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Quantitative Research Article

The Mediating Role of Employee Conscientiousness on Safety Climate, Employee Competency and Safety Performance in Malaysian Electrical Industry

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Abstract

Background/problem: Safety performance plays a crucial role in accident prevention programmes in the workplace. Employees' attitude and behaviour are the main components to improve safety practices. Understanding the impact of employees' competency and abilities related to occupational safety at the workplace need to be enhanced for safety performance outcomes.
Objective/purpose: This study aimed to examine the mediation effect of employee conscientiousness in relationship between safety climate and employee competency on safety performance within Malaysian electrical industry.
Design and Methodology: Using a quantitative method, data was collected from 412 workers in Malaysian electrical industry. Data analysis was performed with partial least ~~s~~quare ~~s~~tructural ~~e~~quation modeling (PLS-SEM).
Results: The findings indicated that safety climate ($\beta = .58$, $p = .000$) and employee competency ($\beta = .30$, $p = .02$) directly affected safety performance among electrical workers. Furthermore, employee conscientiousness mediated the relationship between safety climate ($\beta = .33$, $p = .00$) and employee competency ($\beta = .17$, $p = .00$) on safety performance among electrical workers.
Conclusion and Implications: The study highlights the role of conscientious employees in strengthening the safety climate and effectively applying their competencies in the workplace. This research contributes by extending the application of expectancy valence theory, showing their belief and highlighting the crucial role of employee conscientiousness to improve safety performance. Thus, these findings provide valuable input for government policymakers, that support the strengthening safe behavior among electrical workers in Malaysia.

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In the 21st century, managing safety and health is challenging due to the high-risk nature of the work. With increasing technologies, high-risk industries need to provide comprehensive policies and rigid regulations to prevent accidents (Abeje & Luo, 2023). Electrical is a high-risk industry often exposed to hazards like high-voltage equipment, live wires, and arc flashes, which can cause severe injuries or fatalities. Many developing countries lag behind in terms of safety regulations and practices due to inadequate regulations, outdated safety measures and lack of awareness (Chu et al., 2022). These is challenging for management to shifting workers attitudes and behaviors toward safety practice. One of

factors was safety climate which is refers to the perceived value that is given to safety considerations within an organization . It is a holistic term that includes corporate policies, management attitudes, and worker beliefs about safety within the workplace (Abeje & Luo, 2023). Another of impact factor was employee competency which is skills, knowledge, and behaviors that help employees perform their jobs. Even with its recognized importance, empirical research on safety performance and how effects workplace dynamics yields ambiguous results that need more investigation. Lestari et al. (2023) reported that, despite the implementation of engineering control systems, the incidence in these industry settings still increased. Therefore, Iqbal et al. (2024) emphasized the critical need to strengthen and promote a safety climate, particularly regarding safety behavior, as it plays a vital role in safety compliance and participation. Safety researchers have identified a key distinction in safety behavior. In addressing issues, safety performance indicates individual behavior and the organization's level of safety implementation. This supportive process considered various aspects including the production of personal proctective equipment, safety-oriented attention and detailed in several previous reports (Abeje & Luo, 2023).

Studies have also found that individual traits or characteristics help to promote compliance behavior and it is importance to measure employees' safety behavior in an attempt to improve the company's safety record (Iqbal et al., 2024). Positive and negative attitudes were believed to be relevant to safety. Negative attitudes were found to harm safety efforts, while positive attitudes played more of a facilitatory role. In addition, Basahel (2021) stated that workplace safety behavior is the most crucial and effective measures to reduce occupational injuries and prevent accidents. Meanwhile, the personality trait which received more attention is employees' conscientiousness and had been cited by several studies to have positive relationship with performance (Barrick et al., 1993; Lestari et al., 2023, Amoadu et al., 2023) and with safety behavior (Fan et al., 2024). In the electrical industry, where safety and precision are paramount, conscientious employees are particularly valuable. Their tendency to follow protocols, attend to detail, and avoid unnecessary risks contributes significantly to workplace safety and operational efficiency. By reliably identifying hazards, complying with safety standards, and maintaining high performance, conscientious workers not only enhance individual outcomes but also foster a culture of responsibility and vigilance, thereby supporting a positive safety climate (Fan et al., 2024).

Another important human factor associated with individual's success and high performance is competency. It is attributed to knowledge, skill, ability and attitude that contribute to positive behavior and paramount to organizational success in business endeavors (Sabuhari et al., 2020). In keeping up with the changes in technology and work setting, manufacturers have been consistently validating the competency requirements for its employees. The search for competent people encompasses a wide spectrum of job level starting form entry levels to the board of directors (Chu et al., 2022). Different competency models were proposed for different work setting (Yorulmaz and Sevinc, 2024). A competent person with right mindset has better perceived behavior control for the intended and very likely excel on the job (Basahel, 2021; Iqbal et al., 2024)

The research analyses the influence of safety climate, employee competency on safety performance by considering employee conscientiousness as a meadiating variable. The study aims to evaluate the extent of influence of these factors on safety performance and to asses the impact of employee conscientiousness. While the exicting literature has explored various aspects of safety climate, employee competency , safety performance, employee conscientiousness in diverse organizational contexts, a notable research gap is specific to electrical workers in Malaysia (Iqbal et al., 2024). Firstly, research to date has not systematically investigated the direct impact of safety climate and employee competency on the employee employee conscientiousness, despite the industry playing a vital role in the local economy (Basahel, 2021). The literature also need more detailed studies examining how employee conscientiousness functions as a mediator in relationship between safety climate and employee competency in the specific context of electrical workers in Malaysia. Understanding this mediation is crucial for comprehensively grasping the safety performance especially in electrical industry.

