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Determinants of Occupational Health and Safety Compliance by Malaysian SMEs

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ABSTRACT

Occupational safety and health (OSH) are a critical component of effective business governance. Efficient management of occupational safety and health fosters potential for growth and sustainability, and conversely. Disregarding occupational safety and health negatively impacts all stakeholders, from individual workers to national healthcare systems. This indicates that stakeholders can benefit from enhanced OSH compliance via consistent approaches. The primary principle of global OSH compliance is the mitigation and reduction of accidents, incidents, and diseases. A comparable viewpoint is relevant for small and medium-sized firms (SMEs), including those in Malaysia. This study investigated the factors influencing OSH compliance among Malaysian SMEs using a quantitative research methodology. The impact of five critical determinants: top management support, human resource practices, training and education, organisational attitude, and organisational awareness, on the attainment of OSH compliance was evaluated, drawing from literature support. A survey was done utilising convenience sampling with 400 SMEs in Malaysia. Data was gathered from 380 responding SMEs and examined using structural equation modelling (SEM) with partial least squares (PLS). The statistical findings indicated that human resource practices, organisational attitudes, and organisational awareness were key predictors of occupational safety and health compliance in the sampled Malaysian SMEs. The significance of administering OSH focused human resource policy, particularly the HR practice of endorsing safety and related training programs, has facilitated enhanced support for OSH training programs and employee awareness. The findings indicated that SMEs' practice of displaying hazardous warning signs and promoting incident reporting has resulted in improved occupational safety and health compliance. The level of SMEs' awareness regarding the necessity to review standard operating

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procedures before initiating work, safety information related to hazardous materials, understanding the risks associated with chemical substances, and the segregation of waste materials prior to disposal has facilitated effective OSH compliance among the participating SMEs. The investigation yielded multiple implications derived from the results obtained.

1. Introduction

A sustained industrial revolution has made occupational health and safety an imminent threat across organisations (Crovini et al., 2021; Won, 2024). Advocates have long urged organisations to vigorously promote and follow OSH laws (Jain et al., 2018; Micheli et al., 2018). OSHA compliance is ensured by these industrial and national standards. Maintaining varied occupations' physical, mental, and social wellness is occupational health (Andersen et al., 2019). Organisations must protect employees from workplace illnesses, injuries, and infections. Every organisation needs security, autonomy, fair opportunity, and respect. This is crucial in today's digital environment. To mitigate workplace hazards, organisations must actively monitor and enforce OSH standards. This is crucial if OSH regulations change (Sánchez-Herrera, & Donate, 2019; Chari et al., 2018). The same question applies to SMEs. SMEs are vital to economic growth, yet they often struggle to provide high-quality jobs. Around 80 percent of work-related accidents and illnesses are their fault (Rahlin et al., 2020). These companies have unsafe, impoverished working conditions and low-quality, incompetent job possibilities. In Malaysia, violating occupational safety and health regulations is inexcusable. Malaysia has several important OSH laws. Malaysia's Occupational Safety and Health Act 1994 is significant as it outlines employers' and employees' duty to provide a safe workplace and reduce accidents and diseases.

Occupational safety and health incidents occur frequently, with more than 6,000 people dying daily from work-related illnesses or accidents (Derahim et al., 2021). The US Bureau of Labour Statistics reported 2.7 million nonfatal workplace injuries and illnesses in 2020, highlighting the urgent need to address global occupational safety and health issues (Hammonds & Kerrissey, 2022; Shah & Mishra, 2024). In Malaysia Workplace injuries up by nearly 60%, says statistics department, in which 6,238 of the work-related occurrences in 2023, 178 cases were reported as deadly, 243 permanent disabilities, and 5,817 temporary impairments. The construction industry had the highest number of occupational fatalities, 28 percent of all registered deaths in recent years, including fatal accidents at workplaces and project sites in Kapar only (Free Malaysia Today, Sept 29, 2023). Developing nations like Malaysia need more attention and resources to address workplace safety and health issues (Tike, 2024). The challenges of lowering occupational safety and health concerns are emphasised, as accidents in circumstances involving people and complex technology are likely to happen. Despite this comprehension, there is still a lack of knowledge about what makes occupational safety and health (OSH) regulations work in small and medium-sized enterprises (SMEs), especially in Malaysia, where these businesses face unique challenges.

There is little research on occupational safety and health (OSH) in Malaysian SMEs, including Keraka (2020), Fan et al. (2022), and Asah-Kissiedu (2023). Shaari & Mahmud (2020), Gumel & Bardai (2023), and Chetty et al. (2024) show that most studies on SMEs' success factors have used qualitative methodologies. Furthermore, the contention on the key factors that affect OSH compliance efficiency have not been explored and identified (Okoye, 2023; Ndinyo, 2023). Given this gap, it's crucial to study how facilitating factors impacts the achievement of OSH compliance. Success factors such as organization's attitude, human resources, top management support, training and education, and organisational awareness is crucial to navigate compliance processes. Bello et al. (2024) and López-Alonso et al. (2024) demonstrated that all or specific success criteria across the compliance processes help SMEs prioritise their managerial and operational procedures. It is within this context that this research examined the determinants of occupational safety and health (OSH) compliance by Malaysian SMEs. Specifically, the research examined the influence of training and education, top management support, human resource practices, organisational attitudes, and organisational awareness in achieving OSH compliance.

