Jurnal Kejuruteraan SI 2(1) 2019: 35-43
https://doi.org/10.17576/jkukm-2019-si2(1)-05

Determining Factors on Technical Instructors' Safety Culture Using Structural Analysis Approach

(Menentukan Faktor-Faktor Budaya Keselamatan dalam Kalangan Tenaga Pengajar Teknikal Menggunakan Pendekatan Analisis Berstruktur)

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Received 11th August 2018, Received in revised form 28 March 2019
Accepted 24 April 2019, Available online 30 June 2019

ABSTRACT

Studies on safety culture have been increasing and several proposed models have been developed and evaluated to identify their key dimensions contributed to many occupational sectors. However, less of safety culture studies focused at education sector especially in Malaysia. This study aims to seek a deeper understanding of the structures of safety culture in Malaysian education sector mainly at Technical and Vocational Education Training (TVET). The objective also to investigate the relationship between psychological, behaviourial and situational dimension with safety culture, and to find out what can be done by the top management to increase safety culture in education sector. Data was collected from 391 Vocational Colleges' (VC) instructor all over Malaysia that being selected using multistage sampling. Data was analyzed using SPSS 24 and SmartPLS-Structural Equation Modeling (SEM) technique. Partial least squares analysis revealed Influence of Peers, Safety Knowledge, Safety Communication, Safety Rules, Personnel Protective Equipment and Safety Training plays a pivotal role in inspiring the safety culture among the instructor. Assessment of Importance Performance Matrix Analysis (IPMA) showed that Safety Knowledge, Safety Rule, Influence of Peers and Safety Training are very important factors in determining a safety culture due to their relatively higher importance values compared to the rest of the variables. The study will help to improve safety culture in education sector and expected to bring in more safety awareness among instructor, which will inevitably bring in a culture of safe behavior. The ultimate result will be a substantial reduction or elimination in safety-related incidents and make an education sector as a safe workplace. Only a very few have examined the safety culture factors among VCs' instructor as one of the TVET organisastion, and the used of Smart PLS is a novel idea, with the post analysis of IPMA gives an indicator to the top management of TVET's education and Malaysia Ministry of Education (MOE) in build safety culture in this sector. Compliance of OSHA 1994 is seen as a good measure to build an education sector as a safe workplace.

Keywords: Safety culture; Education; Instructors; Vocational college; PLS-SEM

ABSTRAK

Dewasa ini kajian berkaitan budaya keselamatan semakin berkembang dan terdapat beberapa model telah dibangunkan dan dinilai untuk mengenal pasti dimensi utama yang menyumbang kepada pembentukan budaya keselamatan di pelbagai sektor pekerjaan. Walau bagaimanapun, kurang tumpuan diberikan kepada sektor pendidikan terutamanya di Malaysia. Kajian ini bertujuan untuk mendapatkan pemahaman yang lebih mendalam berkaitan struktur budaya keselamatan di sektor pendidikan Malaysia iaitu di Latihan Pendidikan Teknik dan Vokasional (TVET). Objektif kajian ini juga adalah untuk mengkaji hubungan antara dimensi psikologi, tingkah laku dan situasi dengan budaya keselamatan, dan untuk mengetahui tindakan yang boleh dilakukan oleh pihak pengurusan untuk meningkatkan budaya keselamatan di sektor pendidikan. Data dikumpul dari 391 tenaga pengajar Kolej Vokasional (KV) di seluruh Malaysia yang dipilih menggunakan pensampelan pelbagai *peringkat. Data dianalisis dengan menggunakan perisian SPSS 24 dan SmartPLS-Pemodelan Persamaan Struktur (SEM). Analisis mendapati faktor seperti pengaruh rakan sekerja, pengetahuan keselamatan, komunikasi keselamatan, peraturan keselamatan, peralatan perlindungan diri dan latihan keselamatan memainkan peranan penting dalam pembentukan budaya keselamatan dalam kalangan tenaga pengajar KV. Analisis Matriks Prestasi dan Kepentingan (IPMA) juga menunjukkan faktor-faktor yang dinyatakan tadi mempunyai nilai kepentingan relatif yang lebih tinggi berbanding dengan faktor lain. Kajian ini dapat membantu dalam pemupukan budaya keselamatan di sektor pendidikan dan meningkatkan kesedaran keselamatan dalam kalangan pengajar, seterusnya pembentukan budaya tingkah laku selamat. Paling utama merupakan pengurangan kes kemalangan dan insiden keselamatan dan menjadikan sektor pendidikan sebagai tempat kerja yang selamat. Faktor kurangnya kajian budaya keselamatan dalam kalangan tenaga pengajar KV sebagai salah satu organisasi TVET, penggunaan Smart PLS untuk analisa merupakan kaedah yang berkesan serta analisis IPMA telah memberikan penujuk penting kepada pihak pengurusan TVET dan Kementerian Pendidikan Malaysia dalam pembentukan budaya keselamatan yang positif di sektor pendidikan. Pematuhan terhadap AKKP 1994 dilihat sebagai langkah yang baik untuk menjadikan sektor pendidikan sebagai tempat kerja yang selamat.*

