MEDIATING ROLE OF WORK ENGAGEMENT IN THE RELATIONSHIP BETWEEN SAFETY CLIMATE AND SAFETY PERFORMANCE AMONG ELECTRIC AND ELECTRONICS COMPANIES IN MALAYSIA

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ABSTRACT

Accidents occurring at the workplace affect an organization's financial, productivity, and employees' commitment to continue working with the organization. Previous studies have shown that organizational environment and effective motivation of employees affect to safety performance in the organization. Therefore, this paper aims to investigate the mediating role of work engagement in the relationship between safety climate and safety performance in seven (7) selected electric and electronic manufacturing companies at Perak, Malaysia. The data were obtained from 400 workers operators' workers through questionnaire distributed were then analysed by using the Smart PLS. Findings revealed that work engagement plays a significant role as a mediator in the relationship between safety climate and safety performance based on the findings from indirect effect.

Keywords: *Work Engagement; Safety Climate; Safety Performance; Smart PLS*

1.0 INTRODUCTION

Based on a report released by the International Labour Organization (2017), it has been reported that 2.3 million workers worldwide are involved in accidents every year, with an accumulation of approximately 6000 deaths involving accidents at work. This situation indicates that accidents at work is an increasingly serious issue. Accidents at work has a detrimental effect on organizational development. This is because accidents in the workplace affect the company's finances, productivity, and commitment of employees in the organization.

In Malaysia, based on the statistics by the Social Security Organization (SOCSO) throughout 2013 to 2017, it was found that the year 2017 recorded the highest number of accidents involving the electrical and electronics manufacturing industry (Table 1). This situation is a matter of concern. According to Shahril and Ismail (2020) and Khammar et al., (2019), among the factors causing accidents in this industry is due to the shifts and change of working time in the organization. The shifts lead to extreme fatigue among the employees and exposing them to be at risk of health disorders, besides causing employees to neglect and invite accidents to occur. Therefore, management needs to organize strategies so that the environment of the workplace is safe to prevent accidents. Accidents that occur in the organization indicate the level of sensitivity of the organization towards employees' safety and wellbeing.

Table 1: Number of accident cases in electrical and electronics manufacturing sector reported by SOCSO from 2013 to 2017

Year	Number of Accident Cases in Electrical and Electronics Manufacturing Sector Reported by SOCSO
2013	1041
2014	1027
2015	1037
2016	1072
2017	1159

(Source: SOCSO, 2013; SOCSO, 2014; SOCSO, 2015; SOCSO, 2016; SOCSO 2017)

Safety performance is to find out the extent to which the organization manages safety issues in the organization (Wehbe et al., 2016). Good safety performance in the organization proves that the management prevents the risk of accidents in the organization. On the other hand, when safety performance is low, it indicates that management has failed to ensure that safety issues are

properly managed which can lead to more accidents to occur (Louis et al., 2016). In fact, the level of safety performance in the organization affects the performance of the organization (Wachter and Yorio, 2014).

Safety performance in organizations is influenced by the employee's level of work engagement. This is because employees who feel valued in the organization because of the skills and knowledge they possess, will behave well, and comply with all the safety rules that have been set in the organization (Zohar, 2014). Besides, these employees will behave well, give their full commitment, be innovative and maintain relationships among colleagues and management (Rana, 2019). Work engagement is driven by employee perceptions of a safe organizational environment (Shuck & Reio, 2014). Employees' perception of a safe organizational environment refers to a safety climate (Zohar, 2002; Jiang et al., 2019). Furthermore, Shuck and Wollard (2011) stated that a safety climate affects employees' behaviour and actions. Organizations that constantly practice and value safety will encourage employees to practice safety actions within the organization (Lee et al., 2019).

This research was conducted to examine work engagement as a mediator in the relationship between safety climate and safety performance in electrical and electronics manufacturing organizations. This is because the safety climate is found to influence work engagement and affect safety performance. The research hypothesis built is:

H1: Work engagement mediates the relationship between safety climate and safety performance among electric and electronic companies in Malaysia.

