Eduvest – Journal of Universal Studies
Volume 4 Number 8, August, 2024
p- ISSN 2775-3735- e-ISSN 2775-3727

Assessing the Influence of Safety Culture to Employee Safety Performance Mediated by Safety Communication in Coal-Fired Power Plant

Bambang Jiwantoro
Universitas Bunda Mulia, Master of Management, Jakarta, Indonesia
Email: S81230051@student.bundamulia.ac.id

ABSTRACT

This study analyzes the effect of safety culture on employee safety performance at a Coal Fired Power Plant (CFPP) in Java, as well as the mediating role of safety communication and moderating role of service years. This study aims to investigate the direct and indirect effects between the variables of safety culture, safety communication and employee safety performance. In addition, the study also explored the moderating role of service year in the relationship between safety culture and employee safety performance. Data was obtained from distributing questionnaires to CFPP employees using a stratified sampling method. SmartPLS SEM. The findings reveal that safety culture does not have a significant direct effect on employee safety performance. However, safety communication significantly mediates the relations between safety culture and employee safety performance. The service year does not moderate the relationship between safety culture and employee safety performance This indicates that other factors such as continuous training, reward system, and work environment may be more influential in this context.

KEYWORDS *Safety Culture, Safety Communication, Employee Safety Performance, Service Year*

INTRODUCTION

The demand for electricity in Indonesia continues to increase from year to year in line with the pace of economic development and the increasing population, with the average electricity consumption per capita in 2023 reaching 1,285 kWh up from 1,173 kWh in 2022. However, amidst the development of the power industry, workplace safety is still a major concern in Indonesia.

Work accidents are very costly for companies, employees and state agencies.

How to cite: Bambang Jiwantoro (2024). Assessing the Influence of Safety Culture to Employee Safety Performance Mediated by Safety Communication in Coal-Fired Power Plant. *Journal Eduvest. 4*(8), 6844-6849
E-ISSN: 2775-3727
Published by: https://greenpublisher.id/

The costs caused by work accidents can be likened to an iceberg. Direct costs can be easily calculated, including medical expenses, costs incurred to repair damaged facilities, and wages paid to workers during the period they are unable to work.

Based on the Liberty Mutual Workplace Safety Index 2023 (Doyle, 2023) According to the Liberty Mutual Workplace Safety Index 2023 (Doyle, 2023), in 2020, industries in the United States incurred $58.61 billion in direct costs due to injured workers, of which 82.2 percent ($48.15 billion) was for the top 10 causes of injuries and illnesses. The 10 most costly causes of workplace injuries and illnesses are presented below:

Table 1 Accident Cost Data

Causes	Cost (Billion USD)	Percentage
Excessive exertion involving outside sources	$12.84	21.9%
Fall at the same rate	$8.98	15.3%
Falling at a lower level	$6.09	10.4%
Falling on objects or equipment	$5.14	8.8%
Exertion or other bodily reactions	$3.67	6.3%
Exposure to other harmful substances (Including COVID-19)	$3.35	5.7%
Road incidents involving motorized land vehicles	$2.58	4.4%
Trapped or compressed by equipment or objects	$1.98	3.4%
Slips or trips without falling	$1.92	3.3%
Pedestrian vehicle incidents	$1.61	2.7%

One of the factors that contribute to work safety is safety culture. Safety culture refers to the values, beliefs and norms held by the company and its employees related to work safety. A strong safety culture can encourage employees to prioritize safety, follow safety procedures and report potential hazards.

This research was conducted at one of the Coal Fired Power Plant (CFPP) in Java to analyze the company's efforts to improve safety culture and the factors that influence it. In 2019, the Company began measuring the Safety Culture Maturity Model using the Bradley Curve. Initially, a Safety Perception Survey was conducted in 2019 which showed that the Company was in a Dependent position (see Figure 1).

Figure 1 Safety Perception Survey 2019

The survey was targeted only at permanent CFPP employees and did not involve employees of partners / contractors, especially contractors who are fix services and serve the company for a long period of time.

Since 2019, the company has implemented an Employee Observation program to enhance work safety communication, allowing employees to identify safe and unsafe conditions. While the program's data serve as leading indicators of employee performance, participation from 2021 to 2023 has stagnated, averaging 210 participants monthly, which is significantly lower than expected given the total workforce. This underreporting of unsafe conditions could potentially lead to safety incidents, with recurring issues related to Personal Protective Equipment, Person Position, and Person Reaction.

Research indicates that a positive safety culture, which influences employee safety performance, significantly reduces workplace incidents across various industries. However, safety performance is also affected by other factors, such as communication, knowledge, engagement, and leadership, with employee tenure playing a crucial role in safety practices. Further studies are needed to explore the relationship between safety culture, communication, and employee tenure in improving safety performance.

Based on the explanation above, the problem identification in this study is to investigate the effect of safety culture on employee safety performance and investigate the direct and indirect relationship between safety culture variables, safety communication, and employee safety performance and the moderating role of employee tenure. This research involves more employees of partners / contractors.

Theoretical Background

Safety culture, a key element of organizational culture, reflects workplace safety norms and is linked to improved operational results. Edgar Schein's concept of organizational culture, divided into three levels—artifacts, espoused values, and

basic assumptions—helps explain how organizational culture influences safety culture. Through factors like work environment, leadership, and communication, organizational culture shapes employee safety practices. The relationship between organizational structure and safety culture is complex, requiring cultural norms to support roles, rules, and authority.