Kata kunci: Budaya keselamatan; Pendidikan; Tenaga pengajar; Kolej vokasional; PLS-SEM

INTRODUCTION

Vocational education is part of a social and economic context that evolves constantly in response to the major changes in education environment (ILO 2010). The school system, in general, and the vocational education sector in particular have had to adapt to these changes, and teaching approaches have also been transformed (Salimi 2013). As a result, the teaching and learning process among instructors' at vocational education facing lots of transformation with the used of many machines, technical activities that introduced them with many hazards and danger in a workplace. Therefore, the association between vocational education and OSH is not an outlandish notions and the necessity of education for improving the OSH status among their instructors are really important and need to streessed on. The concentration can be placed on gradual acquiring social and professional skills promoting the concept of health, safety and well-being at work, and in life in general as an adult and citizen.

Occupational Safety and Health Act (OSHA) 1994 stated the self regulation concept was promulgated based on the primary responsibility of ensuring safety, health and welfare of all persons at all places of work (Lyons, 2016). This Act lays down the general principles of prevention and the basic conditions for the purposes of ensuring occupational safety and health protection, and for avoiding risks and factors causing occupational accidents, occupational diseases and other damage to health from work (Schröder et al. 2015). The Act accentuates the role of education and motivation connected with OHS. Education is a strong tool in systematic building and advancement of special knowledge, abilities and skills as well as in creation of desired attitudes towards OHS issues including occupational environment, safety of technical equipments and optimization of working conditions (Kosyrev et al. 2009). That means an adequate incorporation of OHS's problems into lifetime education process which includes mainly professional education, capability growth, retraining, postgraduate courses and acquirement of new skills and competences of occupational safety and health protection as well as methods of risk's prevention is a subject of education at schools which prepare students for exercise of a profession (Feszterová 2015).

Instructors in TVET organisation such as Vocational College are connected with a particular danger. Workplace has to meet all safety conditions for safety and health protection at work (Shyamal Majumdar 2011). The teaching and learning process in workshops and laboratory by choosing proper technique and keeping rules of OHS helps to improve safety between the instructor and also students. It is further ensured that the safety and health of the instructors are not only threatened by the workplace, access roads, working equipment, materials, working procedures, manufacturing procedures, arrangements of workplaces and work organisation, and that the safety and health of the employees are not threatened by chemical factors, physical factors, biological factors, factors influencing the psychological workload and social factors (Feszterová 2015). Harmful factors of the environment and workplace are physical, chemical and biological factors, which according contemporary knowledge of science cause or can cause health disorders, and also stress factors caused by living conditions which adversely affect the physiologic and psychic functions of peoples. Behavior and attitudes patterns need to be addressed via proper educative and legislative approaches (Ismail et al. 2015).

An organisation's success or failure is also determine by the role of safety culture (Sukadarin et al. 2012). A development of positive safety culture provided little guidance on how organizations might improve safety performance. A goal of positive safety culture is to create an atmosphere in which employees are aware of the risk in their workplace, continually on guard against them, and avoid taking any unsafe actions (Ostrom et al. 1993). Necessary and very effective part of researches nowadays is more on the safety culture in occupational sector such as construction, manufacturing, shipping and, mining but less in education sector. In this article, the important of safety culture in education sector was point out that education and safety culture principles is very important as a preventive factor against accidents that may happen in this environment caused by the factors mention before.