Although many studies have examined the relationship between safety climate, employee competency, and safety performance, limited research has explored how individual personality traits, such as employee conscientiousness, mediate these relationships (Basahel, 2021). Most existing research focuses on organizational factors alone, without considering how employee characteristics influence the effectiveness of safety initiatives (Iqbal et al., 2024). This study addresses these gaps by investigating the role of employee conscientiousness as a mediator and applying a motivational theory framework to better understand how both organizational and individual factors contribute to safety performance. The specific research include: How do safety climate and employee affect safety performance? How they affect employee conscientiousness?And how does employee conscientiousness mediate the relationship between safety climate and employee competency toward safety performance?

Literature Review

The literature review delineates expectancy valence theory concepts and prior research supporting the relationships between safety climate, employee competency on safety performance mediated by employee conscientiousness and development of study hypotheses.

Expectancy Valence Theory

The expectancy valence theory originated from Vroom (1994) and subsequently gained significant prominence as a research framework within domains of safety, psychology, motivation and behavior. Expectancy theory was inspired by the realization that employee performance is based on individual factors like personality, past experiences, confidence, skills, and knowledge. Neal et al. (2000) also suggests that the employee would comply with established safety procedures and rules when they perceive that such behaviours may bring valued outcomes. A strong safety climate boosts employees' expectancy (belief that effort improves safety) and instrumentality (perception that safety compliance yields rewards), while competency strengthens their confidence (expectancy) in performing tasks safely (Griffin and Neal, 2000). Therefore, the application of expectancy valence theory helps to examine how employees high in conscientiousness internalize safety values, perceive stronger links between effort and performance, and persistently adhere to safety protocols to achieve desired outcomes. Basahel (2021) highlight in their finding the role of motivation in shaping safety behaviors is emphasized, offering a framework to analyze how individual traits and organizational conditions interact to influence safety outcomes.

The Effect of Safety Climate on Safety Performance

Safety performance is critical component of overall work performance. Safety performance as organisational safety practice levels that indicate means for accident prevention (Amoadu et al., 2023).The quality of safety climate in an organisation can affect the safety performance of an organisation (Syed-Yahya et al., 2022). In the past, many research endeavours showed positive relationships between safety climate and safety performance at the individual, group, and organizational levels (Chu et al., 2022). However, research findings on this relationship are not always similar and compatible with each other. For example, some findings indicated a positive relationship between certain safety climate dimensions and safety performance (Abeje & Luo, 2023), while findings from other authors support models containing mediating variables (Neal et al., 2000). In this context, the indicators of safety climate comprised safety management, safety supervisor, co-worker, safety training, job safety and safety rules and special were capable of influencing safety performance.

These studies collectively highlight a consistent positive relationship between safety climate and safety performance. Saleem and Malik (2022) also investigated psychological strain as a mediator between safety climate and safety performance among workers at 27 construction sites in Hong Kong, finding that psychological strain partially mediated this relationship. Similarly, Zhang et al. (2023) examined the impact of safety climate and personal experience on behavioral safety performance in the Chinese construction industry, concluding that safety climate had a stronger influence on safety behavior than personal experience. They recommended focusing on safety climate and personal experience to enhance safety

performance. Additionally, Kalteh et al. (2021) conducted a meta-analysis to explore the relationships between safety climate, subjective safety, and occupational accidents, confirming the positive link between safety climate and safety performance. This study proposes the following hypothesis based on the established association between safety climate and safety behaviors found in prior research.

H1: Safety climate has a direct effect on safety performance.

The Effect of Employee Competency on Safety Performance

Employee competency is closely related to safety performance, as well-trained and knowledgeable employees are better equipped to identify and manage workplace hazards, reducing accident rates (Sabuhari et al., 2020). The effects of human resource flexibility, employee competency, organizational culture adaptation, and job satisfaction on employee performance. Competent employees understand safety protocols and procedures, which enhances their ability to perform tasks safely and contributes to a positive safety culture. Meher et al. (2022) studies have shown that increased competency through safety training significantly improves safety performance outcomes. For example, Vinodkumar and Bhasi (2010) found a strong positive relationship between employee training and safety performance in the chemical industry, demonstrating that training enhances safety knowledge and compliance with safety regulations. Similarly, Sabuhari et al. (2020) conducted a survey revealing that employees' safety competencies directly impact their adherence to safe behaviors, improving overall safety performance. Based on the previous discussion, the following hypothesis was proposed.

H2 Employee competency has a direct effect on safety performance**.**

The Effect of Safety Climate on Employee Conscientiousness

Conscientiousness, one of the big five personality traits, has consistently been linked with high job performance across various industries (Barrick et al., 1993). Conscientious employees tend to be reliable, disciplined, and detail-oriented, contributing to individual success and overall organizational effectiveness. Consequently, conscientiousness correlates with lower turnover rates and fewer workplace conflicts (Amoadu et al., 2023). Employee conscientiousness, characterized by diligence, reliability, and attention to detail, is crucial to organizational effectiveness and is influenced by various workplace factors, including safety climate and employee competency (Sabuhari et al., 2020). The concept of safety climate has been widely studied, especially in industries where risk management is critical. A study conducted by Basahel (2021) showed that a robust safety climate positively affects employee attitudes and behaviors, leading to fewer accidents and increased compliance with safety protocols. Moreover, employees who perceive a strong organizational commitment to safety are likelier to adopt conscientious behaviors as they feel supported and responsible for maintaining safety (Neal et al., 2000). Other empirical studies align that research shows moderate to strong correlations $r = .30 - .45$ between safety climate and conscientiousness based on findings from multiple studies and meta-analyses in organizational behavior and psychology (Liu et al., 2022; Saleem & Malik, 2022; Fan et al., 2024). Iqbal et al. (2024) also proved conscientious individuals are believed to perform better as they have high level of motivation and behave safely at work due to the characteristics they hold and exhibit. Therefore, optimal performance is achieved when more conscientious individuals have higher level of safety climate. Based on the previous discussion, the following hypothesis was proposed.

