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INVESTIGATING EMPLOYEE PERCEPTIONS OF WORKPLACE SAFETY AND SAFETY COMPLIANCE USING PLS-SEM AMONG TECHNICAL EMPLOYEES IN MALAYSIA

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ABSTRACT

Safety is an important employment issue that needs to be tackled because of the cost implications it brings to organizations. As Malaysia aspires to become a developed nation by 2020, reducing workplace accidents is one of the key employment concerns it aims to address. Literature indicates that one of the reasons for occupational accidents at work is unsafe behaviour. Adding to the safety research literature, this study examined to what extent perceptions of safety affect employees to comply with safety behaviour at work. A survey was conducted in a big telecommunication company in Malaysia among 135 technical employees. Partial least square (PLS) analysis was employed in this study to test the research hypothesis. Our measurement model resulted in five facets of employee perception whose validity and reliability were confirmed. The analysis on the structural model revealed that management safety practices was the most significant predictor of safety compliance, followed by, co-worker safety and job safety. However, no significant effect was found for supervisor safety and satisfaction with safety programs. Practical implications, limitations of the study, and future research direction are discussed.

Keywords: *workplace safety practices, safety compliance, telecommunications industry, Malaysia, occupational accidents and injuries, PLS-SEM*

INTRODUCTION

Occupational accidents are one of the most pressing employment issues around the world (Hämäläinen, Takala, & Saarela, 2006). According to the International Labour Organization (ILO), an estimated 2.3 million people die every year from work-related accidents and diseases, which result in an estimated loss of 4% of the world's annual gross domestic product (GDP) (ILO, 1996-2015). Not only work-related accidents and diseases have economics consequences,

they also have social and moral ramifications (Hrymak & Pérezgonzález, 2007). For instance, accidents that occur at the workplace can damage and pollute the environment, which can have long term health and other effects on the population. Furthermore, in a workplace accident, the emotional and social consequences are typically borne by the employees themselves and their family, friends and community (Health and Safety Executive, 1997).

Unsafe behaviour has been argued to be the highest contributor to work-related accidents (Goetsch, 2008; Neal & Griffin, 2006). One of the ways employees behave unsafely at work is when they do not comply with work safety regulations (Clarke, 2006; Neal & Griffin, 2006). The horrific consequences of non-compliance behaviour were demonstrated in several well-known disasters such as Chernobyl and Bhopal (Meshkati, 1991). The Bhopal disaster that claimed at least 2,500 people on 3rd December 1984 was also partly caused by the insufficient attention to safety (Gupta, 2002). To save energy cost, the refrigeration system to cool the storage tank was shut down, causing the cooling system to overheat (Goetsch, 2008; Gupta, 2002). The human error is, according to Heinrich, Peterson, and Roos's (1980) ten axioms of industrial safety, the highest contributor to work-related accidents (Goetsch, 2008). Because human errors can be reduced through effective safety intervention programs, it is important to promote and encourage employees to comply with safety practices and work in a safe and healthy manner. By doing so, occupational accidents and injuries can be minimized, and hence, saving significant costs to the organization.

One of the factors purported to influence safety compliance is employee perception of safety at work (Hayes, Perander, Smecko, & Trask, 1998). Empirical evidence suggests that employee perceptions of safety in the workplace are important because they have been linked to better adherence to safe work behaviours and a few accident related injuries (Barling, Loughlin, & Kelloway, 2002; Mearns, Whitaker & Flin, 2003; Zohar, 1980, 2000).

Research on employee perception of safety at work was mainly inspired by Zohar's (1980) work (Gyekye, 2006). After Zohar's seminal work, many researchers have begun to study the topic. According to Salminen, Gyekye, and Ojajärvi (2013), safety perception surveys are important as they can help identify precursors to accident occurrence, and by doing so, effectively decrease accident occurrence. By providing proactive information regarding safety problems, they guide management about the specific safety programs that need to be instituted to prevent occupational injuries and accidents at work. Given the importance of safety perception at work, we wished to add to the existing literature on safety perception, but in doing so, were guided by the work of Hayes et al.'s (1998), who argued that Zohar's conceptualization of safety perception at work was not comprehensive enough because he failed to sufficiently sample the content domain of work safety. Hayes et al. proposed five different facets of employee perceptions of workplace safety. They are job safety, co-worker safety, supervisor safety, management safety, and safety programs. Using Hayes et al.'s (1998) work as a theoretical basis, we were interested in examining the role of employee perceptions toward safety in influencing safety compliance.

