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Model of Consistency of Organizational Culture and Commitment to Human Resource Safety Performance

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Abstract: This study examines the consistency of variables that affect the safety performance of Human Resources through organizational culture and commitment to performance measurement in the East Java Pharmaceutical Laboratory. Using the Analytic Hierarchy Process (AHP) method, the results showed that all variables had high consistency with a Consistency Ratio (CR) value below 0.1. The variables of Organizational Culture Impact through Commitment (V1) and Occupational Safety Impact through Commitment (V2) showed the highest consistency, confirming the important role of organizational culture and commitment in improving work safety. These findings provide strategic implications for organizations in strengthening safety culture through systematic performance measurement. Further research is suggested to examine psychosocial factors and safety technologies and use a longitudinal approach to deepen understanding of the dynamics of occupational safety.

Keywords: *Safety Culture; Organizational Culture; Performance Measurement Commitments; Human Resources Safety Performance; Occupational Safety.*

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I. INTRODUCTION

Occupational Health and Safety (K3) in pharmaceutical laboratories is very important to prevent accidents, protect the health of Human Resources, protect the environment, and increase work efficiency and productivity in a sustainable manner [1], [2].

A pharmaceutical laboratory in East Java is facing an increase in work accidents, such as chemical burns, falls, and exposure to toxic gases, which have a serious impact on the safety of Human Resources and laboratory operations. The urgency of countermeasures is emphasized on three main steps: (1) improving safety culture through collective awareness and commitment [3]; (2) strengthening safety practices with strict work procedures and regular training [1], [4], [5]; and (3) root cause analysis to systematically identify incident triggering factors. Delays in treatment will only increase the risk of injury, financial loss, and disruption of pharmaceutical production that is vital to patients [1], [6]. A proactive and structured strategy is needed to minimize work accidents in a sustainable manner.

Study of COVID-19 handling practices improves occupational safety through biological risk management test laboratory [7]. Proper K3 practices increase Human Resources commitment, encourage economic, social, and environmental sustainability of construction companies [8]. This study uses a multi-level system approach to reduce patient irradiation errors in hospitals. Redesigning workspaces, standard procedures, and safety workshops resulted in a 34% reduction in distractions, a 63% decrease in patient identification incidents, and a 150% increase in near-miss reporting [9]. Robot-human collaboration study emphasizes humane design and advanced research for safety and work ethics [10]. AI-based real-time *fire system* and 3D digital twin for effective tunnel response [11]. Integrative, cloud-based risk prediction, effective prediction two days before a construction event [12].

The importance of organizational culture and safety practices, beyond education, to create a safe working environment and positive perception in East Java pharmaceutical laboratories. This study investigates how organizational culture and safety practices in the workplace affect Human Resource safety performance and perception of safety culture. These findings aim to guide pharmaceutical laboratories in East Java in creating a safer working environment through a multi-branch approach, prioritizing criteria or choices in complex decision-making.

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This study offers a priority of the impact of organizational culture on the safety performance of Human Resources, both directly and through a commitment mediation mechanism to performance measurement and perception of workplace health and safety culture. This study also examines the influence of occupational safety directly or through the perception of safety culture on the safety performance of Human Resources. This multifaceted approach provides a deeper understanding of the interaction of organizational culture and workplace safety practices in effectively improving safety performance, which was previously rarely explored in an integrated manner in pharmaceutical laboratories.

This study aims to assess the influence of organizational culture and occupational safety on the safety performance of Human Resources, paying attention to the mediating role of commitment to performance measurement and the perception of health and safety culture in the workplace. Theoretically, this study expands the understanding of the multifaceted relationship between organizational culture, work safety, and Human Resource safety performance by integrating various mediating variables that have rarely been discussed simultaneously in the previous literature. Practically, as a basis for pharmaceutical laboratory management to design strategies to improve safety culture more effectively, strengthen Human Resources commitments, and optimize the implementation of occupational safety procedures to create a safer and more productive work environment.

II. RESEARCH METHODS

➢ *Research Design*

This study uses a mixed study design (quantitative-qualitative) with an Analytic Hierarchy Process (AHP) model approach [13], [14]. This approach was chosen to design the right policy strategy and minimize the risk of work accidents [15], [15], [16].

➢ *Population and Sample*

The population in this study is a team from the East Java Pharmaceutical Laboratory. This study used a sample of three participants from the East Java Pharmaceutical Laboratory team. The selection of participants was carried out purposively by considering certain inclusion criteria. Participants involved are individuals who have at least one year of work experience in pharmaceutical laboratories, both in drug quality testing activities, pharmaceutical raw material management, and analytical method validation [17]–[19]. The three have also been directly involved in the quality decision-making process or are responsible for evaluating laboratory operational standards. These inclusion criteria aim to ensure that the data collected comes from relevant, competent sources, and has a deep understanding of pharmaceutical laboratory practices.

