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Assessing the Level of Safety Knowledge-Attitude-Behaviour (Safety KAB): A Case Study in a Public Cleansing Firm

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Abstract: In Malaysia, the utility sector, including public cleaning service, has relatively high accident cases recorded in recent years. Exposing to various type of hazards, the workers need to maintain their safety behaviour to prevent workplace accidents. As safety behaviour is found to become the leading factor to work-accidents, this research proposed to examine the level of safety knowledge-attitude-behaviour (safety KAB), plus the effect of safety knowledge and safety attitude on safety behaviour amongst workers in a public cleansing company in the southern region of Malaysia. The present research is a quantitative study involving a cross-sectional design which 313 sets of a questionnaire were distributed and answered by to workers who involve in solid waste collecting, and public cleansing works from Company X. The level of safety KAB was determined by the mean values derived from the descriptive analyses, while the direct effect to the variables was tested using PLS-SEM modelling. The results indicated that the level of safety attitude and safety behaviour is high, whereas safety knowledge is at a moderate level. These findings indicated the positive results of safety intervention conducted by the government towards Company X as well as the initiative programs conducted by the company.Furthermore, the PLS-SEM analysis determined that safety attitude and safety knowledge had a significant effect on safety behaviour. Hence, the present research suggests an alternative structural model, which deemed appropriate for Malaysia's public cleansing organizations, and offers a predictive model of safety knowledge, safety attitude, and safety behaviour for future research. Lastly, the outcomes of this study are also hoped to serve as a useful reference to the related industry for elevating safety KAB among the workers.

Keywords: safety behaviour, safety knowledge, safety attitude, occupational safety

1.0 Introduction

A workplace accident can cause an adverse impact on the involving companies. If not prevented, the companies would face financial and non-financial effect simultaneously [1], [2]. Previous scholars reveal that safety behaviour factor is the substantial cause of workplace accidents [1], [3]–[6]. Based on Heinrich's theory, the human factor was found to contribute the highest percentage to workplace accidents compares to other factors. Therefore, safety behaviour needs to be seriously addressed to prevent accidents in the workplace.

In Malaysia, statistics show an increasing trend of accidents as well as fatality cases at workplaces recently [7]–[9]. Besides manufacturing and construction, work-related accidents also occur within the public cleansing services sector. There was a total of 8 fatalities in utilities and cleaning sector in 2015 and 2016 [10]. Besides, statistics revealed that there was an increase in accident cases at sewerage service companies in 2012 [11]. On the other hand, it is also reported that the utility sector recorded 484 accident cases, including the public cleansing services in 2018 [12]. Recently, the accident statistic, as published in DOSH official website recorded that the utility sectors and cleaning service are among the industries which have the highest accident cases in Malaysia. In 2019 alone, this sector has recorded 244 accident cases at work with four fatalities.

In a public cleansing service firm, workers who work daily on the field are exposed to sharp objects, moving

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vehicles or machines, noise and vibration and other dangerous harms, while performing jobs. Cleaning workers are prone to injury risks similar to other hazardous industry [12]. Until 2011, Company X which provides public cleaning service in the southern region of Peninsular Malaysia has recorded a total of 50 accidents cases per year which are categorised under Regulation 5 (1) (b) Occupational Safety and Health (Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease) Regulations. The number was considered high compared to other organisations within the same category of sectors, and most of the cases involved general workers who work at worksites. Based on the personal interview with the executive of the respective company, the types of accident recorded are mainly struck by machines, road accidents, slip and fall, trip and fall, cut by sharp objects, and only involved the uneducated low-paid category of employees.

In terms of daily routine tasks, such category of workers in Company X usually performed fieldworks by the roadsides, beside the drains/ trenches and near the household/industrial areas which are hazardous to their safety and health. In completing their jobs, hazardous machine, and equipment such as grass cutting blade need to be used. Besides, the workers who perform the waste-collecting tasks are exposed to sharp objects, rotating parts of a machine and other physical hazards. Despite these unsafe conditions, there are general workers who found to do not comply with the safe working instructions and prone to taking needless risks to cut time and workload. Additionally, the safety executive stated that lack of knowledge and attitude towards safety risks had made them refused to wear personal protective equipment (i.e., rubber glove, safety boots, safety helmet) provided by the management. This scenario occurs as the workers are convinced that cutting corners able to expedite the completion of a task, and as a result, they would gain extended break time. Without realising that this behaviour is subjecting themselves and others to hazards that could cause severe injury and even fatality[1], [13], the general workers decide to commit unsafe acts at work.

