

## Determinants of Occupational Health and Safety (OHS) Implementation: The Role of Knowledge Management, Work Discipline, and Organizational Culture in the Chemical Industry

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### Abstract

**Introduction:** Occupational Health and Safety (OHS) remains a persistent challenge in industrial sectors, particularly in developing countries where workplace accidents continue to occur despite the implementation of safety regulations. **Objective:** This study aims to examine how knowledge management, work discipline, and organizational culture influence the effectiveness of OHS implementation in the chemical industry in Indonesia. **Method:** This research applied a quantitative explanatory approach involving 300 employees from a chemical manufacturing company (PT X). Data were collected through structured questionnaires and analyzed using multiple regression analysis, supported by tests of validity, reliability, and classical assumptions. **Results and Discussion:** The findings show that all independent variables significantly affect OHS implementation ( $p < 0.05$ ). Organizational culture has the strongest influence ( $\beta = 0.410$ ), followed by knowledge management ( $\beta = 0.308$ ) and work discipline ( $\beta = 0.256$ ). The model explains 65.5% of the variance in OHS implementation ( $R^2 = 0.655$ ). **Conclusion:** These results indicate that OHS effectiveness is largely determined by the alignment between knowledge, employee behavior, and organizational values. Strengthening safety culture and encouraging behavioral-based safety practices are essential for improving sustainable safety performance in high-risk industries.

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### **Introduction**

In high-risk industrial environments, such as the chemical manufacturing sector, workplace safety depends not only on the existence of formal regulations but also on how safety practices are consistently enacted in daily operations. Despite the availability of standard operating procedures and safety management systems, unsafe behaviors and near-miss incidents continue to occur (Sari, Hayati, Dzaki, Juliansyah, & Safaat, 2023); (Meidianto, Pasaribu, & Ismail, 2025); (Astari & Suidarma, 2022); (Dewi, 2024). This indicates a persistent gap between employees' knowledge of safety procedures and their actual behavior in the workplace, often referred to as the "knowing–doing gap" in safety practices. In this study, OHS implementation is operationally defined as the extent to which employees consistently demonstrate safety compliance, active safety participation, and internalized safety behavior in daily work activities—encompassing both adherence to formal procedures and voluntary engagement in safety-promoting actions beyond minimum requirements

In Indonesia, the implementation of Occupational Health and Safety (OHS) has been regulated through the Occupational Health and Safety Management System (SMK3) (Putra & Dharma, 2023); (Suryana & Nurhayati, 2022). However, reports from BPJS Ketenagakerjaan indicate that workplace accidents remain relatively high, suggesting that formal compliance alone is insufficient to ensure effective safety performance (Manaya, Saleh, & Abubakar, 2024). This condition highlights the importance of internal organizational factors that influence how safety is understood, interpreted, and practiced by employees. From a theoretical standpoint, knowledge management plays an essential role in enhancing employees' understanding of workplace hazards through the processes of knowledge creation, sharing, and application. Work discipline, on the other hand, reflects the extent to which employees adhere to organizational rules and safety procedures, thereby reducing unsafe actions. Meanwhile, organizational culture represents shared values and norms that shape employees' attitudes toward safety and influence behavioral consistency (Aprillya, Tahri, Rifani, & Arifin, 2025); (Humairo, Putra, Indaryani, & Lubis, 2025); (Fitriadi et al., 2025); (Yani, 2025)

Together, these three variables are understood to influence OHS implementation across its three dimensions: compliance with safety rules, active participation in safety programs, and the internalization of safety as consistent daily behavior. However, prior studies have generally examined knowledge management, work discipline, and organizational culture as independent predictors of safety performance, leading to a fragmented understanding of OHS implementation. More importantly, limited attention has been given to explaining how these variables interact to influence safety behavior, particularly in high-risk industrial contexts such as the chemical sector. This gap indicates the need for a more integrative perspective that goes beyond direct relationships.

To address this gap, this study proposes an integrated framework that examines the interaction between knowledge management, work discipline, and organizational culture in shaping OHS implementation. The novelty of this research lies in its emphasis on behavioral internalization, where organizational culture is conceptualized as a mechanism that transforms knowledge and compliance into consistent safety behavior. This is particularly relevant given that OHS implementation, as defined in this study, extends beyond rule-following to encompass the degree to which safety values are genuinely embedded in employees' daily routines and decision-making processes. This approach

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provides a deeper understanding of how safety practices are embedded within organizational routines rather than merely enforced through formal rules.