2. Hypotheses Development

Occupational health and safety law plays a vital role in the effective management of organisations through minimisation of incidences and accidents within the work environment. Compliance with OSH law can effectively aid firms in the prevention and management of unwanted incidents, thereby decreasing their consequences (Boudreau, 2024). Various studies (e.g., Salguero-Caparrós et al., 2020; Esterhuyzen, 2022; Sachitra, & Gunasekara, 2023) have identified the significance of recognising cases of non-compliance of OSH by firms as evaluation of incidents and accidents within firms amounting to non-compliance is a regulatory requirement. This is more so when confirmation of OSH non-compliance becomes a retrospective indicator of past occurrences (Tworek et al., 2024) as the strategic management OSH becomes reactive in nature. In addition to ensuring compliance, Shaari, (2020) identified the significance of OSH in small and medium-sized firms (SMEs) as they are perceived as the smaller player in self-regulation of safety elements. This is because the current approaches and rules in occupational health and safety primarily rely on knowledge gained from major firms, with insufficient research targeting SMEs (Duryan et al., 2020; Claxton et al., 2022). The distinctive attributes of SMEs make it imperative to comprehend how owners and managers of SMEs define their company identity and how this definition influences safety management practices. In small organisations, managers often face the challenge of balancing numerous tasks at once, and as a result, health and safety may not always be given the highest level of importance (Salguero-Caparrós et al., 2020).

SMEs manage OSH differently than large organisations. The distinctive features of SMEs may explain their sub-standard occupational health and safety management and results. SME diversity, geographical spread, lack of unified representation, and short lifespans make them difficult to control (Walters, 2001). Recent studies (e.g., Salguero-Caparrós et al., 2020; Biggeri et al., 2023) suggest that SMEs' unique characteristics could contribute to their significantly lower OSH compliance and management than larger organisations. This hampers their ability to maintain a safe workplace and manage safety. SMEs' employees face more difficult situations and have more work-related accidents and illnesses than those in larger firms (Shimizu et al., 2021). In lieu of the

importance for SMEs to manage their OSH compliance and management, studies have shown that effective management of organisational resources, also called success factors, is important in facilitating OSH compliance. Several pertinent success factors have been cited in the literature, including top management support, training and education, organisational attitude, organisational awareness, and human resource practices. It is imperative to note that the notion of compliance is depicted through the achievement of certain compliance-based success elements.

2.1. Top management support

Top management support (TMS) has long been essential to project success. A company's control, resources, and decision-making are under top management's purview (Joseph, & Gaba, 2020). It should show leadership and quality management system dedication. The firm's top management sets rules, standards, and strategic goals and directs quality management. Top management does more than make company-wide decisions. It also governs how managers engage with employees, affecting firm performance. Understanding the repercussions of their job helps the top leadership team alter their decision-making, interactions with other managers and groups, and staff perception. Top management support has historically been crucial to project success. In international quality management systems, top management is an organization's highest level of oversight and governance. It also states that senior management must distribute authority and resources company-wide (Huettermann et al., 2024). Senior management oversees decisions, resources, and control. It should also demonstrate leadership and quality management commitment. For a corporation to successfully deploy an OSH, senior management commitment is required; it is the responsibility of the company's top management to guarantee that workers have a safe workplace and that sufficient resources are available to maintain it. That means checking sure health and safety regulations are not being flouted and putting in place tactics to keep them from being breached. Researchers like Aslam, (2024) found that top management is responsible for overseeing the responsibilities outlined in OSH policies, such as hazards identification, enlisting expert help, and monitoring risk and control methods. Further, they need to ensure that such policies are appropriately implemented. Thus, the following hypothesis is established:

H1: Top management support is an important determinant of OSH compliance achievement by Malaysian SMEs.

2.2. Training and education

Astuti, & Ramdhan, (2023) asserted that OSH can provide a secure environment in the workplace by means of training, implementation, and compliance with rules and OSH standards. By implementing educational and training programs, both workers and management can acquire comprehensive knowledge on workplace hazards and the corresponding preventive measures. Training and education enable employees and managers to get a comprehensive understanding of the safety and health management system, empowering them to contribute to its design and implementation (Suryani et al., 2024). Employers, managers, supervisors, and employees can enhance their job performance and mitigate potential hazards by acquiring education and training.

Furthermore, it is important for personnel to receive on-site training to identify, document, and mitigate any hazards within the workplace. This also applies to individuals whose occupations require specialised training (Ballal et al., 2024). Members of the incident investigation team derive advantages from education and training, which guarantee their complete engagement in the training activities (Goekcimen et al., 2023). Likewise, hands-on instruction and practical training can be provided in non-traditional educational settings. Workers can be educated on safety principles, hazards, and precautions through peer-to-peer training, on-the-job training, or workplace demonstrations (Pressley et al., 2023). Yunan et. al. (2024) stressed the importance of multiple cycles of training throughout the year for OSH measurement. Though the study focused on the construction industry, the practice should be implemented across all industries, including SMEs. The authors demonstrated that provision of OSH training and education for employees on safety protocols and culture facilitates OSH compliance processes. The following hypothesis is given in this context:

H2: Training and education are important determinants of OSH compliance achievement by Malaysian SMEs.