Statistic of occupational accident reported in Malaysia illustrated an increasing number of accidents in services sector and statutory bodies during 2012-2016 (DOSH 2016) and decrease slowly at 2017 (reported until October). Table 1 shows the statistics report by Department of Occupational Safety and Health (DOSH) in that sector. The accidents and their consequences continue to be a major public health concern even tough the statistic data on accidents occurred in this sector quite low than other sector such as manufacturing, construction and others. Newspaper keeps reporting on many accident cases occurred in education sector showing some indicator of low level of safety culture in this sector especially in education sector is quite low (Kamilah et al. 2018).

TABLE 1. The Number of Accidents (Reported and Investigated) In The Service Sector And Statutory Bodies In Malaysia From 2012-2017

Year	Number of Accidents	Fatal	Without Dissabilities	Permanent Dissabilities
2012	54	4	49	1
2013	67	0	67	0
2014	25	5	20	0
2015	32	0	31	1
2016	110	6	101	3
2017	47	4	43	0

In this article, the important of safety culture in education sector was point out that education and safety culture principles is very important as a preventive factor against accidents that may happen in this environment caused by the factors mention before.

RESEARCH MODEL

SAFETY CULTURE AND ITS CONTRIBUTING FACTORS

Many debates have emerged among researchers on the definitions of safety culture. The safety culture concept plays critical role in used by people throughout the world, and explains everything, which is connected with safety, defeats and failures in this area (Curie-Sklodowska and Szubielska 2013). This paper particularly adopt definitions by Hale (2000) in which safety culture is defines as values, attitudes, ways of perceiving shared by a group influencing on defining by it the norms and values, which determine the way of reacting according to actions and risk reaction and risk control systems. A conclusion results from the literature overview that safety culture is non-united concept according to research assumptions. Some of the models emphasise the development of observable indicators of safety culture, whilst others concentrate more on identification of basic assumptions of safety culture which are created on the base of group and by this group accepted, and lead to safe and efficient action (Curie-Sklodowska & Szubielska 2013). Previous literature reviewed on the safety culture model in many occupational sector, has shown less focus for a model that will incorporates in education sector.

Bandura (1986) is the first researcher tried to interpret the concept of safety culture in terms of reciprocal determinism based on Social Cognitive Theory, and derived three components: behaviour, person and environment. Later, Geller (1997) adopted Bandura (1986) work and made an excellent effort to identify the characteristics for each component and that leading to the development of a model called Total Safety Culture. Cooper (2000) adopted and developed Bandura (1986), asserted through his new model that safety culture is a product based on interactions between people, jobs and organisations and called that model as a Reciprocal Safety Culture Model.

Using Reciprocal Safety Culture Model as a baseline, this study specifically looked into psychological dimension (safety attitude, safety knowledge and peers influence), behaviourial dimension (management commitment, safety communication and reward and recognition) and situational dimension (safety rules, PPE, safety training, and accident and incident reporting) as key contributors to safety culture at vocational education institution. Specifically, we hypothesized that the elements in each dimension are directly contribute to safety culture. For this reason this framework is applied as the model of study (see Figure 1).

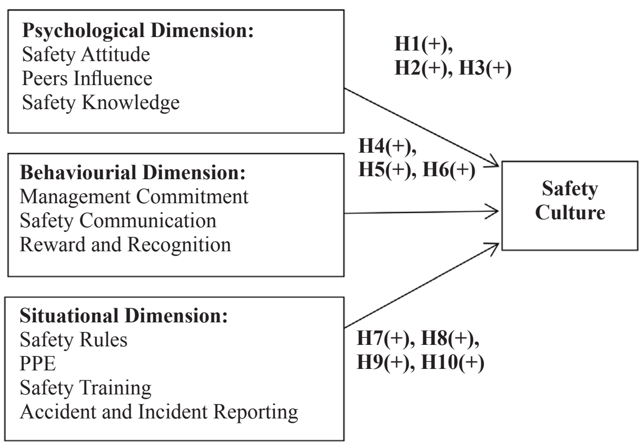

FIGURE 1. Research Model

METHODOLOGY

SAMPLE AND DATA COLLECTION

This research employed explanatory research design with survey as major data collection technique. The selection of the research design was based on the nature of the research objectives that involved hypothesis testing and the need to observe the phenomenon in its natural setting. Data were collected with a structured questionnaire survey. Questionnaire was adapted from previous studies that showed high internal consistency.

