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The Influence Of Occupational Health, Safety And Work Environment On Performance Through Risk Management At Pip Semarang

Vitrianna Sulistyaningrum.[1], April Gunawan Malau [2], Ali Muktar Sitompul [3], Bambang Sumali[4], Imam Fahrudin[4]
[1] Maritime Higher Education Institute, Jakarta, Indonesia, vitriannas@gmail.com
[2] Maritime Higher Education Institute, Jakarta, Indonesia, aprilgunawan22@gmail.com
[3] Maritime Higher Education Institute, Jakarta, Indonesia, sitompulalimuktar@gmail.com
[4] Maritime Higher Education Institute, Jakarta, Indonesia, bambs511@gmail.com
[5] Maritime Higher Education Institute, Jakarta, Indonesia, fahrudinuin@gmail.com

Corresponding Author: vitriannas@gmail.com

Abstract: This study aims to analyze the impact of occupational health and safety (OHS) and work environment on employee performance through risk management at PIP Semarang. The main issue identified is how OHS and the work environment influence employee performance both directly and through risk management. The population of the study includes all employees of PIP Semarang, with a sample of 100 civil servants selected randomly. The research employs a quantitative method using questionnaires for data collection. Data analysis is performed using SMART PLS to evaluate the relationships between variables. The findings reveal that both OHS and the work environment have a significant direct positive impact on risk management, and also directly affect employee performance. Additionally, risk management plays a significant mediating role in the relationship between OHS, work environment, and performance. The study concludes that improvements in OHS and the work environment can enhance employee performance both directly and through risk management. Recommendations for PIP Semarang include enhancing the work environment and OHS practices, and improving coordination in risk management to boost overall employee performance.

Keywords: Occupational Health and Safety, Work Environment, Risk Management, Employee Performance

INTRODUCTION

The development of the Maritime Polytechnic in Central Java, especially in Semarang, as one of the largest port cities in Indonesia, has a crucial role in supporting the national maritime industry. The Semarang Maritime Polytechnic has made rapid progress in providing education and training programs that are relevant to the needs of the industry. The Semarang Maritime Polytechnic as one of the work units under the Transportation Human Resources Development Agency aims to produce quality, professional and highly competitive sailor cadres both nationally and internationally. The PIP Semarang mission is an idea that must be

carried out or implemented by PIP Semarang as an elaboration of the vision that has been set. With this mission statement, it is hoped that all academic communities and other interested parties can know and recognize the existence and role of PIP Semarang in implementation of maritime education.

It is known that PIP Semarang has 7 (seven) Strategic Targets summarized in 1 (one) program supported by 21 (twenty one) Activity Performance Indicators (IKK). These strategic targets represent the input, process, output and outcome of PIP Semarang Performance management in 2023. Throughout 2023, PIP Semarang has succeeded in achieving 16 (sixteen) Activity Performance Indicators (IKK) in accordance with and/or exceeding the set targets, while 5 (five) Activity Performance Indicators (IKK) did not achieve the target. The average achievement of the Activity Performance Indicator (IKK) target for the Transportation Human Resources Development Agency in 2023 is 102.9%.

One of the implementations has been the implementation of the Quality Assurance Unit (SPM) in the Polytechnic of Shipping, so SPM carries out various types of evaluations per year, one of which is EKD (Employee Performance Evaluation). EKD aims to determine employee performance based on cadet assessments. The results of EKD are expected to be used as material for improving employee performance so that the quality of the teaching system can be improved. EKD is carried out by SPM through the distribution of questionnaires to cadets at the same time as filling out the KRS. The number of questionnaire attributes used is 19 question items, which are divided into 3 aspects of competence, namely: Lecture Activity Aspect, Employee Teaching Discipline Aspect and Employee Learning Outcomes Aspect.

Table 1 Employee Performance Evaluation through the Semarang Maritime Polytechnic (PIP) Satisfaction Index

Namea PT	Quality Assessment	IKM Conversion interval value	Information
Polytechnic of Maritime Science (PIP) Semarang	B	84.0	Good

Data Source: Maritime Transportation Human Resources Development Work Unit (2022)

The results obtained in Table 1 above show the IKM value of the results of the Employee performance evaluation at the Maritime Polytechnic are generally category B with a value of 76.61-88.30 then this value is compared with the IKM conversion interval value and the quality of the Employee performance assessment. The IKM value in 10 Poltekpel is included in category B which means that the Employee Performance Evaluation is considered Good.

Based on the performance audit report which includes findings related to human resource management and task implementation in the Semarang Maritime Polytechnic. This audit report highlights various work and performance risks found in the Semarang Maritime Polytechnic. One of the main findings is the existence of multiple positions in several employees, where the additional tasks they carry out often do not pay attention to the main workload. For example, lecturers who in addition to teaching, also have additional responsibilities such as quality assurance, study program management, to dormitory logistics management, with a workload of up to 275 hours per week. This condition poses a risk of workload imbalance, which can lead to stress, increased risk management, and less than optimal performance. In addition, it was also found that the determination of the number of employees in several work units did not fully consider the actual workload. In the BLU PIP Semarang health unit, there are 29 employees with various positions, but not all of them have a workload that is comparable to their roles. This has the potential to cause inefficiency in human resource management and injustice in job distribution.

Another problem that was revealed was the management of non-ASN employee performance reporting that had not been running optimally. Many employees did not submit performance reports on time, with a high level of non-compliance in several months in early

2024. This risks resulting in inaccurate performance assessments, which in turn can affect the overall evaluation of the organization's performance.