➢ *Research Instruments*

Observation and interview at the East Java Pharmaceutical Laboratory for 3 days (12 hours) to understand the culture and practices of occupational safety. Observations are focused on PPE use, incident reporting, and compliance with procedures. The results of the study are expected to provide an overview of cultural safety in the laboratory and provide recommendations to improve it by involving 3 respondents, namely the head of the laboratory, the facility procurement division and the laboratory for the analysis of AHP.

Google Forms are used to determine the distribution of respondents in filling out questionnaires and Google Sheets is used to summarize the results of the questionnaire. All data will then be fed into Microsoft Excel 2016 for the AHP model process. In this study, the type of tools used is expected to help researchers in collecting data effectively and with a high level of accuracy, as well as facilitating careful data analysis steps.

➢ *Research Operational Construct*

This study operationalized six main variables, V1 to V6, supported by the latest literature (Table 1).

Table 1 Research Operational Construct

No.	Variable	Code	Source
1	Organizational Culture Impact through Commitment to Performance Measurement and Human Resource Safety Performance	V1	[20]–[22]
2	The Impact of Occupational Safety through Commitment to Performance Measurement and Human Resource Safety Performance	V2	[23], [24]
3	The Impact of Organizational Culture on Human Resource Safety Performance	V3	[25], [26]
4	The Impact of Organizational Culture through Perception of Health & Safety Culture in the Workplace	V4	[27], [28]
5	The Impact of Workplace Safety on Human Resource Safety Performance	V5	[29]–[31]
6	The Impact of Workplace Safety through Perceptions of Health & Safety Culture in the Workplace	V6	[6], [32]

Source: Processed Data, 2025

➢ *Research Procedure*

The procedure was carried out to measure and compare the relative importance of a number of variables that affect occupational safety [33]. First, a paired comparison matrix was made between the variables studied [34]–[36]. This matrix is square in shape with a size according to the number of variables, where each element in position (i, j) represents how much the variable i is more important than the variable j using a specific numerical scale [15], [37]. After entering the comparison value for each pair of variables, the inverse value

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of each comparison is placed at the opposite position in the matrix, i.e. at position (j, i), to maintain symmetry and consistency of the data [15], [15], [16], [38]. The next stage is to calculate the eigenvector of the matrix as well as the largest eigenvalue (lambda max), which is used to quantitatively determine the relative weight of each variable. Comparative consistency testing was carried out using Consistency Ratio (CR) [19], [39], [40]. This CR is a measure to assess the extent to which the comparative assessment made by the respondent or expert is consistent. A good CR value should be less than 0.1; If this value is higher, then the assessment is considered inconsistent and needs to be revised. With the weights that have been obtained from the eigenvector, we can identify which variables have the most significant influence on occupational safety [17], [35], [41]. This weight is then used to create more targeted priorities or intervention strategies in an effort to improve safety in the work environment, such as in pharmaceutical laboratories.

III. RESULTS AND DISCUSSION

A. Construction Priority to Minimize Work Accidents using AHP

The highest geometric values were obtained V5 (2,213) and V3 (2,259), indicating the dominant impact on safety performance. V6 (1,950) and V4 (2,018) affirm the role of K3 cultural perception. In contrast, V1 (1,366) and V2 (1,231) showed lower impact (Table 2).

Table 2 Geometric Values

No.	Criteria Code	Participants 1	Participants 2	Participants 3	Criteria Code	Geometric
		0,45	0,3	0,25		
1	V1	2	1	1	V1	1.366
2	V1	2	2	1	V2	1.682
3	V1	1	1	1	V3	1.000
4	V1	2	2	1	V4	1.682
5	V1	2	2	3	V5	2.213
6	V2	3	1	2	V6	1.950
7	V2	1	2	1	V2	1.231
8	V2	2	3	2	V3	2.259
9	V2	3	2	1	V4	2.018
10	V3	1	2	1	V5	1.231
11	V3	1	3	2	V6	1.653
12	V3	2	1	1	V3	1.366
13	V4	1	1	1	V4	1.000
14	V4	2	1	1	V5	1.366
15	V5	1	3	3	V6	1.830

Source: Processed Data, 2025

The matrix shows V6 (workplace safety through K3 cultural perception) and V5 (direct workplace safety) have the highest totals, 9.79 and 8.14, respectively, showing the dominance of influence over V1 (4.37) and V2 (4.63) (Table 3).