Studies in employee perceptions of safety have been examined in different parts of the globe; however, such studies in Malaysia are limited, with a few exceptions (Subramaniam, Mohd Zin, & Nadir, 2013; Abdullah, Spickett, Rumchev, & Dhaliwal, 2009; Shah Rollah, Azizah, Roziana, Siti Aisyah, & Maisarah, 2014). Even the existing studies were limited in their examination of employee perception by focusing mainly on management practices such as safety training, leadership style, and safety communication and feedback. Hence, to what extent other facets of employee perceptions in determining safety compliance are unclear. Secondly, in order for Malaysia to achieve the developed nation status by 2020, it needs to ensure that it has the necessary human capital to help the country meet the national aspiration. In this context, reducing occupational injuries and accidents is an issue that needs to be seriously curbed. Even though in general accidents and fatalities at work have been in a steady decline, they remain a

costly affair. The Social Security Organization (SOCSO), a body that oversees compensation to employees due to occupational accidents, estimates that one fatality is equivalent to a loss of RM1.2 million. In 2014, 42,148 industrial accident cases were reported which included 573 cases of fatality (Hakimi, 2015). These accidents contributed to approximately RM2.46 billion being paid as compensation, which was 200 million more than what was paid in 2013 (Awang, 2015). It is estimated that the hidden costs of a workplace accidents—emotional and social—can be up to seven times the amount of visible costs (Health and Safety Executive 1997). The hidden costs are significant to an organization but because they have no dollar value assigned to them they are usually not part of the economic calculations. Because the total costs can run into hundreds billions of ringgit, studies that address occupational accidents specifically and workplace safety and health generally are warranted particularly in Malaysia in its endeavour towards achieving the national agenda. Furthermore, it was also reported that the rate of work-related deaths is four times higher in Asia than it is in other industrialized countries (ILO, 1996–2015). Hence, in our attempt to address the issue of occupational accidents, we focused on one of the important industries in Malaysia, i.e. the telecommunications industry, which is considered to be high-risk (Norrman, & Jansson, 2004). Previous safety research works in Malaysia have been conducted in various sectors such as manufacturing companies (Shah Rollah et al., 2014), small and medium enterprises (Khoo, Lilis, & Kee, 2011), public hospitals (Abdullah et al., 2009), and emergency services (Subramaniam et al., 2013). To date, no study has been carried out in the telecommunication industry despite the statistics issued by the Department of Occupational Safety and Health (DOSH) (2013) Malaysia that, collectively, the transport, storage and telecommunication sector recorded increasing number of non-permanent disabilities (NPD), permanent disabilities (PD), and fatalities (refer to Table 1).

Table 1. Occupational accidents statistics in the transport, storage, and telecommunication sector in Malaysia (2007-2014)

Year	Non-permanent disability (NPD)	Permanent disability (PD)	Deaths
2007	7	0	2
2008	18	1	8
2009	21	0	18
2010	16	1	14
2011	39	6	11
2012	68	5	22
2013	84	1	8
2014	84	3	15

Source: Department of Occupational Safety and Health Malaysia (2013).

Given the current scenario of occupational accidents in this sector, it is imperative that a study on safety is conducted to understand safety behaviour of employees. By investigating employee perceptions of safety, management can devise safety programs appropriate within the specific industry to reduce the occurrence of accidents at work. Towards this objective, this paper is organized as follows. Next, the relevant literatures on safety perception and safety compliance are offered. This is followed by a discussion on how the study was practically carried out. Then, results of the partial least square (PLS) analysis are presented. Discussion of the findings follows which includes practical implications of the findings, study limitations, and direction for future research.

LITERATURE REVIEW

Safety compliance is one of the important elements in explaining safety performance (Clarke, 2006; Griffin & Neal, 2000). Compliance with safety behaviour is defined as the extent to which

individual employees comply with any safety regulations, rules, acts, code of safety practices as in the guidelines of their company (Griffin & Neal, 2000; Kelloway & Francis, 2008). In other words, safety compliance is attained when employees pursue safety-related rules and commonly work in an undisruptive manner (Kelloway & Francis, 2008). Maintaining the standard of work procedures and wearing personal protective equipment (Neal & Griffin, 2006) are some examples of safety compliance behaviour. Because safety compliance refers to behaviour focusing on meeting the minimum work safety standards (Vinodkumar & Bhasi, 2010; Neal & Griffin, 2006), it is best seen as a form of task performance because it is concerned with the core safety activities that need to be performed by individuals to maintain workplace safety (Inness, Turner, Barling, & Stride, 2010).

As mentioned earlier, safety compliance has been shown to be influenced by a number of factors, one of which is employee perception of safety (Clarke, 2006; Hayes et al., 1998; Griffin & Neal, 2000; Gyekye & Salminen, 2010; Neal, Griffin, & Hart, 2000). According to literatures, employees' perception of safety at work is central to the measurement of safety climate (Griffin & Neal, 2000), defined as perceptions about safety values, norms, beliefs, practices and principles shared by workers in their work environments (Gyekye & Salminen, 2010), consistent with the early definition offered by Zohar (1980) in his seminal work. The role of safety climate in contributing to safety performance at work has been aggressively studied on the argument that safety climate provides a frame of reference for employees on how to behave and act in a safe manner based on their assessments and interpretations of the policies, procedures, and practices set by the top management (Clarke, 2006; Zohar, 1980). Such argument resonates well with the postulation that perception and behaviour are theoretically linked (Brewer et al., 2007; Chartrand & Bargh, 1999), because individuals are use interpretive schemas for perceiving and interpreting behaviours and behavioural schemas for producing behaviours (Carver, Ganellen, Froming, & Chambers, 1983). Carver et al.'s prediction that one's perception toward a hostile behaviour would activate not only one's hostile interpretive schema, but one's hostile behavioural schema as well was empirically supported. Using this argument, we can speculate that when employees perceive that others in the organization are working safely, they will be likely to engage in a similar behaviour. To Zohar (1980), safety climate signifies the role behaviour with regards to safety that employees are expected to engage in. So, for instance, when top management stresses on the importance of wearing safety protection gear, employees will perceive that such behaviour is necessary, and this encourages them to behave accordingly. Invoking the perception-behaviour link, we speculate that injuries and accidents can be avoided. Indeed, safety perception studies have shown that employee perception of safety at work is associated with safety performance (Barling et al., 2002; Mearns et al., 2003; Zohar, 1980, 2000).