Safety Culture

Safety culture gained prominence after the Chernobyl disaster, leading to enhanced safety measures and labor protection. It is multifaceted, involving organizational policies, leadership actions, and individual responses. Safety culture includes roles, rules, leadership, communication, and human factors. Maturity models, such as Hudson's five-stage model, assess safety culture development, ranging from a pathological stage—where safety is secondary to business priorities—to a generative stage, where safety is ingrained in the company culture.

Safety Communication

Safety communication involves the exchange of information about well-being and risk management in the workplace. Effective safety communication is crucial in reducing risks and ensuring a safe environment. It includes conveying safety threats, regulations, and progress through various media, which contributes to building a safer workplace.

Employee Safety Performance

Employee safety performance is vital in high-risk industries like construction, utilities, and manufacturing. Companies use leading (proactive) and lagging (reactive) indicators to measure safety performance. Key factors influencing safety performance include management commitment, employee engagement, and safety communication. Effective safety management strategies can improve overall safety outcomes in various industries.

Hypothesis

H1: Safety culture has a positive and significant influence on employee safety performance at the Steam Power Plant (CFPP).
H2: Safety culture has a positive and significant influence on safety communication at the Steam Power Plant (CFPP).
H3: Safety Communication has a positive and significant influence on employee safety performance at the Steam Power Plant (CFPP).
H4: Safety communication acts as a mediator of the relationship between safety culture and employee safety performance in Steam Power Plants (CFPP).
H5: Service Years acts as a moderator of the relationship between safety culture and employee safety performance at the Steam Power Plant (CFPP).

RESEARCH METHOD

Research Design

This study uses a quantitative design. Research data will be collected at one time from a sample of employees at the Steam Power Plant. This design was chosen because it allows researchers to analyze the relationship between research variables simultaneously.

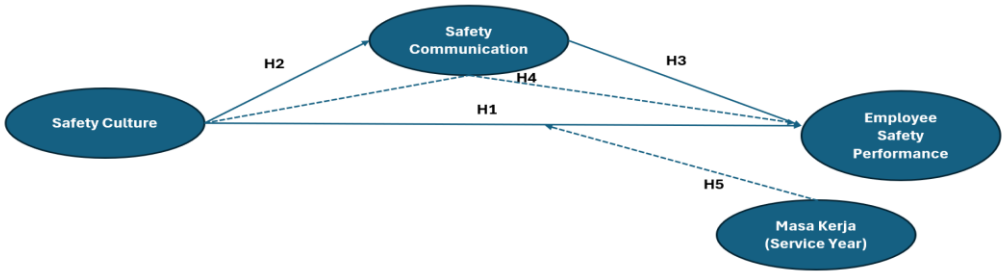

Figure 3 Research Model

Variable & Measurement Scale

This study examines five types of variables: independent, dependent, intervening, moderator, and control variables. The independent variable, Safety Culture, influences the dependent variable, Employee Safety Performance, by causing positive or negative changes. Safety Communication acts as the intervening variable, explaining the relationship between the independent and dependent variables. Service Years serve as the moderating variable, potentially altering the strength or direction of the relationship between the independent and dependent variables. All variables are measured using a 5-point Likert Scale, which captures participants' agreement or disagreement with various statements.

Population and Sample

The population determined in this study are permanent employees of the company totaling 431 people and employees of partners / contractors who are fixed contracts with a duration of more than 1 year totaling 200 people. This research uses Stratified Random Sampling where the population is divided into several subpopulations or strata, and random samples are then drawn from each stratum (Sekaran, 2016). This method was chosen because it can ensure adequate representation of all segments of the population in the sample and allow comparisons between different strata or subpopulations.

The samples taken were mainly from employees of partners/contractors and a small portion from permanent employees of the company. Most respondents, 42%, had a tenure with the company between 6 and 10 years, followed by respondents with a tenure between 11 and 15 years at 25%. Only a small number of respondents had a tenure of less than 5 years (14%) or more than 20 years (12%). This data shows that the majority of respondents have a long working experience in the

company, which can provide deep insights into workplace safety culture and practices.

Table 3 Respondents' Period of Service

Length of Service in the Company	Frequency	Percent
Less than 5 years	14	14%
6 - 10 years	42	42%
11 - 15 years	25	25%
16 - 20 years	7	7%
More than 20 years	12	12%

RESULT AND DISCUSSION

Outer Model Evaluation

Evaluation of the outer model or measurement model is carried out to calculate and test the validity and reliability or reliability of the model. Outer models with reflective indicators are evaluated through convergent validity and discriminant validity of the indicators (Ghozali, 2016). In this research stage, an SEM model diagram is developed which aims to make it easier to see the causal relationships to be tested.

Validity Test

Outer loading testing is used to determine how far an indicator is able to reflect the variables in the study. In the partial least square test, the standardization for the outer loading assessment is 0.70, so all indicators that have a loadings value> 0.70 mean that they have been able to reflect the latent variable. (Hair et al., 2019).

