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Safety Compliance, Safety Training, Safety Competence, and Safety Supervision as Determinants of OHS Performance: The Mediating Role of Motivation in the Oil and Gas Industry

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Abstract
The presence of contractors with a occupational health and safety (OHS) culture differing from the main company at PT Kilang Pertamina Internasional (KPI) Refinery Unit VI Balongan presents challenges to consistently achieving safe work behavior, despite a relatively low occupational accident rate. This strategic national refinery operates under high activity levels and complex risk conditions, making effective occupational health and safety (OHS) management essential for operational continuity and corporate reputation. This study examines the effects of safety compliance, safety training, safety competence, and safety supervision on OHS performance, with employee motivation as a mediating factor. A quantitative survey was conducted among 150 contractor employees, and data were analyzed using Partial Least Squares–Structural Equation Modeling (PLS-SEM). Findings reveal that safety supervisi has the strongest direct impact on OHS performance, while compliance, training, and supervision also contribute positively. Motivation serves as a significant mediator, demonstrating that both internal and external drives enable employees to translate organizational safety policies into consistent safe work practices. These results highlight the critical role of enhancing safety competence, implementing motivational strategies, and conducting interactive supervision to support effective OHS practices in workplaces with diverse safety cultures.

Keywords: safety compliance, safety training, safety competence, safety supervision, motivation, OHS performance

1. Introduction

Occupational Health and Safety (OHS) is a global issue with significant social and economic implications**.** The International Labour Organization (ILO, 2020) reports that more than 2.78 million workers die annually from work-related accidents and diseases, while over 374 million non-fatal incidents occur worldwide. In high-risk industries such as oil and gas, fatality rates are higher compared to other sectors (IOGP, 2021). In Indonesia, the Ministry of Manpower reported 221,000 occupational accidents in 2022, with the energy and oil and gas sector contributing approximately 17% of total cases (Kemnaker, 2024). These data underscore the urgency of implementing more effective safety management systems to mitigate occupational hazards.

In the Indonesian context, Regulation Permen ESDM No. 38 of 2017 mandates that all oil and gas business entities implement an integrated Oil and Gas Safety Management System (SMK Migas). However, field implementation still faces challenges, particularly regarding compliance with procedures, the effectiveness of safety training, development of safety competence, and the quality of safety supervision. This situation reflects a gap between formal regulations (*das sollen*) and operational practices (*das sein*). Previous studies indicate that consistent OHS implementation can prevent up to 70% of occupational accidents (Wang et al., 2021).

Theoretically, various safety models, such as Safety Climate Theory (Zohar, 1980) and the Swiss Cheese Model (Reason, 1990), emphasize the importance of individual and organizational factors—including compliance, safety training, safety competence, and safety supervision—in shaping safe behavior and preventing accidents. Empirical research further supports this: safety training improves workers' skills

(Ajmal et al., 2022), employees with high safety competence are less likely to be involved in accidents (Pourmazaherian & Musonda, 2022a), and effective safety supervision strengthens workplace safety norms (Kandola et al., 2019). Nevertheless, comprehensive studies examining how these factors influence OHS performance through employee motivation as a mediating variable remain limited, particularly in Indonesia's oil and gas industry.

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National regulations, specifically Permen ESDM No. 38 of 2017, mandate that all oil and gas business entities implement an integrated Oil and Gas Safety Management System (SMK Migas) (Ministry of Energy and Mineral Resources, 2017). However, field implementation continues to face challenges, particularly regarding compliance with procedures, the effectiveness of safety training, the development of safety competence, and the quality of safety supervision (Susanti et al., 2020; Sutalaksana et al., 2021). This situation reflects a gap between formal regulations (*das sollen*) and operational practices (*das sein*). Previous research indicates that consistent OHS implementation can prevent up to 70% of occupational accidents (Wang et al., 2021).

One of the distinctive challenges in oil refinery operations is the involvement of contractor workers, particularly in non-routine high-risk tasks. Although work is performed within the Pertamina refinery environment, contractors often bring their own OHS culture from their home companies. These differences in OHS culture do not always align with the safety principles and standards implemented by Pertamina, potentially leading to inconsistencies in safety compliance, proper use of personal protective equipment (PPE), and adherence to standard operating procedures (Budiono et al., 2021; Ridley & Channing, 2022). This situation necessitates harmonization of OHS culture across organizations to enable contractors to adapt to the principal's safety system (Clarke, 2010) (Molenaar et al., 2009).