Therefore, this study aims to analyze the determinants of OHS implementation—defined as the integrated enactment of safety compliance, participation, and behavioral internalization—by exploring the combined effects of knowledge management, work discipline, and organizational culture in the chemical industry. The findings are expected to contribute to the development of a more behavior-oriented safety management approach, particularly in high-risk industrial environments.

### **Hypothesis Development**

Knowledge management facilitates the dissemination and application of safety-related knowledge, enabling employees to better understand workplace risks and appropriate preventive measures. When safety knowledge is effectively transferred and utilized, employees are more likely to engage in safe work practices (Cummings & Worley, 2015). Therefore:

H1: Knowledge management has a positive and significant effect on OHS implementation.

Work discipline reflects employees' consistency in complying with safety procedures and organizational rules. A high level of discipline ensures adherence to safety standards and minimizes unsafe behavior in the workplace (Neal & Griffin, 2006). Accordingly:

H2: Work discipline has a positive and significant effect on OHS implementation.

Organizational culture shapes shared values and norms that influence employees' attitudes toward safety. A strong safety culture encourages proactive safety behavior and reinforces the importance of safety beyond formal compliance (Zohar, 2010). Thus:

H3: Organizational culture has a positive and significant effect on OHS implementation.

OHS implementation is influenced by the interaction between knowledge, behavior, and organizational context. The integration of knowledge management, work discipline, and organizational culture is expected to provide a more comprehensive explanation of safety performance (Christian et al., 2009). Therefore:

H4: Knowledge management, work discipline, and organizational culture simultaneously have a significant effect on OHS implementation.

### **Method**

This study adopted a quantitative explanatory design to examine how knowledge management, work discipline, and organizational culture contribute to the implementation of Occupational Health and Safety (OHS) within a chemical industry setting. The research was conducted in a manufacturing company in Indonesia, hereafter referred to as PT X, where operational activities involve high exposure to occupational risks.

The study involved employees from various functional units, including production, maintenance, and supporting divisions. To capture a representative picture of workplace conditions, respondents were selected proportionally across departments and job levels.

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A total of 300 employees participated in the study, providing a sufficient basis for statistical analysis and reflecting the diversity of work roles within the organization. Data were collected primarily through a structured questionnaire designed to capture employees' perceptions of safety-related practices in their daily work environment. To strengthen the credibility of the data, observations and organizational documents were also considered as supporting sources. The measurement instrument was developed by adapting constructs from previous empirical studies and aligning them with the operational context of the company.

The study focused on four main variables. Knowledge management was examined in terms of how safety-related knowledge is shared, accessed, and applied in work activities. Work discipline reflected the consistency of employees in adhering to organizational rules and safety procedures. Organizational culture was approached as a set of shared values, norms, and collective awareness related to workplace safety. OHS implementation was assessed based on employees' actual behavior, particularly their compliance with safety procedures and their participation in safety initiatives. All responses were measured using a five-point scale to indicate the level of agreement with each statement. Prior to conducting the main analysis, the measurement quality was evaluated to ensure that the instrument adequately captured the intended constructs. The results confirmed that the indicators demonstrated acceptable levels of validity and internal consistency, indicating that the data were appropriate for further analysis.

To examine the relationships among variables, multiple linear regression analysis was employed. This method allowed the study to estimate both the individual contribution of each independent variable and their combined influence on OHS implementation. Rather than focusing solely on statistical output, the analysis was designed to reflect the integrated nature of organizational and behavioral factors in shaping safety performance. Before hypothesis testing, diagnostic checks were conducted to ensure that the model met the underlying statistical assumptions required for regression analysis. These procedures confirmed that the data were suitable for generating reliable and unbiased estimates, thereby strengthening the robustness of the findings. All statistical analyses were carried out using IBM SPSS Statistics, with a significance level set at 5% to evaluate the relationships among the studied variables.

### Result and Discussion

The analysis aims to examine how knowledge management, work discipline, and organizational culture contribute to the implementation of Occupational Health and Safety (OHS) within the observed chemical industry context. The regression output provides empirical evidence of the relative importance of each variable in shaping workplace safety practices.

**Table 1**  
Results of Multiple Linear Regression Analysis

Variable	Coefficient ( $\beta$ )	t-value	Sig. (p-value)
(Constant)	1.343	-	-
Knowledge Management (X1)	0.308	3.205	0.001
Work Discipline (X2)	0.256	2.963	0.003
Organizational Culture (X3)	0.410	4.182	0.002

*Note: Data derived from primary data processed by the authors (2026).*

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The findings indicate that all independent variables have a positive and statistically significant effect on OHS implementation ( $p < 0.05$ ). Among these variables, organizational culture shows the highest coefficient ( $\beta = 0.410$ ), suggesting that it plays a more dominant role compared to knowledge management and work discipline. However, this interpretation should be made cautiously because knowledge management, work discipline, and organizational culture may conceptually overlap and may be correlated with one another. Therefore, future analysis should include multicollinearity testing, such as tolerance and Variance Inflation Factor (VIF), to ensure that each independent variable contributes uniquely to the regression model.

