

The Influence of Safety Culture and Safety Behavior on Occupational Safety and Health (OHS) Performance at PT. Samudra Oceaneering

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Abstract

Introduction: Occupational Health and Safety (OHS) is a critical priority in high-risk industries such as oil and gas, where accidents cause serious injury and financial loss. At PT. Samudra Oceaneering, Batam, Indonesia, recurring 2024 medical cases forced employees into administrative reassignment, underscoring the operational stakes of workplace safety management. **Objective:** This study aimed to empirically examine the influence of safety culture and employee safety behavior on OHS performance. **Method:** A quantitative, cross-sectional design surveyed 101 employees using a Likert-scale questionnaire, analyzed through PLS-SEM. **Result and Discussion:** Results showed safety culture had a positive but non-significant effect on OHS performance ($\beta=0.148$, $p=0.145$), while safety behavior significantly predicted it ($\beta=0.419$, $p=0.001$), together explaining 25.5% of its variance. These findings indicate that safety behavior, more than cultural perception, directly drives safety outcomes in high-risk offshore settings. **Conclusion:** The study concludes that safety culture must be actively reinforced through leadership visibility and accountability systems to translate values into measurable safety performance

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Introduction

Occupational Safety and Health (OHS) is a critical operational priority in high-risk industries, particularly the oil and gas sector, where work accidents can result in serious injuries, operational disruptions, and significant financial losses (Yasmin, Rusba, & Nur, 2026); (Imandiya, Zulkarnain, & Noviadi, 2024); (Armansyah & Winarno, 2024). In 2024, PT. Samudra Oceaneering noted several cases of medical treatment that resulted in employees being unable to carry out their primary duties and had to be transferred to administrative work. This incident not only caused an economic and social burden for the company, but also had an impact on employee morale and perception of OHS management.

Globally and nationally, OHS challenges are still persistent. Based on the International Association of Oil & Gas Producers (IOGP, 2023) report, this sector recorded a total Recordable Injury Rate (TRIR) of 0.84 per million working hours and a fatal accident rate of 0.82. In Indonesia, work accident cases reached 462,241 cases in the January-December 2024 period, with compensation claims exceeding IDR 3.4 trillion (Elisabeth, Simanjuntak, & Yuverda, 2024); (Lestari, 2026); (Syarif, Gani, & Heri, 2025); (Nurkhasanah & Giyono, 2026). The International Labour Organization (ILO) estimates poor OHS practices contribute to losses of about 4% of global GDP, underscoring the economic and humanitarian urgency of effective safety management.

Theoretically, safety culture is understood as the product of individual and group values, attitudes, perceptions, competencies, and behavior patterns that determine an organization's commitment, style, and ability to manage occupational health and safety. This concept is closely related to the safety climate, which is a summary of the shared perception that employees have about the extent to which safety is really a priority in their work environment, which is reflected in policies, communication, and day-to-day management actions (Putri & Assidiq, 2022); (Tiawati & Faidal, 2024); (Paradise, 2025); (Anas, Maharja, & Yana, 2024). Meanwhile, safety behavior is generally divided into two main dimensions: safety compliance, which is the implementation of standard safety procedures and rules as set by the company, and safety participation, which is the employee's voluntary involvement in activities that support safety outside of the formal demands of their job, such as reminding co-workers or proactively reporting potential hazards. The distinction between these two dimensions is important because a positive safety culture does not always encourage compliance and equal participation—an organization may have a high level of compliance but low participation, or vice versa—so its impact on the overall performance of OHS can vary depending on the organization's context and how it is measured (Tanjung, Lorens, & Andi, 2020); (Anyuanu, 2026)

Although much research has been done, empirical findings regarding the direct influence of safety culture on OHS performance still show inconsistencies. Some studies report strong positive relationships, while others show that cultural perceptions do not always convert into operational safety outcomes, especially when behavioral compliance factors, leadership involvement, or specific context mediators. This gap indicates a need for a deeper understanding of the interaction of cultural and behavioral dimensions in the specific context of offshore and marine operations of the oil and gas sector.

