participants included attendees of the OSH conference, ensuring a diverse representation from the workforce and top management across various sectors and states in Malaysia. The survey contains two main sections: respondent demography and factors influencing safety culture in Malaysia.

The data were collected at the following OSH seminar and conference, respectively: 1) National Occupational Safety and Health Seminar and Exhibition (KeJaRI 4.0) held on 26-27 September 2023 and 2) 37th Asia-Pacific Occupational Safety and Health Organization (APOSHO) Conference held on 24-25 October 2023.

In the KeJaRI 4.0 seminar, using a hybrid method, we distributed 800 surveys, yielding 358 returns (44.8% response), and after data screening and cleaning, 312 responses were considered suitable for analysis. Whereas, in APOSHO, which was also conducted using a hybrid method, we distributed 700 surveys, resulting in 267 returns (38.1% response), and 224 responses were identified as clean data. Overall, across both programmes, 1,500 surveys were distributed, leading to 625 returns (41.7% response). The total number of useable data obtained after data cleaning was 536 responses, demonstrating the detailed screening process used to ensure the quality and reliability of the collected information. IBM® Statistical Package for Social Science (SPSS) software was used for data screening, data coding, data imputation and descriptive statistical analysis for demographics, and SmartPLS 4 was used for the Confirmatory Factor Analysis (CFA).

4.0 RESULTS & DISCUSSION

This section presents the results of the study based on a useable sample size (n) of 536 respondents, providing a comprehensive analysis of their demographic profile and the findings from the CFA.

4.1 Respondents' Demographic Profile

The demographic profile of the respondents was diverse across various categories considering owing to a large sample of data collection on both occasions. Regarding gender, the majority of respondents were male, constituting 75.9% of the sample, while females made up 24.1%. The age distribution highlights higher participation from individuals aged 35–44, followed by those in the 25–34 age range, while the 18–24 and 65 years and older categories show the smallest participation. this age distribution was accepted as it corresponds with that found in the Malaysia workforce. The survey captured responses from a mix of professionals, including employers, employees, and representatives from non-governmental organisations (NGOs), with the highest representation being employees (64.6%). Educational backgrounds of respondents were diverse, with the most prevalent group being respondents with the highest level of education, tertiary studies (61.7%). Length of employment also showed variation, with the majority having 10 or more years (55.8%) of experience. The sample includes respondents from micro to large enterprises; large enterprises (68.4%) emerged with the most respondents in our survey. The manufacturing sector (37.6%) dominated as the primary sector followed

by construction (22%), with the lowest portion of respondents from the hotel and restaurant sector (0.2%). In terms of management systems, a significant number of respondents have implemented a combination of quality management systems (QMS), safety management systems (SMS), and environmental management systems (EMS), accounting for 37.1% of total respondents. However, 21.2% of respondents confirmed their organisation does not have any of these systems in place. Budget allocation
for OSH varies, with most enterprises allocating less than 10% from operation cost (33.5%), and a considerable number of respondents are uncertain about their budget allocation for OSH (31.6%).

4.2 Confirmatory Factor Analysis (CFA)

We used partial least squares (PLS) modelling using the SmartPLS 4 version 4.0.9.6 (Ringle et al., 2022) as the statistical tool to examine the measurement model as it does not require a normality assumption, and survey research is usually not normally distributed (Chin et al., 2003). CFA modelling requires building, testing, and validation of the measurement model as a prior requirement. In CFA, we must specify both number of factors within a set of variables and which factor each variable will load highly on before results can be computed. It can also test the extent to which our developed CFA priori pattern of factor loadings represent actual data. The greatest advantage of CFA is its ability to assess the construct reliability and validity of a proposed measurement theory. For CFA model testing, we used n=536 (cleaned) usable data collected from Kejari 4.0 (n=312) and APOSHO (n=224).

4.2.1 Full Collinearity Testing

Since the data were collected using a single source, we first tested the issue of Common Method Bias by following the recommendations of Kock and Lynn (2012) and Kock (2015) by testing the full collinearity. In this method, all the variables are regressed against a common variable and if the VIF $\leq$ 3.3 then there is no bias from the single source data. Our analysis yielded VIF less than 3.3; thus, confirming that single source bias is not a serious issue with our data, as shown in Table 1.

Table 1 Full Collinearity Testing (VIF)

Leadership and Communication	Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents	Attitudes towards OSH Improvements	Education on OSH	Rewards and Recognition	Employees' Competences
2.569	2.256	2.525	3.079	1.499	1.096

4.2.2 Measurement Model

We followed the recommendations of Anderson and Gerbing (1988) to test the model using a two-step approach. First, we tested the measurement model to test the validity and reliability of the instruments used following the guidelines of Hair et al. (2022) and Ramayah et al. (2018).