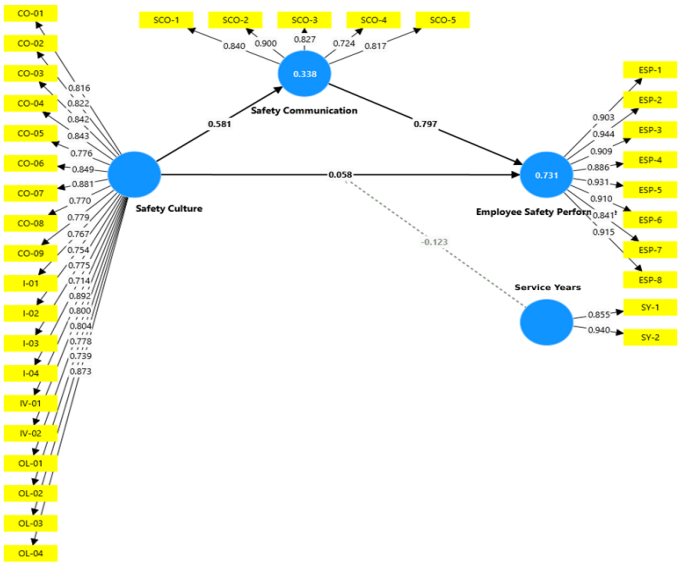

Figure 5 Outer Loading Graphical Output

Figure 51 shows the Outer Loading Graphical Output which illustrates the relationship between latent variables and their indicators in this study. The Safety Culture latent variable has a number of indicators such as CO-01 to OL-04, with high outer loading values, indicating a strong correlation between the indicators and the latent variable. Safety Communication also has several indicators (SCO-1 to SCO-5) with high outer loading values, indicating that these indicators are very good at measuring their latent variables.

Employee Safety Performance (ESP-1 to ESP-8) and Service Years (SY-1 and SY-2) also have high outer loading values, indicating a strong correlation between the indicators and their latent variables. Arrow lines between latent variables indicate the relationship between variables, with coefficient values describing the strength and direction of the relationship. For example, Safety Culture has a direct influence on Safety Communication, which in turn affects Employee Safety Performance. The moderating relationship by Service Years is also illustrated, albeit with a smaller influence. The figure as a whole shows the strength and direction of the relationship between the research variables as well as the reliability of the indicators in measuring their respective latent variables.

Average Variance Extracted (AVE) Test

The Average Variance Extracted (AVE) test is a method for measuring convergent validity in research models. AVE shows how much the latent variable is able to explain the variance of its indicators. A high AVE value indicates that the indicators have good internal consistency and are valid in measuring the latent variable. Generally, an AVE value greater than 0.5 is considered adequate, indicating that more than 50% of the indicator variance can be explained by the latent variable.

Table 4 Average Variance Extracted (AVE) Test Results

Variables	Average Variance Extracted (AVE)
Employee Safety Performance	0.820
Safety Communication	0.679
Safety Culture	0.649
Service Years	0.807

The AVE test results in Table 4 show that all variables in this study have AVE values higher than 0.5, signaling good convergent validity. Employee Safety Performance has the highest AVE value of 0.820, followed by Service Years at 0.807, indicating that the indicators for this variable are highly consistent in measuring their latent variable. Safety Communication and Safety Culture also have adequate AVE values of 0.679 and 0.649, respectively, signifying that these variables are valid in measuring the concepts they represent. Overall, these AVE values indicate that the research model has strong convergent validity.

Composite Reliability Test

The Composite Reliability test results in Table 5 show that all variables in this study have a Composite Reliability value higher than 0.7, indicating excellent internal consistency. Employee Safety Performance has the highest Composite Reliability value of 0.973, indicating very high consistency between its indicators. Safety Culture also has a very high value of 0.972, indicating that the indicators are very reliable in measuring their latent variables. Safety Communication and Service Years have Composite Reliability values of 0.913 and 0.893, respectively, which are still above the recommended threshold, indicating that the indicators for this variable are also consistent in their measurement. Overall, these Composite Reliability values indicate that the research model has excellent internal consistency.

Table 5 Composite Reliability Test Results

Variables	Composite Reliability
Employee Safety Performance	0.973
Safety Communication	0.913
Safety Culture	0.972
Service Years	0.893

Cronbach's Alpha Test

The Cronbach's Alpha test results in Table 6 show that all variables in this study have Cronbach's Alpha values higher than 0.7, indicating excellent internal consistency. Employee Safety Performance has the highest Cronbach's Alpha value of 0.968, indicating that the indicators are very consistent in measuring the latent variable. Safety Culture and Safety Knowledge also show very high internal consistency with values of 0.970 and 0.958 respectively. Safety Communication has a Cronbach's Alpha value of 0.881, which is also in a very good range. Service Years had a Cronbach's Alpha value of 0.771, which showed adequate internal consistency although not as high as the other variables. Overall, these values indicate that all indicators in the study have strong internal consistency, supporting the measurement reliability of the research model.

Table 6 Cronbach's Alpha Test Results

Variables	Cronbach's Alpha
Employee Safety Performance	0.968
Safety Communication	0.881
Safety Culture	0.970
Service Years	0.968

Discriminant Validity Test

The Discriminant Validity test using the Fornell-Larcker Criterion is a method for assessing the extent to which the constructs or latent variables in the

model differ from one another. Discriminant validity is considered adequate if the square root of the AVE (Average Variance Extracted) for each construct is greater than the correlation between that construct and other constructs.