Theoretically, various safety models, such as Safety Climate Theory (Zohar, 1980) and the Swiss Cheese Model (Reason, 1990), emphasize the importance of compliance, safety training, safety competence, and safety supervision in shaping safe behavior and preventing accidents. Empirical research also supports these findings: safety training enhances workers' skills (Ajmal et al., 2022), employees with high safety competence are less likely to be involved in accidents (Pourmazaherian & Musonda, 2022a), and effective safety supervision strengthens workplace safety norms (Kandola et al., 2019). However, comprehensive studies examining how these factors influence OHS performance through employee motivation as a mediating variable remain limited, especially in the context of contractor workers in Indonesia's oil and gas industry.

The urgency of this study lies in the need for a deeper understanding of contractor perceptions regarding dominant OHS factors. By analyzing contractors' perceptions, this research can identify the extent to which Pertamina's OHS standards are understood, accepted, and internalized. Furthermore, this study highlights the role of motivation as a mechanism explaining how compliance, safety training, safety competence, and safety supervision can drive improvements in OHS performance (Ryan & Deci, 2000) (Neal & Griffin, 2006a).

The objective of this study is to analyze the influence of contractor perceptions of safety compliance, safety training, safety competence, and safety supervision on OHS performance, with motivation as a mediating variable. Specifically, the study aims to: (1) clarify the contribution of each factor to safe work motivation, (2) identify the mediating mechanisms of motivation in strengthening the relationship between OHS factors and safety performance, and (3) provide practical recommendations for Pertamina management in designing

strategies to enhance cross-organizational OHS culture. With this focus, the study is expected to offer theoretical contributions to the development of occupational safety literature in high-risk industries and practical implications for implementing OHS standards in Indonesia's oil and gas sector.

2. Literature Review

Safety Compliance and OHS Performance

Compliance with safety procedures refers to employees' adherence to rules, standards, and work instructions to prevent accidents (Neal & Griffin, 2006a). According to the Theory of Planned Behavior (Ajzen, 1991), compliance is influenced by attitudes, norms, and perceived behavioral control; the more positive these factors are, the higher the likelihood of safe behavior. The Swiss Cheese Model (Reason, 1990) suggests that compliance reduces gaps in the layered defense system. Safety Climate Theory (Zohar, 1980) emphasizes that a strong organizational safety climate reinforces compliant behavior. From the perspective of Social Cognitive Theory (Bandura, 1986), employees model safe behaviors through observation and reinforcement. Meanwhile, High Reliability Organization Theory (Weick & Sutcliffe, 2001) asserts that disciplined compliance is crucial for sustaining operations in high-risk industries. Empirical studies have confirmed that high compliance is positively associated with reduced accident rates and improved OHS performance (Christian et al., 2009); Sukwika et al., 2023).

Safety Training and OHS Performance

Safety training enhances employees' knowledge, skills, and awareness in managing occupational risks (Ajmal et al., 2022). According to Adult Learning Theory (Knowles, 1980), training is effective when it aligns with employees' prior experiences. Experiential Learning Theory (Kolb, 1984) emphasizes hands-on learning that strengthens skill acquisition. The Transfer of Training Theory (Baldwin & Ford, 1988a) explains that training design, organizational support, and motivation influence the transfer of knowledge to the workplace. From a strategic management perspective, the Resource-Based View (Barney, 1991) considers safety training as a human capital investment to achieve safety excellence. Additionally, Goal Setting Theory (Locke & Latham, 2006) highlights that training can clarify safe behavior targets. Previous studies have demonstrated that structured and routine safety training significantly contributes to reducing workplace incidents (Burke et al., 2006a); (Lingard & Holmes, 2001)

Safety Competence and OHS Performance

Safety competence encompasses employees' technical skills, knowledge, and attitudes in anticipating and managing risks (Flin et al., 2000). According to Human Capital Theory (Becker, 1975), enhancing employees' safety competence is an organizational investment for both productivity and safety. Competency-Based Theory (Boyatzis, 1982) posits that the combination of skills, knowledge, and values produces effective behavior that influences safe performance. The Risk Homeostasis Theory (Wilde, 1982) suggests that employees with high safety competence can balance risk and safe behavior. The Knowledge-Attitude-Practice Model (Nguyen & Powell, 2003) (WHO, 2008) illustrates that improvements in safety competence translate attitudes into safe practices. Meanwhile, Socio-Technical Systems Theory (Trist & Bamforth, 1951) emphasizes that individual safety competence must align with both technical and social systems to optimize safety performance. Empirical evidence shows that employees with high safety competence are less likely to be involved in accidents (Vinodkumar & Bhasi, 2010a) (Vinodkumar & Bhasi, 2010a).

