Volume 7 Nomor 2 (2024)
ISSN : 2615-0913 (Media Online)
Terakreditasi

The Role of Safety Leadership in the Influence of Safety Coaching and Safety Engagement on Safety Performance

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Abstract

Occupational safety and health professionals play an important role in improving workplace safety. However, the effectiveness of safety leadership, safety coaching and engagement in improving safety performance, mediated by safety culture, remains under-researched. This study aims to analyze how these factors influence safety performance among occupational safety and health professionals in Riau Islands Province, Indonesia. This study used a structural equation modelling (SEM) approach for hypothesis testing based on data collected from 180 active occupational safety and health professionals using purposive sampling. The results showed that all hypotheses were supported: safety leadership mediated the relationship between safety training and safety engagement with safety performance. This suggests that leadership is important in fostering a safety culture and encouraging proactive employee engagement. In addition, safety training was found to significantly influence leadership and safety performance. The results of this study conclude that strengthening leadership and engagement in safety through targeted coaching and training can significantly improve safety outcomes in high-risk industries. The findings underscore the importance of integrating safety leadership and culture into organizational practices. Future research should explore the long-term impact of safety leadership interventions and the potential for cross-industry application to further improve workplace safety standards.

Keywords: Safety Leadership; Safety Coaching; Safety Engagement; Safety Performance; Occupational Health, and Safety Professional

Introduction

Every year, more than 2.3 million people worldwide lose their lives to occupational diseases and accidents, which equates to nearly 6,000 deaths every day (International Labour Organization, 2020). In addition, more than 313 million workers experience significant injuries and absenteeism from non-fatal industrial incidents, and 160 million people are diagnosed with non-serious occupational diseases (ILO, 2020). These alarming statistics highlight the huge risks associated with work-related activities, especially in sectors with high accident and illness rates, such as construction. In Indonesia, workplace accidents have become a significant concern, with BPJS Ketenagakerjaan reporting 177,000 workplace accidents in 2020 (BPJS Ketenagakerjaan, 2021), which continues to increase yearly.

According to Mahdi (2022), Indonesia recorded 234,270 work accidents in 2021, a 5.65% increase from the previous year. Construction is one of the sectors most vulnerable to occupational accidents and diseases. As highlighted by the European Agency for Safety and Health at Work (2011) and the Occupational Safety and Health Administration OSHA (2019), construction ranks as the sector with the highest rates of accidents, illnesses, and fatalities in both developed and developing countries. Construction work involving various physical labour and heavy equipment is inherently high risk. Fang and Wu (2013) also emphasized that accidents in the construction sector

not only cause physical injuries to workers but also cause significant economic losses, such as project delays, increased costs, and damage to the company's reputation.

In addition, factors contributing to workplace accidents often relate to a lack of safety awareness, uncertainty in operational procedures, and a lack of training and leadership in managing safety. Research by Pawlowska (2015) underscores the importance of accurate and reliable safety performance measurement to ensure an effective workplace safety management system. This is all the more important as a poor safety culture can lead to increased accidents and injuries. Therefore, understanding how these factors affect safety performance is key to reducing workplace accidents. Although many studies have identified links between factors such as safety training, safety leadership, and safety engagement with safety performance Griffin and Neal (2000); Neal and Griffin (2006), the direct and indirect impact of these factors, especially in the context of safety professionals, has not been fully explored.

Research by Walker and Hutton (2006) and Pawlowska (2015) suggests that a more comprehensive understanding of the role of safety leadership and engagement in improving safety performance is needed. One of the key challenges in the construction sector, especially in areas with high accident rates, such as Riau Islands, is to develop a safety approach that is both reactive (addressing issues after an accident) and proactive, focusing on developing a strong safety culture. According to Fang and Wu (2013), a proactive safety approach is critical to reducing accident rates as it focuses on prevention through early hazard identification, ongoing training, and building a strong safety culture at all levels of the organization.