This study aims to empirically examine the influence of safety culture and employee safety behavior on OHS performance at PT. Samudra Oceaneering. By focusing on the perception of frontline employees, this study seeks to address research gaps and

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provide practical recommendations for improving safety management in high-risk operational environments.

Method

This study uses a quantitative approach with a cross-sectional design carried out at PT. Samudra Oceaneering, Batam, Indonesia. The target population of the study is all employees of PT. Samudra Oceaneering which totals 135 people from various levels of positions. The sampling technique used random sampling with a sample of 101 respondents. This sample size met the criteria of Hair et al. (2010) for a medium-sized effect at a significance level of $\alpha=0.05$ with a statistical power of above 90%. Data were collected using a structured questionnaire based on a 5-point Likert scale (1=Strongly Agree to 5=Strongly Agree). The research instruments were adapted from the scales that had been validated:

1. Safety Culture (4 items): Adapted from Miller (2017), measures shared perceptions of policies, training, incident reporting, and employee participation in safety.
2. Employee Safety Behavior (3 items): Adapted from Vinodkumar & Bhasi (2010), measures safety compliance and participation.
3. OHS Performance (3 items): Measures the consistency of the implementation of safe procedures under stressful conditions of time and work routines.

All statistical analysis was carried out using SmartPLS 3.0 software. Model evaluation follows the SEM-PLS two-stage approach:

Evaluation of Measurement Models (Outer Model):

1. Convergent validity was assessed through loading factor (≥ 0.55) and Average Variance Extracted (AVE ≥ 0.50).
2. The validity of the discriminant is tested using cross-loading, ensuring each indicator correlates the highest with the construct in question.
3. Reliability is measured through Cronbach's Alpha and Composite Reliability (CR ≥ 0.70).

Evaluation of Structural Models (Inner Model):

1. The coefficient of determination (R^2) measures the explanatory power of the model.
2. The path coefficient (β) assesses the strength and direction of the relationship between constructs.
3. Hypothesis testing was carried out through a bootstrapping procedure (5,000 subsamples), with criteria of t-statistical significance > 1.96 and p-value < 0.05 .

Result and Discussion

1. Results

Respondent Characteristics

The research sample was dominated by Generation Y (58.5%), male (94.1%), with high school education (45.5%), D3 (26.7%), and S1 (24.8%). Technician positions are the largest category (59.4%), and the majority of respondents have a working period of 1–5 years (29.7%). Most respondents worked with a non-shift system (71.3%).

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Evaluation of Measurement Models

Based on the results, all loading factors exceeded the threshold of 0.55, and the AVE values for OHS Performance (0.683), Safety Culture (0.520), and Safety Behavior (0.731) exceeded the criteria of 0.50, confirming the convergent validity. The cross-loading analysis (Table 2) shows adequate discriminant validity, as each indicator has the highest correlation with its respective latent constructs. Reliability statistics (Table 3) confirm the internal consistency, with Cronbach's Alpha and Composite Reliability values of the entire construct exceeding 0.70.

Table 1
Convergent Validity: Loading Factor and AVE

Construct	Indicator	Loading	AVE	Status
OHS (Y) Performance	Y1, Y2, Y3	0.759–0.862	0.683	Valid
Safety Culture (X1)	X1–X4	0.641–0.784	0.520	Valid
Safety Behavior (X2)	X5–X7	0.771–0.901	0.731	Valid

Table 2
Reliability Statistics

Construct	Cronbach's Alpha	Composite Reliability	Status
OHS Performance	0.765	0.865	Reliable
Safety Culture	0.717	0.811	Reliable
Safety Behavior	0.813	0.890	Reliable

Structural Model Evaluation and Hypothesis Testing

The research model was able to explain 25.5% variation in the OHS Performance variable ($R^2=0.255$), showing moderate explainability. Pathway analysis revealed a positive but insignificant influence of Safety Culture on OHS Performance ($\beta=0.148$; $t=1.461$; $p=0.145$), so H1 was rejected. In contrast, Employee Safety Behavior showed a positive and significant influence ($\beta=0.419$; $t=3.317$; $p=0.001$), so H2 was accepted.