If the company is negligent in implementing occupational health and safety, this will reduce employee performance because employees are easily sick or there is a high number of work accidents, which has an impact on many business lines being hampered. Ultimately, the decline in employee performance will affect the sustainability of the company, where if employee performance declines, the company's productivity will also decline. This is supported by research by Hasibuan et al. (2019) and Marganto et al. (2021) which shows that occupational health and safety has a significant effect partially and simultaneously on employee performance. However, research conducted by Daffa & Adi (2022) shows that K3 (Occupational Health and Safety) has no effect on employee performance

In addition, based on a preliminary survey regarding K3 with 30 respondents, it showed:

Table 2 Preliminary Survey Regarding K3 at PIP Semarang

Core Problems	No	Statement	No (Score)	Yes (Score)	Amount	Percentage Decrease
Work Environment Safety	1	I feel the work environment is safe from the risk of accidents or threats.	18	12	30	60%
K3 Facilities	2	K3 facilities are well available in the work area	21	9	30	70%
Emergency Handling	3	Handling of emergency conditions is carried out quickly and accurately	15	15	30	50%
Use of PPE	4	I always use Personal Protective Equipment (PPE) while working	24	6	30	80%
Employee Health Services	5	I feel that the available health services support occupational safety.	21	9	30	70%
Average Decrease K3						**66%**

From table 2 above, it shows that most respondents, namely 60%, feel that their work environment is not completely safe from the risk of accidents or threats. This shows an urgent need to improve workplace security so that employees feel more protected. In addition, 70% of respondents consider the available K3 facilities to be inadequate. This indicates that the availability and maintenance of K3 facilities such as personal protective equipment and other safety equipment need to be significantly improved. Interestingly, only 50% of respondents felt that emergency handling was carried out quickly and appropriately. This suggests that training and procedures for handling emergency situations may not have been carried out effectively. In addition, the high percentage of decline (80%) in the use of personal protective equipment (PPE) is an indication that there is still non-compliance with K3 regulations. Health services for employees are also a serious concern, where 70% of respondents feel that these services are not optimal in supporting occupational safety and health

According to Sunyoto (2012:43), the work environment is part of an important component that comes from within the employee's activities while working. In a company, the work environment factor greatly affects employee work productivity. The problems that occur today are: 1) Physical conditions that are less supportive such as poor lighting, inadequate ventilation, and uncomfortable room temperatures. 2) Tension or conflict between employees that is not handled properly. 3) Lack of adequate work facilities such as equipment and technology needed to support employee work.

In addition, based on a preliminary survey regarding the work environment with 30 respondents, it showed:

Table 3 Preliminary Survey Regarding the Work Environment at PIP Semarang

Core Problems	No	Statement	No (Score)	Yes (Score)	Amount	Percentage Decrease

Workspace Conditions	1	Workspace provides comfort and supports productivity	18	12	30	60%
Cleanliness of Workspace	2	The workspace is always clean and free from health risks	21	9	30	70%
Worship Facilities	3	The worship facilities provided are adequate and easily accessible.	15	15	30	50%
Smoking Room Facilities	4	Smoking room facilities are available and do not disturb public comfort.	18	12	30	60%
Cleanliness of the Yard	5	The office yard is always clean and well maintained	24	6	30	80%
Average Declining Work Environment						**64%**

Table 3 above shows that 60% of respondents feel that their workspace does not support comfort and productivity. Uncomfortable workspace conditions can be an obstacle to employee performance, and this is a signal for management to evaluate the layout, ventilation, lighting, and completeness of facilities in the workspace. In addition, the cleanliness of the workspace is also a serious problem, where 70% of respondents stated that the workspace is not always clean and free from health risks. Poor cleanliness in the workplace can not only reduce productivity but also increase the risk of disease among employees. Worship facilities also received attention, although 50% of respondents felt that the worship facilities were adequate, there were still half who felt that improvements needed to be made. In addition, smoking room facilities received criticism from 60% of respondents who felt that the facilities did not support general comfort, perhaps because their management was not optimal. Worse still, the cleanliness of the office yard was a major concern, with 80% of respondents reporting that the office yard was not well maintained.

In addition to occupational health and safety issues, the work environment also affects performance, namely the issue of risk management. According to ISO 31000 (2009), risk management is a structured and systematic process to identify, analyze, evaluate, and control risks in an organization. At PIP Semarang, risk management plays an important role in managing uncertainty and the impact of risk on employee performance and safety. Current problems, such as lack of employee involvement in decision-making related to risk, low recognition of employee contributions in risk management, and minimal opportunities for skill development in risk management, exacerbate uncertainty in the workplace. Internal risk management, which involves risk control efforts from within the organization such as the implementation of safety and operational procedures, is less than optimal without employee involvement. Meanwhile, external risk management, which is influenced by the work environment and external factors such as regulatory changes, has not been fully anticipated by the organization. To improve the effectiveness of risk management at PIP Semarang, there needs to be increased employee involvement, recognition of their contributions, and relevant ongoing training. That way, existing risks can be identified and faced with more confidence and direction, thus creating a safer and more productive work environment.

In addition, based on a preliminary survey on risk management with 30 respondents, it showed:

Table 4 Preliminary Survey on Risk Management at PIP Semarang

Core Problems	No	Statement	No (Score)	Yes (Score)	Amount	Percentage Decrease
Risk Management Effectiveness	1	Good risk management reduces the potential for work accidents.	18	12	30	60%
Risk Awareness	2	I am always aware of the risks in the workplace and try to avoid them.	21	9	30	70%

Implementation of Risk Management	3	Implementation of risk management in the workplace is effective	15	15	30	50%
Readiness to Face Risk	4	I am ready to face risky situations thanks to risk management.	18	12	30	60%
Loss Reduction	5	Risk management helps reduce losses due to incidents	24	6	30	80%
Average Decrease Risk Management						**64%**

Table 4 above shows that 60% of respondents feel that the risk management implemented is not effective enough in reducing the potential for work accidents. This shows that even though risk management has been implemented, the results have not been fully felt by employees. Awareness of risk is also a problem, where 70% of respondents reported that they were not always aware of risks in the workplace. This indicates the need for increased training and socialization regarding the importance of proactive risk management. In addition, only 50% of respondents felt that the implementation of risk management in the workplace was effective. This indicates that there are gaps in the implementation of risk management policies that require further evaluation. As many as 60% of respondents felt unprepared to face risky situations, indicating that existing procedures and training may not be adequate to deal with emergency situations. More worryingly, 80% of respondents reported that risk management had not helped reduce losses due to incidents in the workplace.