Behm (2005) also found that better safety awareness and a positive safety culture within an organization can significantly reduce risk, especially in large-scale projects involving many workers and third parties. This is particularly relevant given that the construction sector continues to dominate the list of industries with the highest occupational accident rates in many countries, including Indonesia. In this context, this research becomes very important. The main objective of this study is to explore how safety leadership, safety coaching, and safety engagement affect safety performance, with safety culture as a mediating factor. The ultimate goal is to provide a deeper understanding of the role of leadership and engagement in shaping safety performance, particularly among safety professionals who are directly responsible for implementing safety policies.

Building on research, such as that conducted by Griffin and Neal (2000), which identified the relationship between work behaviour and safety, and Neal and Griffin (2006), which highlighted the importance of understanding the factors that influence workplace safety, this study aims to make a significant contribution to the development of more effective safety strategies. The research will also provide valuable insights into improving workplace safety by focusing on factors related to leadership, coaching and engagement of safety professionals. In addition, this research is expected to provide practical recommendations for companies and safety professionals in the construction sector to implement better safety policies, reduce workplace accidents and prevent occupational diseases. Through this more holistic approach, it is hoped that a strong safety culture can be established, improving safety performance and reducing the number of accidents and injuries occurring in the workplace.

Methods

This study employs a quantitative research type with a correlational design to examine the relationships between various occupational health and safety variables. The research uses a survey approach to collect data through online questionnaires. The data

sources for this study are occupational health and safety practitioners working in various companies in the Riau Islands Province. The sampling technique was purposive sampling, where respondents were selected based on specific criteria, such as having experience in the field of occupational safety. The research instrument was a closed-ended questionnaire with a 5-point Likert scale to measure safety performance, leadership, training, and engagement.

The data collection technique involved distributing the questionnaire online using Google Forms. Data analysis included descriptive statistics to summarize respondent demographics and inferential techniques to assess the relationships between the variables under study. In summary, a theoretical framework can be derived to explain the underlying relationship linking safety coaching and safety engagement through the mediation of safety.

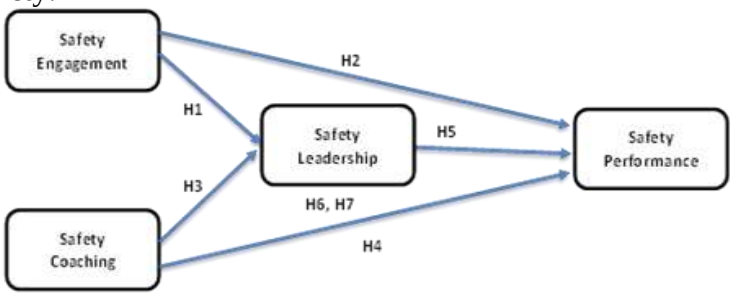

Figure 1. Research Framework

Results And Discussion

1. Validity and Reliability Test Results

The internal consistency of the measurement model was confirmed through the Composite Reliability (CR) and Cronbach's Alpha values. As shown in Table 1, all constructs demonstrated satisfactory reliability, with CR values above the accepted threshold of 0.7. Specifically, Safety Engagement had a CR of 0.858 and Cronbach's Alpha of 0.778, indicating good reliability. Safety Coaching showed a CR of 0.852 and Cronbach's Alpha of 0.693, which is acceptable for exploratory research (Hair et al., 2014). Safety Leadership had a CR of 0.812 and Cronbach's Alpha of 0.639, which is within the acceptable range. Finally, Safety Performance showed the highest reliability, with a CR of 0.904 and Cronbach's Alpha of 0.778.

These findings indicate that the measurement scales used in this study are internally consistent and provide reliable results across all constructs. The convergent validity of the constructs was evaluated using Average Variance Extracted (AVE), which measures how much variance is captured by the indicators of each construct. The results showed that all constructs exceeded the 0.5 threshold for AVE, confirming good convergent validity. This shows that the indicators are aligned with the constructs to be measured.