2.0 LITERATURE REVIEW

There are three variables involved in the study. The variables are safety climate, work engagement and safety performance.

2.1 Safety Performance

Safety performance is defined as employee compliance and participation in ensuring that organizational safety is at a satisfactory level (Neal & Griffin, 2002; Neal & Griffin, 2006; Lu & Yang, 2010). However, Wu et al., (2008) stated that safety performance is an activity that needs to be carried out to ensure that safety in the organization is at an optimum level in the organization. In contrast, Wu (2005) believed that safety performance is the

overall achievement of safety management in emphasizing on safety in the organization, while Martínez et al., (2013) expressed that safety performance is an achievement that is assessed through the compliance and participation of employees in all issues related to safety in the organization. Thus, it can be concluded that safety performance is the implementation and compliance of employees to safety in the organization that has been set by management.

In this study, safety performance is an assessment of the level of implementation and practice of safety in electrical and electronics manufacturing organizations. Safety assessments in organizations are measured based on the dimensions that have been introduced by Wu et al., (2008). To measure safety performance in the organization, there are several dimensions used by past researchers. Among them are dimensions by Wue et al., (2008). This is because the dimension of safety performance by Wu et al., (2008) involves all aspects of safety in the organization in order to measure safety performance in the organization. Thus, by using this dimension of safety performance, researchers will obtain accurate information regarding the level of safety performance in the organization (Gao et al., 2019).

According to Wu et al., (2008), dimensions of safety performance can be categorized into six dimensions, namely management and safety of the organization, safety measures and equipment, accident statistics, accident investigation, safety training practices and safety training evaluation. In the context of organizational safety management, it refers to the handling of management and employees in the manufacturing organization in ensuring safety in the organization. For safety measures, it is the provision of safety protection, safety training, and a variety of preparations to prevent accidents in this organization.

Safety training evaluation is a calculation of safety training in organization by employees in this manufacturing sector. The next dimension is the safety investigation which refers to the effectiveness in ensuring that accidents in the organization do not recur. The practice of safety training is the last dimension. This dimension explains the actions and behaviours of employees towards safety after attending safety training. The dimension of safety training evaluation refers to the extent of effectiveness of safety training that has been provided by management to employees in the organization.

2.2 Work Engagement

Work engagement is the feeling of employees tied to the organization due to the knowledge and skills possessed by them to ensure the success of the organization (Saks, 2006). According to Andrew and Sofian (2012) and Wang et al., (2019), work engagement is seen through the determination to use the entire knowledge and skills that employees have in performing the responsibilities that have been given in the organization. Gorgievski and Bakker (2010) stated that employees who have the highest work engagement possess certain attitudes such as always being independent and motivated in performing the given responsibilities. This condition can be assessed through job performance. However, this is in contrast to the view of Saks (2006) who stated that work engagement is associated with the workload given, the ability to choose the task to be done, the recognition and rewards given, the implementation of justice in the organization and whether the work done is valuable in the organization. Therefore, this shows that work engagement is the inner and psychological feelings of an employee towards the responses they received while being in the organization.

2.3 Safety Climate

The safety climate is the perception of employees on the procedures, policies, and implementation of workplace safety by every employee in the organization (Neal and Griffin, 2006; Zohar, 1980; Zohar, 2014). Apart from that, the safety climate is also associated with the extent to which safety issues are prioritised and practiced in organizations (Huang et al., 2016). Zohar (2014) stated that the safety climate is related to safety behaviour and the number of injuries that occur and have been reported to the management. Moreover, Christian et al., (2009) believed that the safety climate in the workplace can influence the behaviour of an employee.