Safety Supervision and OHS Performance

Safety supervision is a critical mechanism for ensuring effective OHS implementation. According to Leader-Member Exchange Theory (Graen & Uhl-Bien, 1995), strong supervisor–employee relationships enhance compliance. Behavioral Safety Theory (Geller, 2001) highlights the supervisor's role in providing feedback on safe behavior. Transformational Leadership Theory (Bass, 1985) posits that inspirational leaders foster higher safety awareness. Social Learning Theory (Bandura, 1971) emphasizes that employees model supervisors as role models for safe behavior. From an organizational perspective, the Job Demands-Resources Model (Demerouti et al., 2001) positions supervision as a job resource supporting motivation and safety performance. Previous studies have found that effective supervision is positively correlated with lower accident rates (Clarke, 2010) (Håvold, 2010).

Motivation as a Mediating Variable

Safety motivation refers to employees' internal drive to engage in safe behavior (Neal & Griffin, 2006a). Self-Determination Theory (Ryan & Deci, 2000) emphasizes the importance of intrinsic motivation in promoting safe behavior. Expectancy Theory (Vroom, 1964) explains that employees are motivated when they believe their efforts will lead to recognized safety outcomes. Safety Motivation Theory (Neal & Griffin, 2006a) posits that motivation serves as a mediator between safety climate and safe behavior. According to the Job Characteristics Model (Hackman & Oldham, 1976), meaningful work and high feedback enhance safety motivation. Meanwhile, Conservation of Resources Theory (Hobfoll, 1989) suggests that employees are motivated to protect their key resources, including health and safety. Empirical studies support that motivation strengthens the relationship between organizational factors and safety performance (Christian et al., 2009).

Research Hypotheses

Based on the literature review and theoretical foundation, the research hypotheses are formulated as follows:

1. H1: Employees' perceptions of safety compliance positively influence safety motivation.
2. H2: Employees' perceptions of safety training positively influence safety motivation.
3. H3: Employees' perceptions of safety competence positively influence safety motivation.
4. H4: Employees' perceptions of safety supervision positively influence OHS performance.
5. H5: Employees' perceptions of safety training positively influence OHS performance.
6. H6: Employees' perceptions of safety competence positively influence OHS performance.
7. H7: Employees' perceptions of safety supervision positively influence OHS performance.
8. H8: Safety motivation mediates the effects of safety compliance, safety training, safety competence, and safety supervision on OHS performance.

3. Research Methodology

This study employed an explanatory quantitative approach aimed at testing the causal relationships between safety compliance, safety training, safety competence, and safety supervision on occupational health and safety (OHS) performance, with safety motivation as a mediating variable. The explanatory quantitative design was chosen because it is capable of elucidating cause-and-effect relationships among variables formulated theoretically (John W. Creswell & J. David Cresell, 2018). To examine these complex relationships, Structural Equation Modeling–Partial Least Squares (SEM-PLS) was employed, as it accommodates models with latent variables, multiple indicators, and simultaneous mediation testing (Hair et al., 2019).

The study population comprised all non-routine contractor workers at PT Kilang Pertamina Internasional Refinery Unit VI Balongan, totaling 450 employees. Purposive sampling was used to select respondents based on specific criteria relevant to the research objectives (Etikan, 2016). The criteria included active employees with a minimum of one year of service who were directly involved in OHS-related operational activities. The minimum sample size was determined according to SEM-PLS guidelines, requiring at least five times the number of indicators in the model (Hair et al., 2019). With a total of 30 indicators, the minimum sample size was 150 respondents, considered sufficient to ensure model estimation stability and inferential validity (Kline, 2016).

Data were collected using a structured questionnaire based on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The Likert scale was selected because it effectively captures the intensity of respondents' attitudes toward specific statements (Joshi et al., 2015). The research instrument was adapted from previously validated studies, as detailed in Table 1.

Table 1. Operational definitions of research variables

No	Variable	Operational definition	Indicators	References
1	**Safety Compliance (X1)**	The extent to which employees adhere to applicable OHS procedures and regulations in the workplace	1. Compliance with safety procedures 2. Adherence to PPE usage	(Griffin & Neal, 2000); (Neal & Griffin, 2006a); (Christian et al.,