Table 3
Bootstrapping Results for Hypothesis Testing

Hypothesis	Pathway	β	T-Statistics	p-value	Verdict
H1	OHS Safety → Performance Culture	0.148	1.461	0.145	Rejected
H2	OHS Safety → Performance Behavior	0.419	3.317	0.001	Accepted

2. Discussion

The findings of the study reveal a critical divergence between cultural perceptions and operational safety outcomes in high-risk contexts. The insignificance of the influence of safety culture (H1) indicates that although management has established policies, training programs, and incident reporting mechanisms, the initiative has not been fully internalized or consistently implemented at the operational level. These findings differ from studies by Chen et al. (2018) and Miller (2017) that reported strong cultural effects in manufacturing and construction contexts. These differences can be explained by hierarchical communication barriers, limited psychological safety for frontline workers to raise concerns, or organizational cultures that emphasize formal compliance over shared safety ownership. In complex and hazardous offshore and marine operations, safety culture values must be actively reinforced through leadership visibility, transparent

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feedback mechanisms, and accountability systems in order to be converted into measurable performance.

In contrast, the positive and significant influence of employee safety behavior (H2) is in line with the findings of Jiang & Probst (2016) and Neal et al. (2000), confirming that compliance and direct safety participation are stronger predictors of OHS outcomes. Employees who consistently wear protective equipment, adhere to standard operating procedures, and actively participate in safety briefings directly reduce the likelihood of incidents. This confirms the practical reality that in high-risk environments, behavioral discipline and routine safety practices more directly drive performance than abstract cultural perceptions.

Theoretically, this study contributes to the safety management literature by demonstrating that safety culture and safety behavior operate as distinct but complementary pathways. Culture provides a normative foundation, while behavior acts as an operational engine. Practically, the management of PT. Oceaneering needs to prioritize closing the cultural-behavioral gap by integrating safety metrics into daily performance reviews, strengthening safety observations between colleagues, and implementing a structured reward system that recognizes proactive safety participation, not just compliance with rules.

The study was limited to a single company, cross-sectional design, and self-reported survey data. Further research is suggested using longitudinal or multi-site designs to capture causal dynamics and contextual variation. In addition, integrating moderation variables (e.g. leadership commitment, psychological safety) or mediation mechanisms (e.g. safety climate, risk perception) will provide a more comprehensive understanding of the interaction of cultural and behavioral factors in shaping OHS performance.

Conclusion

This study shows that employee safety behavior, not the perception of safety culture, is a significant direct predictor of OHS performance at PT. Samudra Oceaneering. Employee safety compliance and participation significantly drive consistency in the implementation of safe work procedures, while the safety culture, although built through policies, training, and incident reporting mechanisms, has not been sufficiently internalized to directly impact safety performance at the operational level.

These findings confirm that safety culture and safety behavior operate as two distinct but complementary pathways: culture serves as the normative foundation of the organization, while behavior becomes a more proximal operational driver of safety outcomes. In the complex offshore and marine operational context, safety culture values are not necessarily converted into safe actions without active reinforcement through leadership visibility, transparent feedback, and a consistent accountability system.

Practically, the management of PT. Samudra Oceaneering is advised to prioritize closing the gap between culture and behavior, among other things by integrating safety indicators into daily performance evaluations and reinforcing the appreciation of proactive safety participation, rather than just formal compliance with the rules. Given that this study is cross-sectional and limited to one company, further research is recommended to use a longitudinal design and expand the scope of the sample to other companies in the offshore oil and gas sector, in order to test the generalization of the findings as well as uncover the mechanisms that bridge safety culture with employee safety behavior

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