Safety climate is important in the workplace (Vinodkumar & Bhasi, 2009). Safety climate refers to the values, beliefs, norms, practices, procedures, and initiatives of organizational management in addressing and enhancing safety values in the organization (Silva et al., 2004; Yule & Murdy (2007). Attitudes and perceptions of workers towards safety in the workplace have an impact on employee behaviour in performing their duties (Tomás et al., 1999; Vinodkumar & Bhasi, 2009). It is the behaviour of these employees that leads to accidents in the organization. Employees' perceptions of the level of

safety in the workplace are very important to enable employees to feel safe and comfortable when performing their duties well (Glennon, 1982; Zohar & Tenne, 2008).

In this study, safety climate is assessed using the safety climate dimension by Cheyne et al., (2002). The safety climate dimension encompasses safety management, communication, individual responsibility, safety standards and goals, personal involvement, and work environment. Safety management refers to the handling of safety in organizations involved in manufacturing organizations. The second dimension of communication is the relationship between management and employees or fellow employees in the organization related to safety issues.

The dimension of individual responsibility is the duty of employees in the manufacturing organization towards the safety in the organization. Safety standards and goals can be seen from the achievement of safety in organizations in this manufacturing industry. Personal involvement refers to the contribution of the employees towards improving the safety of the manufacturing companies by providing views, suggestions or attending meetings. The last dimension is safety management which includes safety behaviour, and safety policies outline by the organization involved in the manufacturing sector.

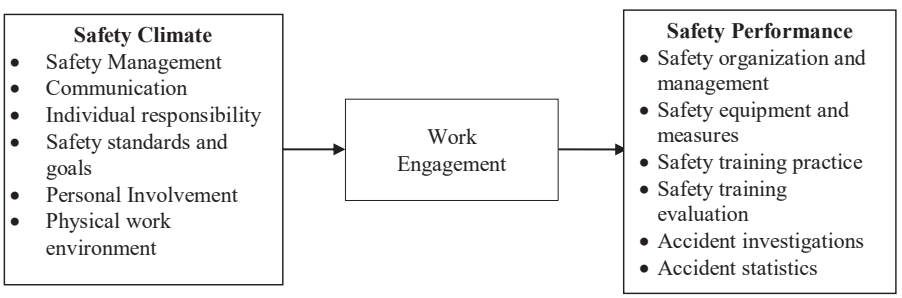

Figure 1: The research model

2.4 Work engagement as mediator in the relationship between safety climate and safety performance

Work engagement has caused employees to utilize all the skills and knowledge they must ensure the success of the organization. This situation has affected employees' perceptions of safety management and affordability to ensure that accidents are avoided. Additionally, previous studies by Geisler et al., (2019), Dollard and Idris (2017) have shown that a safe organizational environment causes employees to always be prepared with thoughtful ideas in increasing

organizational productivity. Employees also understand that mistakes in action can result in accidents and affect the quality of productivity produced. Thus, in this study, the importance of career involvement in influencing the relationship between safety climate and safety performance in electrical and electronics manufacturing organizations is explored.

3.0 METHODOLOGY

This study was conducted in the electrical and electronics manufacturing industry in Malaysia as this industry showed the highest reported accidents by SOCSO (2017). Meanwhile, the state of Perak recorded a worrying number of accidents, which is 16031 recorded cases in 2017 (SOCSO). This study was conducted in seven electrical and electronics manufacturing organizations around the state of Perak. This study is known as population study. Ma and Liao (2018) stated that this population study is more reliable, showing that justice and the data obtained are more significant because it involves the entire respondents who meet the required characteristics. The study was conducted through the distribution of questionnaires. This questionnaire was distributed to operator employees in the operation divisions of electrical and electronics manufacturing organizations. Based on the data from the Federation of Malaysian Manufacturers (FMM), a total of 880 operators in electrical and electronic manufacturing around the state of Perak. Questionnaires were distributed to all employees in the industry. Researchers received 460 sets of questionnaires and were analysed for this study.