No	Variable	Operational definition	Indicators	References
		(Griffin & Neal, 2000); (Neal & Griffin, 2006); (Christian et al., 2009).	3. Reporting hazards and incidents 4. Following supervisor instructions5. Participation in OHS safety training	2009)
2	**Safety Training (X2)**	Systematic learning programs aimed at enhancing employees' knowledge, attitudes, and skills in managing occupational risks (Bloom, 1956); (Baldwin & Ford, 1988); (Burke et al., 2006).	1. Cognitive dimension (knowledge) 2. Affective dimension (attitude) 3. Psychomotor dimension (skills)	(Bloom, 1956); (Baldwin & Ford, 1988a); (Burke et al., 2006a)
3	**Safety Competence (X3)**	Employees' ability to identify risks, apply procedures, and respond effectively to emergency conditions (Spencer & Spencer, 1993); (Fang et al., 2015); (Vinodkumar & Bhasi, 2010)	1. OHS knowledge 2. Risk identification 3. PPE use and maintenance 4. Emergency preparedness 5. Safety-related communication	(Spencer & Spencer, 1993); (Vinodkumar & Bhasi, 2010a); (Fang et al., 2015a)
4	**Safety Supervision (X4)**	The process of monitoring and controlling OHS implementation by supervisors or management to ensure employee compliance (Vinodkumar & Bhasi, 2010);(Zohar, 2002); (Clarke, 2013)	1. Frequency of field supervision 2. Enforcement of OHS rules 3. Provision of safety feedback 4. Inspection of tools and work environment 5. Involvement in incident investigations	(Vinodkumar & Bhasi, 2010a); (Zohar, 1980); (Clarke, 2013a)
5	**OHS Performance (Y)**	The outcomes of systematic organizational efforts to reduce workplace accidents, improve reporting, and strengthen safety systems (Griffin & Neal, 2000); (Neal & Griffin, 2006); (Mearns et al., 2003).	1. Reduction in accident frequency 2. Reduction in accident severity 3. Increased near-miss reporting 4. mplementation of corrective/preventive actions 5. Frequency of audits and safety improvements	(Griffin & Neal, 2000); (Neal & Griffin, 2006a); (Mearns et al., 2003)
6	**Motivation (Z)**	Employees' internal drive to engage in safe behavior based on risk perception and belief in the effectiveness of preventive measures (Rogers, 1975); (Christian et al., 2009); (Probst & Brubaker, 2001)	1. Perceived accident severity 2. Perceived vulnerability 3. Belief in the effectiveness of preventive measures 4. Self-efficacy in maintaining safety 5. Intention to behave safely	(Rogers, 1975a); (Gupta et al., 2001); (Christian et al., 2009); (Probst & Brubaker, 2001)

Data analysis was conducted in two stages. The first stage involved the evaluation of the measurement model (outer model) to ensure the validity and reliability of the research instrument. The criteria included a minimum outer loading of 0.70, Cronbach's Alpha and Composite Reliability of at least 0.70, Average Variance Extracted (AVE) ≥ 0.50, and discriminant validity assessed using the Heterotrait-Monotrait Ratio (HTMT) with a maximum threshold of 0.85 (Hair et al., 2019); (Henseler et al., 2015). Indicators with loadings between 0.40 and 0.70 could be retained if the AVE and construct reliability still met the required thresholds (Hair et al., 2014).

The second stage involved the evaluation of the structural model (inner model) to assess the predictive power of the model and the relationships among variables. Evaluation indicators included the coefficient of determination (R^2), with thresholds of 0.25 (weak), 0.50 (moderate), and 0.75 (strong); f^2 effect size, indicating the contribution of each independent variable to the dependent variable, categorized as 0.02 (small), 0.15 (medium), and 0.35 (large); and Q^2, reflecting predictive relevance, considered adequate when greater than zero (Hair et al., 2019). Goodness of Fit (GoF) was used to assess the overall model fit, with categories of small (0.10), medium (0.25), and large (0.36) (Tenenhaus et al., 2005).
Path significance testing was performed using the bootstrapping method with 5,000 subsamples. Path coefficients were considered significant if the p-value ≤ 0.05 or the t-statistic ≥ 1.96 at the 5% significance level (Effron & Tibshirani, 1993); (Hair et al., 2019).

Furthermore, the mediating role of safety motivation was tested using a bootstrapping approach in accordance with the recommendations of Preacher and Hayes (2008) and (Zhao John Lynch Jr Qimei Chen et al., 2010). The mediation effect was considered significant if the indirect effect had a p-value ≤ 0.05 with a 95% confidence interval that did not include zero. Mediation was then categorized as full mediation if the direct path was not significant while the indirect path was significant, partial mediation if both direct and indirect paths were significant, and no mediation if the indirect path was not significant (MacKinnon et al., 2007).

With this methodological design, the study is expected to yield valid and reliable findings capable of explaining the causal relationships among the tested variables. Additionally, this approach is anticipated to contribute theoretically to the advancement of occupational safety management literature and provide practical implications for improving OHS systems in high-risk oil and gas industries (Reason, 2016); (Le Coze, 2020).

4. Results and Discussion

Respondent Description

The study involved 150 non-routine contractor employees at PT Kilang Pertamina Internasional (KPI) Refinery Unit VI Balongan. Respondent characteristics based on age, highest education level, tenure, and job type are presented in Table 2.