Since 2009, the company X has seen a spike of accidents cases, including fatalities. Therefore, the management of the company opted to take prompt action by seriously addressed the unsafe acts of the general workers. Based on these facts also, the Department of Occupational Safety and Health (DOSH) had taken and initiative to include Company X in a special accident reduction program. Undergoing the intervention, fortunately, the accident rate of the company reduce significantly [14]. Moreover, the management of the company has also invested in utilising technology within the work processes to reduce accident risks as engineering control is one of the most effective measures in occupational hazard controlling [12]. Besides the investment in engineering control, the management of the company had also put an initiative in conducting occupational safety and health (OSH) programs such as safety awareness talks, accident prevention campaign, and safety behaviour incentive program. These OSH programs were conducted since 2017 involving the collaboration with DOSH and SOCSO of the respective state offices. This effort had also reduced the number of accidents significantly within the company.

The purpose of this study is to determine the level of safety KAB of the general workers in Company X. Furthermore, this study attempt to determine the relationship between safety knowledge, safety attitude, and safety behaviour. Safety knowledge is also found to have a direct relationship with safety behaviour [15]–[17]. In addition, safety knowledge has been utilised as the extension of the Theory of Planned Behaviour [18] and determined that safety knowledge influence safety behaviour and intention of young students [19]. Besides, safety attitude is also determined to influence safety behaviour [20]–[22]. The level of safety KAB amongst the general workers could become the benchmark of the effectiveness of safety programs conducted by the management of company X as measuring the level of KAB is the reliable and valid method to evaluate the results of an intervention [23].

2.0 Methodology

This research is a quantitative cross-sectional study using survey methods. Its purpose is to determine the level of safety KAB and also to determine the relationship between workers' "safety knowledge", "safety attitude", and "safety behaviour" among general workers at a public cleansing company in the southern region of Malaysia (Company X). The population of this study is the workers from Company X, who involve in waste collecting and public cleansing works. According to Sekaran [24], the sample size ranges from 30 to 500 is sufficient for any survey research. This research applies a systematic random sampling technique. As the total population of the study were 1700 person, the sample size was 313 workers who were determined based on Krecjie and Morgan's table [25].

A self-administered questionnaire will be used as the research instrument, which was constructed by adapting from previous research, i.e. [17], [26]. For the questionnaire items, the responses were measured using a 5 point Likert scale[27] (1 = "strongly disagree", 2 = "disagree", 3 = "neither agree nor disagree", 4 = "agree", 5 = "strongly agree"). The items of the questionnaire are summarised in Table 1.

Table 1 – Questionnaire Items

Variables	Items	Sources
Safety Knowledge (SK)	I understand how to follow SOP when doing my works.	[17], [28]
	I understand how to use PPE correctly.	
	I am knowledgeable about how to increase safety in my work process.	
	I am able to identify hazards associated with works and take necessary control measures.	
	I understand how to reduce accident risks at work.	
Safety Attitude (SA)	Risk-taking is necessary during busy hours in order to get the jobs done.	[21]
	Safety rules and procedures may sometimes cause difficulty in the work process.	
	A clear safety objective is important in the workplace.	

	It is my responsibility to report unsafe conditions to the employer.	
	Unsafe behaviours should not be tolerated.	
Safety Behaviour (SB)	I always follow the company's safety rules and procedures.	[17], [21], [29]
	I always perform my work according to Standard Operating Procedures.	
	I always wear Personal Protective Equipment correctly during work.	
	I follow safety rules, even when I need to complete my work immediately.	
	I encourage my co-workers to follow Standard Operating Procedures during work.	
	I give suggestions on how to improve Standard Operating Procedures.	
	I report the unsafe conditions that could cause an accident in the workplace.	

Furthermore, a pilot test involving 35 sanitary workers in various offices in Negeri Sembilan has been conducted to determine the understandable of the items as well as determine its reliability. Cronbach's alpha values for each variable were obtained to measure the reliability of the instruments. Alpha Cronbach's value of 0.80 or higher shows high reliability of a questionnaire [30]. This research set that the minimum acceptable of Alpha Cronbach's value is 0.7 [31]. Table 2 depicted Cronbach's alpha results for the research instrument.

Table 2 – Alpha Cronbach (Results)

Variables	Value	Remark
Safety Knowledge	0.937	High reliability
Safety Attitude	0.850	High reliability
Safety Behaviour	0.803	High reliability

Based on the results, it could be said that the questionnaire items are highly reliable.