As part of efforts to improve employee performance at the Semarang Maritime Polytechnic, this study will identify in more depth three main issues related to performance, namely occupational health and safety, work environment, and risk management. In addition, this study will also analyze the relationship between occupational health and safety and work environment on performance through risk management at the Semarang Maritime Polytechnic. With a better understanding of the existing problems and the relationship between these variables, it is hoped that this thesis can provide a significant contribution in efforts to improve the quality and performance of the Semarang Maritime Polytechnic and provide appropriate policy recommendations to improve performance in this institution.

Based on the explanation of the research background above, the researcher is interested in conducting research and compiling a thesis entitled "The Influence of Occupational Health, Safety and Work Environment on Performance Through Risk Management at PIP Semarang"

METHOD

This type of study refers to its type, namely quantitative research with surveys. Quantitative research is classified as a study that uses a measurable data analysis process with clear and detailed stages, and uses certain statistical calculations to draw conclusions objectively.(Sekaran & Bougie, 2020). Survey research is a non-interventional study: not treated specifically or subjects are not intervened in the research period/ data is simply obtained from surveys, namely observing respondents, data is obtained from questionnaires as data collection instruments. This research is also a case study, where data is taken from one case, namely the performance of one agency only in a certain period, namely PIP Semarang. Case study research allows for respondent homogeneity and provides the benefit of respondents having an assessment of the same object, namely PIP Semarang

The research population is all individuals included in a group whose boundaries have been determined and as a group whose changes or variability will be observed. A sample is a part of a population that has certain characteristics and traits, and can be a representative of the population.(Sekaran & Bougie, 2020). Sampling or sampling method is an important stage because it requires sample quality with sufficient quantity to be able to describe the population. This is related to the inferential results of data from the sample that allows the analysis results

to be generalized or applied at the population level.(Sekaran & Bougie, 2020). The general population in this study were all PIP Semarang employees, while the target population in this study were all PIP Semarang employees in 2023. The number of ASN employees at the Semarang Maritime Polytechnic was 156 people.

The determination of the number of samples in this study uses the Slovin formula with an error rate of 5%, so that the level of reasonableness of errors in sampling can still be tolerated in this study. The Slovin formula used in determining the number of samples, namely:

$$n = \frac{N}{1 + \mathrm{Ne}^2}$$

Where:

n = Number of samples

N = Population Size

e2= error rate 5%

Based on this formula, the number of samples obtained is as follows:

$$\mathrm{n} = \frac{156}{1 + 156 * 0,05^2}$$

$$\mathrm{n} = \frac{156}{1 + 0,39}$$

$$\mathrm{n} = \frac{156}{1,39}$$

n = 112.23≈ 112 sampel

This study is classified as quantitative research: data analysis is carried out using certain statistical methods. The data analysis procedure utilizes multivariate analysis, because the conceptual framework or research model is quite complex with many latent variables or constructs.(Sekaran & Bougie, 2016). Considering that there are four variables and seven paths, an analysis technique is needed that can evaluate the influence of several variables on the dependent variable at the same time.

Of all the available multivariate analysis techniques, partial least squares structural equation modeling based on variance was chosen as the analytical approach for this investigation. PLS-SEM was used for several reasons: First, considering that the analysis is theoretically developing, it is suitable for an exploratory approach to the research model. This is not the same as co-variance based - structural equation modeling or CB-SEM, with its confirmatory method.(Hair et al., 2017). The second thing that should be studied is whether the PLS-SEM procedure is in line with the direction of the research, namely to ensure whether the research model developed is able to explain and predict. For research with a prediction orientation from the proposed modeling, the PLS-SEM method is the recommended choice.(Hair et al., 2017). The third consideration is because the PLS-SEM method does not require input data that has a normal distribution but has the ability to test the significance of whether the variables in the model have an adequate influence.(Sarstedt et al., 2021).

The PLS-SEM analysis procedure in this study was carried out using SmartPLS version 4 software. In this software, not only the basic menu, but also the advanced menu is available for deeper analysis (Ringle et al., 2015; Memon et al., 2021). The model output from the calculation with SmartPLS version 4 which is operated in stages is intended to produce two model outputs. First, is the outer model or measurement model. In the results of the measurement model, it will show data related to the correlation between indicators as manifest variables to the construct or latent variables(Hair et al., 2019). This measurement model is intended to test the reliability and validity of the indicators to measure the constructs in the research model. Second, is the inner model or structural model. The results of this inner model are obtained from the bootstrapping process on non-parametric data.(Ringle et al., 2023). This

inner model is also intended to determine the quality of the research model, as well as to test the significance of the influence of the construct along with the coefficient value data for each path in the research model.

Outer Model

The first stage carried out in the analysis using PLS-SEM is the evaluation of the outer model (measurement model) by assessing the correlation between the indicators and their latent variables.(Hair et al., 2019). This measurement model is obtained through the PLS Algorithm calculation on SmartPLS. The analysis on the outer model includes two types of data tests, namely reliability and validity. In the reliability test, it is necessary to assess the reliability of the indicator by observing the value of the measurement model, then the reliability of the construct by observing the value of Cronbach's alpha and composite reliability. Validity testing, the indicator is assessed with two data, namely on the validity of the construct by observing the value of the average variance extracted (AVE), and the validity of the discriminant by observing the value of the heterotrait-monotrait ratio (HT / MT). If the four test result indicators are found, then they are in accordance with the requirements of reliability and validity so that they can proceed to the analysis of the structural model(Hair et al., 2019).

Inner Model

The second stage carried out in the analysis with PLS-SEM is the evaluation of the inner model or structural model. In this inner model evaluation, it is intended to show the correlation between latent variables in the research model. In the evaluation of the inner model, the quality of the model must be evaluated. This is done by observing the variance inflation factor (VIF) value to determine whether there is a multicollinearity problem in the research model. If a multicollinearity problem is found between independent variables, the predictive ability of the model will be reduced.

Next, the coefficient of determination or R2 is used to assess the predictive power of the model. This number shows how well the model proposed in the empirical test is able to describe the phenomenon and make predictions. The greater the R2, the higher the level of prediction accuracy. Its value changes from 0 to 1(Hair et al., 2019). The R2 value is divided into three categories, namely 0.75, 0.5, and 0.25 or substantial, moderate and weak.