Table 1. Combined Reliability and Cronbach's Alpha Test

Construct/Indicator	Item reliability	Convergent validity		
	Loadings	CR	Alpha	AVE
Safety Engagement		0.873	0.858	0.778
EE1	0.905			
EE2	0.866			
EE3	0.875			
Safety Coaching		0.861	0.852	0.693
SC1	0.845			
SC2	0.874			

SC3	0.863			
SC4	0.743			
Safety Leadership		0.815	0.812	0.639
SL1	0.82			
SL2	0.813			
SL3	0.763			
SL4	0.800			
Safety Performance		0.908	0.904	0.778
SP1	0.837			
SP2	0.871			
SP3	0.903			
SP4	0.915			

After validating the measurement model, the study assessed the structural model, which examines the relationships between the constructs. The R^2 values indicate the amount of variance the model explains in each dependent variable. As shown in Table 2, the R^2 value for Safety Leadership is 0.525, meaning that 52.5% of the variance in Safety Leadership can be explained by the exogenous variables in the model. Hair et al. (2017) state that this value falls within the medium effect size range. Similarly, the R^2 for Safety Performance is 0.598, indicating that the model explains 59.8% of the variance in Safety Performance. This also represents a medium effect size, suggesting that the model effectively captures the factors influencing safety performance in the workplace.

Table 2. Coefficient of Determination result (R2)

Variable	R Square	R-Square Adjusted
Safety Leadership	.525	.520
Safety Performance	.598	.592

These results suggest that the model effectively explains a substantial portion of the variance in both Safety Leadership and Safety Performance, demonstrating a reasonable predictive power in understanding the relationships between leadership, coaching, and safety outcomes.

2. Hypothesis Testing

The bootstrap resampling technique was used to test hypotheses. Resampling methods can guarantee data validity without parametric (normal distribution) assumptions. A t-test is used for this analysis. The level of statistical significance was determined to be $p = 0.10$, which corresponds to an alpha of 10%. The threshold of significance was set at $p = 0.05$, which corresponds to an alpha value of 5%. A $p = 0.01$ value, on the other hand, is regarded as very significant. If the p-value was lower than 0.05, the researchers considered the possibility that the null hypothesis was correct. The direct impact test outcomes are tabulated here (Table 3).

Table 3. Hypothesis Effects Testing (Direct)

Hypotheses	Beta (β)	t-values	p values	97.5% CI	Report
Safety Engagement -> Safety Leadership	0.185	2.613	.009	(0.059, 0.334)	Supported
Safety Engagement -> Safety Performance	0.218	2.341	.019	(0.055, 0.418)	Supported
Safety Coaching -> Safety Leadership	0.601	7.276	.000	(0.419, 0.744)	Supported

Safety Coaching -> Safety Performance	0.426	3.866	.000	(0.181, 0.616)	Supported
Safety Leadership -> Safety Performance	0.242	3.476	.001	(0.104, 0.376	Supported

a. The Relationship between Safety Engagement and Safety Leadership

The immediate impact that a dedication to safety may have on the effectiveness of safety leadership. We hypothesize that there is a statistically significant positive link between engagement in safety efforts and leadership in safety-related matters. A statistically significant value was found in the data that is shown in the table that is located above. This value is (β = 0.185, t = 2.613, p = 0.009). This provides more proof of the crucial role that safety leadership plays in the implementation of comprehensive safety measures. Research carried out by Xu and Thomas (2011), Salanova et al., (2011), and Yuan et al., (2012) led to these discoveries.

b. The Relationship between Safety Engagement and Safety Performance

The second hypothesis makes the same assumption as the first one, which is that there is a link between safety engagement and safety performance that is both statistically significant and positive. This is also supported by the data, which show that the impact that was hypothesized in Hypothesis 2 really occurred (β = 0.218, t = 2.341, p = 0.019). So, it works. According to previous studies on the topic of safety performance Raines (2011); Vance (2006), the effect that worker engagement has on the organization's level of safety performance is one factor that objectively demonstrates the significance of worker engagement in meaningful business (Harter et al., 2006).