The questionnaire used is divided into 3 sections based on the variables to be evaluated namely safety climate, work engagement and safety performance. Safety climate was measured using the dimensions of the SCQ (Safety Climate Questionnaire) developed by Cheyne *et al.*, (2002). This instrument consists of 34 items. The dimensions measured are safety management, communication, individual responsibility, safety standards and goals, personal involvement, and physical work environment. To assess work engagement, the Utrecht Work Engagement Scale (UWES) that was developed by Saks (2006) which has seven items was used, while the Safety Performance Scale (SPS) taken from Wu *et al.*, (2008) was used to measure safety performance. This instrument contains six dimensions and 39 items. The dimensions are safety organization and management, safety equipment and measures, safety training practice, safety training evaluation, accident investigations and accident statistics.

All three constructs were rated on a 5-point Likert Type Scale. The Likert scale requires the respondents to indicate their level of agreement based on a score of 1 to 5 which are strongly disagree, disagree, somewhat agree, agree, and strongly agree. Five Likert scale scores were used to minimize respondents' uncertainty and maximize the quality of responses to the statements stated in the questionnaire (Alahmari *et al.*, 2019; Revilla *et al.*, 2014; Devlin *et al.*, 1993).

To analyse the research model, the Partial Least Squares (PLS) analysis was run using the Smart PLS 3.0 software (Ringle *et al.*, 2015). Following the recommended two-stage analytical procedures by Anderson and Gerbing (1988), the measurement model was tested followed by an examination of the structural model (Hair *et al.*, 2014; Ramayah *et al.*, 2018). Finally, the mediation effect was analysed.

4.0 RESULTS AND DISCUSSION

4.1 Measurement and Structural Model

All data have passed the for the reflective model assessment which in include internal consistency, convergent validity, and discriminant validity. As a result, all the data is appropriate to be analysed to achieve the objectives of the study. To assess the structural model, Hair et al., (2014) suggested looking at the R2, beta, and the corresponding t-values using a bootstrapping procedure with a resample of 5000. Table 2 illustrates the results of the test of the hypothesized structural model. The explained variance R2, has been achieved for the explained variance of a particular endogenous construct to be deemed adequate to ensure a minimal level of explanatory power. The R2 value was 0.665, indicating that 66.5 percent of the variance in extent of 'Work Engagement' can be explained by the independent variable of 'Safety Climate'. The R2 from 'Work Engagement' to 'Safety Performance' was 67.4 percent. In sum, the model exhibits acceptable fit and a high-predictive relevance.

4.2 Assessment of Mediation Analysis

The effect of work engagement as a mediator in the relationship between safety climate and safety performance is based on the t-value and 95% Boot CI Bias Corrected intervals obtained. The findings illustrate that there is a significant and positive effect of the role of work engagement as a mediator

in the relationship between safety climate and safety performance. This is evident by the value β = 0.67 and the t-value = 3.125 which indicate that there is a significant and positive relationship between safety climate and work engagement as well as the relationship between work engagement and safety performance. From the indirect effect analysis 95% boot CI Bias Corrected (LL = 0.031, UL = 0.117), do not straddle a 0 in between, indicating that there is a mediation (Preacher & Hayes, 2008; Ramayah et al., 2018). Thus, it can be concluded that the mediation effects are statistically significant. The result of mediation analysis is presented in Table 2.