H3: Safety climate has a direct effect on employee conscientiousness

The Effect of Employee Competency on Employee Conscientiousness

Employee competency, defined by skill level, experience, and professional knowledge, is a critical determinant of employee behavior. High competency enables employees to perform their tasks precisely and attentively, often translating into conscientious behavior (Meher et al., 2022).. Furthermore, competency in the workplace is linked with better decision-making and problem-solving capabilities, often resulting in higher levels of job satisfaction and conscientiousness. Empirical studies consider employee competency and conscientiousness significant, as competency enhances self-efficacy, motivation, and

alignment with job roles, all contributing to conscientious behavior (Pourmazaherian et al., 2021; Eissa, 2020; Meher et al., 2022). While competency is a skill-based attribute and conscientiousness is a personality trait, they are mutually reinforcing, with empirical evidence supporting their positive correlation in improving job performance and workplace outcomes. Based on the previous discussion, the following hypothesis was proposed:

H4: Employee competency has a direct effect on employee conscientiousness.

The Effect of Employee Conscientiousness on Safety Performance

Conscientious individuals are characterized by dependability traits, such as thoroughness, organization, responsibility, carefulness, and a strong need for achievement (Fan et al., 2024; Barrick and Mount, 1991). These individuals are typically diligent, reliable, self-motivated, and highly dedicated to achieving personal and organizational objectives. Due to these attributes, conscientious individuals are believed to demonstrate superior job performance, as they are both highly motivated and likely to engage in safe workplace behaviors. Prior research has established a connection between the Big Five personality traits, particularly conscientiousness, and various aspects of work performance (Barrick et al., 1993; Fan et al., 2024; Liu et al., 2022). For example, Fan et al.(2024) examined 91 wholesale representatives from a major appliance manufacturer, assessing personality traits as predictors, autonomous goal-setting and goal commitment as mediators, and sales volume and supervisor ratings as performance indicators. Their structural equation modeling results showed that autonomous goal-setting and goal commitment partially mediated the relationship between conscientiousness and performance indicators. Note that conscientiousness was directly and positively related to sales volume and supervisor-rated job performance. Based on the previous discussion, the following hypothesis was proposed:

H5: Employee conscientiousness has a direct effect on safety performance.

The Mediating Role of Employee Conscientiousness

According to Fan et al. (2024), a mediation employee conscientiousness model capable of using the expentancy tool was established to describe workplace behaviors. Liu et al. (2022) also analyzed various high-risk industries by testing the relationship between the safety climate and indicators of supervisor safety; job safety, co-worker's safety, safety management, safety training, and safety rules and special safety training. In Meher et al. (2022), employee competency were connected the abilities of workers to perform tasks safely and improved safety performance outcomes. Both safety climate and employee competency are crucial for promoting safe work behaviors and reducing workplace accidents. Base on Abeje and Luo (2023), the perception among employees that safety is prioritized within the organization. It has been shown to positively influence safety performance by encouraging adherence to safety protocols and proactive safety behaviors (Neal & Griffin, 2006).

Meanwhile, employee competency, encompassing skills, knowledge, and experience, enables individuals to respond effectively to safety risks and meet organizational safety standards (Fan et al., 2024). However, the impact of these factors on safety performance may depend on individual personality traits, particularly conscientiousness, which reflects qualities like diligence, responsibility, and adherence to rules (Barrick & Mount, 1991). Fan et al. (2024) also stated conscientious employees are more likely to internalize safety values and apply their skills responsibility. Furthermore, the conscientious employees respond more positively to a strong safety climate and leverage their competencies to engage in safety behaviors, amplifying safety outcomes (Meher et al., 2022). The concept of employee conscientiousness as mediated variable was first introduced by Barrick et al., 1993). Futhermore, the correlation between safety management and safety performance may be predicted by employee conscientiousness (Saleem & Malik, 2022). In this context, the mediation effect of employee conscientiousness could act as a mediator, enhancing the effect of safety climate and competency on safety performance. Based on the previous discussion, the following hypothesis was proposed:

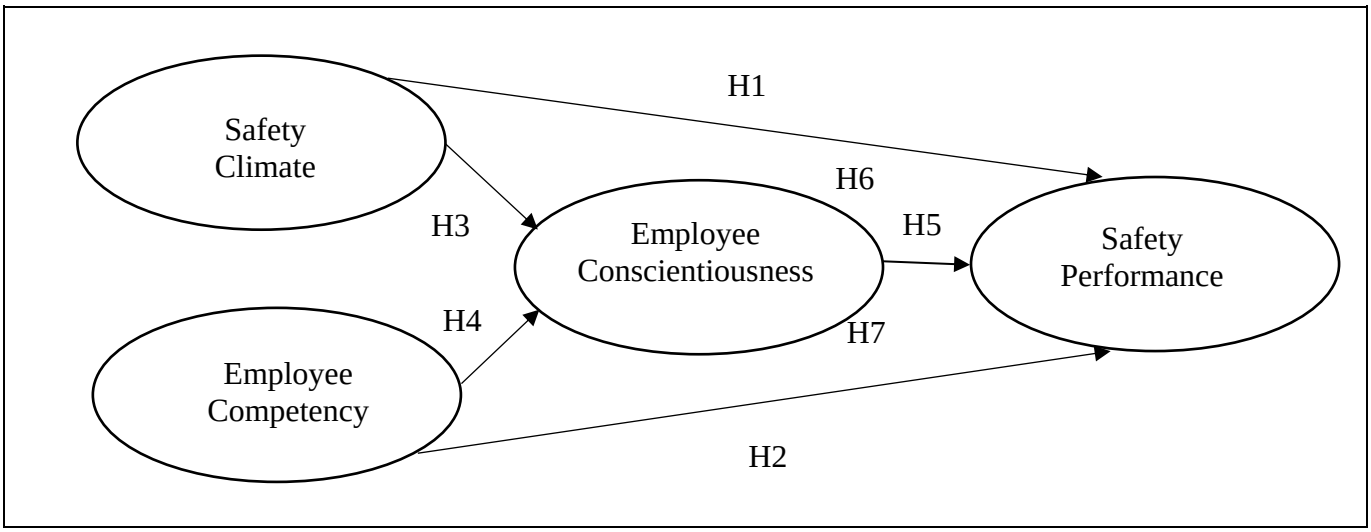
H6: Employee conscientiousness mediates the relationship between safety climate and safety performance.