2.3. Human resource practices

Human resource practices determine the legality of an organization's operations and the necessary legislation that must be adhered to. To get a favourable result in compliance, it is essential that employees possess a sense of assurance when expressing their concerns and have the awareness that their issues will be acknowledged and taken seriously. The human resources department is primarily responsible for facilitating such a process, as it can stimulate enhancement of the compliance process. Human resource practices can facilitate the implementation of the decision to enforce remote work for staff to safeguard them from potential hazards while ensuring their continuous productivity for the organisation. Employers have the obligation to furnish the requisite people management to cultivate a milieu that prioritises safety and well-being (Posey, & Shoss, 2024). Employees should have the option to work remotely, allowing them the freedom to decide when and where they work rather than being restricted to their house as their only workspace (Kukathas, 2022; Angelici, & Profeta, 2024). Nevertheless, the human resource department must guarantee the implementation of sufficient health and safety protocols. They also offer the option for employees to reserve a flexible office presence, ensuring their continued connection to the workplace. Kolbe et al. (2020) suggested the importance of all individuals in the organisation feeling at ease expressing their concerns about the safety goals set by the company. Human resources authorities should initiate one-on-one conversations with employees who express reluctance in voicing safety concerns to their direct superiors (Martin et al., 2018). This will aid employees who have reservations about expressing safety concerns. Using defined safety protocols and the assistance of human resources, a firm can proficiently recognise and reduce potential risks, therefore ensuring the welfare of its employees while they are present at the workplace (Rahlin et al., 2020; Olaniyi et al., 2023).

H3: Human resource practices are an important determinant of OSH compliance achievement by Malaysian SMEs.

2.4. Organisational attitudes

Compliance with OSH is also associated with organisational attitudes. The notion of positive thinking benefits employers and employees as it boosts happiness, contentment, and productivity. Positive organisational attitudes should be encouraged, but employees must bring them to work (Wongsuwan et al., 2023). Supervisors encourage employee safety, thus making them an important part of a company's health and safety management system. Mujtaba, & Kaifi, (2023) found that workers are more likely to obey safety rules if they think their supervisor is fair and follows business policies such as the tracking of harmful acts and recognition of workers' safety elements. Unacceptable organisational attitudes such as lacklustre safety consciousness can cause accidents (Zwetsloot et al., 2020), especially for SMEs (Orikpete, & Ewim, 2024). Other key organisational attitudes leading to positive OSH are managerial dedication to safety, worksite security, and workplace safety programs (Tan et al. 2023; Lari, 2024). There seems to be a greater focus on the attitude of supervisors in mitigating safety risk reduction and compliant safety procedures (e.g., Rantala et al., 2022). Thus, it is hypothesised that:

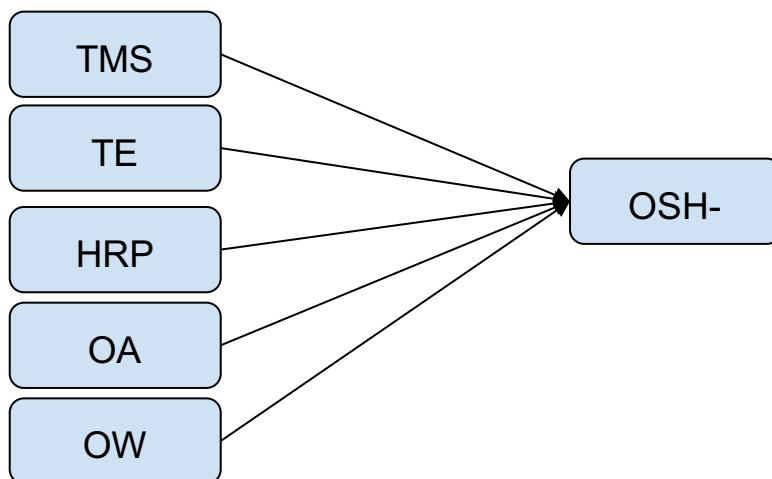
H4: Organisational attitudes are an important determinant of OSH compliance achievement by Malaysian SMEs.

2.5. Organisational awareness

The main goal of OSH is to safeguard workers in the workplace and prevent them from getting injured. Despite the possibility of unforeseen accidents, the employer must uphold their responsibility of providing a secure working environment and minimising the probability of mishaps (Zhang et al., 2020). This is contextualised as the act of organisational awareness. Organisational awareness has been promoted as a key factor for successful OSH compliance in the literature. The nexus between managerial awareness toward a robust safety culture in the workplace and promotion of the significance of safety leads to OSH compliance organisation wide (Rantala et al., 2022). To enhance OSH compliance, employees need to be given an awareness and understanding of safety as detailed as possible using available resources (Goldman et al., 2023). This is because inadequate safety awareness, limited knowledge, and substandard safety behaviours are the primary factors contributing to workplace accidents (Suhaila et al., 2021). The efficacy of safety awareness is contingent upon employee attitudes, management practices, and leadership behaviours (Wahid et al., 2020). Together, the lack of literacy among participants (Kang, 2023) and poor collaboration (Noreen et al., 2024) lead to the neglect of health and safety precautions and a lack of professionalism in the workplace (Bosetti, 2023). Therefore, organisations, including SMEs, need to create organisational-wide awareness to assess the efficiency of occupational health and safety management systems (Akhurst, 2021; Boakye et al., 2023). In their study, Jaafar et al. (2024) demonstrated a high awareness level among Malaysian public employees toward OSH. However, the authors also argued that senior leaders must provide a thorough explanation of legislation and policies to ensure strict adherence to the standards. Thus, the following hypothesis is proposed:

H5: Organisational awareness is an important determinant of OSH compliance achievement by Malaysian SMEs.