According to Hayes et al. (1998), employee perception of safety is categorized into five facets: job safety, co-worker safety, supervisor safety, management safety, and satisfaction with safety program. Job safety is defined as to extent to which employees perceive that the job safe in the accomplishment of the job performance (i.e. whether the job is perceived to be dangerous, risky, scary etc.). Co-worker safety refers to what co-workers are perceived to practise safe work behaviour (i.e. whether they follow safety rules or encourage others to follow safety procedures). Supervisor safety is defined as the extent to which a supervisor is perceived to demonstrate safety-related behaviour at work (i.e. whether he/she enforces safety rules, acts on safety suggestions etc.). Management safety refers to what extent management is perceived to develop safety culture at work (i.e. whether it rewards safe behaviour, provides safe working conditions etc.). Finally, satisfaction with safety program–To what extent safety program conducted is perceived to satisfactory (whether the safety program is perceived to be unclear, worthwhile, important etc.). These five facets of employee perception of safety make up the Workplace Safety Scale (WSS).

Various studies have used the WSS scale to examine employee safety perception and its outcomes. For instance, Gyekye (2006) used the WSS scale to examine the role of employee

perception of safety in influencing safety performance among 320 Ghanaian industrial employees. They found that those who had negative perceptions of safety tended to exhibit more accidents than those who had positive perceptions, tended to have less job satisfaction and were less committed to safety management policies. In a later study, Gyekye and Salminen (2010) compared the differences in work experience among 320 Ghanaian industrial workers and demonstrated significant differences between experienced cohorts and their inexperienced counterparts. He revealed that experienced employees indicated the best perceptions on safety, expressed the highest level of job satisfaction, were the most compliant with safety procedures and recorded the lowest accident frequency. In a different study, Salminen et al. (2013) used structural equation modelling to investigate the influence of individual and organizational factors on safety compliance and accident frequency at work. One of the organizational factors considered was organizational climate, which was measured by the WSS. They found a positive association between organizational climate and safety compliance, which subsequently reduced accident frequency. In a study on 218 health care providers in a large community hospital in the USA, McCaughey, DelliFraine, McGhan, and Bruning (2013) revealed that workplace-derived injury and illness were associated with poor perceptions of safety climate, which reduced job stress and job satisfaction and increased turnover intention.

Separate studies appear to confirm the role of each safety aspect on safety performance. Job demands, for instance, were found to be negatively related to injury severity (Gillen, Baltz, Gassel, Kirsch, & Vaccaro, 2002). Probst and Brubaker (2001) demonstrated that employees who perceived their job to be insecure tended to exhibit decreased safety motivation and compliance, which subsequently increased workplace injuries and accidents. In their study to examine the effects of supervisory monitoring and rewarding of subordinates 'safety performance, Zohar and Luria (2003) observed that when supervisors interacted with their subordinates on safety issues, employees tended to exhibit better safety behaviours. Using SEM analyses, Dahl and Olsen (2013) revealed that leadership involvement in daily work operations had a significant positive influence on the level of safety compliance on offshore platforms. In an earlier study, Hayes et al. (1998) found that supervisor safety and management safety were among the best predictors of perceived workplace safety. In a different study involving seafarers within the container shipping context in Taiwan, Lu and Tsai (2008) found that supervisor safety, measured using seven items, had a significant effect on safety compliance behaviour of seafarers in comparison to safety management practices and safety policy. In addition to supervisory safety practices, co-worker safety climate, defined as the degree to which safety is a real priority of the co-workers, was also found to significantly affect safety behaviours of employees (Brondino, Silva, & Pasini, 2012). In a different study, Arboleda, Morrow, Crum, and Shelley (2003) revealed that management practices were significant antecedents of safety culture within the trucking Industry in the USA. They recommended that improving safety management practices by giving driver fatigue training, drivers the opportunity for safety input, and showing top management commitment to safety were important to strengthen employees' perceptions of safety culture.