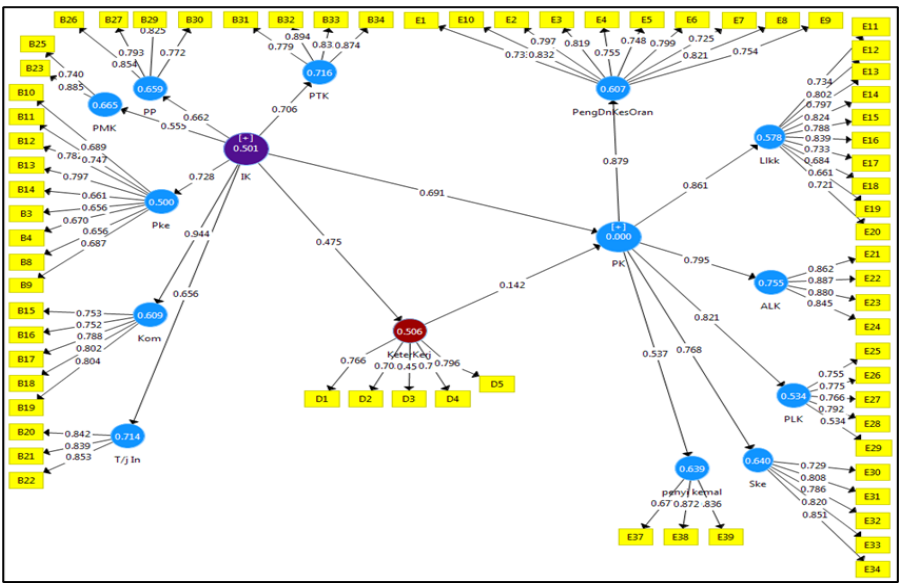

Figure 2: Structural model analysis for measuring the impact of work engagement as a mediator between the relationship between climate safety and safety performance

** IK = Safety Climate, Pke = Safety Management, Kom = Communication, T/j In = Individual Responsibility, PMK = Safety Standards and Goals, PP = Personal Involvement, PTK = Workplace Environment, KeterKerj =Work Engagement, PK = Performance Safety, PengDnKesOran = Organizational Management and Safety, LLKK = Safety Measures and Equipment, ALK = Safety Training Practices, PLK = Safety Training Evaluation, SKe = Penyi Kemal Accident Statistics = Accident Investigation

Table 2: Hypotheses testing on mediation

Relationship	β	Std. Error	t-value	Confidence Interval (BC)		Decision
				LL	UL	
Safety Climate → Work Engagement → Safety Performance	**0.067**	**0.0022**	**3.125**	**0.031**	**0.117**	**H1 Supported**

*std error=Standard Error, LL= Lower level, UL =Upper Level, t >1.9

5.0 CONCLUSION

The results of t-value analysis and 95% Boot CI Bias Corrected value found that work engagement is a significant mediator in the relationship between safety climate and safety performance. This explains that employees in electrical and electronic manufacturing organizations are tied to the organization because they have knowledge in performing work activities, causing employees to have a good perception of the management of safety issues by the management and consequently affecting safety actions by employees in the organization. This causes employees to adopt the safety measures that have been set by the organization.

In this study, work engagement was found to have a positive and significant relationship with safety climate and safety performance. The findings showed a positive and significant relationship between safety climate and work engagement, which indicates that employees who have a good perception of safety management in the organization will always contribute all the knowledge they have in ensuring organizational success. Findings from this study support the study conducted by Geisler *et al.*, (2019) and Dollard and Idris (2017) that the feeling of being safe in the organization influences employees' action of using all the skills and expertise they must ensure that the vision and mission of the organization are achieved.

Meanwhile, a positive and significant relationship between work engagement and safety performance was also found in this study which shows that employees who feel that their skills and knowledge are appreciated and acknowledged by the organization will comply and ensure that the safety of the organization is at a good level. This situation is in support of a study conducted by Rich *et al.*, (2010) and Yuan and Tetrick (2015), which proved

that work engagement and safety performance are interrelated. This is because employees who are always focused on the job in ensuring the vision and mission can be achieved, are always avoid making mistakes that can lead to accidents in the workplace. This is because accidents that occur also lead to failure of achieving the vision and mission of the organization.