In the CFA final measurement model for higher order Safety Culture (Figure 1), we assessed the loadings, average variance extracted (AVE), and the composite reliability (CR). The values of loadings should be $\geq$ 0.708, the AVE $\geq$ 0.5, and the CR $\geq$ 0.7. Cronbach's Alpha and CR signify internal consistency reliability while AVE signifies construct convergent validity. As shown in Table 2, the AVEs are all greater than 0.5 and the CRs are all greater than 0.7, which proves all lower-order constructs

(LOCs) were reliable and valid. There were five items deleted in the CFA due to loadings less than 0.708 (Hair et el., 2022), two items of the Leadership and Communication construct (F4-2 & F4-4), and three items of the Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents construct (F8-2, F8-3 & F9-2). Details of all variables and respective items are given in Table 2.

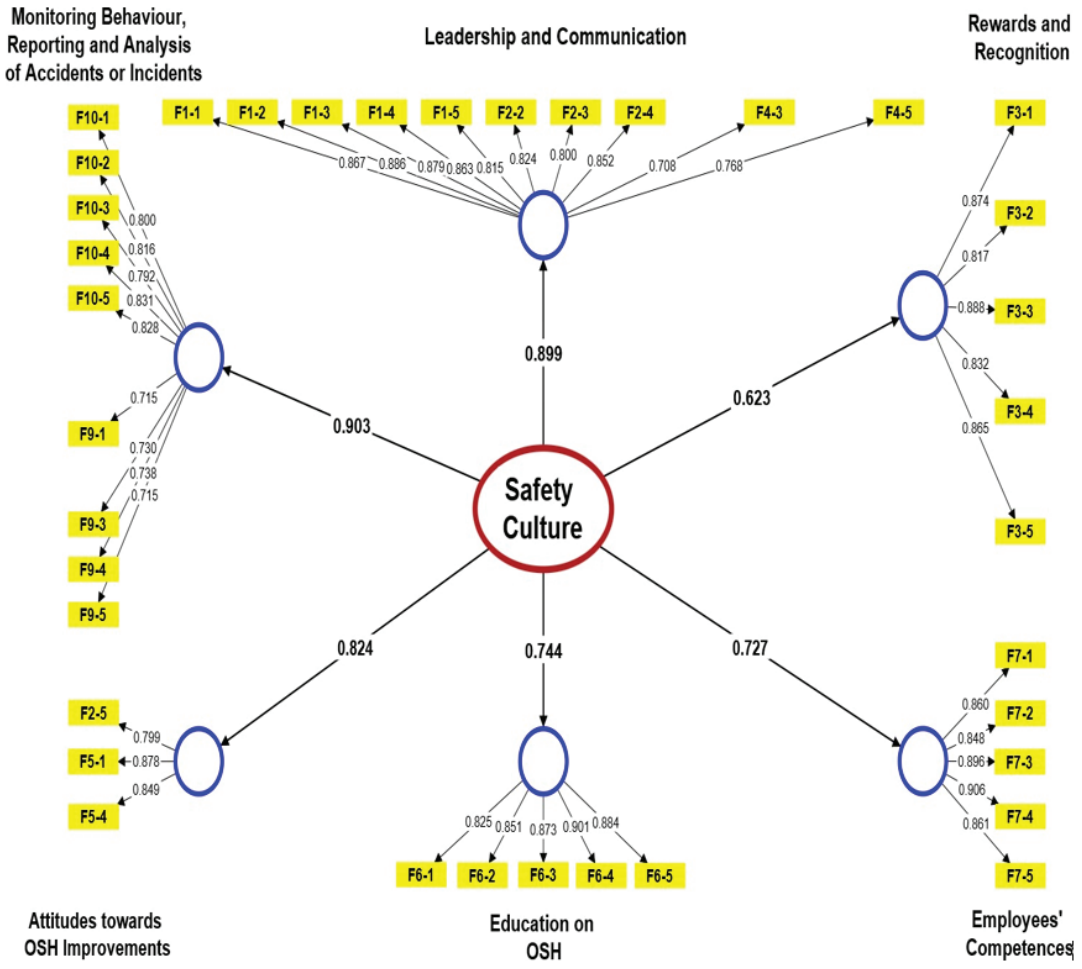

Figure 1: Overall Best Fitting Measurement Model (Reflective-Reflective 2nd Order)