Within the context of Malaysia, studies reported a significant association between employee perceptions toward safety and safety behaviour. In a study among fire fighters, Subramaniam et al. (2013) revealed that management commitment, safety training, and safety rules and procedures were positively related to safety compliance. In examining the influence of safety training practices on safety performance, Shah Rollah et al. (2014) revealed a positive and significant link between the two among 696 employee in automotive manufacturing and assembly plants in Malaysia. In a study of 418 employees in three public hospitals in Malaysia, Abdullah et al. (2009) showed that employees perceived safety reporting as the most important dimension and work pressure as the least important component in the OHS practices in their workplaces.

Based on the above discussion, we hypothesized that employee perceptions of each safety facet are likely to enhance safety compliance.

METHOD

Research Context and Sample

To achieve the research objective, we conducted our study at the Property Operation Division of a big telecommunication company in Malaysia. The Division is responsible for managing the facilities provided to the main company such as power supplies, firefighting appliances, air condition facilities and other infrastructure requirements. At the time of the study, the Division had 574 employees, of whom 90 percent were either directly involved in maintaining the facility services or administering the contractors responsible for the overall facility maintenance throughout Malaysia. The Division itself recorded near accident cases in 2008 due to non-conformity to safety behaviour that almost claimed several lives.

The present study was conducted among different levels of technical employees at the Division. The employees were involved in various maintenance and engineering jobs such as mechanical, electrical, civil and structural. This group of employees was selected because their job entailed the highest risk compared to other groups of employees in the company. These employees worked in groups for installation works. Generally the job they were involved in was associated with various forms of physical hazards namely mechanical hazards, electrical hazards, working with heights, fall related hazards, radiation hazards etc. To ensure that they were aware of their safety and they understood the need to reduce the accident rate in the company, they were given daily safety briefings from the safety and health officer before they started work. Besides these briefings, the company also implemented periodic safety trainings, enforced safety rules and regulations, carried out safety promotional activities etc.

Data Collection Procedure

After approval to conduct the research was given, we distributed self-reported questionnaires to participants, who were selected randomly based on a list obtained from the company's human resource department directory. We personally approached the selected participants to complete the questionnaire. By doing this, we were able to explain to them the purpose of the study, entertain questions they might have, and encourage them to participate by assuring them of their confidentiality and anonymity.

Although the survey items were originally in English, they were translated into Malay for the convenience of the participants. To ensure that the translation was equivalent to the original items, back translation was utilized (Brislin, 1970). The final version of the questionnaire in Malay was then pre-tested to eliminate ambiguous items. To ensure that the instrument was applicable to the telecommunication industry, three expert opinions in occupational safety specifically with technical background were solicited. Their comments and feedback were later incorporated into the final survey before distribution.

A potential threat in a self-reported survey is common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Literatures suggest two ways to address this issue: administratively and statistically (Chang, van Witteloostuijn, & Eden, 2010). The statistical testing for checking this threat will be dealt with later in the Result section. Administratively, common method bias was dealt with in several ways, following the recommendation of Chang et al. (2010). Guaranteeing anonymity and confidentiality, assuring the participants that there were no right or wrong answers, encouraging them to answer as honestly as possible, and checking the items with the experts were some of the measures we took to deal with such bias.

After two months of data collection and after multiple follow-up visits, 157 questionnaires were returned. However, 22 of them were incomplete and removed from analysis. All in, 135 questionnaires were usable for final analysis, yielding a response rate of 61.36 percent. Majority were male (78.5%) and Malays (86.7%) with an average of more than 15 years of working experience. More than half of the participants had different levels of technical jobs (61%) and almost half had a diploma certificate (45.2%).

Measures

Employee Perceptions of Safety

We used Workplace Safety Scale (WSS) developed by Hayes et al. (1998) to measure employee perceptions of safety. The Workplace Safety Scale (WSS) has five facets of workplace safety: job safety, co-worker safety, supervisor safety, management safety, and safety training. Each facet was measured by 10 items on a five-point Likert scale, ranging from '1' "strongly disagree" to '*5*' "strongly agree". A sample item of job safety was, "'Do you agree or disagree that your workplace is dangerous?", while an item of co-worker safety was "Do you agree or disagree that the people work with you ignore safety rules?" Supervisor safety was measured by items such as, "Do you agree or disagree that your immediate supervisor praises safe work behaviours?" On the other hand, a sample item of management safety practices was, "Do you agree or disagree that your management provides enough safety training?' and a sample item of satisfaction with safety program was, "Do you agree or not that the safety program at work is worthwhile?"

WSS was used because it has been reported to have good internal reliability, which ranged from .88 to .95 (Hayes et al., 1998). The WSS has been used to examine the influence of perceptions of workplace safety on safety-related variables in various countries such as in Africa (Gyekye, 2006; Salminen et al., 2013), Iran (Darvish, Zamahani, Masihi, Azizi, & Ghanbari, 2014), and Canada (McCaughey et al., 2013). These studies generally found the scale to be associated significantly with safety compliance (Darvish et al., 2014), low accident rates (Gyekye, 2006), and low injury and illness (McCaughey et al., 2013).