In conclusion, the relationship between work engagement, safety climate and safety performance that has been obtained in this study is in support of the study conducted by Hu *et al.*, (2018). The study proves that organizations that prioritize safety in the organization (safety climate), influence employees to remain committed in performing tasks (work engagement) and have an impact on safety compliance by employees. In fact, the indirect effect of work engagement in influencing the relationship between safety climate and safety performance is evidenced through the analysis that has been conducted in this study. Work engagement is a key element in influencing employee's perceptions and safety actions in the organization.

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REFERENCES

Alahmari, M., Issa, T., Issa, T., & Nau, S. Z. (2019). Faculty Awareness of the Economic and Environmental Benefits of Augmented Reality for Sustainability in Saudi Arabian Universities. *Journal of Cleaner Production*, 226, 259-269.

Andrew, O. C., & Sofian, S. (2012). Individual Factors and Work Outcomes of Employee Engagement, *Procedia-Social and Behavioral Sciences*. 40, 498-508.

Cheyne, A. Oliver, A., Tomas, J.M., & Cox, S. (2002). The Architecture of Employee Attitudes to Safety in the Manufacturing Sector. *Personnel Review*, 31(6),649-670.

Christian, M. S., Bradley, J. C., Wallace, J. C., & Burke, M. J. (2009). Workplace Safety: A Meta-Analysis of the Roles of Person and Situation Factors. *Journal of Applied Psychology*, 94, 1103–1127.

Delvin, S.J., Dong, H.K., &Brown, M. (1993). Selecting a Scale for Measuring Quality. *Marketing Research*, 5(3),12-17.

Dollard, MF., & Idris, M.A, (2017). Climate Congruence: How Exposed Psychosocial Safety Climate and Enacted Managerial Support Affect Emotional Exhaustion and Work Engagement. *Safety Science*, 96,132-142.

Fornell, C., &Lacker, D.F. (1981). *Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics*. Division of Research, Graduate School of Business Administration, The University of Michigan.

Gao, Y., Fan, Y., Wang, J., Li, X., & Pei, J. (2019). The Mediating Role of Safety Management Practices in Process Safety Culture in the Chinese Oil Industry. *Journal of Loss Prevention in the Process Industries*, 57, 223-230.

Geisler, M., Berthelsen, H., & Muhonen, T. (2019). Retaining Social Workers: The Role of Quality of Work and Psychosocial Safety Climate for Work Engagement, Job Satisfaction, and Organizational Commitment. *Human Service Organizatioan: Management, Leadership & Governance*, 43(1),1-15.

Gholami, R., Sulaiman, A.B., Ramayah, T., & Molla, A. (2013). A Senior Manager's Perception on Green Information Systems (IS) Adopted and Environmental Performance: Results from a Field Survey. *Information & Management*, 50(7)431- 438.

Glennon, D.E. (1982). Safety Climate in Organizations: Ergonomics and Occupational Health. *Proceedings of the 19th Annual Conference of the Ergonomics Society of Australia and New Zealand*,pp. 17-31.

Gorgievski-Duijvesteijn, M., & Bakker, A. (2010). Passion for work: Work engagement versus workaholism, Handbook of Employee Engagement. *New Harizon in Management*, 262-271.

Hair JR, J.F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V.G. (2014). Partial Least Squares Structural Equation Modeling (PLS-SEM): An Emerging Tool in Business Research. *European Business Review*, 26(2),106-121.

Hu, X., Griffin, M, Yeo, G., Kanse, L., Hodkiewics, M., &Parkes, K. (2018). A New Look at Compliance with Work Procedures: An Engagement Perspective. *Safety Science*, 105, 46-54

Huang, Y. H., Lee, J., McFadden, A. C., Murphy, L. A., Robertson, M. M., Cheung, J. H., & Zohar, D. (2016). Beyond Safety Outcomes: An Investigation of The Impact Of Safety Climate on Job Satisfaction, Employee Engagement and Turnover Using Social Exchange Theory as The Theoretical Framework. *Applied Ergonomics*, 55, 248-257.