Figure 1: OSH Compliance Research Model



Notes: Top management support (TMS), Training and Education (TE), Human Resource Practices (HRP), Organisational Attitudes (OA), and Organisational Awareness (OW), OSH Compliance (OSHCO).

3. Methods

This research used the quantitative research approach to achieve the aim of this research and test the established research hypotheses. A survey instrument was used to collect the intended data from Malaysian SMEs. The survey instrument was comprised of three sections, as depicted in Table 1.

Table 1: Elements of the survey instrument

Section	Category	Items	Scale	Adapted source
1	Demographics	Age	Ordinal	Own review
		Gender	Nominal	
		Education	Ordinal	
		Work experience	Ordinal	
		Employment size	Ordinal	
2	Training & Education	Comprehensive training on safety and health issues	Likert 1 – 7 Not at all important Very important	Vinodkumar et al. (2011).
		Employees are trained adequately to learn safety rules and procedures.		

		<p>Safety issues are given high priority in training programs.</p> <p>Adequate safety training given to evaluate workplace hazards</p> <p>Management encourages workers to attend safety training programs.</p>		
3	Human Resource Practices	<p>Reward policies for employees reporting safety hazards</p> <p>Safety promotional activities arranged by HR to create safety awareness</p> <p>Healthy competition policies for employees to report unsafe conditions.</p> <p>HR policies for regular safety inspections</p> <p>Safe conduct is a positive factor for job promotion.</p>	<p>Likert 1 – 7</p> <p>Not at all important</p> <p>Very important</p>	
4	Top Management Support	<p>Top management involvement in the OSH project.</p> <p>Top management providing funds for OSH</p> <p>Top management promotes OSH policies through meetings and briefings.</p> <p>Top management responsibility for injuries at work</p> <p>Top management organising internal safety audits and inspections</p>	<p>Likert 1 – 7</p> <p>Not at all important</p> <p>Very important</p>	Ndegwa et al. (2014).
5	Organisational Attitudes	<p>Priority given to safety and health when performing a job</p> <p>Use of PPE when handling sensitive materials</p> <p>Reminders to staff not to commit unsafe work practices</p>	<p>Likert 1 – 7</p> <p>Not at all important</p> <p>Very important</p>	Paul et al. (2022).

		Postage of warning signs in hazardous areas		
		Reporting of even a minor incident		
6	Organisational Awareness	Attending safety training when instructed to	Likert 1 – 7 Not at all important Very important	
		Reading the Standard Operating Procedure before starting work		
		Reading the Material Safety Info Sheet before handling sensitive material		
		Knowing the hazards posed by chemical materials before starting to use them.		
		Categorising waste materials accordingly before disposal		
7	OSH compliance achievements	We had an increase in employees' OSH awareness.		Yiu, et al., (2018).
		We had and increased support for OSH training and information.		
		We had improved employee morale.		
		We had a better safety culture.		
		We had an improved OSH audit team.		
		We had a systematic audit framework.		

Section 1 collected data on the demographic characteristics of the participating SMEs. Sections 2–6 inquired about the significance of the success factors for OSH compliance achievement. Section 7 described the achievement elements for OSH compliance. The survey was assessed using a 7-point Likert scale, with options of 1 (not at all important) through 7 (very important) (for Sections 2-6). Section 7 had the Likert scale of 1 (strongly disagree) through 7 (strongly agree).

The study focuses on small and medium-sized enterprises (SMEs) located in the Klang Valley region of Malaysia. In 2022, there were 1.15 million small and medium-sized enterprises (SMEs) in Malaysia, accounting for 97 percent of all firms in the country (Azman, 2021, <https://themalaysianreserve.com/2021/12/27/smes-expect-a>

gloomy-2022). According to the Kraejić Morgan sampling table, a sample size of at least 385 is appropriate for this study. This calculation considers a 95 percent confidence level and a 5 percent margin of error. The selection method included convenience sampling, which entailed selecting participants (SMEs) based on factors such as accessibility, geographic proximity, availability, or desire to engage at a specific time (Awa et al., 2015). A fundamental drawback of employing convenience sampling is the possibility of overlooking the appropriately described small and medium-sized enterprises (SMEs) in the Klang Valley. Statistically, this is expressed as a margin of error of 5 percent. Nevertheless, the researcher sought to address this selection problem by carefully choosing respondents with the appropriate background to answer the question. This was done by providing clear instructions to the respondents, emphasising that they should only answer the questionnaire if they have a sufficient level of involvement in the OSH compliance process and knowledge.

An individual with the necessary expertise and experience in adopting and improving workplace safety and health practices was chosen as a key informant from each respondent. The researcher reached out to the specific small and medium-sized enterprises (SMEs) either by direct contact or by seeking referrals. The researcher explained the purpose of the survey and the expected outcomes. They were asked to express their consent to take part. Upon getting confirmation, they were dispatched with the survey equipment. Data collection was carried out through face-to-face meetings to address the problem of decreased participation. The data collection period spanned from February to July 2023. The data analysis was undertaken using the structural equation modeling's (SEM) partial least square, through the SmartPLS 4.0 version.