Table 7 Discriminant Validity Test Results (Fornell-Larcker Criterion)

	Employee Safety Performance	**Safety Communication**	**Safety Culture**	**Safety Knowledge**	**Service Years**
Employee Safety Performance					
Safety Communication	**0.905**				
Safety Culture	0.842	**0.824**			
Service Years	0.899	0.819	0.607	**0.909**	
Service Years × Safety Culture	0.100	0.042	0.069	-0.016	**0.898**

The discriminant validity test results in Table 7 show that the square root of the AVE (bold diagonal values) for each construct is greater than the correlation between the construct and other constructs (off-diagonal values). Employee Safety Performance has an AVE square root of 0.905, which is greater than the correlation with other constructs. Safety Communication has a value of 0.824, which is also greater than the correlation with other constructs. Safety Culture has a value of 0.805, which indicates good discriminant validity as these values are greater than the correlations between constructs. Service Years has an AVE square root of 0.898, which is greater than the correlation with other variables. These results indicate that each construct in this model has adequate discriminant validity, signaling that the constructs are measuring clearly distinct concepts.

Inner Model Evaluation (Structural Model)

Inner model or inner measurement is a model that connects latent variables. According to Ramayah et al, (2018) the model feasibility test is used to determine how far the panel data regression has succeeded in forming a good regression model to interpret the research results. There are three stages in testing the feasibility of the model, namely including the Determinant Coefficient (R^2), Q Squere, and F Squere.

Determinant Coefficient Test (R)²

The Determinant Coefficient Test (R^2) is used to assess how well the proposed model explains the variability of the dependent variable. The R^2 value indicates the proportion of variance in the dependent variable that can be explained by the independent variables in the model. An R^2 value close to 1 indicates that the

model has a very good ability to explain the variance in the dependent variable, or in other words, the independent variables in the model have a strong influence on the dependent variable. R^2 can be expressed as strong if the value is greater than 0.7, moderate if the value is greater than 0.5, and weak if the value is greater than 0.25 ((Cepeda-Carrion et al., 2019).

Table 8 Test Results of the Coefficient of Determination

	R-square	Adjusted R-square
Employee Safety Performance	0.857	0.849
Safety Communication	0.336	0.329

The coefficient of determination test results in Table 8 show that the Employee Safety Performance variable has an R-square value of 0.857 and an adjusted R-square of 0.849. This means that 85.7% of the variability in Employee Safety Performance can be explained by the independent variables in the model, indicating that this model is very good at explaining these variables. Safety Communication has an R-square value of 0.336 and an adjusted R-square of 0.329, indicating that 33.6% of the variability in Safety Communication can be explained by the independent variables, indicating moderate explanation. Overall, these values indicate that the model is reasonably good at explaining the variability of the Employee Safety Performance variable, but less powerful at explaining the variability of Safety Communication.

Predictive Relevance Test (Q^2)

The Predictive Relevance (Q^2) test was used to assess the predictive ability of the structural model in the study. Q^2 is measured using a blindfolding procedure and indicates how well the observed values are reconstructed by the model. A positive Q^2 value indicates that the model has good predictive ability. Q^2 values greater than 0 indicate predictive relevance, with larger values signaling better predictions.

Table 9 Predictive Relevance (Q^2) Test Results

Variables	Q^2
Employee Safety Performance	0.749
Safety Communication	0.288

The Predictive Relevance test results in Table 9 show that all variables have positive Q^2 values, indicating that the model has good predictive ability. Employee Safety Performance has the highest Q^2 value of 0.749, indicating that this model has excellent predictive ability for this variable. Safety Communication has a Q^2 value of 0.288, indicating moderate predictive ability. Overall, these Q^2 values indicate that the structural model used in this study was able to accurately predict the observed values for the variables tested.

Effect Size Test (F)²

The Effect Size (F^2) test is used to measure the influence or relative effect of each independent variable on the dependent variable in the structural model. The F^2 value indicates the size of the influence of the independent variable on the dependent variable. Generally, an F^2 value of 0.02 is considered to have a small effect, 0.15 has a medium effect, and 0.35 has a large effect.

Table 10 Effect Size Test Results (F2)

	Employee Safety Performance	Safety Communication	Safety Culture	Service Years	Service Years x Safety Culture
Employee Safety Performance					
Safety Communication	0.238				
Safety Culture	0.019	0.506			
Service Years	0.073				
Service Years x Safety Culture	0.025				

The effect size test results in Table 10 show that variables have various effect sizes on Employee Safety Performance and other variables. Safety Communication has an effect size of 0.238 on Employee Safety Performance, which indicates a moderate influence. Safety Culture has a small effect size on Employee Safety Performance (0.019) but has a large effect on Safety Communication (0.506). Service Years shows a small effect size on Employee Safety Performance with a value of 0.073. Finally, the interaction between Service Years and Safety Culture shows a small effect size on Employee Safety Performance with a value of 0.025. This data shows that Safety Communication has a significant influence on Employee Safety Performance, while the influence of Safety Culture is greater on Safety Communication than directly on Employee Safety Performance.

Test Path Coefficients

Bootstrapping is a resampling technique used to estimate the accuracy (standard error, confidence interval) of model estimates. Figure 6 shows the bootstrapping results of the structural model analyzed in this study. In this figure, the numbers displayed above the arrows represent the t-statistic values, which indicate the statistical significance of the relationship between the latent variables.

1. Safety Culture to Safety Communication (0.336): The relationship between Safety Culture and Safety Communication is significant with a strong t-

statistic value (0.000), indicating a significant effect of Safety Culture on Safety Communication.