Jiang, L., Lavaysse, L. M., & Probst, T. M. (2019). Safety Climate and Safety Outcomes: A Meta-Analytic Comparison of Universal Vs. Industry-Specific Safety Climate Predictive Validity. *Work & Stress*, 33(1), 41-57.

Khammar, A., Khandan, M., Veisi, R., Hosseinighosheh, S. N., Alimohammadi, M., Poursadeghiyan, M., & Kavari, S. H. (2019). An Epidemiological Study of Fatal and Non-Fatal Industrial Accidents in Semnan, Iran. *Health in Emergencies and Disasters*, 4(2), 93-100.

Lee, J., Huang, Y. H., Cheung, J. H., Chen, Z., & Shaw, W. S. (2019). A Systematic Review of the Safety Climate Intervention Literature: Past Trends and Future Directions. *Journal of Occupational Health Psychology*, 24(1), 66.

Louis, D. N., Perry, A., Reifenberger, G., Von Deimling, A., Figarella-Branger, D., Cavenee, W. K., & Ellison, D. W. (2016). The 2016 World Health Organization Classification of Tumors of the Central Nervous System. *A Summary, Acta Neuropathologica*,31(6), 803-820.

Lu, C.S. & Yang, C.S. (2010). Safety Leadership and Safety Behavior in Container Terminal Operations. *Safety Science*, 48,123–134.

Ma, C., & Liao, H. (2018). Income Elasticity of Cooking Fuel Substitution in Rural China: Evidence from Population Census Data. *Journal of Cleaber Production*, 199, 1083-1091.

Martínez-Córcoles, M., Gracia, F. J., Tomás, I., Peiró, J. M., & Schöbel, M. (2013). Empowering Team Leadership and Safety Performance in Nuclear Power Plants: A Multilevel Approach. *Safety Science*, 51(1), 293-301.

Munauwar, M. & Muhamad Aidil, H. (2014). *Hubungan antara Iklim Keselamatan dengan Prestasi Keselamatan Pekerjaan: Kajian di ILJTM Lembah Klang*.Tesis PhD, Universiti Utara Malaysia.

Neal, A., & Griffin, M. A. (2002). Safety Climate and Safety Behaviour, *Australian Journal of Management*, 27(1_suppl), 67-75.

Preacher, K.J. & Hayes, A.F. (2008). Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effects in Multiple Mediator Models. *Behavior Research Methods*, 40(3),879-891.

Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M.A. (2018). *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using SmartPLS 3.0. Second Edition*. Pearson, Malaysia.

Rana, S. (2019). Managing Organizations Through Employee Engagement: An Indian Perspective, In *Management Techniques for Employee Engagement in Contemporary Organizations* (pp. 256-267). IGI Global.

Revilla, M.A., Saris, W.E., & Krosnick, J.A. (2014). Choosing the Number of Categories in Agree-Disagree Scales. *Sociological Methods & Research*, 43 (1), 73-97.

Rich, B. L., Lepine, J.A., &Crawford, E.R. (2010). Job Engagement: Antecedents and Effects on Job Performance. *Academy of Management Journal*, 53 (3), 617-635.

Ringle, Christian M., Wende, Sven & Becker, Jan-Muchael (2015). SmartPLS 3. Bõningstedt: SmartPLS. Rerieved from: http://www.smartpls.com

Saks, A. M. (2006). Antecedents and Consequences of Employee Engagement. *Journal of Managerial Psychology*, 21(7), 600-619.

Shahril Abu Hanifah, M., & Ismail, N. (2020). Fatigue and its Associated Risk Factors: A Survey of Electronics Manufacturing Shift Workers in Malaysia, Fatigue: Biomedicine. *Health & Behavior*, 8(1), 49-59.

Shuck, B., & Reio Jr, T. G. (2014). Employee Engagement and Well-Being: A Moderation Model and Implications for Practice. *Journal of Leadership & Organizational Studies*, 21(1), 43-58.