All of the constructs were measured based on scales developed by previous researchers. There were three constructs under psychological dimension that were safety attitude, influence of peers and safety knowledge. Safety attitude was measured based on a scale by Idrus et al. (2004) containing eleven items. The Cronbach's alpha reported by Idrus et al. (2004) was 0.91. Influence of peers was measured based on a scale developed by Frazier (2011) containing ten items. The Cronbach's alpha reported by Frazier (2011) was 0.84. Safety knowledge was measured based on a scale developed by Vinodkumar & Bhasi (2010) containing six items. The Cronbach's alpha reported by Vinodkumar & Bhasi (2010) was 0.77.

For the behaviourial dimension, there were three constructs, which were management commitment, safety communication and, reward and recognition. Management commitment was measured based on a scale developed by Vinodkumar & Bhasi (2010) containing seven items and the Cronbach's alpha reported by was 0.86. Safety communication was measured based on a scale developed by Chenhall (2010) containing four items. The Cronbach's alpha reported by Chenhall (2010) was 0.88. Reward and recognition was measured based on a scale developed by Frazier (2011) containing eight items with the Cronbach's alpha reported was 0.94

Lastly for the situational dimension, there were four constructs in it, which were safety rule, safety training, personnel protective equipment and accident and incident reporting. Safety rule was measured based on a scale developed by Idrus et al. (2004). The Cronbach's alpha reported by Idrus et al. (2004) was 0.92. containing five training was measured based on a scale develop by Vinodkumar & Bhasi (2010) containing five items. The Cronbach's alpha reported was 0.82. Safety training was measured based on a scale develop by Vinodkumar & Bhasi (2010) containing five items. The Cronbach's alpha reported was 0.82. PPE was measured based on a scale developed by Idrus et al. (2004) containing eight items with the Cronbach's alpha reported was 0.86. Accident and incident reporting was measured based on a scale develop by Abdullah, (2010) containing five items and the Cronbach's alpha reported was 0.764.

Unit of analysis are the instructors working at Malaysia TVET sector focusly in Vocational College (VC). The instructors' involved in this study were the only involved in teaching Engineering and Technology courses. To decide on the sample size of the respondents for this study, we first used the GPower software to calculate the minimum sample size required. Since the model had a maximum of 10 predictors (for the variables in each dimension), the effect size was set as small (0.02) and power needed as 0.95. The sample size required was 172. Hence we set out to collect data that was slightly larger than the required number.

There were about 62 VC all over Malaysia that offers Engineering Technology courses. 38 VCs' were randomly selected using cluster-sampling technique (the type of probability sampling). A total of 447 sets of questionnaires were distributed were not fully answered, 391 were accepted for further analysis based on cluster sampling interpreted using SPSS Version 24 and path analysis using SmartPLS 3.0.technique.

MEASURES

Data was collected using a structured questionnaire. The items or measures for all these variables were adapted from many previous researchers and anchored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). Partial Least Squares (PLS) analysis technique using the SmartPLS 3.0 software (Ringle et al. 2015) is used to analyze the research model. The measurement model was tested (validity and reliability of the measures) and followed by an examination of the structural model (testing the hypothesized relationships) (Hair, Hult, Ringle & Sarstedt, 2014; Ramayah et al. 2011; Ramayah et al. 2013). Bootstrapping method was used to test the significance of the path coefficients and the loadings (Hair et al. 2014). IPMA asessment as a post analysis is used to see the importance and performance of each variable towards safety culture.

RESPONDENT'S PROFILE

A total of 391 VC's instructor responded to the questionnaire. The SPSS 24 software was used to obtain the frequencies of the demographic profile. In summary, the majorities of the respondents are more than 46 years old (33.7%), are male (68.7%), are equipped with undergraduate degrees (69.5%) and with working experience more than 15 years in VC (45.0%). The response rate is 89% of sample size.

