

Role of Safety Leadership in Fostering Safety Behaviour in Malaysia's Small and Medium Manufacturers: Determining the effect of safety knowledge and attitudes

By

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Abstract

Present paper proposes a safety model appropriate to SME to combat the resource's limitations own by the sector. Exploring the consequence of safety leadership on safety behaviour by inserting safety knowledge and attitudes as the intervening variables, the model was tested on 140 production employees from small manufacturer in northern Malaysia. Such studies have been shown to be infrequent specifically within SME setting. The analysis of the data collected via questionnaire confirmed the intervening effect of safety knowledge and attitudes on the effect of safety leadership to safety behaviour, a finding which was rarely tested in previous literature. In conclusion, this report provides a foundational understanding of the relationship between these characteristics and serves as a springboard for future research on how supervisor safety leadership might improve workers' safety behaviour through their knowledge and attitude. Furthermore, this approach is suggested to be suitable in the SME manufacturings to overcome their limitations in succeeding good safety performance.

Keywords: Safety Behaviour; SME, Safety Knowledge; Manufacturing; Safety Attitudes; Malaysia.

Introduction

Manufacturing industry has contribute the highest number of accident cases recorded in Malaysia (Department of Occupational Safety and Health, 2020). This become a major problem for the government of Malaysia. Referring to the statistics, small and medium-sized enterprises (SMEs) accountable for 80-90% of all the cases (Aziz et al., 2015;, 2016). This fact indicates the inadequacy of safety management within the sector and need to be seriously addressed (Mohamed & Mohd Tamrin, 2016; Surlenti, 2012;, 2021). Given the level of safety amongst the SMEs are poor, researchers advocate that the constraints such as financial (Surlenty, 2019) shortages of qualified personnel, perceived difficulties in complying with safety regulations, and perceived low risk of work accidents within SMEs (Md Deros et al., 2014) are the factors towards poor level of safety performance in the sector. In addition, the

low level of safety awareness among SME employees which has been proved to be additional factor towards the situation whereby accidents are high in the SMEs (Khoo et al., 2011a).

Despite the aforementioned limitations of the SME, present study argues that SME should utilise the benefit of their simple organizational set up to promote safe worker's behaviour using internal resources. Such structure of a small business allows the supervisors to impose leadership towards subordinates in order to intervene their risky behaviours. Leveraging supervisor safety leadership to influence employees' safety behaviour (Khoo et al., 2011a) has been shown to be effective to improve occupational safety of SMEs in Malaysia (Khoo et al., 2011a), furthermore enabling one of the cost-effective safety interventions (Khoo et al., 2011b).

Based on previous research, safety behaviour is recognized as the major determinant of work accidents. Unsafe acts committed by employees, such as disregarding safety procedures or improperly using personal protection equipment are examples of unsafe behaviours (Mohd Ishanuddin et al., 2019; Yeow et al., 2020) have led to accidents in manufacturing, especially in Malaysia's SME (Hassan & Rahim, 2019; Zaidi et al., 2016; Zulkifly et al., 2017). Furthermore, Kidam et al. (2014) identified organisational failures as among the obstacles exist in SME manufacturing industry, resulting in high workplace accidents. Moreover, Kidam et al. (2014) revealed that the majority of accidents that occur in small manufacturing enterprises are the result of human errors.

Theoretically, Bandura (1977) explains that humans acquire learning through social interaction with others, referring to social learning theory (SLT). Individuals develop comparable social tendencies by observing others. On the other hand, Social Cognitive Theory (SCT) established by Bandura (1999) focuses on the way humans navigate social situations cognitively and how these cognition processes affect behaviour, based on SLT.

To support above mentioned theories, the mediation safety climate model is referred for present study. The model asserted that the social cognition mediation model is proposed as a means of grasping worker compliance and preventative safety behaviours. Specifically, proximal situational factors influence the safety behaviour of workers mediated by factors related to the proximal person (that is, attitudes) (Fugas et al., 2012).

According to those facts, it could be said that the knowledge and attitudes of workers are vital facets to cultivate safety behaviour. Safety knowledge (Abdullah & Aziz, 2020; Basahel, 2021; Vinodkumar & Bhasi, 2010) has been found to directly affect safety behaviour. However, research pertaining safety leadership as predictor to safety knowledge or safety attitudes is at the infancy stages (Abd Aziz et al., 2021). A previous article also confirmed that no research has been conducted on the impact of supervisory leadership on safety knowledge (Jiang & Probst, 2016).