Safety Compliance

Safety compliance was measured by 11 items developed by Hayes et al. (1998). Participants were asked to indicate, on a five-point scale, ranging from '1' "never" to '*5*' "always", how frequently they engage in the behaviour on their current job, such as "Overlook safety procedures in order to get my job done more quickly," "Follow all safety procedures regardless of the situation you're in?," and "Take shortcuts to safe working behaviours in order to get the job done faster." The safety compliance measure by Hayes et al. (1998) was shown to have good psychometric properties in other studies (Darvish et al., 2014).

Demographic Variables

Gender, length of work experience, level of education, and levels of technical jobs were asked. Except length of work experiences which was considered a continuous variable, the others were measured on a categorical scale.

DATA ANALYSIS

The research model developed in the present investigation was tested using Partial Least Squares (PLS), a variance-based structural equation modelling approach (Henseler, Ringle, & Sinkovics, 2009). PLS has the ability to facilitate the assessment of both the measurement and

structural models (Roldán & Sánchez-Franco, 2012). This study utilized PLS for two main reasons: firstly, the aim of the study was oriented towards prediction of the dependent variable (Chin, 2010), and secondly, the latent variables' scores were used in the subsequent analysis for predictive relevance (Hair, Ringle, & Sarstedt, 2011). Hair et al. (2011) further stressed that these arguments have led to the widespread acceptance of PLS in many research. Specifically, this study used the SmartPLS approach introduced by Ringle, Wende, and Will (2005).

Prior to using PLS-SEM, data were also tested to check for common method variance. Podsakoff and Organ (1986) stressed that common method variance is an issue when a single latent variable accounts for the majority of the explained variance. To check for such bias, we used un-rotated exploratory factor analysis, as suggested by Podsakoff et al. (2003). Result indicated that the first factor extracted from the un-rotated exploratory factor analysis only accounted for 23.38% out of the total 73.06% variance, suggesting that such bias was not a serious problem in the present study.

RESULTS

Goodness of Measures

The reliability and validity of reflective measurement models were evaluated to test goodness of measure. One type of validity is construct validity, which examines the extent to which a set of measured items actually reflects the theoretical latent construct designed to measure. The construct validity of a measure comprises two components, namely, convergent and discriminant validity. Construct reliability is an internal consistency of a scale used to measure the latent variable statistically (Garver & Mentzer, 1999). It reflects the consistency of the developed measurement's scale. In testing goodness of measures, we examined all these psychometric properties of the scales used.

Convergent validity examines the degree to which the items measuring the same construct are in agreement. In the present study, we used the loading acceptable value of .707, as suggested by F. Hair, Sarstedt, Hopkins, and Kuppelwieser (2014). Any standardized loading estimates of items below the cut-off value of .707 were removed and the analysis was re-run with the exclusion of these items. The final output consisting of the remaining items with the standardized loading estimation exceeding the cut-off value of .707 is shown in Table 2. An average variance extracted (AVE) is used to evaluate the convergent validity of measurement models that use reflective measures. The AVE measures the variance captured by the indicators relative to measurement error. It is suggested that a value of .5 and above indicates adequate convergence (Bagozzi & Yi, 1988). In the present study, the AVE values ranged from .580 to .748 (refer to Table 2), which were well above the recommended value of .5.

Table 2. Results of Measurement Model

Model construct	Items	Loadings	AVE[a]	CR[b]
Co-worker safety	CS6	0.774	0.580	0.847
	CS8	0.771		
	CS9	0.787		
	recodecs10	0.712		
Compliance with safety behaviour	CSB10	0.734	0.641	0.877
	CSB11	0.823		
	CSB6	0.824		
	CSB7	0.818		
Job safety	JS4	0.825	0.734	0.917
	JS6	0.842		
	JS8	0.859		

	JS9	0.899		
Management safety	MSP10	0.768	0.609	0.916
	MSP2	0.818		
	MSP3	0.786		
	MSP5	0.731		
	MSP6	0.725		
	MSP7	0.804		
	MSP9	0.825		
Satisfaction with safety program	SP1	0.893	0.748	0.947
	SP2	0.900		
	SP3	0.887		
	SP4	0.852		
	SP5	0.860		
	SP8	0.792		
Supervisory safety	SS10	0.825	0.615	0.906
	SS3	0.798		
	SS5	0.782		
	SS6	0.779		
	SS7	0.752		
	SS9	0.769		

[a] *Composite reliability (CR) = (square of the summation of the factor loadings)/{(square of the summation of the factor loadings) + (square of the summation of the error variances)}*

[b] *Average variance extracted (AVE) = (summation of the square of the factor loadings)/{(summation of the square of the factor loadings)+(summation of the error variances)}*

Discriminant validity was conducted to verify that the developed scales measured different constructs (Garver & Mentzer, 1999). According to Hulland (1999), a construct will possess discriminant validity when it shares more variance with its own measures than to the other constructs. Fornell and Larcker's (1981) criterion was used to ascertain the discriminant validity of the scales because it is a widely accepted criterion. They suggested that the square root of AVE of a construct and the correlations of the respective construct are compared against other latent variables. Specifically, Table 3 shows the square root of the AVE (i.e. the diagonal) and the correlations between the constructs (i.e. the off-diagonal elements). To attain adequate discriminant validity, the diagonal elements should be significantly greater than the off-diagonal elements in the corresponding rows and columns (Fornell & Larcker, 1981; Roldán & Sánchez-Franco, 2012). Based on this criterion, Table 3 shows that the scales developed in this study had adequate discriminant validity (Chin, 2010), which means that each construct was related more strongly to its own measure than to others.