ASSESSMENT OF MEASUREMENT MODEL

Based on partial least squares structural equation modeling (PLS-SEM), the measurement model was assessed first using SmartPLS 3.0. To assess the measurement model, the convergent validity, discriminant validity, and reliability of the measurements used were examined.

To assess convergent validity, the factor loadings and the average variance extracted (AVE) were examined. First of all, the factor loadings of each variable were inspected. The individual loadings that are above 0.70 on each variable are deemed significant (Hair et al. 2014). Indicators with very low loadings below 0.40 should be deleted (Hair et al. 2014). No indicators were below 0.40 and as a result, no indicators were deleted. There are several indicators that are between 0.40 and 0.70 but it was not required to be deleted because the AVEs are already above the recommended values (Hair et al. 2014). All of the AVEs for each indicator are above 0.50, which is the recommended cut-off value (Hair et al. 2014). The rest of the indicators have loadings well above 0.70 for each respective variable. Thus, the measurements used for each variable in this study are convergently valid.

To assess reliability, the composite reliability for each variable was examined. The value of composite reliability for all variables is above 0.60, which is the acceptable cut-off value (Hair et al. 2014). Therefore, the measurement used for each variable in this study was reliable. As to assess discriminant validity, the indicators should load more strongly on their own constructs than on other constructs in the model, the average variance shared between each constructs and its measures should be greater than the variance between the constructs and other constructs (Fornell & Larcker 1981). All constructs in this study exhibit sufficient or satisfactory discriminant validity (Fornell & Larcker 1981), where the square root of AVE (diagonal) is larger than the correlations (off-diagonal) for all reflective constructs.

The other method of assessing discrimant validity is by using Heterotrait-Monotrait Ratio (HTMT) technique developed by (Henseler, Ringle & Sarstedt, 2014). As shown in Table 5, all the values fullfill the criterion of $HTMT_{.90}$ (Gold, Malhotra & Segars, 2001) and the $HTMT_{.85}$ (Kline, 2015). This indicates that discriminant validity has been ascertained. Besides the result of HTMT inference also shows that the confidence interval does not show a value of 1 on any of the constructs (Henseler et al. 2014), which also confirms discriminant validity.

RESULTS

ASSESSMENT OF STRUCTURAL MODEL: COLLINEARITY ASSESSMENT

The variance inflation factor (VIF) values for all exogenous variables were examined to assess collinearity. Using SPSS 24, safety attitude, influence of peers, management commitment, safety communication, safety knowledge, reward and recognition, safety rules, safety training, personnal protective equipment and, accident and incident reporting, were regressed against safety culture to obtain the VIF values. The VIF values are 1.500 (SA), 2.033 (INF), 2.443 (MC), 2.476 (COM), 1.772 (REW), 1.937 (SKNOW), 1.662 (RULE), 1.823 (PPE), 1.809 (TRAIN) and 1.901 (REPORT). None of the variables have a VIF value above 5.00, which is the recommended cut-off value (Hair et al. 2014). Therefore, there is no collinearity issue in this study.

TABLE 2. Hypothesis Testing

Hypothesis	Relationship	Std β	t-value	Decision	R^2	Q^2
H1	SA → SC	0.06	1.19	Rejected	0.46	0.26
H2	INF → SC	0.15	2.39***	Supported		
H3	SKNOW → SC	0.21	3.75***	Supported		
H4	MC → SC	-0.10	1.30	Rejected		
H5	COM → SC	0.13	2.12**	Supported		
H6	REW → SC	0.05	0.91	Rejected		
H7	RULE → SC	0.13	2.68***	Supported		
H8	PPE → SC	0.09	1.51*	Supported		
H9	TRAIN → SC	0.15	2.56***	Supported		
H10	REPORT → SC	-0.08	1.38	Rejected		