Table 2. Respondent characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Age	< 25 years	32	21.3
	25–34 years	54	36.0
	35–44 years	38	25.3
	≥ 45 years	26	17.4
Highest Education	Junior High School	12	8.0
	Senior High School / Vocational	89	59.3
	Diploma	28	18.7
	Bachelor's Degree	21	14.0
Tenure	< 1 year	27	18.0
	1–3 years	61	40.7
	4–6 years	42	28.0
	> 6 years	20	13.3

Characteristic	Category	Frequency (n)	Percentage (%)
Job Type	Field Technical Personnel	97	64.7
	Administration & Support	53	35.3

Source: Primary data, 2025

Regarding age, the majority of respondents were in the 25–34 years category (36.0%) (Figure 2), indicating a dominance of the productive age group with high learning capacity in the context of occupational safety (Hofmann & Morgeson, 1999).

In terms of education, most respondents had completed Senior High School / Vocational School (59.3%) (Figure 1). This finding aligns with the typical profile of contractor personnel in the oil and gas industry, where vocational education is predominant (Cooper, 2000).

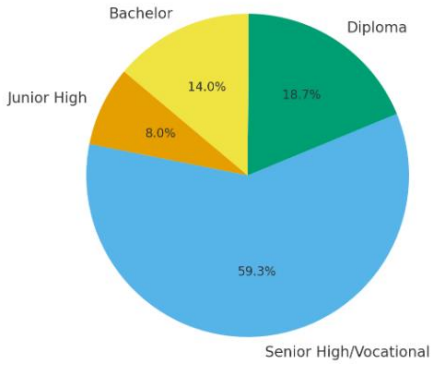

Figure 1. Educational background of respondents

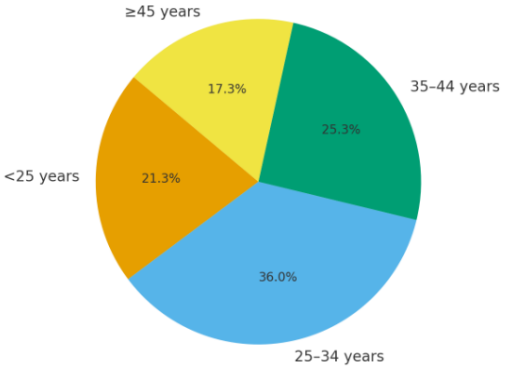

Figure 2. Age distribution of respondents

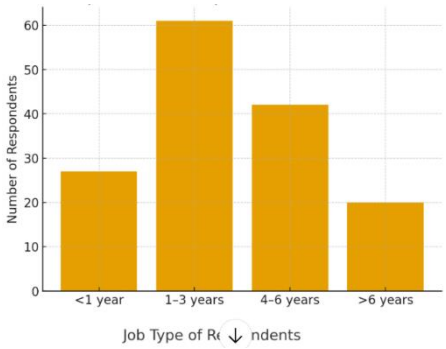

Figure 3. Work experience of respondents

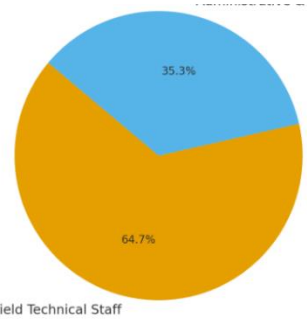

Figure 1. Job type of respondents

Regarding tenure, the largest group of respondents had 1–3 years of work experience (40.7%), indicating that a substantial portion of employees were relatively new and still in the process of adapting to the company's safety system. (Neal & Griffin, 2006a) emphasize that tenure is positively correlated with the consistency of safety behavior (Figure 3). In terms of job type, the majority of respondents were field technical personnel (64.7%), a group exposed to the highest levels of occupational risk (Figure 4). Therefore, emphasis on technical safety competence, safety supervision, and safety compliance is critically important (Vinodkumar & Bhasi, 2010a).

Measurement Model Evaluation (Outer Model)

Reliability and validity testing indicated that most indicators had outer loadings > 0.70. Some indicators with loadings between 0.60 and 0.69 were retained because the construct AVE remained > 0.50. Composite Reliability for all variables exceeded 0.70, indicating good internal consistency reliability (Hair et al., 2019). Discriminant validity assessed using HTMT showed values < 0.85 for all constructs, confirming the adequacy of discriminant validity (Henseler et al., 2015).