H7: Employee conscientiousness mediates the relationship between employee competency and safety performance.

Based on the hypotheses, a conceptual framework was proposed (see Figure 1).

Figure 1

Proposed Conceptual Framework



Method

A quantitative method employing structural equation modelling analysis for the cross-sectional data was used. The conceptual model of this study, which incorporates latent variables, is exploratory in nature, partial least squares structural equation modeling (PLS-SEM) was selected as the data analysis tool accordingly (Hair et al., 2021).

Participants and Procedure

The population of this study involved 1,480 workers among electrical's contractors from five states like Penang, Kuala Lumpur, Selangor, Pahang and Johor in Malaysia. The five states were chosen as study locations due to their significant economic development and the elevated rates of workplace accidents observed within the industry. In addition, the Solvin formula was applied to determine the appropriate sample size. A self- administered questionnaire survey was implement from February 1, 2024 to May 30, 2024. with a total 412 participants. After preliminary analysis, the number of valid questionnaires was 379. Partial least ~~s~~quare ~~s~~tructural equation modeling (PLS-SEM) was applied to assess the measurement and the structural model (Hair et al., 2021). According to Hair et al. (2021), the assessment of the measurement model is carried out by (i) the reliability test, (ii) the convergent test, and (iii) the discriminant test. The assessment of the structural model comprises collinearity, path coefficient, coefficien~~t~~ of determination (R^2), effect ~~s~~ize (f^2), and Stone Geisser predictive relevance (Q^2) (Hair et al., 2021).

Instruments

The accumulation of data occurred through the dissemination of questionnaires to selected the participants, measuring their appraisals concerning the relevant variables. All measurement items were adapted from prior research or techniques. The adapted questionnaire tailored to align closely with the Malaysian context and standard translation procedures (Brislin, 1980), where adhered to in order a guarantee the equivalency of the measures in English versions of instrument. The questionnaire for data collection had two sections. The section 1 collected demographic information such as the respondents' age, gender, work exprience, and education to provide context for analyzing safety performance. The section 2 consisted of scales measuring study variables. Respondents rated items on a five-point Likert scale (1 =

strongly disagree to 5 = strongly agree), designed to capture safety performance, safety climate, employee competency and employee conscientiousness.

Safety Performance

Safety performance was measured by safety compliance and safety participation. There were seven items to assess safety performance, comprising three items for safety compliance and four items for safety participation. Safety compliance and participation were adopted by Neal et al. (2000). A similar approach was applied by Vinodkumar and Bhasi (2010) to measure the safety performance of employees in the manufacturing industry. Example items are 'I carry out my work in a safe manner', 'I use all necessary safety equipment to do my job', 'I ensure the highest levels of safety when I carry out my job', 'I put extra effort to improve safety of the workplace'. The reported Cronbach's alpha was .94. (Neal et al., 2000).

Employee Conscientiousness

The items that measure employees' conscientiousness derived from Goldberg (1999) and contained nine items. Example items are, 'I normally follow the rules and regulations', 'Safety management helps prevent accidents', 'Safety training programmes are useful for my work', 'I get others to do my duties', 'I demand for quality', 'I work hard', 'I put little time and effort into my work', 'I put little time and effort into my work'.The reported Cronbach's alpha was .96. (Goldberg, 1999)

Safety Climate

There were six dimensions in safety climate, which are (1) supervisor safety, (2) job safety, (3) co-worker safety, (4) safety management, (5) safety training, and (6) safety rules and special safety training. Note that all of them were adopted by Shang and Lu (2009). However, it was noted that dimensions of supervisor safety, job safety, co-worker safety, and safety management were originally used by Hayes *et al.* (1998), while safety training and safety rules and special safety training were adopted by Mearns *et al.* (2003). Example items are "My supervisor provides safe working conditions", "My co-workers encourage others to be safe", "My supervisor enforces safety rules", "My management provides safety training programmes for new employees" .The reported Cronbach's alpha was .96. (Shang & Lu, 2009)

Employee Competency

Employees competency was measured using six items adapted from safety climate tools questionnaires (Neal et al., 2000). Example items are, 'I am clear about what my responsibilities are for safety,' ' I fully understand the safety instructions associated with my job,' 'I am good at detecting unsafe behavior during performing the job,' 'I understand the nature of all the hazards,' 'I am likely to encounter during my work,' 'I have a poor understanding of the risks associated with my work'. The reported Cronbach's alpha was .95. (Neal et al., 2000)

Results

Characteristics of the Respondents

The total number of respondents for this research was 412 workers. Among 412 respondents, 408 were male (99.9%) and 4 were female (1.0%) who participated in this research. In terms of races, 404 Malays (94.0%), 8 Chinese (1.8%) and 18 Indians (4.2%). Additionally, 133 respondents (34.2%) were between 26 and 33 years old, the highest group that contributed to this research. On the other hand, 100 respondents (23.3%) were between 34 to 41 years, 84 respondents (19.5%) were between 42 to 49 years, 70 respondents (16.3%) were between 50 to 59 years, 26 respondents (6.0%) were between 18 to 25 years, and 3 respondents (0.7%) were 60 years and above.