Table 3. Discriminant Validity of Constructs

	CS	SC	JS	MS	SP	SS
Co-worker safety (CS)	**0.762**					
Safety compliance (SC)	0.480	**0.801**				
Job safety (JS)	0.170	0.203	**0.857**			
Management safety practices (MS)	0.484	0.468	0.036	**0.780**		
Satisfaction with safety program (SP)	0.382	0.261	-0.067	0.545	**0.865**	
Supervisor safety (SS)	0.578	0.431	0.123	0.695	0.413	**0.784**

Note: Diagonals represent the square root of the AVE, while the off-diagonals represent the correlations.

Composite reliability (CR) is an indicator explaining the reliability of each latent variable; it precisely explains the convergence and internal consistency of the developed measures. According to Lin (2007), CR estimates the degree to which the respective indicators signal the latent construct. The CR estimates of the latent variables of the present study ranged from .847 to .947 (refer to Table 2), which exceeded the cut-off value of .7, as suggested to be representing

adequate reliability (Hair, Black, Babin, & Anderson, 2010). In sum, the measurement model of the present study demonstrated sufficient reliability and convergent validity, suggesting that all items were valid measures of their respective constructs based on parameter estimates and statistical significance.

Hypotheses Testing

After ascertaining the validity, reliability and common method bias of the measures used, path analysis was run to test the hypotheses. Figure 1 illustrates the results. The variance explained (R^2) was generated to signify the level of power in explaining the particular endogenous construct (i.e. Safety Compliance). The R^2 value of .323 indicates that 32.3% of the variance in Safety Compliance can be explained by the independent variables of Job Safety, Co-worker Safety, Supervisor Safety, Management Safety Practices, and Satisfaction with Safety Programs. In addition to the R^2 estimation, the study included predictive relevance Q^2, developed and suggested by Stone (1974) and Geisser (1975). The Q^2 is an additional assessment for model fit which is a criterion to evaluate how well the omitted data are estimated by the model. As suggested by Chin (2010), a model has predictive relevance when $Q^2 > 0$. Adhering to the blindfolding procedure in partial least square (PLS), we found that the value of Q^2 for Safety Compliance was .198, which was greater than zero. This means that the model exhibited an acceptable fit and high predictive relevance. Table 4 shows the result.

Table 4. Blindfolding Results

Construct	**CV Red (Q^2)**
Safety compliance	0.198

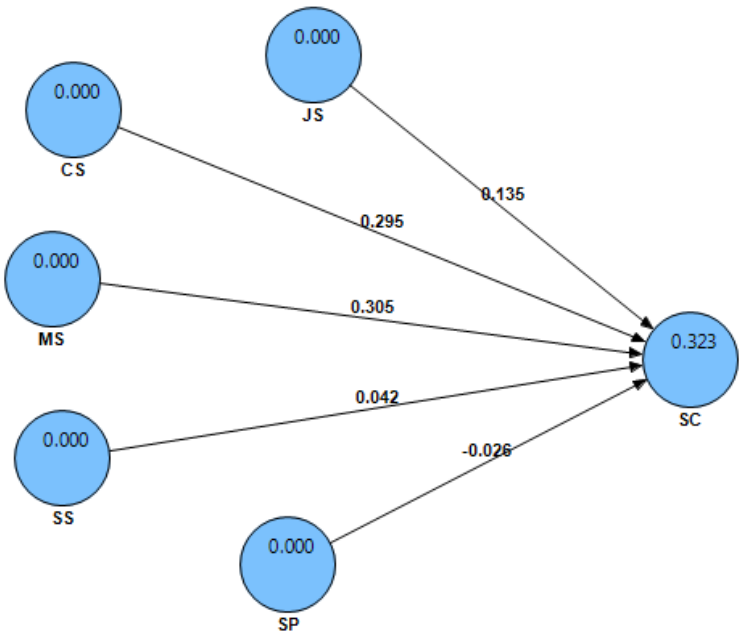

Figure 1. Results of Path Analysis

As suggested by Chin (2010), the statistical significance in partial least square was ascertained by using a re-sampling technique such as bootstrapping. This procedure provides t-test results for all path coefficients. The path coefficients (β) and t-statistics for the model were used to evaluate the relationship between the independent variable and the dependent variable. In other

words, the path coefficient and the t-value examined how the data support the hypothesized model. In the present study, a significant p-value below .01 (t-value > 2.33) and .05 (t-value > 1.65) for a one-tailed test was used.