Hypothesis Testing

The hypothesis testing results are presented in Tables 3–4 and Figure 5. Employee safety competence demonstrates the strongest and statistically significant direct contribution to OHS performance, with a path coefficient of 0.217 (t = 1.980; p = 0.024), indicating that the hypothesis regarding the direct effect of competence on performance is supported. This finding reinforces prior evidence that employees with high safety competence are more capable of identifying hazards and implementing preventive actions, thus improving workplace safety outcomes (Pourmazaherian & Musonda, 2022b; Fang et al., 2015b; Vinodkumar & Bhasi, 2010b)

Safety supervision also exhibits a positive and significant direct effect on OHS performance (β = 0.174; t = 1.650; p = 0.050) and a significant indirect effect through motivation (indirect β = 0.087; t = 1.913; p = 0.028), highlighting the critical role of supervision both directly and via enhanced employee motivation. This supports the notion that effective supervisory practices and transformational safety leadership improve employees' motivation and adherence to safety procedures (Zohar, 2002a; (Clarke, 2013b)

Safety compliance does not present a significant direct effect on OHS performance (β = −0.038; p = 0.320) but has a significant indirect effect through motivation (indirect β = 0.055; p = 0.046), suggesting that compliance contributes primarily via a psychological pathway (motivation) rather than through direct technical influence on performance. This aligns with Protection Motivation Theory, which posits that individuals' compliance and behavioral intentions toward safety are mediated by motivational and cognitive evaluations of risk (Neal & Griffin, 2006b; Rogers, 1975b)

Safety training exhibits moderate direct (β = 0.166) and indirect effects (β indirect = 0.055), yet neither pathway reaches statistical significance at α = 0.05 (p = 0.071 and p = 0.069). This indicates that, within the present sample, the effect of training is not significant—potentially due to limited training transfer or misalignment between training content and field application, consistent with previous research on training transfer and experiential learning effectiveness (Baldwin & Ford, 1988b; Burke et al., 2006b).

Table 3. Hypothesis testing results

Hypothesis	Path	Coefficient (β)	t-statistic	p-value	Result
H1	Safety Compliance → OHS Performance	-0.038	0.467	0.320	Not significant
H2	Safety Training → OHS Performance	0.166	1.468	0.071	Not significant
H3	Safety Competence → OHS Performance	0.217	1.980	0.024	Significant
H4	Safety Supervision → OHS Performance	0.174	1.650	0.050	Significant (marginal)
H5	Safety Compliance → Motivation → OHS Performance	0.055	1.689	0.046	Significant mediation
H6	Safety Training → Motivation → OHS Performance	0.055	1.483	0.069	Not significant
H7	Safety Competence → Motivation → OHS Performance	0.029	1.068	0.143	Not significant
H8	Safety Supervision → Motivation → OHS Performance	0.087	1.913	0.028	Significant mediation

Table 4. Total, direct,and indirect effects

Variable → OHS performance	*Direct Effect*	*Indirect Effect*	*Total Effect*	*Status*
Safety compliance	-0.038	0.055	0.017	Weak, total effect not significant
Safety training	0.166	0.055	0.221	Not significant

Safety competence	0.217	0.029	0.246	Significant, strongest effect
Safety supervision	0.174	0.087	0.261	Significant, high total effect

The model's R^2 values indicate that 41.9% of the variance in OHS performance is explained by the model, while 53.2% of the variance in motivation is accounted for, reflecting a moderate explanatory power for both endogenous constructs. According to (Hair Jr et al., 2021), R^2 values of around 0.50 represent a moderate level of predictive accuracy in structural equation modeling, confirming the adequacy of the model's explanatory power.

Effect size analysis (f^2) further reveals that supervision has the largest impact on motivation ($f^2 = 0.174$), whereas competence contributes the most to OHS performance ($f^2 = 0.039$). These effect sizes correspond to the medium and small categories as proposed by Cohen (2013), indicating that supervisory practices have a meaningful influence on motivational levels, while safety competence provides a more direct but smaller contribution to performance outcomes.

Practically, this implies that enhancing safety supervision is highly effective for increasing employee motivation, aligning with previous studies emphasizing the role of supervisory engagement and leadership in fostering motivation toward safe behavior (Zohar, 2002a; Clarke, 2013b). Conversely, improving safety competence exerts a direct influence on OHS performance by strengthening employees' technical ability to manage risks, as supported by (Vinodkumar & Bhasi, 2010b) and (Fang et al., 2015b).