Assessment of Measurement and Structural Model

Table 1 indicates that all indicators exhibited with recommended values above .70, represents the correlation between the construct and its indicators (Hair et al., 2021). The analysis results revealed Cronbach"s alpha values exceeding .70 for all variables, establishing their reliability. Table 1 illustrates

that, for the constructs of effective safety climate, employee competency, employee conscientiousness and safety performance, the AVE root value surpassed the correlation value and all criteria.

The cross-loading, the fornell-larcker criterion, and the heterotrait-monotrait (HTMT) ratio were used to assess discriminant validity. No cross-loading issues were found in the research as the loading of an indicator to its corresponding construct was higher than its loading to any other construct (Hair et al., 2021). The fornell-larcker criterion requires that the square root of the construct AVE be greater than the correlation coefficients between it and the other constructs (Hair et al., 2021). The values of the discriminant validity were fulfilled.

The structural model's fit was evaluated using standardized root mean square residual (SRMR), unweighted least squares discrepancy (d-ULS), geodesic discrepancy (d-G), and normed fit index (NFI). The SRMR value was .06 below the .08 threshold, d-ULS value was .36 and d-G value was .42 value. Furthermore, the NFI value was .91 approaching the ideal value of 1.0 (Hair et al., 2021). Overall, the results confirmed acceptable model fit with the observed data as shown in Table 2. Safety climate has a significant direct effect on safety performance. The results of testing H1 are significant ($\beta = .58$, $p < .001$). Other than that, employee competency also directly affects safety performance. The results of testing H2 are significant ($\beta = .30$, $p = .02$). In addition, safety climate also has a direct effect on employee conscientiousness, and employee competency has a direct effect on employee conscientiousness. The results of testing H3 are significant ($\beta = .71$, $p < .001$) and H4 also are significant ($\beta = .53$, $p < .001$). Finally, employee conscientiousness has a direct effect on safety performance. The results of H5 are significant ($\beta = .24$, $p < .001$).

The values of determination coefficient (R^2), predictive relevance (Q^2), and size effect (f^2) toward R^2 were examined in this study. The R^2 value for safety performance was found to be .50, indicating that 50.0% of the variance in safety performance could be explained by safety climate, employee competency, and employee conscientiousness. According to Hair et al. (2021), this represents a weak to moderate effect. For employee conscientiousness, the R^2 value was .61, meaning 61.0% of its variance could be accounted for by safety climate, employee competency reflecting a moderate to substantial effect (Chin, 1998). Regarding Q^2, safety performance had a Q^2 value of .41, which indicates that safety climate, employee competency, and employee conscientiousness collectively had 41.0% predictive relevance toward safety performance (Hair et al., 2021). Similarly, the Q^2 value for employee conscientiousness was .60, meaning that safety climate and employee competency had a 60.0% predictive relevance toward employee conscientiousness (Hair et al., 2021). In terms of f^2, as suggested by Hair et al. (2021), employee conscientiousness showed a small effect (.09) on safety performance. Safety climate exhibited a minimal effect (.10) on safety performance and a moderate effect (.24) on employee conscientiousness. Finally, employee competency showed a small effect (.02) on safety performance but a substantial effect (.42) on employee conscientiousness.

Mediation Effect

Mediation analysis was used to assess the direct and direct impacts of an independent variable on dependent factor. This analysis evaluated the significant relationship between independent and dependent variable using a mediating determinant. In the context , a statiscally significant indirect was indentified by a t-value > 1.96 and p-value < .05 (Hair et al., 2021). Table 3 displays the results of examining the mediation effect of employee conscientiousness serves as a mediator for relationship between safety performance as well as the association of employee competency and safety performance. The mediation effect (H6) examined that employee conscientiousness had a significant mediation effect on the relationship between safety climate and safety performance ($\beta = .32$, $p < .00$). Thus, the hypothesis 6 was therefore supported. This study also showed a significant relationship between employee competency and safety performance ($\beta = .17$, $p < .00$) supporting H7. The analysis also indicated that employee conscientiousness has a more substantial mediating effect than the direct effect on safety climate and employee competency on safety performance.

Table 1

Validity and Reliability Test among the Study Variable

Variables	items	Loading	α	CR	AVE	CV
SV	SV1	.74	.97	.97	.76	Yes
	SV2	.86				
	SV3	.89				
JS	JS4	.79	.74	.85	.62	Yes
	JS5	.86				
	JS6	.73				
CW	CW7	.77	.90	.93	.72	Yes
	CW8	.88				
	CW9	.90				
SM	SM10	.78	.87	.91	.66	Yes
	SM11	.79				
	SM12	.87				
ST	ST15	.77	.80	.86	.56	Yes
	ST16	.78				
	ST17	.81				
SR	SR18	.90	.66	.85	.74	Yes
	SR19	.82				
	SR20	.95				
SK	SK1	.82	.77	.87	.64	Yes
	SK2	.86				
	SK3	.80				
	SK4	.84				
	SK5	.74				
	SK6	.78				
EC*	EC1	.73	.95	.95	.61	Yes
	EC2	.71				
	EC3	.74				
	EC4	.79				
	EC5	.73				
	EC6	.88				
	EC7	.71				
	EC8	.71				
	EC9	.78				
SC	SC1	.89	.87	.92	.79	Yes
	SC2	.89				
	SC3	.88				
SP	SP1	.83	.77	.87	.69	Yes
	SP2	.83				
	SP3	.84				
	SP4	.82				

Note. SV = supervisor safety; JS = job safety; CW = co-worker's safety; SM = safety management; ST = safety training; SR= safety rules and special safety training; SC = safety compliance; SP = safety participation; SK = employee competency; EC = employee conscientiousness, α = cronbach's alpha, CR = composite reliability, AVE = average variance extracted, CV = convergent validity. Variable marked with * had a item with loadings below .5 removed; the table presents the reliability data after deletions.