3.0 Data Analyses Results

The collected data was analysed using SPSS (Version 23) program to conduct descriptive statistics analysis. Additionally, Smart PLS 3.2.7. Software [33] was used to test the theoretical model and path modelling. A total of 313 sets of questionnaires were distributed randomly to the respondents, and 225 sets were answered and returned. A set questionnaire was discarded due to the incompletion of answer, and the remaining 224 were used for data analyses. Thus the rate of return was 71.57%.

3.1 Descriptive Analysis

The descriptive analysis is performed mainly to determine the level of safety KAB among the respondents. The level of variables was distinguish based on Davies convention [32] stating that mean value 3.68-5.00 is high, 2.34-3.67 is moderate, and 1.00-3.66 is low.

Table 3 – Descriptive Analysis

Variables	Mean	Std. Dev.	Skewness	Kurtosis	Level
SK	3.75	.725	-.042	-.460	High
SA	3.36	.516	.316	.063	Moderate
SB	3.69	.582	.264	-.696	High

Based on Table 3, the results indicated that safety knowledge and safety behaviour were at a high level, while the level of safety attitude was moderate.

3.2 Measurement Model Assessment

The measurement model was assessed for its construct and discriminant validity. For assessing the construct validity, composite reliability (CR) and average variance extracted (AVE) were determined [34]. On the other hand, Hetrotrait-Monotrait ratio (HTMT) was determined to assess the discriminant validity. Table 4 summarised the CR and AVE. On the other hand, for determining discriminant validity, Table 5 depicted the HTMT results for the measurement model.

Table 4 – Construct Validity

Variables	CR	AVE
Safety Knowledge	0.934	0.739
Safety Attitude	0.862	0.564
Safety Behaviour	0.907	0.584

Based on the assessment results, the CR value for all variables had exceeded the cut-off value, which is at least 0.7 [35]. Moreover, the AVE values for all variables were also above the accepted value, which is 0.5 [35], [36].

The results in Table 5 indicated that the discriminant validity of the measurement model is acceptable under the criterion of $HTMT_{90}$, which is less than 0.90 [36][34].

Table 5 – Discriminant Validity (HTMT)

Variables	SA	SB	SK
SA			
SB	0.845		
SK	0.810	0.844	

Based on the results reported above, it could be concluded that the measurement model for this research was reliable and valid. Figure 1 illustrated the measurement model for this research.

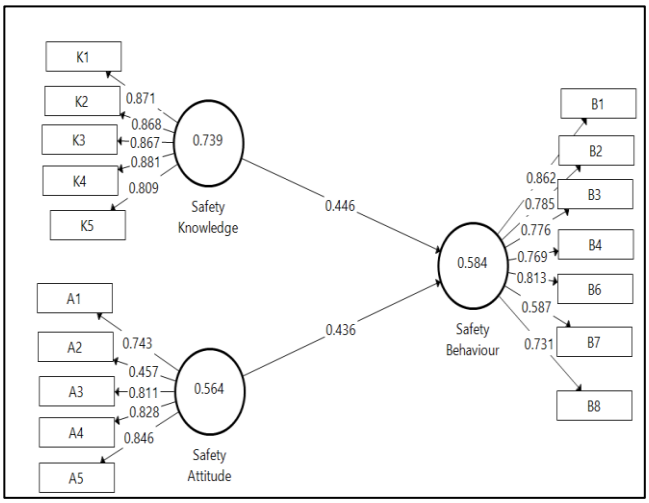

Fig. 1 – Measurement Model Assessment

3.3 Structural Model Assessment

Applying PLS-SEM approach, the assessment of the path- coefficient, the determination of the R^2 values, and the predictive relevance, Q^2 is performed to evaluate the structural model. Performing bootstrapping (5000), first, the result of R^2 value is 0.670, which carry the mean that 67% of safety behaviour is explained by safety knowledge and safety attitude. Based on the rule of thumb, the R^2 is huge [37]. Subsequently, the path-coefficient results were determined as depicted in Table 6.

Table 6 – Path-Coefficient

Path	Standard β	T-value	P-value
SA -> SB	0.436	6.545	0.000
SK-> SB	0.446	6.855	0.000

The results as per Table 6 indicated that safety knowledge and safety attitude has significantly affect safety behaviour ($p<0.05$). Moreover, the results revealed that safety attitude has the most dominant effect compares to safety knowledge according to beta value [31], [38]. Figure 2 affirmed the path-coefficient results of this research.