c. The Relationship Between Safety Coaching and Safety Leadership

Furthermore, Hypothesis 3 forecasted a statistically favorable and statistically significant association between the utilization of safety coaching and the leadership of safety initiatives. The experiment results are presented in Table 4, demonstrating that the values of t and p fall within the acceptable range of 1.96 to 1.96. (β = 0.601, t = 7.276, p = 0.000); for this reason, the hypothesis was validated. These findings align with those found in earlier research, such as those done by Hagen and Aguilar (2012); (Pousa and Mathieu, 2014).

d. The Relationship between Safety Coaching and Safety Performance

Still, it is obvious from the findings of Hypothesis 4, which postulates the presence of a significantly positive and statistically significant association between the implementation of safety coaching and safety performance. This investigation came to the conclusion that (p = 0.000, t = 3.866, and p=0.426), respectively. The study confirms that coaching is highly correlated with overall organizational performance and that coaching also has a significant effect on organizational performance. Coaching is another factor that may have a big impact on the overall effectiveness of an organization. Research that has been done on the subject Liu and Batt (2010) indicates that management coaching is an essential aspect of employee success on the job. Previous studies, such as those carried out by Hamlin et al., (2006); Kim (2014); Ellinger et al., (2005); Trépanier (2010); Dansereau et al., (1975); Liden et al., (1998); Lee (2005), have produced findings that are consistent with these.

e. The Relationship between Safety Leadership and Safety Performance

A statistically positive and statistically significant association between safety leadership and safety performance is postulated in Hypothesis 5, as was the case with the previous hypothesis. If the findings of the analysis with a threshold of β=0.242, t=3.476, and p=0.001 are included, then the hypothesis can be considered acceptable. These data provide some credence to the conclusions drawn by Barling et al., (2002); (Wu et al., 2008; Zohar, 2002). The results of the final analysis can be put to use right away.

According to the findings that are presented in Table 4, the results of the mediation analysis imply that both the impact of safety leadership on trust in safety coaching and on safety engagement are substantial. Hypotheses 6 and 7 are devoted to predicting indirect effects on the path coefficient. The fact that the influence of safety leadership on trust in safety recommendations is strong lends credence to both of these findings. Predicting the direct and indirect impacts that route coefficients will have been the focus of the sixth and seventh assumptions, respectively.

Table 4. Hypothesis Effects Testing (In-Direct)

Hypotheses		Beta (β)	t-values	p values	97.5% CI	Report
Safety Coaching -> Safety Leadership -> Safety Performance	->	0.145	3.001	.003	0.057,0.245	Supported
Safety Engagement -> Safety Leadership -> Safety Performance	->	0.045	2.025	.043	0.010,0.095	Supported

Hypothesis 6 is a statistically significant positive association between safety coaching and safety performance, which confirms what a safety coaching predicts will happen due to the relationship. This study was carried out using a value of β=0.145, t=3.001, and p = 0.003 These findings provide some credence to the conclusions of prior studies by Wu et al., (2011); Wilderom et al., (2012); (Liu et al., 2010; Blair, 2002). The same is also obtained in Hypothesis 7, where the analysis can also be accepted at β = 0.045, t = 2.025, and p = 0.043. That is, the safety leadership-mediated hypothesis is statistically significant because the study met all thresholds. The results presented here support some of the outcomes of previous research by Wu et al., (2016); Skeepers and Mbohwa (2015); (Nelson and Cooper, 2012).

Conclusion

In conclusion, this study highlights the significant influence of safety leadership, safety coaching, and safety engagement on safety performance in the construction sector of the Riau Islands. The structural model's findings, with R^2 values indicating medium effect sizes for safety leadership (52.5%) and safety performance (59.8%), demonstrate that the model effectively explains a substantial portion of the variance in these key factors. The results emphasize the importance of proactive safety leadership and engagement strategies in enhancing workplace safety. Given the high rate of occupational accidents in the region, particularly within the construction industry, fostering a safety-oriented culture through effective leadership and coaching is crucial for reducing incidents and improving overall safety performance. These findings provide valuable insights for policymakers, safety professionals, and organizations in developing targeted interventions to improve safety standards and reduce workplace hazards in high-risk sectors.

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