Table 2

Assessment of Structural Model (Direct Effect)

Estimated Paths	β	*t*	*p*-value	Results
H1: Safety Climate → Safety Performance	.58	5.49	.000***	Supported
H2: Employee Competency → Safety Performance	.30	4.01	.02***	Supported
H3: Safety Climate → Employee Conscientiousness	.71	6.43	.000***	Supported
H4: Employee Competency → Employee Conscientiousness	.53	6.71	.000***	Supported
H5: Employee Conscientiousness → Safety Performance	.24	4.79	.000***	Supported

Note: ***$p < .001$

Table 3

The Results of the Mediation Effect

Mediated Paths	β	*t*	*p*-value	Results
H6: Safety Climate → Employee Conscientiousness→ Safety Performance	.32	5.49	.00*	Supported
H7: Employee Competency → Employee Conscientiousness→ Safety Performance	.17	4.01	.00*	Supported

Note: *$p < .05$

Discussion and Conclusion

The results suggest the main predictors of safety performance within Malaysian electrical employees. In this context , the purposed conceptual model included the dimensions of variable and mediator. As predicted, safety performance influence positively by safety climate which is consistent with previous research (Eissa, 2020) due the strong management, leadership, and co-workers to comply with safety rules and regulations. It reflects the emphasis placed on safety by the organization and how safety is prioritized in daily operations. This is consistent with previous research that safety climate is often a precursor to safety behaviors, as it influences how employees perceive risks, adhere to safety protocols, and engage in proactive safety practices (Abeje & Luo, 2023). Workers' perceptions of the safety climate significantly impact high-risk industries such as electrical. The findings of this study also align with the research by Chu et al. (2022), which found that a limited safety climate and insufficient training contribute to mild safety behaviors among workers in construction industries. Similarly, this study corroborates the findings of Fan et al. (2024), which emphasized that safety climate is an awareness of hazards and safety regulations enhanced through safety.

As anticipated, employee competency directly affects safety performance. The findings in this study confirmed the interpretation by Sabuhari et al. (2020) that employee competency had positive realationship with safety performance which skilled workers had the technical knowledge to handle equipment safely, follow safety protocols, and identify hazards proactively. The competent workers understand essential procedures and they know how to use personal protective equipment effectively to reduce the risk of accidents. This depth of knowledge and skill ensures tasks are performed safely and accurately, following safety rules and regulations.

Employee conscientiousness could mediate the relationship between safety climate, employee competency and safety performance. An employee conscientiousness among electrical workers examined in this study was the responsibility of workers to participate in safety training to comply with safety regulation to enhance workplace safety, to provide an opinion on safety improvements and enforce standard operating procedure. A review of all the information related to employee conscientiousness indicate a significant effect. In this context , the importance of employee conscientiousness in behavioral analysis was expressed by self-motivated and highly committed influencing and motivating safety-related attitude . This finding indicated that none of this safe behavior is possible without conscientious employees who posses

qualities that reflect dependability (e.g., thorough, careful, organized, responsible) as well as the need for achievement (Barrick et al., 1993; Zhang et al., 2023; Xia et al., 20221). This is important because safety at the workplace is definitely a concern and having employees possessing this characteristic might enable them to plan effectively to complete the tasks more accurately and safely in a specified amount of time (Fan et al., 2024).

The study also showed that employee conscientiousness could significantly mediate the relationship between safety climate and safety performance, as the expectancy valence theory explains. According to expectancy valence theory performance is influenced by three key components: expectancy, instrument, and valence (Budianto et al., 2021). Therefore, the findings of this study clearly demonstrate that a safe climate enhances safety performance by creating an environment where safety is a clear priority for management, leadership, and employees who are committed to following safety protocols. Hence, the results of this study were able to provide a clear indication that conscientious electrical workers in a positive safety climate are likely to consistently follow safety regulations, use appropriate personal protective quipment and conduct thorough risk assessments before performing tasks (Liu et al., 2022). Their high conscientiousness leads them to act with greater care, precision, and responsibility, directly improving safety performance in an electrical workplace with a strong safety climate that emphasizes safety through clear policies, training, and leadership (Saleem and Malik, 2022). Employees are also more likely to develop positive attitudes toward safety (attitude component). Furthermore, conscientious workers, characterized by their attention to detail, responsibility, and reliability, are more likely to internalize these safety values and take them seriously. Indirectly, the combination of safety climate and employee conscientiousness strengthened safety performance among electrical workers in the workplace (Rajabi et al., 2022).

In relation to employee competency, this study found that employee conscientiousness among electrical workers was able to have a more significant mediation effect rather than a direct effect. Employee conscientiousness has proved to be a crucial factor in enhancing workers competency the work safety in the workplace. Besides that, conscientiousness influences their commitment to consistently applying these skills with caution and attention to detail (Budianto, 2021). As a result, conscientious electrical workers are more likely to use their knowledge responsibly, follow safety protocols, check equipment carefully, and ensure compliance with safety standards. This study also found that employee conscientiousness can increase the relationship between employee competency and safety performance among electrical workers. Thus, the management should have considered enhancing their technical competencies to ensure that skills are applied in a way that prioritizes safety (Saleem and Malik, 2022).