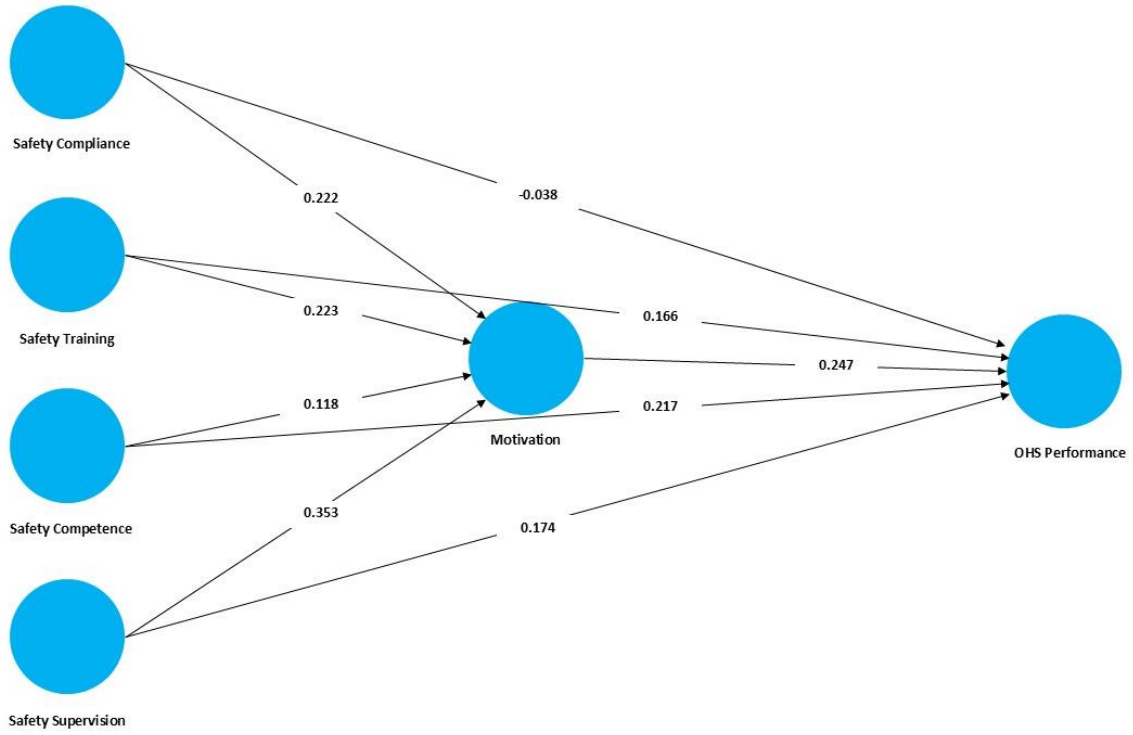

Figure 2. Figure 5. Results of Research Analysis

Discussion

This study provides several theoretical contributions, particularly by reaffirming the validity of using PLS-SEM as an appropriate analytical method for predictive models involving mediating variables. Consistent with (Sukamdani et al., 2024), the application of SmartPLS has become a crucial quantitative approach for enhancing the rigor of management and OHS research.

Employee safety competence emerged as the strongest predictor of occupational health and safety (OHS) performance. This finding extends the work of (Griffin & Neal, 2000) and (Christian et al., 2009), highlighting that technical and cognitive competencies of employees have a greater impact than formal safety training alone. Workers with adequate technical and procedural safety competence are better equipped

to identify hazards and implement preventive measures, as emphasized by (Spencer & Spencer, 1993) and (Fang et al., 2015a).

The results imply that enhancing technical safety competence through certification programs and practical skills-based safety training is an effective strategy to reduce workplace accidents. These findings are further supported by (Fauzi Andiwinata et al., 2024), who demonstrated that individual factors such as knowledge, attitudes, and professional characteristics significantly influence behavior in medical record-keeping. Accordingly, both in the healthcare sector and the oil and gas industry, individual safety competence is a critical element in shaping behavior that aligns with established safety standards.

Subsequently, the safety supervision variable not only exerts a direct effect on OHS performance but also enhances performance through motivation. The total effect of safety supervision was even slightly higher than that of safety competence. This finding aligns with (Zohar, 2002b) and (Clarke, 2013a), who emphasized that safety leadership styles can increase employee engagement and motivation. Accordingly, effective safety supervision serves a dual function: direct control and a trigger for motivation.

The results also indicate that motivation acts as a partial mediator between safety compliance/safety supervision and OHS performance, providing empirical support for Protection Motivation Theory (Rogers, 1975a). Although safety compliance did not have a significant direct effect on performance, it exhibited a significant indirect effect via motivation. This suggests that employees who adhere to procedures are more motivated to maintain safety, and it is this motivation that serves as a mechanism bridging compliance to improved performance.

These findings are consistent with (Christian et al., 2009), who noted that compliance behavior is often normative, and its impact becomes significant only when internal motivation is present. Hence, the study demonstrates that compliance and supervision alone are insufficient; they must be internalized through motivation to make a meaningful contribution to OHS performance.

Safety training did not demonstrate a significant effect, either directly or indirectly, on OHS performance. This condition may be attributed to weak transfer of learning (Baldwin & Ford, 1988a) or because the safety training programs are more administratively oriented rather than focused on practical skill development. (Burke et al., 2006a) emphasized the importance of participatory and experiential training methods to produce tangible impacts on safety behavior. The present study also revealed that OHS training was not significant in influencing performance, either directly or indirectly, which contrasts with some prior literature (Burke et al., 2006a). This finding enriches the theoretical discourse that the effectiveness of safety training highly depends on its design, transfer methods, and organizational context (Baldwin & Ford, 1988a).