The next stage is to assess Q2 or the predictive relevance capability of the research model. The evaluation of the predictive relevance of this research model can also be carried out using a more advanced method, namely with the Q2_predict value.(Shmueli et al., 2019). When the model data parameters change, predictive relevance is used to verify the predictive power of the model. If the data used changes, it concludes that the structural model has relevant predictions if the Q2_predict value is above 0. On the other hand, if Q2_predict is below 0, there is no significant prediction in the research model. At the Q2_predict indicator level, analysis is carried out by comparing the indicator error values in the PLS-SEM results with the linear model.(Shmueli et al., 2019).

After the quality assessment stage of the study model is carried out, it means that the analysis can be directed to the most important stage, namely the proposed hypothesis test. Hypothesis data testing is obtained from the bootstrapping or re-sampling menu with SmartPLS software. The conclusion of the hypothesis test is carried out by observing two assessments. First, the significance test of the correlation between variables uses a comparison of the t-table value to the t-statistic obtained through empirical testing. If the t-statistic is above or exceeds the t-table value, it means that the variable has a significant effect.

This study uses $\alpha = 0.05$, as its significance level, and classifies infinity as the degree of freedom. The t-table value for the one-sided hypothesis is 1.645 (Chin, 1988). Second, observe the coefficient value (standardized coefficient), whether the direction of the coefficient

is in accordance with the direction of the directional hypothesis that has been known and written in the hypothesis. The hypothesis can be considered supported if it is known that there is a significant influence and the direction of the coefficient is in accordance with the hypothesis. Furthermore, path analysis is carried out to analyze the influence of variables on each path that crosses the mediating variable. This action is carried out with the intention of measuring the mediation capability of the mediating variable in the research model. The analysis stage can be carried out by observing the specific indirect effect value (Nitzl, 2018).

RESULTS AND DISCUSSION

Respondent Profile

This study was conducted through a survey using a questionnaire instrument. Distributed through google form. The survey resulted in 112 respondents who answered and were eligible as research samples.

Table 5 Respondent Characteristics

Respondent Characteristics	Category	f	%
Gender	Man	80	71.4
	Woman	32	28.6
	Total	112	100.0
Age	20-30 Years	23	20.5
	31-40 Years	55	49.1
	> 41 Years	34	30.4
	Total	112	100.0
Education	High School	28	25.0
	Diploma	34	30.4
	S1	50	44.6
	Total	112	100.0

Source: Primary Data Processing (2024)

Table 5 above shows the distribution of respondents based on gender, age and last education in a study of 112 respondents. Overall, the majority of respondents were male with a total of 80 people (71.4%), with the majority age between 31-40 years with a total of 55 people (49.1%). Most respondents had a final education of S1, with a total of 50 people (44.6%).

Hypothesis Testing

To test the influence of independent variables on dependent variables through intervening variables, the path analysis method is used, which is an extension of multiple linear regression analysis, or path analysis is the use of regression analysis to estimate the causal relationship between variables (casual models) that have been previously determined based on theory and determine the pattern of relationships between three or more variables and cannot be used to confirm or reject the hypothesis.

The statistical method used to test the hypothesis in this study is Partial Least Square (PLS). PLS is an alternative analysis method with Structural Equation Modeling (SEM) based on variance. The advantage of this method is that it does not require assumptions and can be estimated with a relatively small number of samples.

In Structural Equation Modeling there are two types of models formed, namely the measurement model (outer model) and the structural model (inner model). The measurement model explains the proportion of the variance of each manifest variable (indicator) that can be explained in the latent variable. Through the measurement model, it will be known which

indicators are dominant in the formation of the latent variable. After the measurement model of each latent variable is described, the next step is to describe the structural model that will examine the influence of each exogenous latent variable on the endogenous latent variable. In this study, there are 61 manifest variables and 4 latent variables, namelyOccupational health and safety (X1) is measured by 12 manifest variables, Work Environment (X2) is measured by 15 variable manifest, Risk Management (Y) which is measured by 14 manifest variables and Performance (Z) which is measured by 20 manifest variables.

Tool help Which used in the form of the Smart PLS Version 3.0 program which was designed special For estimate structural equations with variance basis.

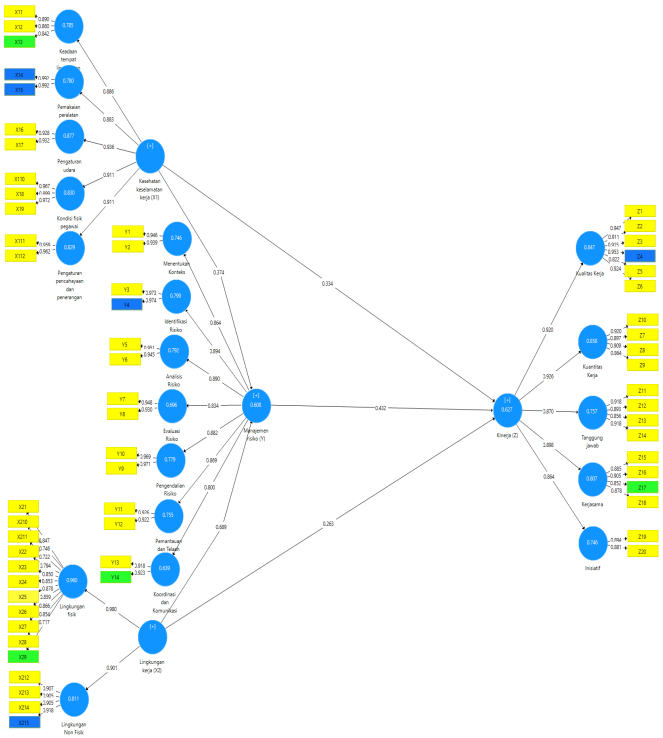
Analysis *Measurement* (Outer *Model*)

In data analysis with PLS-SEM, the first stage is the evaluation of the outer model which is also called the measurement model. This analysis stage is to test and evaluate the relationship of reflective indicators used to measure the latent variables (constructs).