2. Safety Communication to Employee Safety Performance (0.857): The relationship between Safety Communication and Employee Safety Performance is very significant with a t-statistic value (0.000), indicating that Safety Communication has a very large and significant influence on Employee Safety Performance.
3. Service Years to Employee Safety Performance (-0.070): The effect of Service Years on Employee Safety Performance has a t-statistic value that shows significance (0.001), but the effect is negative and small, indicating that length of service is not positively related to employee safety performance.
4. Service Years × Safety Culture to Employee Safety Performance: The interaction relationship between Service Years and Safety Culture with Employee Safety Performance shows a t-statistic value of (0.456), which indicates moderating significance in the relationship.

The structural model shown in Figure 6 shows that Safety Culture, Safety Communication, and Safety Knowledge have a significant influence on Employee Safety Performance. Service Years also has a significant but negative influence, suggesting complex dynamics in this relationship. The use of bootstrapping provides greater confidence in the model estimates and demonstrates the statistical significance of the relationships tested in this study.

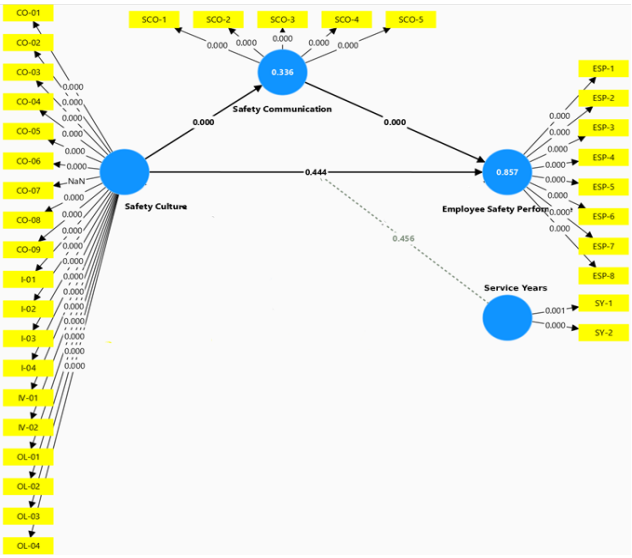

Figure 6 Bootstrapping (Model Structure)

Hypothesis Test

Hypothesis testing in this study was conducted to test the relationship between latent variables that had been hypothesized. Table 11 displays the results of the Path Coefficient test which includes the original sample, sample mean,

standard deviation, t-statistics, and p-values to determine the significance of the relationship between these variables.

Table 11 Path Coefficient Test Results

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Safety Communication -> Employee Safety Performance	0.329	0.342	0.082	4.023	0.000
Safety Culture -> Employee Safety Performance	-0.067	-0.069	0.088	0.766	0.444
Safety Culture -> Safety Communication	0.579	0.586	0.099	5.864	0.000
Service Years -> Employee Safety Performance	0.103	0.097	0.052	1.984	0.047
Service Years x Safety Culture -> Employee Safety Performance	-0.070	-0.096	0.094	0.746	0.456

a. Safety Culture and Employee Safety Performance

The results of the path coefficient test show that safety culture has no significant effect on employee safety performance with an original sample value of -0.067, t-statistic 0.766, and p-value 0.444. This means that in the context of this study, safety culture does not directly affect employee safety performance at CFPP. Although previous literature suggests that safety culture can influence safety performance, the results of this study do not support this hypothesis. Hypothesis H1 is thus rejected.

b. Safety Culture and Safety Communication

Safety culture has a positive and significant influence on safety communication with an original sample value of 0.579, t-statistic of 5.864, and p-value of 0.000. This shows that a strong safety culture in the organization can improve effective safety communication. This is consistent with previous research which shows that a good safety culture can strengthen the way safety information is conveyed and understood in the organization. Therefore, hypothesis H2 is accepted.

c. Safety Communication and Employee Safety Performance

Safety communication has a positive and significant influence on employee safety performance with an original sample value of 0.329, t-statistic of 4.023, and p-value of 0.000. This indicates that effective safety communication plays an important role in improving employee safety performance. This result is consistent

with previous findings which show that good safety communication can improve employee safety behavior and attitudes, so hypothesis H3 is accepted.

d. Interaction of Service Years and Safety Culture on Employee Safety Performance

The interaction between Service Years and safety culture has no significant effect on employee safety performance with an original sample value of -0.070, t-statistic 0.746, and p-value 0.456. This shows that tenure does not moderate the relationship between safety culture and employee safety performance in the context of this study. This result contradicts the proposed hypothesis and suggests that other factors may play a greater role in moderating this relationship. Therefore, hypothesis H5 is rejected.

Indirect hypothesis testing is carried out to understand the mediating effect of intermediate variables between independent and dependent variables. Table 12 displays the results of the path coefficient test for the mediating relationship of safety communication and safety knowledge between safety culture and employee safety performance.

Table 12 Indirect Hypothesis Test Results

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
Safety Culture -> Safety Communication -> Employee Safety Performance	0.191	0.201	0.062	3.090	0.002

The test results show that safety culture has a significant indirect effect on employee safety performance through safety communication with an original sample value of 0.191, t-statistic 3.090, and p-value 0.002. This means that safety communication mediates the relationship between safety culture and employee safety performance. In other words, a strong safety culture improves safety communication, which in turn improves employee safety performance. This hypothesis is supported by the literature which shows that effective safety communication plays an important role in the implementation of a good safety culture, thereby strengthening safety performance.