4. Results and Discussion

The survey involved 400 participants, out of which 20 responses were deemed inconclusive or contained inaccuracies. Therefore, the total number of participating small and medium-sized enterprises (SMEs) was calculated to be 380. The demographic profile study was conducted using version 21.0 of the SPSS software. Table 2 presents a concise overview of the findings. Approximately one-third of the participants fell within the age range of 36-46 years (33%), with men comprising most participants (62.36%). Most of them reported having completed high school (30%) and a bachelor's degree (30%), while 45% had 10-15 years of job experience.

Table 2: Summary of Demographic Profile Analysis

Variable	Measures	Percentage	Frequency
Age	18 – 25 years	14%	53
	26 – 35 years	27%	103
	36 – 46 years	33%	125
	47 – 60 years	26%	99

Gender	Male	62.36%	237
	Female	38.68%	127
Education	SPM/STPM	30%	114
	Bachelor's	30%	114
	Master's	20%	76
	Others	20%	76
Experience	0-3 years	14%	53
	4-9 years	28%	106
	10-15 year	45%	172
	16-25 years	13%	49

The measurement models were assessed by examining factor loadings, internal consistency reliability, convergent validity, and discriminant validity (Cheung et al., 2024). The study evaluated the internal consistency reliability of the constructs using three distinct measures: Cronbach's α (CA), Dijkstra-Henseler's ρA (ρA), and composite reliability (CR).

4.1. Measurements

The initial Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis was conducted for the OSH compliance model, encompassing all constructs: Training & Education (TE), Top Management Support (TMS), Human Resource Practices (HRP), Organisational Attitude (OA), Organisational Awareness (OW), and Occupational, Safety & Health Compliance (OSHCO). Each construct consists of five indicators. The undertaking of the initial model evaluation showed that several indicators' loading values were below the threshold value of 0.50, thus they were deleted from further testing. The improved model comprised of:

- Human Resource Practices [HRP1, HRP2]
- Organisational Attitude [OA4, OA5]
- Organisational Awareness [OW1, OW2, OW3, OW4, OW5]
- Training & Education [TE2, TE3, TE4]
- Occupational Safety and Health Compliance [OSHCO1, OSHCO2]

Further model assessment does not include the top management support construct since its indicators were found to have statistically significant loading values below the threshold. Therefore, further evaluation was

conducted on only four independent variables (refer to Figure 1). The resulting reliability and validity outcomes are shown in Table 3. The model strength shown through the R^2 for this model is 0.346, indicating the four independent variables define the model moderately with 35 percent model strength.