Measurement model analysis is used to test the construct validity and reliability of the instrument of the reflective Second Order Construct (Multidimensional Construct). Second Order Construct (SOC) is a theoretical relationship between latent variables or higher order constructs with dimensions.construct below it. The relationship between higher order constructs and construct dimensions can be reflective or formative. (Abdillah and Hartono, 2011). For the multidimensional reflective construct format, testing can be done at only one level, whether at the higher order or lower order reflective construct, depending on the theory and level of abstraction of the testing objectives (Abdillah and Hartono, 2015).

Construct Validity Test at the Second Order Level Multidimensional constructs are divided into two, namely reflective multidimensional constructs and formative multidimensional constructs. Multidimensional constructs thathas a construct below it that is reflective of its core construct, then testing at the higher order level can be done by compositing all indicators in each dimension construct. Construct validity testing does not have to be done, but reliability testing to obtain internal consistency of the higher order construct must be done. Or, researchers can directly test each dimension construct at the lower order level. (Abdillah and Hartono, 2011). This study used a reflective multidimensional construct. Statistically, testing of reflective multidimensional constructs at the higher order level is a composite of all constructs at the lower order (construct dimensions) (Abdillah and Hartono, 2015)

The analysis of this measurement model consists of 2 types, namely reliability test and validity test. To obtain the outer model in this study, SmartPLS4 software was used by running the calculate menu, namely the PLS Algorithm. The outer model reflective model test of this study is arranged in 4 parts, namely sequentially 1) indicator reliability (outer loading), 2) construct reliability (Cronbach's alpha and composite reliability), 3) construct validity (average variance extracted or AVE), and 4) discriminant validity (heterotrait-monotrait ratio). The results of data processing with the PLS Algorithm get an outer model image as below



Source: Smart PLS Program Output (2024)

Figure 1 *Loading factor*First Order and Second Order

From the results of the loading factor data processing that can be seen in the image above, it is said to be valid that it has met the rule of thumb which means that the loading factor value for each indicator has a value greater than 0.7. Below is a table of loading factor values for each indicator:

Table 7 Loading of Dimension Factors and Indicators

Variables	Loading Dimension Factors	Dimensions	Indicator	Loading Factor Indicator	Note
Occupational health and safety (X1)	0.886	The condition of the work environment	X11	0.890	Valid
			X12	0.860	Valid
			X13	0.842	Valid
	0.883	Use of work equipment	X14	0.992	Valid
			X15	0.992	Valid
	0.936	Air conditioning	X16	0.928	Valid
			X17	0.932	Valid
	0.911	Physical condition of employees	X18	0.899	Valid
			X19	0.972	Valid
			X110	0.967	Valid
	0.911	Lighting and illumination settings	X111	0.959	Valid
			X112	0.962	Valid
Work environment (X2)	0.980	Physical environment	X21	0.847	Valid
			X22	0.794	Valid
			X23	0.850	Valid
			X24	0.853	Valid
			X25	0.878	Valid
			X26	0.859	Valid

Variables	Loading Dimension Factors	Dimensions	Indicator	Loading Factor Indicator	Note
			X27	0.866	Valid
			X28	0.854	Valid
			X29	0.717	Valid
			X210	0.746	Valid
			X211	0.722	Valid
	0.901	Non-Physical Environment	X212	0.907	Valid
			X213	0.905	Valid
			X214	0.905	Valid
			X215	0.918	Valid
Risk management (Y)	0.864	Determining Context	Y1	0.946	Valid
			Y2	0.939	Valid
	0.894	Risk Identification	Y3	0.973	Valid
			Y4	0.974	Valid
	0.890	Risk Analysis	Y5	0.951	Valid
			Y6	0.945	Valid
	0.834	Risk Evaluation	Y7	0.948	Valid
			Y8	0.930	Valid
	0.882	Risk Control	Y9	0.971	Valid
			Y10	0.969	Valid
	0.869	Monitoring and Review	Y11	0.926	Valid
			Y12	0.922	Valid
	0.800	Coordination and Communication	Y13	0.918	Valid
			Y14	0.923	Valid
Performance (Z)	0.920	Quality of Work	Z1	0.947	Valid
			Z2	0.911	Valid
			Z3	0.915	Valid
			Z4	0.953	Valid
			Z5	0.822	Valid
			Z6	0.924	Valid
	0.926	Quantity of Work	Z7	0.897	Valid
			Z8	0.909	Valid
			Z9	0.864	Valid
			Z10	0.920	Valid
	0.870	Responsibility	Z11	0.918	Valid
			Z12	0.893	Valid
			Z13	0.856	Valid
			Z14	0.918	Valid
	0.898	Cooperation	Z15	0.885	Valid
			Z16	0.905	Valid
			Z17	0.852	Valid
			Z18	0.878	Valid
	0.864	Initiative	Z19	0.894	Valid
			Z20	0.881	Valid

Source: Smart PLS Program Output (2024)

For the Occupational Health and Safety variable (X1), the dimension with the highest loading factor is Air conditioning with a value of 0.936, while the dimension with the lowest loading factor is Use of work equipment with a value of 0.883. In its indicators, the highest loading factors are in X15 and X14 (Use of work equipment) with a value of 0.992, while the lowest loading factor is in X13 (Condition of the work environment) with a value of 0.842. This shows that the use of work equipment makes the strongest contribution, while the condition of the work environment is slightly lower in influencing occupational health and safety.

For the Work Environment variable (X2), the highest dimension is the Physical Environment with a value of 0.980, while the lowest dimension is the Non-Physical Environment with a value of 0.901. In the indicator, the highest loading factor is in X215 (Non-Physical Environment) with a value of 0.918, and the lowest is in X29 (Physical Environment) with a value of 0.717. This means that the physical environment as a whole is more influential, but some non-physical environmental indicators such as X215 still have a strong influence.

For the Risk Management variable (Y), the highest dimension is Risk Identification with a value of 0.894, while the lowest is Coordination and Communication with a value of 0.800. The highest indicator is in Y4 (Risk Identification) with a value of 0.974, while the lowest is in Y14 (Coordination and Communication) with a value of 0.918. This shows that risk identification is the most dominant in risk management, while coordination and communication have a relatively smaller influence.