Safety attitudes, in addition to safety knowledge, have also been demonstrated to determine safety behaviour (Khan & Kaliannan, 2019; Xu et al., 2018; Zulkifly et al., 2020). Furthermore, employees who frequently address workplace safety issues with their superiors are thought to have a positive safety attitude and a better awareness of how to accomplish jobs properly (Shen et al., 2017).

This study, based on explained arguments, offers a customised model for safety management within SME by utilising the effect of safety leadership variable towards safety knowledge-attitude-behaviour (KAB). It is because, management of SMEs had to count on

their inner resources (supervisors) in embedding safety KAB amongst production employees. This paper proposed the framework as an optimal safety management paradigm for SMEs, specifically manufacturing sector in Malaysia.

Literature Review

Linking Safety Leadership and Safety Behaviour

Workers' unsafe acts is the main substantial cause of work accidents. Hence, good safety behaviour has been shown to predict low accident cases. Based on various leadership theories and many previous studies, a substantial relationship has been established between leadership styles and safety behaviours. For sample, Leader Member Exchange (LMX) theory was used to examine worker safety behaviour at Chinese energy providers (Zhou & Jiang, 2015). The findings reveal that LMX is positively associated with safety behaviour, moderated by work environment.

Nevertheless, many studies have confirmed the impact of traits that represent safety leadership towards safety behaviour. For example, the effects of transformational and transactional safety leadership towards safety behaviour were significantly found amongst container terminal workers in Taiwan (Lu & Yang, 2010).

Until recent, other scholars have also distinguished that safety leadership predicts safety behaviour components (Zhao et al., 2022; Zulkifly, 2020; Zulkifly et al., 2017). Therefore, present paper affirmed that safety leadership an influential factor to predict safety behaviour.

Knowledge, Attitudes, and Behaviour towards Occupational Safety

Huang and Yang (2019) summarised that knowledge can influence one's behaviour, either explicitly or implicitly. Understanding occupational safety issues, such as identifying workplace risks and performing work safely to prevent accidents, is classified as safety knowledge in the current study. Previous scholar also determined that knowledge of safety has been found to be essential for improving safety behaviours in a workplace (Choudhry & Fang, 2008).

Prior research has demonstrated a significant correlation pertaining workers' safety knowledge with safety behaviour (Basahel, 2021; Subramaniam et al., 2022; Vinodkumar & Bhasi, 2010; Zulkifly et al., 2020). For example, According to a study (Kao et al., 2019), safety behaviour of power plants in the southern United States is predicted by worker safety knowledge.

Attitude is an individual's assessment of his feelings towards something or someone (Gharibi et al., 2017). Attitudes can influence a person's response (Haynes et al., 2011). Safety attitudes are people's propensity to respond either positively or unfavourably to safe working procedures in a company (Sari, 1988). When it comes to aviation safety, attitude is defined as a human's propensity to make errors (Joseph et al., 2013). The current study defines safety attitudes as employees' perceptions of the value of safety management and workplace behaviour norms in preventing accidents.

Previous research has also shown that safety attitudes influence (Basahel, 2021; Sugumaran et al., 2017; Zulkifly et al., 2020). According to a study, Malaysia's kitchen staff members' safety attitudes had a big significant impact on their behaviour (Lim et al., 2016). Similar findings were found by a study (Warmerdam et al., 2018) which discovered that driving habits at work were significantly influenced by individual attitudes toward safety. Another

study has also found that, a personality factor namely attitudes pertaining work-safety has a significant outcome on his or her unsafe behaviour among elevator installation technical workers in China (Rau et al., 2018).

In order to ascertain the effect of safety knowledge and safety attitude on safety behaviour, a study had been implemented on general workers in solid waste management organisations in the Malaysian setting. The results of PLS-SEM indicate that worker knowledge together with attitudes have a notable influence on their safety behaviour (Zulkifly et al., 2020).