Table 5 presents the result of the analysis on the structural model. We found Management Safety Practices ($\beta = .306$, $p < .01$) to be the most significant predictor of Safety Compliance, followed by Co-Worker Safety ($\beta = .295$, $p < .01$) and Job Safety ($\beta = .135$, $p < .05$). These three facets of workplace safety were positively related to Safety Compliance, which means that the more employees perceived that the management was implementing safety practices, that their co-workers were engaged in safe behaviour, and that their job was safe, the more compliant they were in exhibiting safe behaviour at work. No significant effect was found for Supervisor Safety and Satisfaction with Safety Programs.

Table 5. Path coefficients and Hypotheses Testing

Hypotheses	Beta	SE	*t*-value	Decision
Co-worker safety → Safety compliance	.295	.107	2.748**	Supported
Job safety → Safety compliance	.135	.073	1.842*	Supported
Management safety practices → Safety compliance	.306	.113	2.709**	Supported
Satisfaction with safety program → Safety compliance	-.02	.090	.293	Not Supported
Supervisor safety → Safety compliance	.049	.103	.407	Not Supported

***p < .01 (2.33), *p < .05 (1.645), SE = Standard Error*

DISCUSSION

We examined the role of employee perceptions of workplace safety, as measured by five safety facets, in influencing safety compliance. Contrary to our expectations, not all workplace safety facets significantly predicted safety compliance. Only three aspects were found to be significant in determining safety compliance. They were management safety practices, co-worker safety, and job safety. Of these three predictors, management safety practices played the biggest role, followed by co-worker safety and job safety. Our data suggested that different safety facets affected safety compliance differently, consistent with the findings of previous studies (Hayes et al., 1998; Lu & Tsai, 2008).

This finding suggests that in different work contexts, different safety aspects are more prominent in determining safety compliance. We conducted our study in a telecommunications company among technical employees, whose job might be exposed to different types and degrees of hazards and risks. In our study, the sampled employees were primarily involved in maintenance works, involving the installation of electrical components. In this type of job, they had to deal with high voltage currents, which could possibly endanger their lives. Because of the nature of the jobs, management commitment toward their safety was paramount in promoting safety compliance. The daily briefings on the importance of working safely could have played a key role toward this end. The fact that the Division almost lost several lives due to near misses that occurred in 2008 might further embolden the management's initiative in enhancing a climate where safety at work should take precedence. While safety perceptions of the employees were not studied before the near misses in 2008, it is safe to speculate that the incident could serve as a game changer in the way the management assessed safety at work. It is typical that people tend to be more safety oriented after they have encountered adverse incidents in their lives. In this context, the management might bolster its safety practices and policies after such incident, fearing that it could run into significant losses if such occurrence happens again. In her study on hospital employees on the role of management safety practices

in safety performance, Vredenburgh (2002) concluded that when the organization derives financial benefit when it takes proactive measures to protect its employees.

The role of management practices as the key predictor of safety compliance is not surprising given the similar findings reported elsewhere (Ali, Abdullah, & Subramaniam, 2009; Arboleda et al., 2003; Gyekye, 2007; Vredenburgh, 2002). Management safety practices reflect the commitment and desire of the organization to ensure that safety is a priority. By providing sufficient safety programs, conducting frequent safety inspections, investigating safety problems, providing safe working conditions, and responding quickly to safety concerns, the management is seen as providing the necessary support when it comes to safety. Research has indicated that employees who perceive that the management is supportive and concerned about the well-being of the employees when it comes to safety issues tend to reciprocate by engaging in safe behaviours at work (Ali et al., 2009; Michael, Evans, Jansen, & Haight, 2005), consistent with social exchange theory (Gouldner, 1960). Gyekye (2007) maintained that when the management implements safety practices such as providing the right job equipment, visiting workplaces to alert the employees of dangerous work practices as well as informing hazards, and praising and rewarding safety behaviours, the employees are encouraged and motivated to work safely.

We also argue that co-workers may behave safely at work as a result of the management safety practices implemented in the company. Because of the dangerous nature of the job, it had always been the priority of the management of the company to ensure that the maintenance employees receive much safety training and are provided with safe equipment. Furthermore, given that this group of employees possessed the necessary qualifications to do their job, the management safety practices instituted could reinforce the need to be working safely in the field. Vinodkumar and Bhasi (2009) found that employees with higher qualifications could understand safety rules and regulations better because of their knowledge. Gyekye and Salminen (2009) also showed that better educated employees were more committed to safe work behaviour.

As the employees in our study tended to work in groups, it was not surprising that co-worker safety was found to be significant in determining safety compliance, above and beyond job safety. While their job was inherently unsafe, we found that co-workers' safe behaviour played a much bigger role in influencing other employees to engage in safe acts. As the closest individuals who work together in a job, any dangerous acts by other employees could affect their well-being and safety as well. So, they constantly are in the lookout for each other's safety and encourage each other to work in a safe manner. In other words, the work interdependence serves as an incentive for them to engage in safe acts. The result also resonates well with social information processing theory that suggests that people use cues in their environment to understand what behaviour is acceptable and what is not (Salancik & Pfeffer, 1978). In this case, when the co-workers insist that safety is important, the employees are likely to act accordingly. Consistently, social learning theory (Bandura, 1977) posits that individuals use vicarious learning to know how to act. In this case, the co-workers serve as a role model to other employees to work safely. The present result further corroborates previous findings on the influence of co-worker support on safety behaviour (Gillen et al., 2002; Jiang, Yu, Li, & Li, 2010; Turner, Chmiel, Hershcovis, & Walls, 2010).