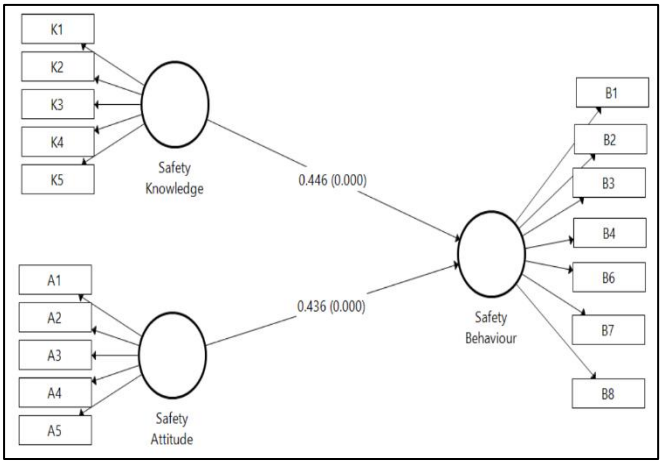

Fig. 2 – Path-Coefficient Results

Finally, the predictive relevance assessment was conducted by determining the Q^2. The blindfolding analysis result shows that $Q^2 = 0.384$. According to the rule of thumb, the value of Q^2, which higher than 0 confirms that the specific path of the dependent variable is predictively dependent on the independent variables [39]. Thus, this study found that safety behaviour is predictively depending on safety knowledge and safety attitude.

4. Conclusion

This paper conducted an exploratory study to determine the level of safety KAB amongst the general workers in a public cleansing company. Based on the obtained descriptive analysis results, safety knowledge and safety behaviour are at a high level, while the level of safety attitude among the workers is moderate. This finding indicated the effectiveness of safety intervention conducted by DOSH and the positive impact of safety initiatives performed by the management of the company. These results support the findings of previous researches which concluded that safety intervention could increase safety knowledge, safety attitude, and also safety behaviour among industrial workers [40], [41]. Moreover, the research findings concluded that safety behaviour was explained by a huge variance of safety knowledge as well as safety attitude, and the dependent variable is predictively depending on both independent variables.

Additionally, this research had also determined the simultaneous effect of safety knowledge and safety attitude, on safety behaviour as the dependent variable. The research framework was developed based on previous researches [17], [20]–[22], [42], [43] as well as related theories [18], [44]. Based on the results, it is found that the safety knowledge and safety attitude significantly affect safety behaviour. The result matched with other researches which determined the influence of safety knowledge [17], [21] and also safety attitude [20], [45] on safety behaviour. Moreover, the predictive relevance of the research framework could contribute to the body of knowledge in relevance area.

In contributing to the body of knowledge, this research offers an alternative prediction model to be explored in future research. Moreover, the results of this study could contribute additional empirical evidence to the existing literature on safety behaviour. Additionally, this research provides the predictive relevance of the independent variables towards the dependent variable. Furthermore, the results of this study would be theoretically valuable as the extension of the Theory of Planned Behaviour [18] and Self-Efficacy Theory [44].

For practical implication, the findings of the present study could serve as an initial reference for the management of the company furthermore to upgrade its safety behaviour intervention for general workers. For example, the management of Company X could conduct programs that could increase the workers' knowledge in hazards identification and risks assessment to improve their safety behaviour as the perceived risks could influence one's behaviour [46], [47]. Moreover, specific programs to foster safety attitude should be implemented by the management of the company as the attitude towards risks is found to influence safety behaviour [47], [48].

4. Limitation of Study and Future Suggestions

Besides the contributions elaborated above, this research owns some limitations that need to be considered. Firstly, this research was conducted on a public cleansing company in Negeri Sembilan, which limiting the results to be generalised. Secondly, this research applied a cross-sectional design in which the data was collected via a self-administered questionnaire. The collected data was analysed using PLS-SEM, where in-depth information on safety KAB could not be gathered to determine the real situation. Lastly, the results of safety KAB level is unable to serve as a solid evaluation of intervention's effectiveness conducted by the management of Company X as well as DOSH.

Based on these facts, it is suggested that the research could be replicated by other researchers to be conducted in another study context to affirm the developed structural model. Additionally, this research is also proposed to be expanded to other public cleansing companies in Malaysia to enhance the generalisability. Lastly, a quasi-experimental design is suggested to evaluate the improvement of safety KAB.

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