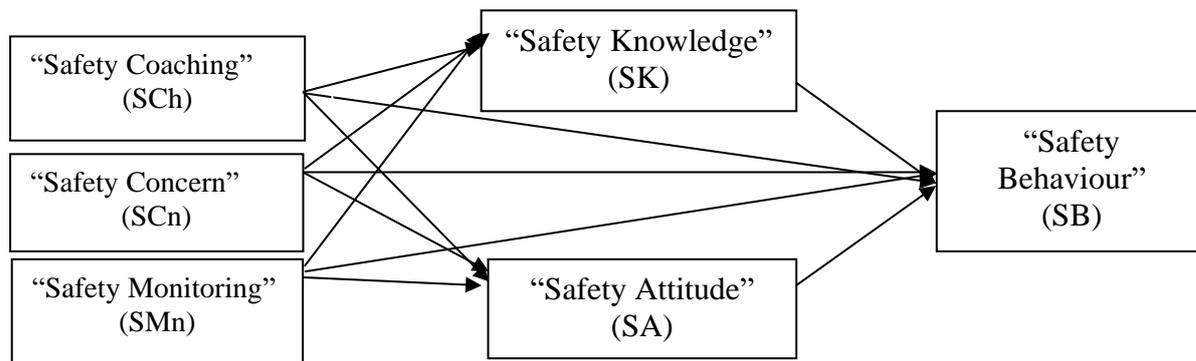
Conceptual Framework Development

Most of the research on safety leadership is conducted outside of Malaysia. As a result, differences in lifestyle and cultural beliefs can lead to disagreements with many other countries about how Malaysians exercise leadership (Zulkifly, 2020). In a nation whereby large power-distance exists (N. H. Abdullah et al., 2014; Zainuddin et al., 2013), Malaysian workforces expect leaders to provide perspicuous rules for the implementation of tasks and offer adequate reinforcement and direction to staff (Shima et al., 2008). In addition, in Malaysian organizational culture, reciprocity is important towards leader-follower interactions, allowing subordinates to reciprocate their supervisors' concerns according to latter's directive actions (Tajaddini & Mujtaba, 2009; Zulkifly, 2020). Safety controlling has already been cited as one of the characteristics of safety leadership in Malaysian contexts by scholars (Chua & Wahab, 2017; Subramaniam et al., 2022). However, this study also identified the significance of monitoring leaders in predicting safe participation behaviours, so establishing an akin factor known as safety monitoring (Du & Sun, 2012). In addition to safety monitoring, the study uses safety issues as one element of safety leadership, not safety considerations, due to the need for reciprocity in the Malaysian context (Zulkifly, 2020).

According to the theory of social learning, human beings can learn through interaction with others in a social context (SLT). They observe the behaviour of others and then perform similar behaviours (Bandura, 1977). However, according to Bandura (1999), social cognitive theory (SCT) expands its focus based on SLT on the ways in which human beings intelligently modify social experiences and influence behaviour. Another scholar proposed that the "Social Cognition Mediation Model" can be utilised to explain safe workplace behaviour in their mediation safe climate model (Fugas et al., 2012). The safety behaviour of labours is basically guided by their imminent situational elements (i.e., descriptive norms of supervisors/colleagues) and mediated by proximal individual-related aspects (i.e., "attitudes towards behaviour" and "perceived behavioural control"). On the one hand, safety management model (Christian et al., 2009) posits that knowledge is able to mediate the relationship between leadership and behaviour in terms of work-related safety.

Referring the aforementioned research, present study constructed a framework and outlined it in Figure 1. Besides, the framework also referring to recent studies which demonstrates the intervening effect of safety attitudes (Li et al., 2020) and safety knowledge (Basahel, 2021; Subramaniam et al., 2022) to the safety leadership-behaviour framework.

“Safety Leadership” (SL)



Based on the conceptual framework established and depicted in Figure 1, the study’s hypotheses appear to be as follows:

H₁: Would safety knowledge (SK) has a significant mediating impact towards supervisory safety leadership (SL) and safety behaviour (SB) of employees in small and medium-sized enterprises (manufacturing).

H₂: Would safety attitudes (SA) has a significant mediating impact towards supervisory safety leadership (SL) and safety behaviour (SB) of employees in small and medium-sized enterprises (manufacturing).

Method

Sample Size

Production workers of small manufacturing firms in Northern Corridor Economic Region (NCER), Malaysia were selected to included in the data collecting process. Such categories of companies which involved in DOSH’s Compliance Support Programs were randomly selected. Furthermore, number of sample size is calculated using G*Power as shown in Figure 2.