Figure 1: Refined PLS Model for OSH Compliance

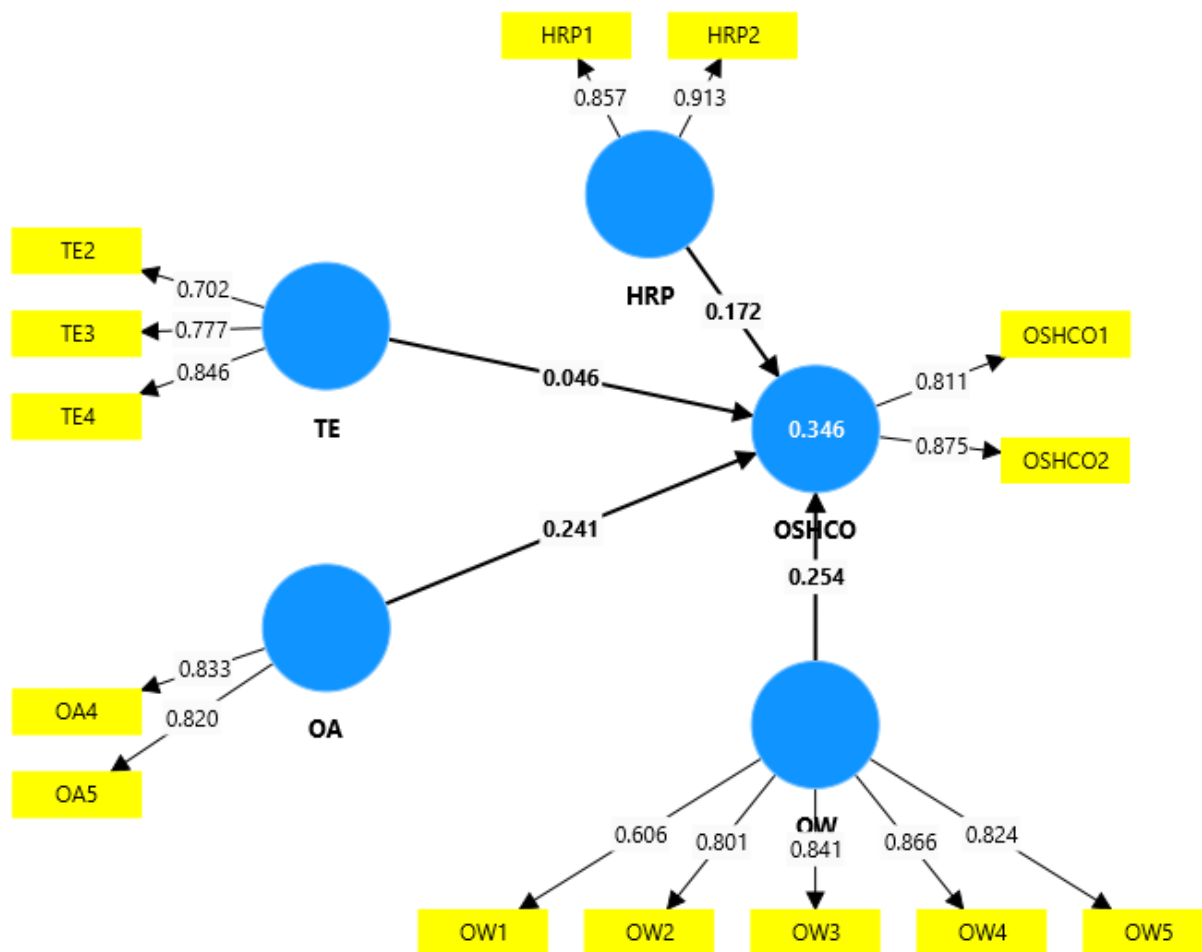


Table 2: Internal Reliability Outcomes

Variable	Indicators	Cronbach's alpha	Composite reliability (rho_c)	Average variance extracted (AVE)
Human Resource Practices (HRP)	HRP1	0.857	0.878	0.783
	HRP2	0.913		
	TE2	0.702	0.820	0.604

Training & Education (TE)	TE3	0.777		
	TE4	0.846		
Organisational Attitude (OA)	OA4	0.833	0.812	0.684
	OA5	0.820		
Organisational Awareness (OW)	OW1	0.606	0.893	0.629
	OW2	0.801		
	OW3	0.841		
	OW4	0.866		
	OW5	0.824		
OSH Compliance (OSHCO)	OSHCO1	0.793	0.831	0.712
	OSHCO2	0.860		

The reliability analysis demonstrates that the constructs have excellent composite reliability (CR), as indicated by the AVE values exceeding the threshold of 0.50 for all constructs. This suggests that convergent validity has been achieved. The HTMT demonstrates the successful establishment of discriminant validity, with a maximum HTMT value of 0.885. This value is significantly lower than the threshold value of 0.90, as indicated in Table 3.

Table 3: HTMT ratio values for OSHCO

	HRP	OA	OSHCO	OW	TE
HRP	0.885				
OA	0.396	0.827			
OSHCO	0.452	0.487	0.844		
OW	0.648	0.585	0.525	0.793	
TE	0.435	0.646	0.375	0.390	0.777

4.2. Structural Model Assessment

The OSH compliance structural model was built to address the following hypotheses:

- H1: Training and education are an important determinant of OSH compliance achievement by Malaysian SMEs.*
- H2: Top management support is an important determinant of OSH compliance achievement by Malaysian SMEs.*
- H3: Human resource practices are an important determinant of OSH compliance achievement by Malaysian SMEs.*

H4: Organisational attitudes are an important determinant of OSH compliance achievement by Malaysian SMEs.
H5: Organisational awareness is an important determinant of OSH compliance achievement by Malaysian SMEs.

The outcomes of the structural model assessment are shown in Tables 4 (outer loadings) and 5 (path coefficient values). The outer loadings were found to be greater than the required threshold of 0.70.

Table 4: Outer loadings for OSH Compliance

Indicators	Outer loadings
HRP1 ← HRP	0.830
HRP2 ← HRP	0.862
HRP3 ← HRP	0.767
OA4 ← OA	0.833
OA5 ← OA	0.820
OSHCO1 ← OSHCO	0.810
OSHCO2 ← OSHCO	0.876
OW2 ← OW	0.801
OW3 ← OW	0.855
OW4 ← OW	0.875
OW5 ← OW	0.844
TE2 ← TE	0.702
TE3 ← TE	0.777
TE4 ← TE	0.846

Table 5: Path coefficient for OSH compliance

Relationship	Path coefficients
HRP ← OSHCO	0.142
OA ← OSHCO	0.230
OW ← OSHCO	0.276
TE ← OSHCO	0.057

The path analysis outcomes for all the established hypotheses are as given.

H1: Training and education are an important determinant of OSH compliance achievement by Malaysian SMEs. Table 6 shows the structural path relationship between training and education and OSH compliance. There is no statistically significant association between training and education and OSH compliance. The path coefficient ($\beta = 0.057$) results in a structural model t-statistical value of 0.935, which is not statistically significant as the p-value is greater than 0.05. This implies that training and education do not have a statistically significant impact on the attainment of this stage and its results. The significance of training and education in compliance is negligible by the respondents. The outcome indicates that H1 was rejected.

Table 6: Structural path analysis [TE \rightarrow OSH compliance]

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
TE \leftarrow OSHCO	0.057	0.060	0.061	0.935	0.350

H3: Human resource practices are an important determinant of OSH compliance achievement by Malaysian SMEs.

The structural path analysis conducted on human resource practices (as shown in Table 7) indicates a statistically significant relationship between HRP and the outcomes of compliance ($\beta = 0.142$; $t = 2.081$; $p = 0.037 < 0.05$). This indicates that H3 is statistically supported. Three components of HRP have significantly contributed to the achievement of OSH compliance, namely HRP1 ($p < 0.000$), HRP2 ($p < 0.000$), and HRP3 ($p < 0.000$). Among these, HRP2 has the greatest impact, as indicated by the highest t-statistic of 36.411. It is followed by HRP1 with a t-statistic of 26.517 and HRP3 with a t-statistic of 7.409. HRP2 is defined by the statement "Safety promotional activities organised by HR to raise awareness of safety" and appears to play a significant role in driving the accomplishment of the following two OSH compliance achievements:

- OSHCO2: "We had an increased support for OSH training and information" ($p < 0.05$, $t = 46.378$).
- OSHCO1: "We had an increased employee OSH awareness" ($p < 0.05$, $t = 25.911$).