Table 2 Measurement Model for the First Order Constructs

Lower order constructs	Indicator	Loading			α	*CR*	AVE
		(Initial)	(Iteration 1)	(Iteration 2)			
Leadership and Communication	F1-1	0.859	0.861	0.867	0.948	0.956	0.685
	F1-2	0.877	0.882	0.886			
	F1-3	0.867	0.872	0.879			
	F1-4	0.849	0.856	0.863			
	F1-5	0.799	0.805	0.815			
	F2-2	0.803	0.810	0.824			
	F2-3	0.790	0.796	0.800			
	F2-4	0.829	0.841	0.852			
	F4-2	0.703	0.692	**Deleted**			
	F4-3	0.749	0.739	0.708			
	F4-4	0.676	**Deleted**	**Deleted**			
	F4-5	0.790	0.776	0.768			
Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents	F8-2	0.646	**Deleted**	**Deleted**	0.916	0.931	0.601
	F8-3	0.659	**Deleted**	**Deleted**			
	F9-1	0.722	0.722	0.715			
	F9-2	0.695	**Deleted**	**Deleted**			
	F9-3	0.743	0.740	0.730			
	F9-4	0.785	0.752	0.738			
	F9-5	0.749	0.729	0.715			
	F10-1	0.752	0.789	0.800			
	F10-2	0.759	0.808	0.816			
	F10-3	0.728	0.781	0.792			
	F10-4	0.794	0.824	0.831			
	F10-5	0.797	0.822	0.828			
Attitudes towards OSH Improvements	F2-5	0.797	0.797	0.799	0.794	0.880	0.709
	F5-1	0.877	0.877	0.878			
	F5-4	0.851	0.851	0.849			
Education on OSH	F6-1	0.818	0.818	0.825	0.917	0.938	0.752
	F6-2	0.856	0.856	0.851			
	F6-3	0.874	0.874	0.873			
	F6-4	0.902	0.902	0.901			
	F6-5	0.883	0.883	0.884			
Rewards and Recognition	F3-1	0.878	0.878	0.874	0.909	0.931	0.730
	F3-2	0.805	0.806	0.817			
	F3-3	0.880	0.880	0.888			
	F3-4	0.847	0.847	0.832			
	F3-5	0.860	0.860	0.865			
Employees' Competences	F7-1	0.863	0.863	0.860	0.923	0.942	0.764
	F7-2	0.846	0.846	0.848			
	F7-3	0.894	0.894	0.896			
	F7-4	0.906	0.906	0.906			
	F7-5	0.862	0.862	0.861			

Note: F4-2, F4-4, F8-2, F8-3 and F9-2 were deleted due to low loading

We also assessed the validity and reliability of the higher-order constructs (HOCs), because we have one exogenous construct which is higher order, Safety Culture, as shown in Table 3. The higher-order Safety Culture measurement model with 6 factors (Type 1: Reflective-Reflective) was concluded to have sufficient convergent validity and reliability.

Table 3 Measurement Model for the Higher-Order Constructs (Safety Culture Dimensions)

Higher order construct (HOCs)	Lower order construct (LOCs)	Std beta, β	α	*CR*	AVE
Safety Culture	Leadership and Communication	0.899	0.883	0.912	0.637
	Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents	0.903			
	Attitudes towards OSH Improvements	0.824			
	Education on OSH	0.744			
	Rewards and Recognition	0.623			
	Employees' Competences	0.727			

Subsequently, we assessed the discriminant validity using the Heterotrait-monotrait ratio (HTMT) criterion recommended by Henseler et al. (2015) and updated by Franke and Sarstedt (2019). The HTMT values should be ≤ 0.85 to meet the stricter criterion and to meet the lenient criterion it should be ≤ 1.00. As shown in Table 4, all the values of HTMT in our model were less than 1 and met the threshold, as such we conclude that the respondents understood that the six latent variables in our survey were distinct, and discriminant validity has been achieved. Together, both validity tests show that all our measurement items are both valid and reliable.

Table 4 Discriminant Validity (HTMT)

Constructs	1	2	3	4	5	6
1. Leadership and Communication						
2. Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents	0.818					
3. Attitudes towards OSH Improvements	0.789	0.736				
4. Education on OSH	0.600	0.595	0.931			
5. Rewards and Recognition	0.559	0.625	0.435	0.291		
6. Employees' Competences	0.537	0.677	0.696	0.594	0.325	

Table 5 shows descriptive statistics for all six constructs of Safety Culture. The highest mean value was scored by Education on OSH, M = 4.300, S.D = 0.639, followed by Employees' Competences, M = 4.288, S.D = 0.598, and Attitudes towards OSH improvements, M = 4.234, S.D = 0.643. Leadership and Communication and Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents also displayed mean values greater than 3.9, while only Rewards and Recognition construct scored a mean value less than 3.6.