From the results of hypothesis testing, it can be concluded that safety communication has a positive and significant influence on employee safety performance. Safety culture has a significant influence on safety communication but not directly on employee safety performance. Years of service (Service Years) has a significant moderating effect on employee safety performance, but the interaction between Service Years and safety culture is not significant.

From the results of the indirect hypothesis test, it can be concluded that safety communication mediates the relationship between safety culture and employee safety performance significantly. A strong safety culture improves safety

communication, which in turn improves employee safety performance at the power plant. These results emphasize the importance of the mediating role of safety communication and knowledge in the relationship between safety culture and employee safety performance.

Discussion

Safety Culture and Employee Safety Performance

The results showed that safety culture does not have a significant influence on employee safety performance in CFPP (original sample value -0.067, t-statistic 0.766, and p-value 0.444). This finding contradicts many previous studies which show that safety culture has a positive influence on employee safety performance. For example, (Bautista-Bernal et al., 2024) and (Abeje & Luo, 2023) found that a strong safety culture improves safety performance, which impacts financial and operational performance. In addition, research (Naji et al., 2022) and (Setiawan & Astutik, 2022) also support that safety culture has a positive impact on safety performance by reducing psychosocial hazards and through effective training and supervision. However, the results of this study emphasize the importance of considering contextual and organization-specific factors that may influence the relationship between safety culture and employee safety performance.

Safety Culture and Safety Communication

Safety culture has a positive and significant influence on safety communication (original sample value 0.579, t-statistic 5.864, and p-value 0.000). This is consistent with previous research which shows that a strong safety culture can increase the effectiveness of safety communication within the organization (Schulman, 2020). Research by (Naji et al., 2022) in the petrochemical industry and (Mat Isa et al., 2021) in the context of government-related companies show that effective safety communication mediates the relationship between safety culture and safety performance. In the construction field, (He et al., 2019) found that two-way communication facilitated by a strong safety culture can reduce work accidents. Therefore, the results of this study strengthen the evidence that a good safety culture can create an environment where effective safety communication can flourish, improving overall employee safety.

Safety Communication and Employee Safety Performance

The test results show that safety communication has a positive and significant effect on employee safety performance (original sample value 0.329, t-statistic 4.023, and p-value 0.000). This is in line with the findings of (Naji et al., 2022) in the petrochemical industry and (Acheampong et al., 2024) in the construction industry, which showed that effective safety communication can improve employee safety behaviors and attitudes, leading to better safety performance. However, (Sun et al., 2022) noted that not all forms of safety communication have a positive impact; for example, voice endorsement can have a negative effect on safety messaging. These findings emphasize the importance of selecting and implementing appropriate safety communication methods to improve employee

safety performance.

Safety Communication as a Mediator

This study shows that safety communication mediates the relationship between safety culture and employee safety performance with an original sample value of 0.191, t-statistic of 3.090, and p-value of 0.002. This means that a strong safety culture improves safety communication, which in turn improves employee safety performance. This result is consistent with research (Zhang et al., 2022) in the mining industry and (Mohd Nawi et al., 2023) in the manufacturing industry, which showed that safety communication mediates the relationship between safety culture and safety performance. These findings confirm the importance of developing a strong safety culture to strengthen safety communication, which will improve employee safety performance.

Service Years as Moderator

Service Years has a significant moderating effect on employee safety performance with an original sample value of 0.103, t-statistic of 1.984, and p-value of 0.047. This suggests that longer tenure in the organization is associated with better employee safety performance. Previous research by (Ahmad et al., 2021) and (Opoku et al., 2019) showed that employees who have worked longer have a deeper understanding of safety processes, which can improve their safety performance. However, the interaction between Service Years and safety culture has no significant effect on employee safety performance (original sample value -0.070, t-statistic 0.746, and p-value 0.456). This finding suggests that tenure does not moderate the relationship between safety culture and employee safety performance, indicating that other factors may play a greater role in this relationship.

The results of this study are largely consistent with the existing literature, but also show some important differences. Although many previous studies have shown that safety culture has a significant direct influence on safety performance (Bautista-Bernal et al., 2024), the results of this study are largely consistent with the existing literature. (Bautista-Bernal et al., 2024), the results of this study do not support this hypothesis in the context of CFPP. This may be due to specific contextual factors unique to this organization, which requires further research.

In addition, the findings showing that safety communication mediates the relationship between safety culture and employee safety performance are consistent with previous studies (Zhang et al., 2022) (Mohd Nawi et al., 2023). This confirms that improving safety communication through a strong safety culture is an effective strategy to improve employee safety performance. However, the results showing that service year does not moderate the relationship between safety culture and employee safety performance are in contrast to previous research which shows that experience and tenure contribute to better safety performance. (Ahmad et al., 2021)(Opoku et al., 2019)This indicates that other factors such as continuous training, reward system, and work environment may be more

influential in this context.

This study confirms the importance of safety communication as a mediator in the relationship between safety culture and employee safety performance in CFPP. Although safety culture does not have a significant direct effect on employee safety performance, its influence on safety communication shows that a strong safety culture remains an important factor for improving employee safety. In addition, service year has a significant moderating effect on safety performance, but does not moderate the relationship between safety culture and safety performance. These results emphasize the importance of a holistic approach that considers multiple factors in an effort to improve workplace safety. Further research is needed to identify specific contextual factors that may influence the relationship between these variables across different organizations and industries.