The findings of this study support previous studies conducted by (Sabuhari et al., 2020) that workers who comply with safety regulations and standard operating procedures can implement a zero-vision accident policy. This affirmation provided a better understanding of study conducted by (Xia et al., 2021) that competency among workers one of the factors to reduce accidents in workplace. Indirectly, these result also showed that employee conscientiousness was to able fulfill , a notable research gap is specific to electrical workers in Malaysia. This study found that employee conscientiousness is seen to have the strength of the element that is capable of forming better safety performance.The result also supported a previous study that examined the positive influence of safety workplace atmosphere on employees and organization outcomes beyond protective matters (Budianto, 2021).

Limitations and Future Research Direction

This study has certain limitations that should be acknowledged. Firstly, the cross-sectional design, while establishing correlations among the variable, leaves the directionality of these relationships over time unclear. Secondly, the unique workers of electrical industry may not fully represent the whole electrical workers in Malaysia because of geographical regions. The reliance on self-reported data may also introduce biases such as social desirability, potentially affecting the accuracy of the responses. Finally, this study focused on a specific set of variables, and future research could explore additional factors, such as organizational support or job satisfaction, that may also impact safety performance. Future studies might

address these limitations through longitudinal designs, broader and comparative sampling, and the inclusion of diverse mediators or moderators, which would offer a more comprehensive understanding of the dynamics influencing safety performance in varied contexts. Additionally, expanding the research to different cultural contexts and industries would help understand how conscientiousness impact to the safey performance.

Implications for Behavioral Science

The research enriches the behavioral science literature by applying expectancy valence theory to explore the dynamics of safety climate, employee competency, employee conscientiousness, and safety performance among electrical workers. This theory suggests that individuals are motivated to act based on the expected outcomes of their actions. The study underscores the importance of trait personality as a key personal resource within the framework, enhancing safety performance (Fan et al., 2024). Employee conscientiousness significantly impacts employee' perceptions of safety climate, with employee skills affecting these perceptions more than previously prioritized factors (Amoadu et al., 2023). Insight highlight the importance of fostering a strong safety culture in high-risk industries like electrical through comprehensive training and strong personality (Meher et al., 2022).

Conscientiousness influences employees' well being and misconduct incident. Besides that both safety climate and employee competency by ensuring that workers are skilled and committed to maintaining a safe, responsible, and high-quality working environment. These traits improve safety outcomes, efficiency, and overall safety performance (Chu et al., 2022). Moreover, the impact of conscientiousness, safety climate, and employee competency on an organization is profound, particularly in high-risk fields like electrical work (Laurent et al., 2020). The research outcomes offer practical guidance for management of electrical company in Malaysia, informing strategies to optimize accident and enhance safety performance. By uncovering the direct impact of safety climate, employee competency and the mediating role of employee conscientiousness , the study equips insights to tailor their approaches for greater safety performance. Thus, these findings provide valuable input for government policymakers, assisting in the formulation of targeted strategies and policies that support the strengthening safe behavior among electrical workers in Malaysia.

Conclusion

This study highlights the importance of a positive safety climate and employee competency in promoting safety performance among electrical workers in Malaysia, with employee conscientiousness as a mediating factor. The findings underscore that fostering a conscientious workforce can enhance the effectiveness of safety initiatives and improve overall safety outcomes. Other than that, this study strengthens the theoretical framework regarding safety climate and employee competency in terms of safety performance and psychological factors like conscientiousness. The paper provides valuable insights and recommendations for exploring causality and testing additional variables to provide a more comprehensive framework for understanding safety performance in high-risk occupations.

Declarations

Conflicts of Interest: The authors declare no conflicts of interest.

Ethical Approval Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the School of Business Management, Universiti Utara Malaysia (protocol code 2024/0183) and date 13 March 2024.

References

Abeje, M., & Luo, F. (2023). The influence of safety culture and climate on safety performance: Mediating role of employee engagement in manufacturing enterprises in Ethiopia. *Sustainability, 15*(14), 11274. https://doi.org/10.3390/su151411274

Amoadu, M., Ansah, E. W., & Sarfo, J. O. (2023). Influence of psychosocial safety climate on occupational health and safety: A scoping review. *BMC Public Health*, *23*(1), 1344. https://doi.org/10.1201/9781351228848

Barrick, M. R., Mount, M. K., & Strauss, J. P. (1993). Conscientiousness and performance of sales representatives: Test of mediating effects of goal setting. *Journal of Applied Psychology, 78*(5), 715–722. https://psycnet.apa.org/doi/10.1037/0021-9010.78.5.715

Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: a meta-analysis. *Personnel psychology, 44*(1), 1–26. https://doi.org/10.1111/j.1744-6570.1991.tb00688.x

Basahel, A. M. (2021). Safety leadership, safety attitudes, safety knowledge and motivation toward safety-related behaviors in electrical substation construction projects. *International Journal of Environmental Research and Public Health*, *18*(8), 4196. https://doi.org/10.3390/ijerph18084196

Brislin, R. W. (1980). Cross-cultural research methods: Strategies, problems, applications. In *Environment and Culture* (pp. 47–82). Springer.