***p < 0.01 **p < 0.05 *p < 0.10

HYPOTHESIS TESTING

In this study, 10 direct hypotheses are developed between the constructs. In order to obtain the standardised path coefficients, standard errors, and *t* values in order to assess the significance of each hypothesised relationship for all paths are generated using SmartPLS3.0 bootstrapping function. Based on the assessment of the path coefficient as shown in Table 2, it was found that safety attitude (H1) and reward and recognition (H6) was not supported to have a positive significant relationship with safety culture. While the influence of peers (H2) ($\beta = 0.151$, $p < 0.01$), safety knowledge (H3) ($\beta = 0.207$, $p < 0.01$), safety communication (H5) ($\beta = 0.130$, $p < 0.05$), safety rules (H7) ($\beta = 0.131$, $p < 0.01$), personnel protective equipment (H8) ($\beta = 0.092$, $p < 0.10$) and safety training (H9) ($\beta = 0.146$, $p < 0.01$) had a significant positive relationship with safety culture. Interestingly there were two hypotheses, which was management commitment (H4) ($\beta = -0.092$, $p < 0.10$) and, accident and incident reporting (H10) ($\beta = -0.076$, $p < 0.10$) have a negative significant relationship with safety culture. With that, these hypotheses were rejected. Thus, all hypotheses are support except for H1, H4, H6 and H10.

The coefficients of determination (R^2) are 0.457 for safety culture. It can be interpreted that all elements in three dimension of safety culture (psychological, behaviourial and situational) explain 45.7% of safety culture in Malaysian education sector. It means that 54.3% of the variance in safety culture is explained by other factors which are not covered in this study. The R^2 value of 0.457 is above the 0.26 value as suggested by Cohen (1988) which indicates a substantial model. Figure 2 shows the path analysis of structural model.

EFFECT SIZE

Beside the value of R^2 alone, the change in R^2 value when a specific exogenous variable is omitted from the model was also being calculated and examined in order to assess the magnitude of the impact of the exogenous variable on an endogenous variable (Hair et al. 2014). According to Sullivan and Feinn (2012) effect size played as a practical guide to interpret the practical importance of a specific relationship. This can be done by calculating the f^2 effect size for each relationship and the results are shown in Table 3 below. The