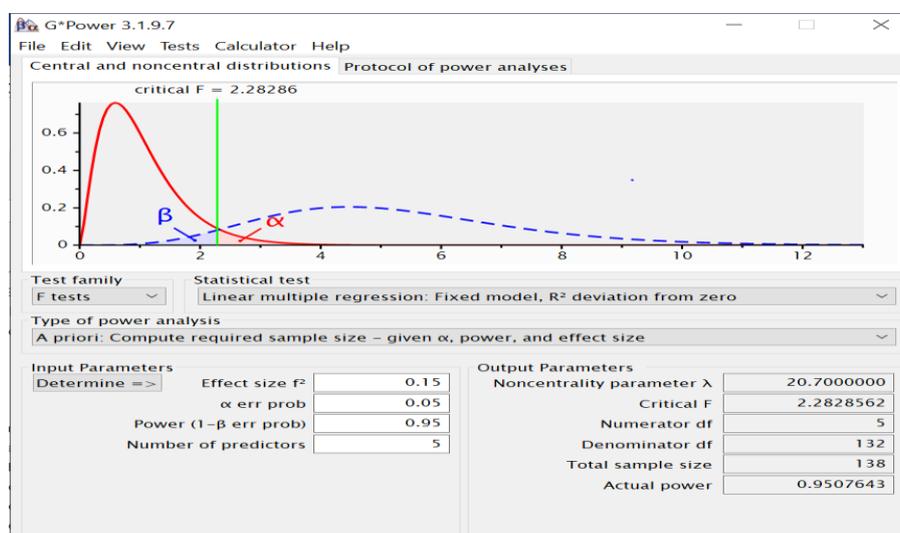


Figure 2 Sample size calculation with power G*

Research Measuring Instrument

Reflective structures are measured using the five-point Likert scale (Likert, 1932), which has a response range starting from 1 (strongly disagree) to 5 (strongly agree). The questionnaire items for safety leadership were redesigned based on Wu (2008), furthermore modified to fit the needs of this study settings and context. In comparison, previous research instrumentation for safety behaviour is derived from Kao et al (2019). The safety knowledge and attitudes items were extracted and modified from previous research (Sawhney & Cigularov, 2019; Vinodkumar & Bhasi, 2010).

Procedure

Partial Least Squares Structural Equation Modeling (PLS-SEM) is used to study measurement and structural models.

In PLS-SEM, measurement models are first evaluated to ensure the accuracy and reliability of equipment and frameworks. In addition, structural model evaluation and hypothesis testing are integrated (Henseler et al., 2009; 2018). In the analysis of the PLS algorithm, a low-order (first-order) structure is used to evaluate the measurement model. However, high-level configuration models are used to measure structural models, including hypothesis testing. Given that this study uses a two-step methodology, latent variable scores are taken to assess structural models (Sarstedt et al., 2019).

Ethical considerations

All participant information is kept as confidential information to safeguard their privacy. They voluntarily agreed to participate and were allowed to withdraw at any time. The authors also underlined that the study received no external funding or commercial support.

Results and Discussion

Respondent Biography

As many as 95 (68%) of the total sample, namely the respondents to this survey were men and the rest were women. For education background, a total of 13.7% owns LCE/SRP/PMR qualifications, whereas, 25% of them hold MCE/SPM/SPMV level of qualifications, and another 30.3% have HSC/STPM or tertiary certificates Furthermore, 19% have a diploma/advance diploma as their highest qualifications whereby 7.7% have a bachelor's degree and above, and the remainings have other educational qualifications.

In terms of tenureship's duration with current manufacturers, most of the respondents have worked less than five years at 179 (59.7 %), 57 (59.7%) have worked for 6 – 10 years (19%), 33 (11%) have worked for 11-15 years, and 31 (10.3%) have worked for more than 16 years.

Evaluation of the Measurement Model

Composite reliability (CR), convergent validity, and discriminant validity were utilised to assess the validity and reliability of constructs (Henseler et al., 2014; 2018). All first-order construct variables satisfy the CR construct validity requirements of >0.7 and $AVE > 0.5$. The findings confirmed the convergent validity of the measurement mode and are presented in Table 1.

Table 1 Reliability and effectiveness of construction

	Composite Reliability (CR)	Extracted mean variance (AVE)
SA	0.90	0.70
SB	0.94	0.70
SCh	0.91	0.70
SCn	0.92	0.70
SK	0.94	0.77
SMn	0.86	0.51

The heterotrait-monotrait ratio (HTMT) method is used to assess the discriminant validity of primary construct components (Franke & Sarstedt, 2019; Henseler et al., 2014; Ramayah et al., 2018). The results are shown in Table 2.