For the Performance variable (Z), the dimension with the highest loading factor is Quantity of Work with a value of 0.926, while the lowest dimension is Responsibility with a value of 0.870. In its indicators, the highest loading factor is in Z4 (Quality of Work) with a value of 0.953, while the lowest is in Z5 (Quality of Work) with a value of 0.822. This shows that quantity of work plays an important role in influencing performance, with quality of work also making a major contribution despite a slight decline in certain indicators.

Based on the table above, it shows that the variable indicators that have a loading value greater than 0.70 have a high level of validity, thus fulfilling convergent validity. Thus, the analysis is continued with the Discriminant Validity test.

Discriminant Validity

The next criterion in the discriminant validity test is to use the Heterotrait-Monotrait Ratio (HTMT) value using the maximum HTMT value limit of 0.90. The results of the Heterotrait-Monotrait discriminant validity test can be reviewed in the table below.

Table 8 Heterotrait-Monotrait Ratio (HTMT)

	Occupational health and safety (X1)	Performance (Z)	Work environment (X2)	Risk management (Y)
Occupational health and safety (X1)				
Performance (Z)	0.505			
Work environment (X2)	0.068	0.576		
Risk management (Y)	0.377	0.757	0.710	

Source: Smart PLS Program Output (2024)

According to the description above, it is stated that the variables used in this study already have good discriminant validity in the preparation of each variable.The recommended measurement value in HTMT analysis in PLS has been set below 0.85, although there are

values above 0.85 to a maximum of 0.90, which is still considered sufficient. In the HTMT criteria table, it is <0.9, so it has met the discriminant validity test criteria.

Average Variance Extracted (AVE)

Convergent validity can also be seen through the AVE value. In this study, the AVE value of each construct was more than 0.5 (Ghozali, 2016). On that basis, there was no problem of convergent validity in the model being tested. The results of the AVE value are listed in the following table.

Table 9 Average Variance Extracted

	Average Variance Extracted (AVE)
Occupational health and safety (X1)	0.713
Work environment (X2)	0.649
Risk management (Y)	0.666
Performance (Z)	0.655

Source: Smart PLS Program Output (2024)

Through the explanation above, it can be seen that the AVE value of each construct is more than 0.5. On that basis, there is no problem of convergent validity in the tested model, so the constructs in the model can be called good discriminant validity.

Reliability Test

*Outer model*not only measured using convergent validity or discriminant validity, but also can observe the reconstruct liability or latent variable measured by observing the composite reliability value of the indicator block that measures the construct. The PLS output results on composite reliability and Cronbach alpha are listed as described below.

Table 10 *Composite Reliability*

	Cronbach's Alpha	Composite Reliability	Rule of Thumb	Information
Occupational health and safety (X1)	0.963	0.967	>0.70	Reliable
Work environment (X2)	0.961	0.965		Reliable
Risk management (Y)	0.961	0.965		Reliable
Performance (Z)	0.972	0.974		Reliable

Source: Smart PLS Program Output (2024)

The description above shows the composite reliability value for all constructs is more than 0.70. Based on these results, it is concluded that all constructs have good reliability based on the minimum boundary conditions (Ghozali, 2016:75).

Outer model besides measured by assessing convergent validity and validity discriminant can also be implemented by paying attention to reliability construct aknow latent variables are measured by looking at the values *cRonbach alpha* from the indicator blocks that measure the construct. Construct stated reliability if the Cronbach alpha value is above 0.60.

Based on the explanation, it can be concluded that Occupational Health and Safety (X1), Work Environment (X2), Risk Management (Y) and Performance (Z), are considered reliable because they have a Cronbach's alpha value above 0.6 (Ghozali, 2016:75). On that basis, it can be concluded that all constructs are reliable based on the minimum value limit required.

Structural Model Analysis or Inner Model

Structural model testing is carried out in order to determine the correlation between constructs, significance values, and r-square of the research model. Evaluating the structural model using r-square for the dependent construct of the t-test and the significance of the structural parameter coefficient. Stages analysis which is done in the evaluation of the structural model seen from a number of indicator that is :

Q-Square

*Q-square*can be seen in the results of the Q_Predict calculation in the PLS_Blindfolding section. The results of the calculation are listed in the description below.

Table 11 ResultsQ_Predict

	Q²predict	**Results**
Performance (Z)	0.404	Medium Predictive Relevance
Risk management (Y)	0.399	Medium Predictive Relevance

Source: Smart PLS Program Output (2024)

Through the calculation results in the table above, the Q2 value is 0.404 and 0.399. Because the Q2 value between 0.25-0.50 is said to be medium predictive relevance, then the model has met the predictive relevance where the model has been reconstructed well.

R Square (R2)

Regarding the assessment of the structural model using PLS, it can be started by observing the r-square value for each endogenous latent variable as the predictive power of its structural model. Changes in the r-square value can be useful for describing certain exogenous latent variables in influencing endogenous latent variables, whether they have a substantial effect or not. The r-square values of 0.75, 0.50, and 0.25 can clarify whether the model is strong, moderate and weak (Ghozali, 2016). In order to observe the r-square value, you can pay attention to the following description.

Table 12 ResultsR Square

	R Square
Performance (Z)	0.627
Risk management (Y)	0.608

Based on the table above, the R-Square value for the Risk Management variable is 0.608. This shows that the percentage of the influence of the variable on Risk Management is 60.8%, while the remaining 39.2% is influenced by other variables. The results of the R^2 calculation show that the value is in the moderate category, meaning that the Occupational Health, Safety and Work Environment variable has a direct influence of 60.8% on Risk Management.

Meanwhile, the R-Square value for the Performance variable is 0.627, which explains that the percentage of influence on Performance is 62.7%. Based on the results of the R^2 calculation, this value is also included in the moderate category, which means that the Occupational Health and Safety, Work Environment, and Risk Management variables directly affect Performance by 62.7%, while the remaining 37.3% is influenced by other variables.