Silva, S., Lima, M. L., & Baptista, C. (2004) OSCI: An Organizational and Safety Climate Inventory. *Safety Science*,42(3), 205-220.

SOCSO, (2013). *Social Security Organization: Annual Report 2013*. Retrieved from http://www.perkeso.gov.my

SOCSO, (2014). *Social Security Organization: Annual Report 2014*. Retrieved from http://www.perkeso.gov.my

SOCSO, (2015). *Social Security Organization: Annual Report 2015*. Retrieved from http://www.perkeso.gov.my

SOCSO, (2016). *Social Security Organization: Annual Report 2016*. Retrieved from http://www.perkeso.gov.my

SOCSO, (2017). *Social Security Organization: Annual Report 2017*. Retrieved from http://www.perkeso.gov.my

Tomás, J. M., Meliá, J. L., & Oliver, A. (1999). A Cross-Validation of A Structural Equation Model of Accidents: Organizational and Psychological Variables As Predictors of Work Safety. *Work & Stress*, 13(1), 49-58.

Vinodkumar, M. N., & Bhasi, M. (2009). Safety Climate Factors and its Relationship with Accidents and Personal Attributes in the Chemical Industry. *Safety Science*,47(5), 659-667.

Wachter, J. K., & Yorio, P. L. (2014). A System of Safety Management Practices and Worker Engagement for Reducing and Preventing Accidents: An Empirical and Theoretical Investigation. *Accident Analysis & Prevention*, 68, 117-130.

Wahab, S. R., Rajab, A., Shaari, R., Rahman, S. A., & Saat, M. M. (2014). Manipulation of Safety Training Practices on Organizational Safety Performance: An Evidence in Malaysia's Automotive Industry. *International Journal of Trade, Economics and Finance*, 5(1), 110-113.

Wang, L., Law, K. S., Zhang, M. J., Li, Y. N., & Liang, Y. (2019). It's Mine! Psychological Ownership of One's Job Explains Positive and Negative Workplace Outcomes of Job Engagement. *Journal of Applied Psychology*, 104(2), 229-246.

Wehbe, F., Al Hattab, M., & Hamzeh, F. (2016). Exploring Associations between Resilience and Construction Safety Performance in Safety Networks. *Safety Science*, 82, 338-351.

Wollard, K. K., & Shuck, B. (2011). Antecedents to Employee Engagement: A Structured Review of the Literature. *Advances in Developing Human Resources*, 13(4), 429-446.

Wu, T. C. (2005). The Validity and Reliability of Safety Leadership Scale in Universities of Taiwan. *International Journal of Technology and Engineering Education*, 2(1), 27-42.

Wu, T. C., Chen, C. H., & Li, C. C. (2008). A Correlation Among Safety Leadership, Safety Climate and Safety Performance. *Journal of Loss Prevention in The Process Industries*, 21(3), 307-318.

Yuan, Z., Li, Y., & Tetrick, L.E. (2015). Job Hindrances, Job Resources, and Safety Performance: The Mediator Role of Job Engagement. *Applied Ergonomics*, 51,163-171.

Yule, S., Flin, R., & Murdy, A. (2007). The Role of Management and Safety Climate in Preventing Risk-Taking at Work. *International Journal of Risk Assessment and Management*, 7(2), 137-151.

Zohar, D. (1980). Safety Climate in Industrial Organization: Theoretical and Applied Implications. *Journal of Applied Psychology*, 65(1), 96 - 102.

Zohar, D. (2014) Safety Climate: Conceptualization, Measurement, and Improvement. *The Oxford Handbook of Organizational Climate and Culture*, 2014,317-334.

Zohar, D. & Tenne-Gazil., O. (2008). Transformational Leadership and Group Interaction as Climate Antecedents: A Social Network Analysis. *Journal of Applied Psychology*, 93(4),744-757.