It appears that SMEs in Malaysia have focused on carrying out safety awareness initiatives through their human resources department. This has resulted in the attainment of heightened support and knowledge for occupational safety and health (OSH), which likely contributed to the success of this phase. In addition, these organisations

should have acknowledged the significance of ongoing measures to foster awareness of occupational safety and health (OSH) among employees to get their support for implementing reforms.

Table 7: Structural path analysis [HRP → OSH compliance]

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
HRP ← OSHCO	0.142	0.145	0.068	2.081	0.037
OSHCO1 ← OSHCO	0.810	0.809	0.031	25.911	0.000
OSHCO2 ← OSHCO	0.876	0.875	0.019	46.378	0.000
HRP1 ← HRP	0.830	0.827	0.031	26.517	0.000
HRP2 ← HRP	0.862	0.862	0.024	36.411	0.000
HRP3 ← HRP	0.567	0.563	0.076	7.409	0.000

H4: Organisational attitudes are an important determinant of OSH compliance achievement by Malaysian SMEs. The path analysis conducted on organisational attitudes (OA) reveals a statistically significant link between OA and OSH compliance ($\beta = 0.230$; $t = 3.320$; $p = 0.001 < 0.05$). The t-value of 3.320 is statistically significant, indicating a higher level of specificity. Specifically, OA4 ($p < 0.05$, $t = 25.869$) and OA5 ($p < 0.05$, $t = 23.863$) appear to be the main factors contributing to successful compliance, as shown in Table 8. Therefore, H4 is deemed valid. OA4, which involves placing warning signs in hazardous areas, has had a somewhat more positive effect on the outcomes compared to OA5, which involves reporting even minor incidents. The implementation of these two organizational attitude initiatives has resulted in the attainment of OSH achievements, namely increased support for OSH training and employee awareness.

Organisational attitudes (Table 8) have been found to have a substantial impact on adherence to occupational safety and health regulations, a trait that is particularly evident in Malaysian small and medium-sized firms (SMEs). SMEs that have responded have prioritised the development of the proper mind set about occupational safety and health. This has been achieved by implementing hazard identification signs and fostering a culture of incident reporting. Malaysian small and medium-sized enterprises (SMEs) have made significant advancements in fostering a culture of safety and shared accountability in the workplace. This is demonstrated by their focus on identifying warning signals of danger and their attitudes toward reporting incidents. Organisations must consistently integrate occupational safety and health awareness into their actions to maintain and develop a culture of safety.

Table 8: Structural path analysis [OA → OSH compliance]

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
OA ← OSHCO	0.230	0.225	0.069	3.320	0.001
OSHCO1 ← OSHCO	0.810	0.809	0.031	25.911	0.000
OSHCO2 ← OSHCO	0.876	0.875	0.019	46.378	0.000
OA4 ← OA	0.833	0.832	0.032	25.869	0.000
OA5 ← OA	0.820	0.819	0.034	23.863	0.000

H5: Organisational awareness is an important determinant of OSH compliance achievement by Malaysian SMEs. The impact of Organisational awareness (OW) has been examined in H5. The path analysis reveals a statistically significant correlation between organisational awareness (OW) and occupational safety and health compliance (OSHCO) with a beta coefficient of 0.276, a t-value of 4.193, and a p-value of 0.001, which is less than the significance level of 0.05. Hypothesis 5 has been confirmed. According to the findings, a 1% improvement in organisational awareness corresponds to a 0.276% increase in the potential for achieving OSH compliance, as shown in Table 4.24. Four key factors of organisational awareness are identified, namely:

- OW2 (p < 0.05, t = 27.487) "Reading the standard operating procedure before starting work."
- OW3 (p < 0.05, t = 36.952) "Reading the material safety information sheet before handling sensitive material."
- OW4 (p < 0.05, t = 47.171) "Knowing the hazards posed by chemical materials before starting to use them."
- OW5 (p < 0.05, t = 36.135) "Categorizing waste materials accordingly before disposal."

Out of the four elements, OW4, which refers to "being aware of the dangers presented by chemical substances before using them," stands out since it has the highest t-statistics value of 47.171 (Table 9). The sample of small and medium-sized enterprises (SMEs) appear to have implemented a focused campaign to raise awareness. This campaign included activities such as reading safety documents, recognising workplace dangers, and properly segregating and disposing of waste items. The identification of dangers has been crucial for OSH compliance achievements.