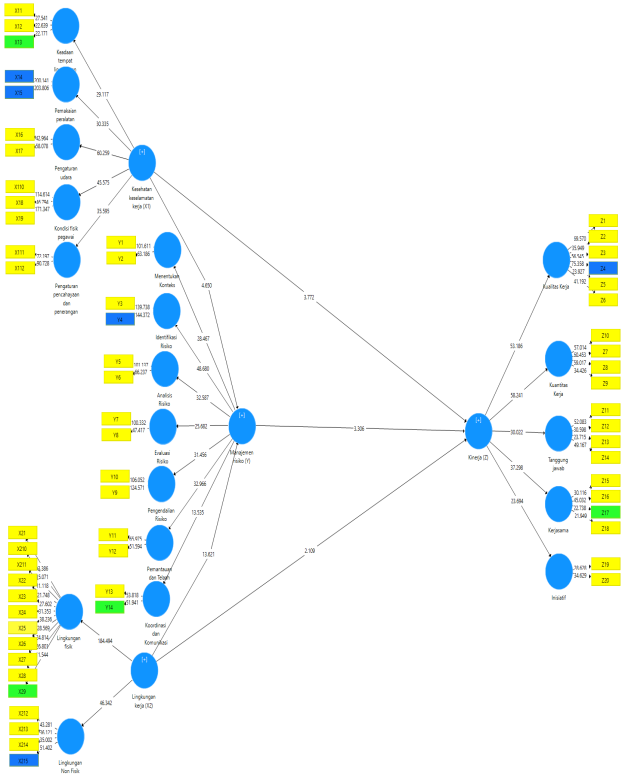
Hypothesis Testing Results (Bootsrapping)

Model evaluation is carried out by examining the significance value to ensure the existence of variable influence through the bootstrapping procedure (Ghozali, 2016).Hypothesis testing in this study was carried out by considering t-statistics and p-values. The hypothesis is considered accepted if T-Statistics > 1.64 (ttable value) and P-Values < 0.05. The following are the results*Path Coefficients*direct influence:

Table 13 Direct Influence and Indirect Influence

Hypothesis	Influence	Original Sample (O)	T Statistics (|O/STDEV|)	P Values	Information
H1	Occupational health and safety (X1) -> Risk management (Y)	0.374	4,650	0.000	Significant
H2	Work environment (X2) -> Risk management (Y)	0.689	13,621	0.000	Significant
H3	Occupational health and safety (X1) -> Performance (Z)	0.334	3,772	0.000	Significant
H4	Work environment (X2) -> Performance (Z)	0.263	2.109	0.018	Significant
H5	Risk management (Y) -> Performance (Z)	0.432	3.306	0.001	Significant
H6	Occupational health and safety (X1) -> Risk management (Y) -> Performance (Z)	0.162	2.386	0.009	Significant
H7	Work environment (X2) -> Risk management (Y) -> Performance (Z)	0.298	3.361	0.000	Significant

Source : Output Program Smart PLS (2024)



Source : Output Program Smart PLS (2024)

Figure 2 Boostrapping First Order and Second Order

Discussion and Findings of Research Results

In the Occupational Health and Safety variable, the dimension with the highest loading factor is Air Conditioning, which has a value of 0.936. Good air conditioning in the workplace is very important because it can improve employee comfort and health, reduce the risk of respiratory problems, and increase productivity. In contrast, the dimension with the lowest loading factor is Use of Work Equipment with a value of 0.883. Although the use of work equipment is an important aspect, its contribution is slightly lower than air conditioning. This may be due to variations in the level of maintenance and use of equipment in different workplaces. At the indicator level, X15 and X14 which focus on Use of Work Equipment show

the highest loading factor of 0.992. This indicates that the use of proper and safe equipment is a key factor in occupational health and safety, because unsafe or damaged equipment can cause serious harm. On the other hand, indicator X13 related to Condition of the Workplace Environment has the lowest loading factor of 0.842. Although the condition of the work place environment is important, its influence is slightly lower than other indicators, which may indicate that this aspect is quite good or is less considered in this assessment.

For the Work Environment variable, the dimension with the highest loading factor is the Physical Environment, with a value of 0.980. Aspects of the physical environment such as lighting and temperature have a significant influence on comfort and work performance, and can increase productivity and job satisfaction. In contrast, the Non-Physical Environment dimension has the lowest loading factor of 0.901. Although the non-physical environment, which includes noise and pollution, is also important, its contribution is slightly lower than the physical environment. At the indicator level, X215 related to the Non-Physical Environment has the highest loading factor of 0.918, indicating that some non-physical aspects, such as noise or pollution, still have a strong influence even though this dimension has a lower loading factor overall. On the other hand, indicator X29 related to the Physical Environment shows the lowest loading factor of 0.717. This indicates that suboptimal lighting and room temperature can interfere with work comfort and productivity, and there are variations or problems in the physical environment in some workplaces.

For the Risk Management variable, the dimension with the highest loading factor is Risk Identification with a value of 0.894. Good risk identification is very important because it ensures that potential risks are correctly identified and can be managed effectively. In contrast, the Coordination and Communication dimension has the lowest loading factor of 0.800. Although coordination and communication are important, these roles may already be well integrated into risk management practices, so their influence is slightly lower. At the indicator level, Y4 related to Risk Identification has the highest loading factor of 0.974. This indicates that risk identification practices in this organization are very good and are key to effective risk mitigation. In contrast, Y14 related to Coordination and Communication has the lowest loading factor of 0.918. Although important, coordination and communication may face some challenges in their implementation in the field.

In the Performance variable, the dimension with the highest loading factor is Work Quantity with a value of 0.926. High work quantity reflects productivity and the ability to meet set targets. On the other hand, the Responsibility dimension has the lowest loading factor of 0.870. Although responsibility is important, its contribution is slightly lower than work quantity in influencing overall performance. At the indicator level, Z4 which is related to Work Quality has the highest loading factor of 0.953. This indicates that good work quality is very important to achieve satisfactory results and meet standards. However, indicator Z5 which is also related to Work Quality shows the lowest loading factor of 0.822. Although work quality remains important, some indicators may show variations in quality standards or applications in the field

Direct Impact of Occupational Health and Safety on Risk Management

Occupational health and safety (OHS) is an important aspect in creating a safe and healthy work environment, which can affect how risk management is carried out. The test results show a path coefficient of 0.374 and a statistical T value of 4.650, which is higher than the T table value at a significance level of 5% (1.64). This indicates that OHS has a significant direct effect on risk management. This significant positive effect shows that the better the OHS condition, the more effective the risk management implemented. Implementation of good OHS practices can help in identifying and mitigating risks, reducing the potential for accidents and health problems, and overall improving the organization's capacity to manage possible risks.