Budianto, T. (2021). A mediated moderation model: Personality, team psychological safety and team performance. *Management Analysis Journal*, *10*(1), 95–102. https://doi.org/10.15294/maj.v10i1.45586

Chu, F., Liu, S., Guo, M., & Liu, R. (2022). Group strength in safety performance: The effects of group characteristics on individual personality expression in high-speed railway operators. *International Journal of Occupational Safety and Ergonomics*, *28*(2), 909–922. https://doi.org/10.1080/10803548.2020.1846875

Eissa, G. (2020). Individual initiative and burnout as antecedents of employee expediency and the moderating role of conscientiousness. *Journal of Business Research*, *110*, 202–212. https://doi.org/10.1016/j.jbusres.2019.12.047

Fan, Y., Qu, X., Zhang, W., Tao, Z., & Chen, C. (2024). The influence of authentic leadership perception on clinical nurses' voice behaviour and the mediating effect of conscientiousness. *Journal of Nursing Management*, *2024*, 9946881. https://doi.org/10.1155/2024/9946881

Griffin, M. A., & Neal, A. (2000). Perceptions of safety at work: A framework for linking safety climate to safety performance, knowledge, and motivation. *Journal of Occupational Health Psychology*, *5*(3), 347–358. https://doi.org/10.1037//1076-8998.5.3.347

Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Partial least squares structural equation modeling (PLS-SEM) using R: A workbook* (p. 197). https://doi.org/10.1007/978-3-030-80519-7

Iqbal, S., Nawaz, M. J., Ali, A., Osman, E., & Hamza, A. (2024). Investigating the impact of project planning on construction project success through the mediating role of risk management and safety climate. *International Journal of Organizational Leadership*, *13*, 119–139. https://doi.org/10.33844/ijol.2024.60426

Kalteh, H. O., Mortazavi, S. B., Mohammadi, E., & Salesi, M. (2021). The relationship between safety culture and safety climate and safety performance: A systematic review. *International Journal of Occupational Safety and Ergonomics*, *27*(1), 206–216. https://doi.org/10.1080/10803548.2018.1556976

Laurent, J., Chmiel, N., & Hansez, I. (2020). Personality and safety citizenship: the role of safety motivation and safety knowledge. *Heliyon*, *6*(1), e03201. https://doi.org/10.1016/j.heliyon.2020.e03201

Lestari, F., Modjo, R., Wibowo, A., & Sunindijo, R. Y. (2023). Influence of safety climate on safety performance in gas stations in Indonesia. *Safety*, *9*(3), 44. https://doi.org/10.3390/safety9030044

Liu, Y., Xu, N., Yuan, Q., Liu, Z., & Tian, Z. (2022). The relationship between feedback quality, perceived organizational support, and sense of belongingness among conscientious teleworkers. *Frontiers in Psychology*, *13*, 806443. https://doi.org/10.3389/fpsyg.2022.806443

Meher, J. R., Nayak, L., Mishra, R. K., & Patel, G. (2022). Impact of organizational learning culture on organizational effectiveness: A serial mediation analysis with knowledge sharing and employee

competencies. *VINE Journal of Information and Knowledge Management Systems*, *54*(2), 324–338. https://doi.org/10.1108/VJIKMS-10-2021-0230

Neal, A., Griffin, M. A., & Hart, P. M. (2000). The impact of organizational climate on safety climate and individual behavior. *Safety Science*, *34*, 99–109. https://doi.org/10.1016/S0925-7535(00)00008-4

Neal, A., & Griffin, M. A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behavior, and accidents at the individual and group levels. *Journal of Applied Psychology*, *91*(4), 946. https://doi.org/10.1037/0021-9010.91.4.946

Pourmazaherian, M., Baqutayan, S. M. S., & Idrus, D. (2021). The role of the big five personality factors on accident: A case of accidents in construction industries. *Journal of Science, Technology and Innovation Policy*, *7*(1), 34–43. https://doi.org/10.11113/jostip.v7n1.65

Rajabi, F., Mokarami, H., Cousins, R., & Jahangiri, M. (2022). Structural equation modeling of safety performance based on personality traits, job and organizational-related factors. *International Journal of Occupational Safety and Ergonomics*, *28*(1), 644–658. https://doi.org/10.1080/10803548.2020.1814566

Sabuhari, R., Sudiro, A., Irawanto, D., & Rahayu, M. (2020). The effects of human resource flexibility, employee competency, organizational culture adaptation and job satisfaction on employee performance. *Management Science Letters*, *10*(8), 1777–1786. http://dx.doi.org/10.5267/j.msl.2020.1.001

Saleem, F., & Malik, M. I. (2022). Safety management and safety performance nexus: Role of safety consciousness, safety climate, and responsible leadership. *International Journal of Environmental Research and Public Health*, *19*(20), 13686. https://doi.org/10.3390/ijerph192013686

Shang, K. C., & Lu, C. S. (2009). Effects of safety climate on perceptions of safety performance in container terminal operations. *Transport Reviews*, *29*(1), 1–19. https://doi.org/10.1080/01441640802264943

Syed-Yahya, S. N., Noblet, A. J., Idris, M. A., & Lee, M. C. C. (2022). Examining the role of supervisory and co-worker safety support in mediating the relationship between safety climate and safety performance. *Safety science*, *155*, 105880. https://doi.org/10.1016/j.ssci.2022.105880

Vinodkumar, M. N., & Bhasi, M. (2010). Safety management practices and safety behaviour: Assessing the mediating role of safety knowledge and motivation. *Accident Analysis & Prevention*, *42*(6), 2082–2093. https://doi.org/10.1016/j.aap.2010.06.021

Vroom, V. H. (1994). *Work and motivation*. Wiley

Xia, N., Tang, Y., Li, D., & Pan, A. (2021). Safety behavior among construction workers: influences of personality and leadership. *Journal of Construction Engineering and Management*, *147*(4), 04021019. https://doi.org/10.1061/(ASCE)CO.1943-7862.0002023

Yorulmaz, M., & Basol, F. S. (2024). Yacht crews' perceptions of ethical climate, safety climate, psychological capital and psychological well-being in Türkiye. *Maritime Business Review*, *9*(2), 113–127. https://doi.org/10.1108/MABR-07-2023-0057

Zhang, S., Loosemore, M., Sunindijo, R. Y., & Gu, D. (2023). An investigation of safety climate in Chinese major construction projects. *International Journal of Construction Management*, *23*(8), 1365–1375. https://doi.org/10.1080/15623599.2021.1972385