Table 9: Structural path analysis [OW \square OSH compliance]

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
OW \leftarrow OSHCO	0.276	0.278	0.066	4.193	0.000
OW2 \leftarrow OW	0.801	0.800	0.029	27.487	0.000
OW3 \leftarrow OW	0.855	0.854	0.023	36.952	0.000
OW4 \leftarrow OW	0.875	0.874	0.019	47.171	0.000
OW5 \leftarrow OW	0.844	0.844	0.023	36.135	0.000

5. Discussion and Conclusion

The empirical result suggests the pertinence of four independent variables, that is, human resource practices, organisational attitude, and organisational awareness, as the key determinants for OSH compliance achievement by Malaysian SMEs. Training and education were found to be statistically insignificant, while top management support was not included in the model evaluation due to a lack of statistical reliability. Human resource strategies have profoundly impacted OSH compliance by Malaysian SMEs. The SMEs are executing strategic HR practices, like offering rewards to employees for reporting safety concerns and conducting safety awareness programs throughout the organisation. These strategies have favourably impacted the execution of OSH compliance. The SMEs attained heightened employee support for OSH awareness during the compliance phase. The human resources section guarantees that SMEs adhere to all pertinent occupational safety and health legislation and standards. This entails remaining informed about modifications in occupational safety and health legislation, supplying requisite documentation, and engaging in occupational safety and health inspections and audits. Human resource specialists are responsible for formulating and executing complete occupational safety and health policies and procedures customised to the organization's requirements and risks. Moreover, human resource departments play a vital role in cultivating a safety culture inside small and medium-sized enterprises (SMEs). This includes advocating for safety awareness, delivering safety training, and fostering employee engagement in safety efforts. The research findings indicate that incorporating occupational safety and health (OSH) into human resource management is essential for guaranteeing small and medium-sized enterprises' adherence to OSH standards and promoting a safety culture. The research findings indicate that SMEs must acknowledge the essential function of the human resources department in ensuring compliance with occupational safety and health regulations.

Organisational attitudes are crucial for the occupational safety and health compliance of small and medium-sized enterprises. These attitudes influence the organization's priorities, policies, and practices, affecting the adopted OSH compliance procedures. This study indicates that Malaysian SMEs have developed a robust organisational culture and mind-set that emphasises occupational safety and health alone during compliance. This conclusion is crucial as it underscores the necessity to enhance comprehension of the fundamental elements influencing OSH attitudes throughout the compliance journey. Previous research (e.g., Nykänen et al., 2020; Amaral et al., 2023) has suggested that insufficient focus on safety attitudes may lead to detrimental risk-taking in the workplace. This may lead to an increase in accidents and a decline in productivity, adversely affecting employees' capacity to fulfil their obligations effectively. According to Nykänen et al. (2020), the implementation of safety training programs, including training audits, safety drills, safety regulations, presentations, and seminars, can eliminate adverse safety attitudes, reduce accident probability, and enhance staff productivity. Duryan et al., (2020) contended that employees' safety attitudes significantly influence their compliance with established safety standards and laws, hence impacting their overall safety and productivity. The results of this study emphasize the important role of organizational attitudes in influencing occupational safety and health (OSH) compliance within Malaysian small and medium-sized enterprises (SMEs). SMEs need to prioritize leadership and management in shaping organizational attitudes towards OSH. Effective communication of the significance of OSH by leaders, enforcement of compliance, and the fostering of a safety-conscious culture can provide valuable insights, leading to more effective approaches in promoting OSH compliance within SMEs.

Organisational awareness includes many components essential for the effective implementation of occupational safety and health (OSH) policies and procedures. Organisational awareness entails comprehending the organization's distinct context, encompassing its industry, scale, and the hazards and risks linked to its activities. In the context of occupational safety and health, organisational awareness is a crucial element in ensuring the successful achievement of the compliance phase. The empirical findings on organisational awareness indicate its importance throughout the OSH compliance journey. The existence of organisational awareness of safety measures, such as reviewing SOP documents before initiating tasks or managing sensitive items, understanding the risks associated with chemical substances, and ensuring proper waste disposal, has resulted in the attainment of compliance. The awareness factors present in Malaysian SMEs have impacted the results of enhanced support and awareness of OSH during the compliance phase, leading to improved safety conditions and accident management. This study's findings align with the significance of organisational awareness, which is occasionally linked to training components. Amaral et al., (2023) posited that inadequate emphasis on safety training may lead to detrimental safety awareness, like phobias and overconfidence, which encourage employees to partake in unwarranted risk-taking or to eschew duties perceived as hazardous. This may lead to an increase in accidents and a decline in productivity, adversely affecting employees' capacity to fulfil their obligations effectively.

In conclusion, occupational health and safety compliance research has increased in recent years. This study brought forward some empirical evidence on the association between organisational resources and OSH compliance. The primary motivation to undertake this research was the lack of body of knowledge of how SMEs should manage pertinent organisational resources to improve occupational safety and health performance. This is despite the consistent call for actions by Malaysian government and related agencies to bring OSH to the next level of efficiency. Enforcement agencies and policy makers often strive to create and implement OSH interventions for SMEs as their unique characteristics hinders effective compliance. There is unanimity that safety intervention strategies designed for large businesses are inappropriate for SMEs. The difficulty of reaching micro and small organisations, their geographical dispersion, and their short lifespans have forced them to address safety measures individually. The outcome of this research reveals that Malaysian SMEs have a dynamic success factor to manage OSH compliance. This study showed the value of understanding the key determinants to improve workers safety and health, specifically by addressing OSH centric human resource practices, enhancing organisational attitude toward OSH and organisational awareness toward OSH and its processes. This study expands knowledge and lays the groundwork for improving Malaysia's occupational safety and health (OSH) standards.

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