Previous studies such as those conducted by Elva Susanti et al. (2019), which analyzed the influence of risk management and safe work behavior on worker performance, showed that risk management has a significant impact on worker performance, which is in line with the finding that K3 plays a role in risk management. Yoga Dila Nugraha and Dr. Ira Novianty (2022) also found that the implementation of good risk management has a positive effect on financial performance, which strengthens the relationship between K3 and risk management.

Direct Influence of Work Environment on Risk Management

A conducive work environment affects the effectiveness of risk management by providing an atmosphere that supports risk detection and handling. With a path coefficient of 0.689 and a statistical T value of 13.621, the test results show that the work environment has a very significant direct influence on risk management. A good work environment allows workers to communicate more easily, report potential risks, and implement preventive measures. A comfortable and safe environment also contributes to reducing stress and increasing job satisfaction, which in turn supports better risk management.

This finding is consistent with Dyah Agustin Widhi Yanti and Mursidi (2022) who stated that risk management has a significant effect on employee performance, and Elva Susanti et al. (2019) who showed that factors related to the work environment affect risk management.

Direct Impact of Occupational Health and Safety on Performance

Good occupational health and safety are not only related to risk management but can also affect individual and organizational performance. The path coefficient of 0.334 and the T-statistic value of 3.772 indicate that OHS has a significant direct effect on performance. Good OHS implementation contributes to a safer and more comfortable work environment, which can increase employee productivity and performance. Employees who feel safe and healthy will be more motivated and productive, which ultimately has a positive impact on organizational performance.

Yohanes R. Kanaf et al. (2024)stated that K3 and work environment have a significant effect on workforce performance, with job satisfaction as a mediating variable. This finding supports the importance of K3 in improving performance.

Direct Influence of Work Environment on Performance

A supportive work environment can improve employee performance. The path coefficient of 0.263 and the T statistic value of 2.109 indicate a significant direct influence between the work environment and performance. A positive and conducive work environment, including adequate facilities and a good working atmosphere, can increase employee motivation, job satisfaction, and efficiency. Conversely, a poor environment can lead to decreased productivity and performance.

Research by Putry Mutiarasari et al. (2019) and Fx. Pudjo Wibowo & Gregorius Widiyanto (2019) which shows that the work environment has a positive effect on employee performance, in line with the finding that the work environment has a direct impact on performance.

Direct Effect of Risk Management on Performance

Effective risk management can contribute to better performance by reducing the likelihood of problems that can disrupt performance. With a path coefficient of 0.432 and a T-statistic value of 3.306, this hypothesis is accepted. Good risk management can help organizations better identify, analyze, and manage risks, thereby reducing their negative impact on performance. By reducing uncertainty and mitigating risk, organizations can achieve more stable and optimal performance.

Tita Ning Tias et al. (2023)revealed that the implementation of risk management plays an important role in ensuring good employee performance, which supports the results that risk management affects performance.

Indirect Effect of Occupational Health and Safety on Performance through Risk Management

Occupational health and safety can affect performance not only directly but also through risk management. The path coefficient of 0.162 and the T-statistic value of 2.386 indicate that there is a significant indirect effect of OHS on performance through risk management. By improving OHS, organizations can improve risk management, which in turn will have a positive impact on performance. Good OHS supports more effective risk management, which reduces the impact of risk on employee and organizational performance.

Herman Yolanda's research (2024) supports this by showing that K3 influences performance through work motivation as a mediating variable.

Indirect Effect of Work Environment on Performance through Risk Management

A good working environment can affect performance not only directly but also through risk management. The path coefficient of 0.298 and the T statistic value of 3.361 indicate a significant indirect effect of the working environment on performance through risk management. A good working environment can support more effective risk management, which ultimately improves performance. By providing a supportive environment, organizations facilitate better risk management processes, which contribute to improved performance.

In conclusion, variables such as Occupational Health and Safety, Work Environment, and Risk Management have a significant influence on Performance, both directly and indirectly. Implementing and improving these aspects can contribute to better performance in an organization.

Research by Fiverio (2022) shows that the work environment affects performance through employee work discipline, in line with the results that the work environment affects performance through risk management.

CONCLUSION

There is a positive and significant direct effect of Occupational Health and Safety on Risk Management. This means that the aspect of occupational health and safety has a positive and significant direct impact on how organizations manage risk. The better the condition of occupational health and safety, the more effective the risk management implemented. This shows that improvements in occupational health and safety can directly improve risk management practices in organizations.

There is a direct positive and significant influence of the Work Environment on Risk Management. This means that a good work environment also has a direct and positive impact on risk management. Comfortable and safe work environment conditions can improve the organization's ability to identify and manage risks more effectively.

There is a direct positive and significant influence of Occupational Health and Safety on Performance. Good occupational health and safety contribute directly and significantly to improving employee performance. If the work environment is safe and healthy, employees tend to be more productive and their work performance improves.

There is a direct positive and significant influence of the Work Environment on Performance. A good work environment also has a direct and significant impact on performance. Adequate lighting, comfortable temperature, and supporting facilities will increase employee comfort, which in turn improves their performance.

There is a direct positive and significant effect of Risk Management on Performance. Effective risk management practices have a direct and positive impact on performance. Good risk management helps identify and mitigate potential problems that can interfere with performance, thereby improving employee performance.

There is a positive and significant indirect effect of Occupational Health and Safety on Performance. Occupational health and safety affect performance indirectly, through other variables such as risk management or the work environment. That is, improvements in occupational health and safety will have a positive impact on employee performance, but this effect may be through changes in other variables.

There is a positive and significant indirect effect of Work Environment on Performance through Risk Management. Work environment affects performance indirectly through risk management. A good work environment improves risk management, which in turn has a positive impact on performance. So, although the work environment does not affect performance directly, improvements in the work environment can improve risk management which then improves employee performance.

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