Table 2 Results of Discriminant Validity using HTMT Ratio

		1	2	3	4	5	6
1	SA						
2	SB	0.50					
3	SCh	0.12	0.15				
4	SCn	0.37	0.45	0.39			
5	SK	0.32	0.41	0.46	0.42		
6	SMn	0.43	0.58	0.13	0.59	0.36	

Additionally, the heterotrait-monotrait ratio (HTMT) shows that each construct's value is below the 0.85 conservative limit (Ab Hamid et al., 2017; Franke & Salstat, 2019). The results are calculated in Table 3. Furthermore, the results of the evaluation of the measurement model (primary configuration) are shown in Figure 3.

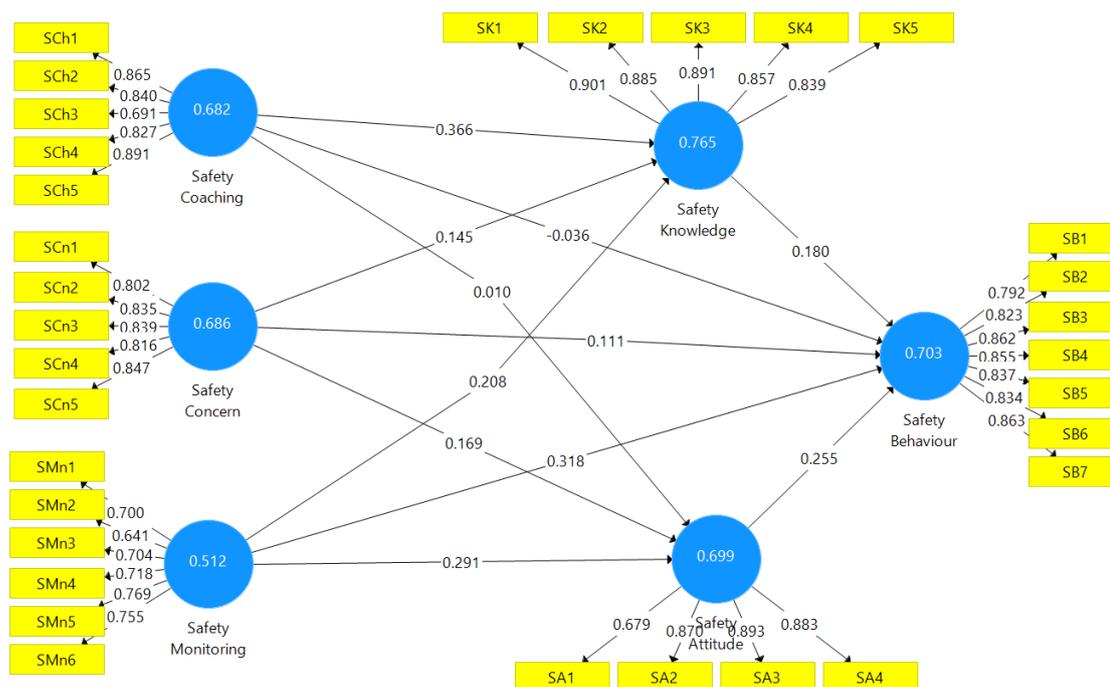


Figure 3 Measurement Model Assessment

Evaluation of structural models (hypotheses testing)

This study uses a type II reflective formation framework to conceptualize safety coaching, safety concern, and safety monitoring to become a second-order configuration with formative indications (Becker et al., 2012). The quadratic configuration was assessed utilising the two-step embedded approach (Sarstedt et al., 2019). Then, the R² value of the structural model was evaluated using the endogenous structure determination coefficient (Hair et al., 2020). The R² value for safety attitude is 0.15, for safety knowledge is 0.23, and safety behaviour is 0.36. On the contrary, the predictor's composition can be examined using the Cohen effect size, *f*² (Glass & Cohen, 2012). The results showed that safety leadership had a moderate impact on safety attitudes (0.18) and safety knowledge (0.30), but had little impact on safety behaviour (0.13). In addition, safety knowledge (0.02) and safety attitudes (0.11) have no negligible effect on safety behaviour (Cohen et al., 1998).