Table 5 Descriptive and Quality of Measurement

Constructs	Mean	Std Dev.	Kurtosis	Skewness
Leadership and Communication	3.948	0.679	-0.094	-0.427
Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents	3.983	0.594	0.046	-0.328
Attitudes towards OSH Improvements	4.234	0.643	1.714	-0.970
Education on OSH	4.300	0.639	1.752	-0.976
Rewards and Recognition	3.536	0.857	0.192	-0.537
Employees' Competences	4.288	0.598	0.509	-0.704

Table 6 shows a summary of each LOC of Safety Culture that has total of 37 items, and statistics output for the CFA in comparison with that of Exploratory Factor Analysis (EFA, Hafizah et al., 2023). Our CFA model established validity and reliability for all Safety Culture constructs through measurement model assessment for the higher order model of Safety Culture.

Table 6 Summary of EFA (Hafizah et al., 2023) and CFA (our study)

	Exploratory Factor Analysis, EFA (Hafizah et al., 2023) **(n=243)**						Confirmatory Factor Analysis, CFA **(n=536)**					
	1	2	3	4	5	6	1	2	3	4	5	6
Final number of items	12	12	5	5	5	3	9	10	5	5	5	3
Mean	4.08	3.97	4.15	3.24	4.11	4.08	3.98	3.95	4.29	3.54	4.30	4.23
Ranking by Mean	3	4	1	5	2	3	4	5	2	6	1	3
Beta Coefficient, β	-	-	-	-	-	-	0.90	0.90	0.73	0.62	0.74	0.82
Ranking by Beta Coefficient	-	-	-	-	-	-	1	1	4	5	3	2

Note:
1. Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents,
2. Leadership and Communication,
3. Employees' Competences,
4. Rewards and Recognition,
5. Education on OSH,
6. Attitudes towards OSH Improvements

Based on output from the CFA, we developed a national safety culture model for Malaysia, as illustrated in Figure 2. All six factors are further clustered into two main non-observable domains in reference to van Nunen et al. (2022), namely, the organisational and human domains. Our model shall assist organisations to strategize and implement an action plan to improve safety culture at organisation or individual level based on factors that are underperforming in the business unit.

Figure 2: Proposed Safety Culture Model for Malaysia

Factor 1: Leadership and Communication

This factor is a combination of leadership and communication (Hafizah et al., 2023). Based on factor loading in PLS-SEM results, the top five items with the highest loadings were "Our management is proactive in implementing safety measures. (F1-2)", "Managers set a good example by following safety procedures themselves. (F1-3)", "Management frequently communicates the importance of safety in our workplace. (F1-1)", "Our management takes immediate action when a safety concern is reported. (F1-4)" and "I am comfortable discussing safety issues with my supervisor. (F2-4)". Overall, these statements portray the significance of proactive management strategies, action, communication, and becoming a safety role model for employees. Globally, leadership is ranked first, and communication is ranked fourth among the various factors studied in the literature (Hafizah et al., 2023). Leadership is considered a highly significant and frequently advocated aspect of workplace safety, and our results align with this (leadership ranking first), indicating its primary importance in developing safety culture suitable for occupational settings in Malaysia. Our findings also prove the importance of top management commitment and taking the position as a safety leader to drive safety culture of an organisation; aligned with the findings from Ismail et al. (2012).

Factor 2: Monitoring Behaviour, Reporting and Analysis of Accidents or Incidents

This factor was a combination of reporting and analysis of accidents with monitoring employees' behaviour (Hafizah et al., 2023). Based on factor loading in PLS-SEM results, the top five items with the highest loadings were "Monitoring of safety behaviours has led to noticeable safety improvements. (F10-4)", "Regular safety checks and observations contribute to a safer workplace. (F10- 5)", "I am comfortable with the level of safety-related supervision in my workplace. (F10-2)", "Employees' adherence to safety procedures is regularly monitored. (F10-1)" and "Employee behaviour is assessed to improve safety, not to punish. (F10-3)". Similar to the global ranking of third for monitoring employees' behaviour (Hafizah et al., 2023) in the literature, we noticed this factor was highly important in the Malaysian cultural context, ranking first in influencing Safety Culture. Overall, these statements portray the significance of constant observation and checking on employees' safety behaviours and compliance to safety rules for positive safety outcomes.