From a practical perspective, this study highlights that organizations should prioritize technical safety competence development through certifications, hands-on training, and simulation-based learning to enable employees to effectively manage occupational risks. Companies should also strengthen participatory safety supervision systems, emphasizing positive feedback, employee involvement in incident investigations, and transformational safety leadership (Clarke, 2013a). Safety supervision has been shown to significantly affect performance, both directly and indirectly through motivation.

To enhance the effectiveness of OHS training, organizations must conduct a comprehensive evaluation of curricula and delivery methods. Rather than focusing solely on administrative compliance, safety training should be designed to improve practical skills, encourage real-case discussions, and strengthen employees' self-efficacy perceptions. Ultimately, the findings indicate that motivation is a crucial psychological mechanism linking managerial factors to safe behavior. Therefore, safety communication strategies should aim to build realistic threat perceptions, enhance employee confidence in preventive measures, and reinforce the intention to act safely.

Motivation was found to be a significant mediator in the pathways of safety compliance and safety supervision, but not in the pathways of safety training and safety competence. This finding indicates that motivation serves as a psychological mechanism bridging some external factors with OHS performance. The result aligns with Protection Motivation Theory (Rogers, 1975a), which posits that threat perception and beliefs in the effectiveness of preventive measures enhance the intention to engage in safe behavior.

Furthermore, these findings are consistent with cross-industry research. (Sulistyadi et al., 2016) demonstrated that motivation plays a critical role in shaping organizational citizenship behavior among employees in the hospitality sector. Similarly, (Maulana & Eddyono, 2025) found that motivation mediates the relationship between workload, job rotation, and employee performance in the tax sector. This consistency underscores that motivation is a universal factor capable of bridging diverse organizational pressures with optimal performance outcomes, both in administrative contexts and high-risk operational environments such as the oil and gas industry.

This study has several limitations that provide avenues for future research. First, the scope was limited to contractor employees at a single oil refinery unit, which constrains the generalizability of the findings. Future studies should test the model in other high-risk industries, such as construction, mining, or manufacturing, to enhance external validity.

Second, this research assessed OHS performance solely based on employee perceptions using survey instruments. Future studies could strengthen the evidence by incorporating longitudinal data, such as actual accident rates, near-miss reports, or audit records, to provide more objective insights. The finding that safety training did not significantly influence performance opens opportunities to investigate potential moderating factors, such as safety climate or organizational support, which may affect training effectiveness. Furthermore, subsequent research could adopt a mixed-methods approach, including in-depth interviews or field observations, to capture the dynamic behaviors of workers that may not be fully reflected in quantitative data.

Additionally, this study has implications for sustainability. As noted by (Sukamdani et al., 2024), innovations such as converting cigarette butt waste into organic liquid fertilizer can deliver dual benefits for communities and the environment. While the context differs, the overarching principle is that safe and innovative work practices can simultaneously support sustainability objectives. Therefore, modern OHS management should not only focus on accident prevention but also contribute to achieving the Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth) and SDG 12 (Responsible Consumption and Production).

Conclusion

This study confirms that enhancing Occupational Health and Safety (OHS) performance among contractor employees at PT Kilang Pertamina Internasional (KPI) Refinery Unit VI Balongan is strongly influenced by a combination of individual and organizational factors. The analysis indicates that, from the contractors' perspective, safety supervision and employee safety competence are the strongest determinants in reducing workplace accidents. Furthermore, motivation plays a significant mediating role, linking organizational factors with employees' safe behavior. These findings underscore that improving OHS performance cannot rely solely on formal regulations but also requires strategies to foster both intrinsic and extrinsic motivation among workers.

Theoretically, this research contributes to the OHS management literature by highlighting safety supervision as a primary determinant and motivation as a universal mediator across sectors, consistent with studies in the hospitality, taxation, and healthcare industries. Practically, the findings emphasize the importance of: (1) strengthening safety training programs focused on developing safety competence, (2) integrating motivational approaches into OHS policies, and (3) enhancing field safety supervision effectiveness through interactive feedback mechanisms.

Consequently, the implementation of OHS management at PT KPI RU VI Balongan should not only emphasize safety compliance but also focus on developing competent and motivated human resources. Ultimately, this approach supports the achievement of the Sustainable Development Goals (SDG 8 – Decent Work and Economic Growth; SDG 12 – Responsible Consumption and Production) and ensures the sustainability of national oil and gas operations.

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