This result reflects that safety practices within the organization are not merely influenced by individual understanding or rule compliance, but are strongly shaped by shared values and collective norms. When safety becomes part of the organizational mindset, employees are more likely to report consistent engagement in safe behaviors and participation in OHS-related activities. Thus, the findings are more accurately interpreted as evidence of perceived safety implementation and behavioral tendency, not necessarily as proof of improved actual safety outcomes such as reduced accident rates, injury frequency, or near-miss occurrence.

Knowledge management also demonstrates a significant contribution ( $\beta = 0.308$ ). This indicates that the availability and application of safety-related knowledge remain essential in supporting OHS implementation. However, the presence of near-miss incidents suggests that knowledge alone is not always sufficient to ensure safe behavior. This finding highlights the existence of a gap between understanding and action, particularly in high-risk environments where information must be translated into practice effectively. Because the dependent variable is relatively general, future studies should distinguish more clearly between knowledge of safety procedures, participation in safety programs, compliance with safety rules, and measurable safety outcomes.

Work discipline shows a positive and significant effect ( $\beta = 0.256$ ), although its contribution is relatively lower compared to the other variables. This suggests that compliance with rules and procedures is necessary but not sufficient to sustain safety implementation. Discipline tends to function as an external control mechanism, whereas long-term safety improvement requires internal motivation reinforced by organizational culture. Nevertheless, the lower coefficient should not be interpreted as indicating that discipline is unimportant, because its effect may also be connected to organizational culture and knowledge management. Employees who work in a strong safety culture may naturally show better discipline, while adequate knowledge may strengthen their ability to comply with safety procedures. The simultaneous influence of all variables is presented in Table 2.

**Table 2**  
Model Feasibility Test

Model Indicator	Value
F-value	28.787
Sig.	0.000
R <sup>2</sup>	0.655

*Note: Data derived from primary data processed by the authors (2026).*

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The model is statistically significant ( $p < 0.001$ ), indicating that knowledge management, work discipline, and organizational culture jointly influence OHS implementation. The coefficient of determination ( $R^2 = 0.655$ ) shows that 65.5% of the variation in OHS implementation can be explained by the model, while the remaining proportion is influenced by other factors not included in this study. This relatively high explanatory value indicates that the three variables are relevant predictors of perceived OHS implementation. However, it also raises the need to ensure that the predictors are not strongly overlapping through multicollinearity testing. Without such testing, the individual strength of each variable should be interpreted with caution.

These findings reinforce the view that workplace safety is a multidimensional phenomenon. The interaction between knowledge, behavior, and organizational context forms a system that determines how safety is implemented in practice. This study extends previous research by demonstrating that organizational culture not only supports safety practices but may also strengthen the impact of knowledge and discipline through internalization processes. However, because the measurement appears to focus more on perceptions, safety behavior, and participation, the results should not be generalized directly as evidence of objective safety performance. Additional indicators such as accident rates, lost-time injury frequency, safety audit results, or documented near-miss reports would be needed to confirm whether perceived OHS implementation is consistent with actual safety outcomes.

From a practical perspective, the results suggest that improving OHS implementation requires more than procedural enforcement. Organizations should prioritize the development of a safety-oriented culture alongside strengthening knowledge-sharing mechanisms and ensuring consistent disciplinary practices. In high-risk industries such as chemical manufacturing, this integrated approach is critical to minimizing workplace risks and enhancing sustainable safety practices. At the same time, organizations should evaluate OHS implementation using both subjective and objective indicators so that improvements in safety perception and participation can be compared with actual safety performance data

### **Conclusion**

The findings of this study emphasize the importance of organizational culture in strengthening OHS implementation in the chemical industry. OHS implementation should not be understood only as procedural compliance, but as a process in which safety values are internalized into daily work behavior. Although knowledge management and work discipline contribute to safety practices, their influence becomes more effective when supported by a strong safety-oriented culture. The author also acknowledges that OHS implementation in this study reflects the interaction between knowledge, discipline, and organizational culture. Therefore, the findings provide both theoretical and practical value by showing that sustainable safety improvement requires the alignment of cognitive, behavioral, and cultural factors. However, the study is limited to one organizational context and selected variables, so future research is recommended to include other factors such as leadership, safety climate, and organizational learning in broader industrial settings.

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