Unexpectedly, we failed to find a link between supervisor safety and satisfaction with safety program. We speculate that the items in the supervisor scale could not have captured what it was intended to capture because the participants might have conflated the perception of management and supervisor. The participants might have assumed also that supervisors were representing the management because the Occupational Safety and Health Act (Act 514) in Malaysia does not clearly specify the roles of a supervisor even though it does so for the employer and the employees. This argument may hold since 35% of the participants indicated that they were indifferent to many supervisory safety items. The non-significance effect of

safety program on safety compliance may suggest that the current programs were not effective enough to produce the desired safety compliance or that the items asked on safety program were very general that they failed to capture the safety aspects of the specific tasks of the employees. Similar argument was also offered by Vinodkumar and Bhasi (2010) when they too found that safety promotion did not motivate safe behaviour in Kerala. They contended that non-task specific interventions could explain why they did not motivate the employees to engage in safety compliance. On these scores, we recommend that future researchers revisit the WSS items by adapting them to the context of future studies. In this way, meaningful results may be obtained.

Practical Implications

The findings suggest the importance of management safety practices, co-worker safety, and job safety in enhancing safety compliance among employees at work. Of these, management safety practices play the biggest role in ensuring that the employees work safely. It has been argued that management safety practices reflect the safety culture and safety climate in the organization (Ali et al., 2009; Arboleda et al., 2003; Gyekye, 2007; Michael et al., 2005; Vredenburgh, 2002). There is overwhelming evidence that points out to the significant role of safety climate/culture in encouraging and promoting safety behaviour at work (Ali et al., 2009; Arboleda et al., 2003; Brondino et al., 2012; Clarke, 2006; Gillen et al., 2002; Neal & Griffin, 2006).

A safety climate is said to be effective when employees internalize safety values and play the expected appropriate role when it comes to safety. To accomplish this, it is imperative that the management displays its commitment toward safety. Management commitment towards safety should not be merely reduced to displaying occupational safety and health policy as required by the Occupational Safety and Health Act (Act 514), which is a compulsory practice in Malaysia for all employers. However, what is more important is for the management to be seen as walking the talk because the management is constantly seen as a reference point for employees to work safely. In this context, the management should play a supportive and facilitative role toward enhancing workplace safety by providing enough safety programs that are task relevant, conducting frequent safety inspections, investigating safety problems quickly, instituting a reward programs to incentivize employees who work safely etc.

Workplace accidents can also be minimized when every employee understands that his/her behaviour can significantly affect the behaviour of other employees. This is especially important for employees who work in dangerous jobs and work in groups that the management gives them more attention by providing task-related interventions. As employees have to work in groups, it is important to stress that they need to watch each other's back for their own safety at work. In this context, the importance of working as a team should be emphasized so that every member in the group understands his/her role when it comes to safety. Safety leadership training is one area that needs to be implemented toward this end as a group leader can play a very important role in guiding and motivating group members to work safely. Mullen and Kelloway (2009) revealed in their longitudinal study that leadership training had a significant effect on safety compliance.

It is inevitable that some employees have to work in dangerous jobs. Despite being naturally dangerous, the management should play an active part in alleviating employee fears and anxiety when they are doing their job. Even though we failed to find a link between safety programs and safety compliance, it does not mean that safety programs are not important in reinforcing safety behaviour at work. The absence in the empirical link may suggest that the safety programs could have been ineffective in effecting the desired change in safety behaviour. If our contention is correct, it points out to the importance of tailoring the safety programs for specific

jobs/tasks. Such interventions are also meaningful in reducing and allaying fears and anxieties that the employees may have when doing dangerous jobs.

Limitations of Study and Future Research Directions

The findings of the present study need to be interpreted with caution by considering a few caveats. Firstly, the study was cross-sectional and hence causality was difficult to be inferred. Secondly, the external validity of the findings may be suspect due to small sample size. Thirdly, despite the statistical and administrative procedures to address common method variance, such bias cannot be ruled out entirely in affecting the findings. Despite these limitations, we argue that the present study has managed to add to the literatures in that safety compliance is affected by different facets of safety perceptions. However, to what extent such finding holds true in other industries needs to be investigated. This is because, to be effective, safety intervention programs need to be tailored to different work environments. Furthermore, as resources are limited, organizations have to prioritize safety areas that need more focus. Secondly, the non-significance effects of safety training and supervisory safety may suggest that the theoretical link between perception and behaviour (Brewer et al., 2007; Carver et al., 1983; Chartrand & Bargh, 1999) is not as simple and straightforward. We suggest that future studies consider relevant mediators and moderators to further understand the link between the two. Future research may also wish to consider looking at injuries rather than behaviour as the former offers a more objective manifestation of safety compliance.

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