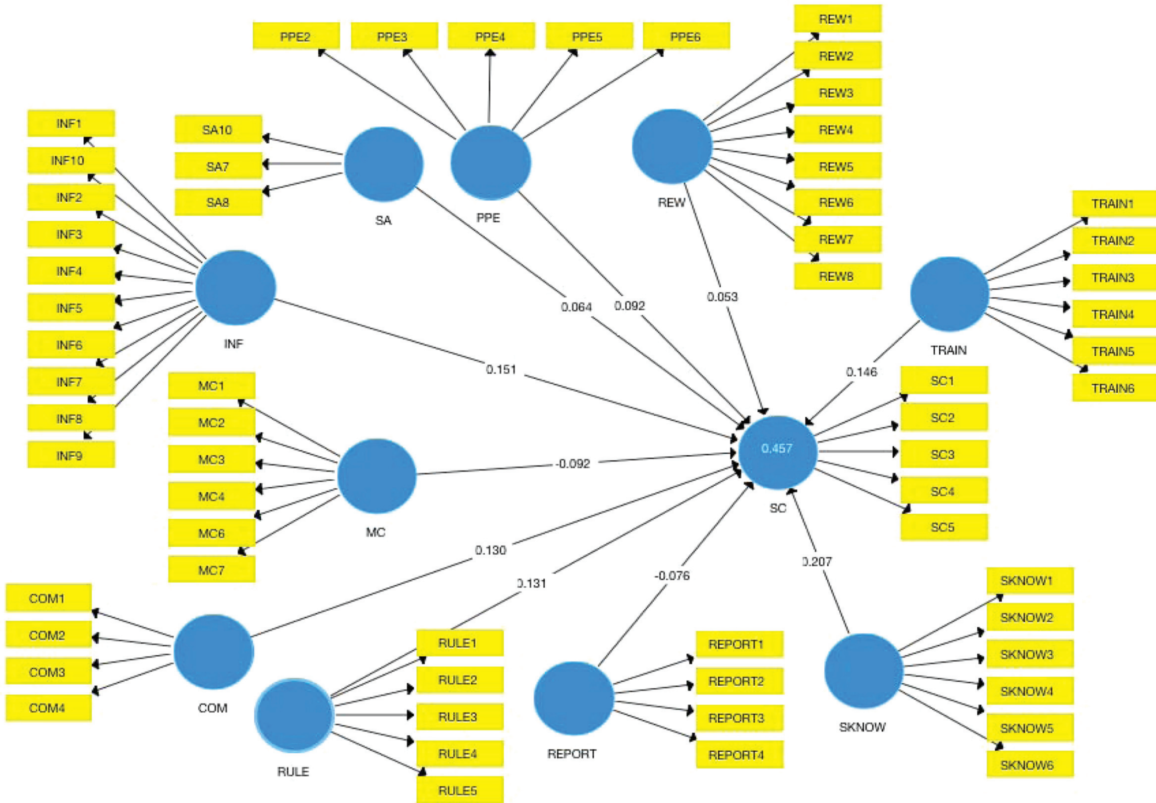

FIGURE 2. Structural Model Path Analysis of Safety Culture Education Model

f^2 effect size is calculated manually (Hair et al. 2014) just to the supported relationships.

Rule of thumb for effect size is that the f^2 values of 0.02, 0.15, and 0.35 represent small, medium and large effect size respectively (Cohen 1988). Based on the rule, it can be interpreted that influence of peers, safety communication, safety knowledge, safety rules, personnel protective equipment and safety training has a small effect on safety culture amounting to 2.1%, 1.3%, 4.1%, 1.9%, 0.9% and 2.3%. Eventhough with a small effect size, according to (Sullivan & Feinn 2012), small effect size does not necessarily imply the effect is not important. Furthermore, all the hypothesised relationships in Table 2 were already shown to be does not necessarily imply the effect is not important statistically significant, all of the relationships here are deemed important and meaningful judging by the effect sizes found. Looking at the f^2 values in Table 3, it can be observed that all the relationships showed relationships with small effect sizes.

PREDICTIVE RELEVENCY OF THE MODEL

In addition, the predictive relevance of the model is examined using the blindfolding procedure in SmartPLS3.0. Hair et al. (2014) recommended the cross-validated redundancy to calculate Q^2. Blindfolding is a sample reuse technique that omits every *d*th data point in the construct's indicators of the endogenous variable and uses the resulting estimates to predict the omitted part (Hair et al. 2014). An omission distance between 5 and 10 is recommended to be used to calculate the Q^2 (Hair et al. 2014). In this study, an omission distance of 7 was chosen to calculate the Q^2.

If the Q^2 value is larger than 0, the model had predictive relevance for a certain endogenous construct (Fornell & Larcker 1981; Hair et al. 2014). The Q^2 for safety culture is 0.256 is more than 0, indicating that the model has sufficient predictive relevance. Hair et al. (2014) also state that as a relative measure of predictive relevance, the values of 0.02, 0.15 and 0.35 indicate that an exogenus construct has a small, medium, or large predictive relevance for a certain endogenous construct.

TABLE 3. Effect Size For Direct Effect

Relationship	f^2	Magnitude
INF → SC	0.0207	Small
SKNOW → SC	0.0429	Small
COM → SC	0.0126	Small
RULE → SC	0.0189	Small
PPE → SC	0.0086	Small
TRAIN → SC	0.0228	Small

ASSESSMENT OF IMPORTANCE AND PERFORMANCE ANALYSIS

A post-hoc IPMA was run as an extension to the results of the study using Safety Culture as the target construct or outcome variable. The IPMA builds on the PLS estimates of the structural model relationships (importance of each latent variable) and includes an additional dimension to the analysis that considers the latent variables' average values (performance) (Hair et al. 2014). Due to Völckner et al. (2010), the Importance scores were derived from the total effects of the estimated relationships in the structural model for explaining the variance of the endogenous target construct or outcome variable. On the other hand, the computation of the performance scores or index values were carried out by rescaling the latent variables scores to range from 0 which is for the lowest performance, to 100 for the highest performance (Hair et al. 2014). Table 4 presents the results of total effects (importance) and index values (performance) used for the IPMA.