Factor 3: Attitudes towards OSH Improvements

This factor portrays an importance of employees having positive attitudes towards OSH improvements, planning, and execution, by incorporating active safety participations; ranking third for Safety Culture in our study. The highest loading for the top 2 items were "I am actively involved in safety planning and improvements. (F5-1)" and "I frequently participate in safety-related discussions and activities. (F5-4)". We recommend that organisations in Malaysia prioritise this factor to ensure employees provide full support and active participation in safety related initiatives.

Factor 4: Education on OSH

This factor combines education on OSH and employees' engagement to evaluate the effectiveness of education and training programmes related to OSH within the workplace (Hafizah et al., 2023). Based on factor loading in PLS-SEM results, the top three items with highest loadings were "I feel confident in my ability to respond to a safety incident because of the training I've received. (F6-4)", "The training provided has increased my awareness of potential hazards in my workplace. (F6-5)", and "I understand the reasons behind the safety protocols in place. (F6-3)". It is evident that training on OSH is important in shaping employees' understanding of and response to safety knowledge and rules. Hence, we recommend that organisations prioritize the safety knowledge management aspect of the organisation as a good reflection of the safety culture level of an organisation in Malaysia.

Factor 5: Employees' Competences

This factor had been a key factor in past research and, similarly, it ranked fifth in the safety culture constructs of our study. The top three items influencing safety culture with a high factor loading were: " I have the necessary skills to identify potential safety hazards in my workplace. (F7-4)", "Employees regularly receive training to update their safety- related skills. (F7-3)", and "I understand how my actions can influence safety outcomes. (F7-5)". Based on these statements, with safety skilled employees, organisations can ensure that employees can identify risk associated with daily tasks and the impact of their actions to prevent incidents or accidents.

Factor 6: Rewards and Recognition

This factor evaluated the importance of positive rewards and recognition systems in an organisation to promote and reinforce safety culture within the workplace (Hafizah et al., 2023). The top three items with a high loading were: "Employees who suggest safety improvements are rewarded. (F3-3)", "Employees who adhere to safety protocols are publicly recognized. (F3-1)", and "Our reward system motivates employees to prioritize safety. (F3-5)". Globally, rewards and recognition are ranked ninth among the various factors studied in the literature (Hafizah et al., 2023). Similarly, in the context of safety culture in Malaysia, they hold the lowest six rank among the remaining factors. Despite this ranking last in our study, it still serves as one of the key elements of safety culture, and allocating resources for this factor can elevate the level of safety culture in an organisation and encourage employees' job performance.

4.2.3 Practical Recommendation to OSH Practitioner

Based on Figure 2, this study consists of six factors which can be furthered divided into two categories. The first category is called organisational domain or employer domain which are monitoring behaviour and analysis, leadership and communication, and reward and recognition. The second category is called human or employee domain, which include attitude towards OSH, education on OSH, and employees' competences. Therefore, employers should focus on these three factors in managing and inculcating safety culture at the workplace. Budget allocation should be included related to these three factors for workplace safety improvement and initiatives purposes. Regarding employees, they should attend a daily toolbox meeting organised by employers before starting their work day. Employees should also implement a daily check to ensure their workstation is free from hazards before starting their work day, and if they find anything hazardous, they should contact their superiors to eliminate it. Finally, employees should report any accidents or near–misses to their direct supervisors.

5.0 CONCLUSION

This study applied the CFA by PLS-SEM method to confirm the hierarchical structure of safety culture as a higher order factor, and developed a safety culture model suitable for the occupational setting and culture in Malaysia. The six main factors that the CFA confirms as key influencers of safety culture were (i) Leadership and Communication, (ii) Monitoring Behaviour, Reporting, and Analysis of Accidents or Incidents, (iii) Attitudes towards OSH Improvements, (iv) Education on OSH, (v) Employees' Competencies, and (vi) Rewards and Recognition, arranged in descending order of ranking based on factor loading in the CFA. All six factors were highly significant in forming safety culture as a higher order factor with 37 final items. A national safety culture model was also developed specifically for occupational settings in Malaysia. This study further highlights the importance of research specifically on safety culture, considering diverse cultural context, work environment variations, and government regulations. The findings of this study provide practical implications to organisations in Malaysia to bridge the current gap in safety culture of organisations; thus, achieving positive outcomes such as the

reduction of accident rates and increase in productivity and profitability. Our research could also enable Malaysia to become a leader in OSH and meet global demands through an identified national OSH culture level. Although this research is based construction and manufacturing industries findings, the developed and validated questionnaire can also be administered to other sectors such as agriculture, services, healthcare; resulting in the generalizability of the six factors derived. Longitudinal study is another area in which this research can be extended and conducted in future.

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