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

Abiltarova, E. N. (2021). Safety Culture: Historiography of Notion. IOP Conference Series: Materials Science and Engineering, 1079(6), 062045. https://doi.org/10.1088/1757-899X/1079/6/062045

Acheampong, A., Adjei, E. K., Adade-Boateng, A., Acheamfour, V. K., Afful, A. E., & Boateng, E. (2024). Impact of construction workers informal safety communication (CWISC) on safety performance on construction sites. Engineering, Construction and Architectural Management. https://doi.org/10.1108/ECAM-09-2023-0906

Ahmad, A., Ambad, S. N. A., Syed Mohd, S. J. A. N., & Lajuni, N. (2021). The Moderation Effect of Job Tenure on Psychological Empowerment and Employee Performance in Malaysia Public Sector. International Journal of Academic Research in Business and Social Sciences, 11(4). https://doi.org/10.6007/IJARBSS/v11-i4/9733

Ali, M. X. M., Arifin, K., Abas, A., Ahmad, M. A., Khairil, M., Cyio, M. B., Samad, M. A., Lampe, I., Mahfudz, M., & Ali, M. N. (2022). Systematic Literature Review on Indicators Use in Safety Management Practices among Utility Industries. International Journal of Environmental Research and Public Health, 19(10), 6198. https://doi.org/10.3390/ijerph19106198

Almost, J., Caicco Tett, L., VanDenKerkhof, E., Paré, G., Strahlendorf, P., Noonan, J., Hayes, T., Van hulle, H., Holden, J., Silva e Silva, V., & Rochon, A. (2019). Leading Indicators in Occupational Health and Safety Management Systems in Healthcare. Journal of Occupational & Environmental Medicine, 61(12), e486-e496. https://doi.org/10.1097/JOM.0000000000001738

Asad, M., Kashif, M., Sheikh, U. A., Asif, M. U., George, S., & Khan, G. ul H. (2022). Synergetic effect of safety culture and safety climate on safety

performance in SMEs: does transformation leadership have a moderating role? International Journal of Occupational Safety and Ergonomics, 28(3), 1858-1864. https://doi.org/10.1080/10803548.2021.1942657

Bautista-Bernal, I., Quintana-García, C., & Marchante-Lara, M. (2024). Safety culture, safety performance and financial performance. A longitudinal study. Safety Science, 172, 106409. https://doi.org/10.1016/j.ssci.2023.106409

Cepeda-Carrion, G., Cegarra-Navarro, J.-G., & Cillo, V. (2019). Tips to use partial least squares structural equation modeling (PLS-SEM) in knowledge management. Journal of Knowledge Management, 23(1), 67-89.

Churruca, K., Ellis, L. A., Pomare, C., Hogden, A., Bierbaum, M., Long, J. C., Olekalns, A., & Braithwaite, J. (2021). Dimensions of safety culture: a systematic review of quantitative, qualitative and mixed methods for assessing safety culture in hospitals. BMJ Open, 11(7), e043982. https://doi.org/10.1136/bmjopen-2020-043982

Cooper, M. D. (2000). Towards a model of safety culture. Safety Science, 36(2), 111-136. https://doi.org/10.1016/S0925-7535(00)00035-7

Doyle, D. (2023). The 2023 Liberty Mutual Workplace Safety Index.

Filho, A. P. G., Andrade, J. C. S., & Marinho, M. M. de O. (2010). A safety culture maturity model for petrochemical companies in Brazil. Safety Science, 48(5), 615-624. https://doi.org/10.1016/j.ssci.2010.01.012

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1), 2-24. https://doi.org/10.1108/EBR-11-2018-0203

Hammond, D. M., King, A. L., Joe, M., & Miller, J. R. (2023). Understanding the relationship between safety culture and safety performance indicators in U.S. nuclear waste cleanup operations. Safety Science, 166, 106241. https://doi.org/10.1016/j.ssci.2023.106241

He, C., Jia, G., McCabe, B., Chen, Y., & Sun, J. (2019). Impact of psychological capital on construction worker safety behavior: Communication competence as a mediator. Journal of Safety Research, 71, 231-241. https://doi.org/10.1016/j.jsr.2019.09.007

Hudson, P. (2007). Implementing a safety culture in a major multi-national. Safety Science, 45(6), 697-722. https://doi.org/10.1016/j.ssci.2007.04.005

Ismail, S. N., Ramli, A., & Aziz, H. A. (2021). Influencing factors on safety culture in mining industry: A systematic literature review approach. Resources Policy, 74, 102250. https://doi.org/10.1016/j.resourpol.2021.102250

Liu, S., Nkrumah, E. N. K., Akoto, L. S., Gyabeng, E., & Nkrumah, E. (2020). The State of Occupational Health and Safety Management Frameworks (OHSMF) and Occupational Injuries and Accidents in the Ghanaian Oil and Gas Industry: Assessing the Mediating Role of Safety Knowledge. BioMed Research International, 2020, 1-14. https://doi.org/10.1155/2020/6354895

Mat Isa, A. A., Wahab, W. A., Omar, R. C., Mohd Nordin, M. Z., Taha, H., & Roslan, R. (2021). Factors influencing the compliance of workplace safety culture in the government linked company (GLC). E3S Web of Conferences, 325,