Table 3 Pairs Comparison Matrix

	V1	V2	V3	V4	V5	V6
V1	1.000	1.366	1.682	1.000	1.682	2.213
V2	0,732	1.000	1.950	1.231	2.259	2.018
V3	0,595	0,513	1.000	1.231	1.653	1.366
V4	1.000	0,812	0,812	1.000	1.000	1.366
V5	0,595	0,443	0,605	1.000	1.000	1.830
V6	0,452	0,495	0,732	0,732	0,546	1.000
Total	4,37	4,63	6,78	6,19	8,14	9,79

Source: Processed Data, 2023

The eigen vector shows that V1 (0.228) and V2 (0.226), respectively Organizational Culture Impact through Commitment to Performance Measurement and Occupational Safety Impact through Commitment to Performance Measurement have the highest weight. Meanwhile, V6 (0.101) and V5 (0.132), namely Workplace Safety through K3 Cultural Perception and Direct Workplace Safety, have the lowest weight. This is followed by V3 (0.156) and V4 (0.158) which describe the direct influence and mediation of organizational culture on safety performance (Table 4).

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Table 4 Vektor Eigen

	V1	V2	V3	V4	V5	V6	Total	Vector Eigen
V1	0,229	0,295	0,248	0,161	0,207	0,226	1.366	0,228
V2	0,167	0,216	0,288	0,199	0,277	0,206	1.353	0,226
V3	0,136	0,111	0,147	0,199	0,203	0,139	0,936	0,156
V4	0,229	0,175	0,120	0,161	0,123	0,139	0,948	0,158
V5	0,136	0,096	0,089	0,161	0,123	0,187	0,792	0,132
V6	0,103	0,107	0,108	0,118	0,067	0,102	0,606	0,101

Source: Processed Data, 2025

Consistency shows that all variables are within the tolerance limit of the Consistency Ratio (CR) < 0.1, so they are considered consistent and valid to be used as a basis for decision-making. The V1 variable (Organizational Culture Impact through Commitment to Performance Measurement and Human Resource Safety Performance) has CI = 0.000 and CR = 0.000, making it the most consistent among all variables and ranking first. Followed by V2 (Job Safety through Commitment) with CR = 0.010, and V3 (Organizational Culture towards Performance) with CR = 0.025. While V4, V5, and V6 show acceptable consistency, with CR = 0.029, 0.033, and 0.048, respectively. This smallest CR rating indicates that respondents' decisions in comparing V1 to V6 are quite logical and reliable in the AHP-based modeling process. These findings strengthen the reliability of the data in assessing the influence of organizational culture and occupational safety on the safety performance of Human Resources (Table 5).

Table 5 Variable Consistency

Variable	CI	CR<0,1	Results	Smallest CR Rating
Organizational Culture Impact through Commitment to Performance Measurement and Human Resource Safety Performance	0,000	0,000	Consistent	1
The Impact of Occupational Safety through Commitment to Performance Measurement and Human Resource Safety Performance	0,005	0,010	Consistent	2
The Impact of Organizational Culture on Human Resource Safety Performance	0,013	0,025	Consistent	3
The Impact of Organizational Culture through Perception of Health & Safety Culture in the Workplace	0,015	0,029	Consistent	4
Impact of Workplace Safety -> Human Resource Safety Performance	0,017	0,033	Consistent	5
The Impact of Workplace Safety through Perceptions of Health & Safety Culture in the Workplace	0,025	0,048	Consistent	6

Source: Processed Data, 2025

B. Discussion

All variables had an excellent consistency level, with a Consistency Ratio (CR) value below 0.1. The V1 variable, which measures the Impact of Organizational Culture through Commitment to Performance Measurement and Human Resource Safety Performance, shows the smallest CR value of 0.000, indicating the highest level of consistency among other variables. This confirms that respondents provide a very aligned and logical assessment of this variable, so that it can be used as the main benchmark in measuring performance and work safety. It was followed by V2 with a CR of 0.010 and V3 with a CR of 0.025, which also showed good consistency and was relevant for testing the research hypothesis.

Furthermore, the variables V4, V5, and V6, although they have slightly higher CR values of 0.029, 0.033, and 0.048, respectively, remain within the accepted threshold. This shows that although the differences in participants' perceptions slightly increased on these variables, their decisions remained consistent and trustworthy in the study of the influence of organizational culture and workplace safety on the safety performance of Human Resources. Overall, these results reinforce the validity of the research model, where variables that integrate commitment to performance measurement play a key role, while variables that focus on perceptions of health and safety culture in the workplace also have a significant influence albeit with slightly lower consistency. These findings provide a solid foundation for further analysis and implementation of an organizational culture-based work safety improvement strategy.

IV. CONCLUSION

The study found consistency showed all study variables had a good level of consistency with a CR below 0.1, confirming the validity and reliability of the model. Variables related to organizational culture and performance measurement commitments (V1 and V2) showed the highest consistency, indicating a central role in influencing the safety performance of the East Java Pharmaceutical Laboratory's human resources. The practical implication of these findings is the importance of organizations to strengthen safety culture through a real commitment to performance measurement to improve occupational safety. For further research, it is recommended to test additional variables such as psychosocial factors and safety technologies to enrich the understanding of occupational safety dynamics in a variety of different industry studies. The longitudinal approach can also

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be used to look at changes in the consistency and influence of variables over time.

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