In addition, this study examines the indirect effect of safety knowledge and attitudes on the consequence of safety leadership on safety behaviour. Table 5 shows the bootstrapping results for the resample of 5000.

Table 5. Indirect Effect Results

Hypothesis	β-Value	T-Statistics	Results
SL -> SA -> SB	0.11*	4.43	accepted
SL -> SK -> SB	0.06*	2.29	accepted

**Significant at p<0.05*

Referring to the analysis findings outlined in Table 5, SK and SA mediates the relationship between SL and SB. These results are supported by previous literature (K. H. Abdullah & Aziz, 2020; Basahel, 2021; Subramaniam et al., 2022). These results corroborate the previous research findings by Fugas et al. (2012) together with the results from Li et al. (2020). Figure 3 shows a structural model of the higher-order approach.

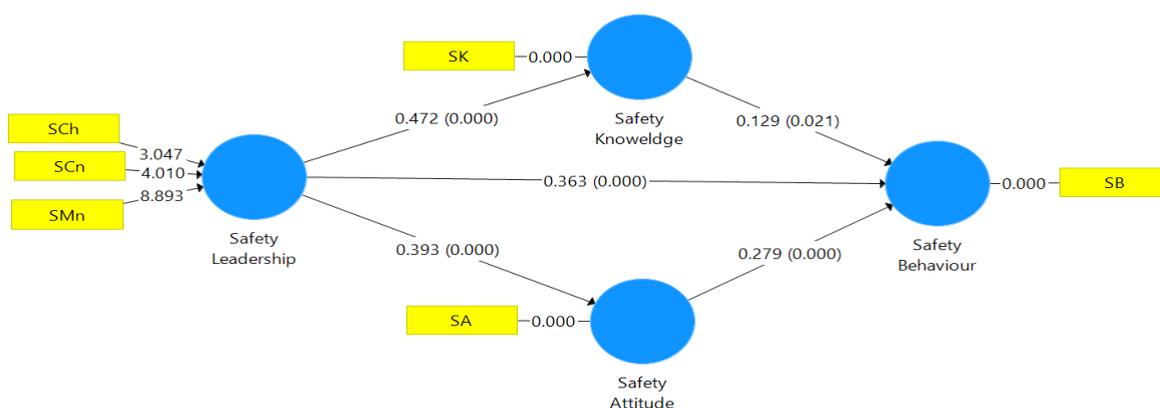


Figure 3 Results of Structural Model Assessment (Second-Order)

Based on the results stated in Table 3 and Table 5, it can also be disclosed that both alternative hypotheses are fulfilled and accepted.

Limitation

Due to the limited scope of the study, which encompasses primarily small and medium-sized manufacturing firms in northern industrial area in Malaysia, there are a number of obvious limitations. A national level assessment towards various sectors of SME is proposed for the next research to affirmed the generalisability of the model.

Conclusion

This study proposes mediating roles of safety knowledge and attitudes towards the effect of safety leadership (safety coaching, concern, monitoring) on safety behaviour. The model were elicited from previous research (K. H. Abdullah & Aziz, 2020; Basahel, 2021; Subramaniam et al., 2022) and also proposed model by Christian et al. (2009). The study demonstrates the significance roles of supervisory leadership in influencing workers' safety knowledge and attitudes in the Malaysian small manufacturing enterprises.

The results of this study contribute in many ways by giving confidence to the application of SLT and SCT, especially in the study of the relationship between safety leadership, knowledge, attitudes, behaviour. The study also helps address gaps in the literature by showing that safety attitudes mediate the relationship between safety behaviour and safety leadership. This research contributes to an understanding of how supervisor safety leadership influences employee safety behaviours via mediators, such as safety knowledge and attitudes, and provides crucial factual corroboration of the intervening impacts of safety knowledge pertaining the correlation described above. The findings will also help small and medium-sized enterprise (SME) owners to better promote safety behaviour among their staff by utilising the role of supervisors. In addition, reliable and valid results can be used as a springboard to assist governments in developing occupational health and safety intervention program strategies targeting SME, with the aim of improving workplace safety level through the means of worker safety knowledge and attitudes.

Acknowledgement

The DOSH has been recognized for its cooperation and support in the research data collection phase. Special token of gratitude towards all the respondents who were voluntarily partaken in this study.

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