06005. https://doi.org/10.1051/e3sconf/202132506005
Memon, M. A., Ting, H., Cheah, J.-H., Thurasamy, R., Chuah, F., & Cham, T. H. (2020). Sample Size for Survey Research: Review and Recommendations. Journal of Applied Structural Equation Modeling, 4(2), i-xx. https://doi.org/10.47263/JASEM.4(2)01
Mohd Nawi, M. N., Zainol, N. A., Naim, F., Mamat, M. N., Hamzah, N. A., & Mohd Nawi, M. N. (2023). Employers' Perceptions of the Manufacturing Industry on Workplace Safety Culture. Journal of Energy and Safety Technology (JEST), 5(2), 78-86. https://doi.org/10.11113/jest.v5n2.123
Mrugalska, B., & Dovramadjiev, T. (2023). A human factors perspective on safety culture. Human Systems Management, 42(3), 299-304. https://doi.org/10.3233/HSM-220041
Naji, G. M. A., Isha, A. S. N., Alazzani, A., Saleem, M. S., & Alzoraiki, M. (2022). Assessing the Mediating Role of Safety Communication Between Safety Culture and Employees Safety Performance. Frontiers in Public Health, 10. https://doi.org/10.3389/fpubh.2022.840281
Naji, G. M. A., Isha, A. S. N., Mohyaldinn, M. E., Leka, S., Saleem, M. S., Rahman, S. M. N. B. S. A., & Alzoraiki, M. (2021). Impact of Safety Culture on Safety Performance; Mediating Role of Psychosocial Hazard: An Integrated Modeling Approach. International Journal of Environmental Research and Public Health, 18(16), 8568. https://doi.org/10.3390/ijerph18168568
Ng, T. W. H., & Feldman, D. C. (2010). Organizational Tenure and Job Performance. Journal of Management, 36(5), 1220-1250. https://doi.org/10.1177/0149206309359809
Nguyen, B. N., Le, H. N., & Nguyen, Q. T. (2023). Safety communication in construction projects in Vietnam from contractors' perspective. Science & Technology Development Journal - Economics - Law and Management. https://doi.org/10.32508/stdjelm.v7i1.1150
Opoku, M. A., Choi, S. B., & Kang, S.-W. (2019). Psychological Safety in Ghana: Empirical Analyses of Antecedents and Consequences. International Journal of Environmental Research and Public Health, 17(1), 214. https://doi.org/10.3390/ijerph17010214
Pahos, N., & Galanaki, E. (2022). Performance Effects of High Performance Work Systems on Committed, Long-Term Employees: A Multilevel Study. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.825397
Peng, C., Xue, K., Tian, Y., Zhang, X., Jing, X., & Luo, H. (2022). Organizational Emotional Capability Perspective: Research on the Impact of Psychological Capital on Enterprise Safety Performance. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.854620
Ravi, D., Tawfik, D. S., Sexton, J. B., & Profit, J. (2021). Changing safety culture. Journal of Perinatology, 41(10), 2552-2560. https://doi.org/10.1038/s41372-020-00839-0
Reader, T. W. (2022). Stakeholder safety communication: patient and family reports on safety risks in hospitals. Journal of Risk Research, 25(7), 807-824.

https://doi.org/10.1080/13669877.2022.2061036
Reason, J. (2016). Managing the Risks of Organizational Accidents. Routledge. https://doi.org/10.4324/9781315543543
Schein, E. H. (2010). Organizational culture and leadership (3rd Edition, Vol. 2). John Wiley & Sons.
Schulman, P. R. (2020). Organizational structure and safety culture: Conceptual and practical challenges. Safety Science, 126, 104669. https://doi.org/10.1016/j.ssci.2020.104669
Sekaran, U. & B. R. (2016). Research Methods For Business: A Skill Building Approach (7th ed.). John Wiley & Sons.
Setiawan, F., & Astutik, M. (2022). The Effect of Training, Supervision and Occupational Safety and Health (K3) Culture on Employee Performance. Indonesian Journal of Law and Economics Review, 17. https://doi.org/10.21070/ijler.v17i0.821
Vinodkumar, M. N., & Bhasi, M. (2010). Safety management practices and safety behavior: 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
Westrum, R. (1993). Cultures with Requisite Imagination. In Verification and Validation of Complex Systems: Human Factors Issues (pp. 401-416). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-662-02933-6_25
Wright, T. A., & Bonett, D. G. (2002). The moderating effects of employee tenure on the relation between organizational commitment and job performance: A meta-analysis. Journal of Applied Psychology, 87(6), 1183-1190. https://doi.org/10.1037/0021-9010.87.6.1183
Xu, J., Cheung, C., Manu, P., & Ejohwomu, O. (2021). Safety leading indicators in construction: A systematic review. Safety Science, 139, 105250. https://doi.org/10.1016/j.ssci.2021.105250
Zakari Mustapha, Benjamin Boahene Akomah, & Benjamin Boahene Akomah. (2023). Organizational culture and construction employee safety. Global Journal of Engineering and Technology Advances, 16(2), 114-123. https://doi.org/10.30574/gjeta.2023.16.2.0145
Zhang, S., Hua, X., Huang, G., & Shi, X. (2022). How Does Leadership in Safety Management Affect Employees' Safety Performance? A Case Study from Mining Enterprises in China. International Journal of Environmental Research and Public Health, 19(10), 6187. https://doi.org/10.3390/ijerph19106187