TABLE 4. Index Value and Total Effect

Latent Variable	Total effect of the latent variable Safety Culture (Importance)	Index values Performance)
Safety Attitude	0.060	79.000
Influence of peers	0.152	78.878
Safety Knowledge	0.202	71.722
Management Commitment	-0.060	74.000
Safety Communication	0.079	72.400
Reward and Recognition	0.030	70.000
Safety Rule	0.153	73.031
PPE	0.085	76.651
Safety Training	0.117	61.058
Accident and Incident Reporting	-0.071	27.650

We plotted the index values and total effects scores out in a priority map as shown in Figure 3. Based on Figure 3, it can be observed that Safety Knowledge, Safety Rule, Influence of Peers and Safety Training are very important factors in determining a safety culture among VC's instructor due to their relatively higher importance values compared to the rest of the variables. However the performance of these two important factors lagged behind Safety Attitude. Though variables such as Management Commitment, Safety Attitude, PPE, Safety Communication and Reward and Recognition scored relatively high in performance, it has little relevance in influencing VC's instructors Safety Culture. With respect to the predecessors of Safety Knowledge, Safety Rule, Influence of Peers and Safety Training, the constructs Safety Communication, PPE and Safety Attitude exhibited intermediate importance and performance compared with the other constructs.

DISCUSSION AND CONCLUSION

In this study, Reciprocal Safety Culture Model Cooper (2000) was replicated and validated using a larger sample. Analysis done had successfully proven that this model holds partially true at a different time, place, researchers and subjects of study

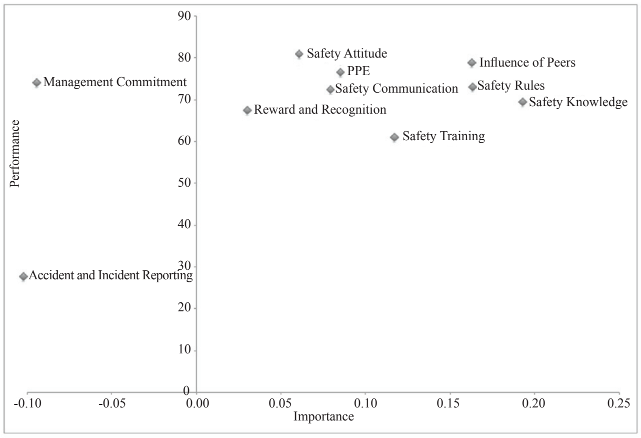

FIGURE 3. IPMA (Priority Map) for safety culture among VC's instructors

that is Malaysia. Replication is pivotal in providing support to any worthwhile model and in this case the replication model was the Reciprocal Safety Culture Model.

Our findings have shown that safety culture in TVET sector is affected by combination of phsycological, behaviourial and situational dimension of Cooper Model. With all the relationship between variables in each dimension toward safety culture, these study findings partially mirror the findings from previous researchers. These due the fact that, there is a non-significant relationship between safety attitude, management commitment and accident and incident reporting, towards safety culture which is really different to any results from previous researchers. Thus confirming that safety culture is different due to the different occupational environment and country (Ho et al. 2004; Zhang et al. 2012) and also workers background and working experience (Ibrahim et al. 2012).

The findings of this study should be interpreted in light of its limitations. First, only safey culture among the instructors was surveyed in this study. The perspectives of the education's top management, students, non-academic staff and visitors were not taken into account. This could result in a potential bias in the study despite the fact that instructors are not the only workers in VC. Therefore, it would be greatful if future researchers examine safety culture not only among the instructors but the top managements, students, non-academic staffs and visitors at the VC as well to compare if there are any discrepancies in the safety culture among them in education sector. This study also can be replicated in other organisation in education sector such as at primary school, secondary school, boarding school, matriculation and others organisation in education sector so as to more representative state of education sector in Malaysia. Third, this study also can be replicated by adding more key elements at each dimension of phsycological, behaviourial dan situational dimension.

There were about more than thirty elements can be used in measuring safety culture (He et al. 2012). Future researchers could test these key elements that may important in measuring safety culture in education sector. It would be interesting to examine these new key elements towards safety culture in phsycological, behaviourial dan situational dimension. There were about more than thirty elements can be used in measuring safety culture (He et al. 2012). Future researchers could test these key elements that may important in measuring safety culture in education sector. It would be interesting to examine these new key elements towards safety culture.

In sum, top management such as Ministry of Education (MOE) and Technical and Vocational Division (BPTV) action to improve safety culture among their instructors in TVET should focus on improving the performance of Safety Knowledge, Safety Rule and Safety Training. Attention should also be given to build up the importance and performance of Management Commitment and Reward and Recognition as these two variable give a higher performanve but less of importance among VC's instructor.

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