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Pengaruh Safety Climate dan Safety Leadership terhadap Safety Performance pada Pekerja Perusahaan Alat Berat Kalimantan Timur

Safety Climate and Safety Leadership Influence on Safety Performance in East Kalimantan Heavy Equipment Employees

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ABSTRAK

Latar Belakang: *Perawatan dan perbaikan alat-alat berat di tambang batubara mempunyai bahaya yang besar dan dapat mengakibatkan kecelakaan. Bahkan dengan upaya terbaik manajemen untuk menyediakan lapangan kerja, kebijakan, praktik, infrastruktur, dan perlengkapan keselamatan yang dapat diterima, kerusakan property, dan cedera ringan tetap saja terjadi.*
Tujuan: *Mengkaji bagaimana* safety climate *dan* safety leadership *mempengaruhi* safety performance *pada karyawan perusahaan alat berat Kalimantan Timur dalam hal keselamatan.*
Metode: *Kuesioner digunakan dalam penelitian ini untuk mengumpulkan data dari 65 responden yang dipilih melalui seleksi acak sederhana.*
Hasil: Safety climate *dipengaruhi secara positif dan signifikan* oleh safety leadership *berdasarkan analisis jalur (koefisien jalur = 0,962).* Safety performance *dipengaruhi oleh secara positif dan signifikan oleh* safety climate *dan* safety leadership *(koefisien jalur = 0,415 dan koefisien jalur = 0,562). Dengan* safety climate *bertindak sebagai mediator,* safety leadership *dapat memengaruhi* safety performance *(koefisien jalur = 0,3992).*
Kesimpulan: Safety leadership dan safety climate dapat menjadi anteseden terhadap safety performance karyawan perusahaan alat berat Kalimantan Timur. Perusahaan perlu memperkuat Safety leadership dengan memastikan para pemimpin mempraktikkan prinsip-prinsip keselamatan, serta menciptakan safety climate yang kondusif untuk meningkatkan komitmen keselamatan karyawan.

Kata Kunci: *Pekerjaan yang layak, Analisis Jalur*, Safety climate, Safety leadership, Safety performance

ABSTRACT

Background: Maintaining and repairing heavy machinery in coal mines included significant danger and may result in mishaps. Even with management's best efforts to provide acceptable employment, policies, practices, infrastructure, and safety gear, property damage and small injury occurrences nevertheless happen.
Objective: Examine how safety leadership and the safety environment affect employees of East Kalimantan heavy equipment companies' performance in terms of safety.
Method: A questionnaire was utilized in the study to gather data from 65 respondents who were chosen by simple random selection.
Results: The safety climate is positively and significantly impacted by safety leadership, according to path analysis (path coef = 0.962). Safety performance is positively and significantly impacted by safety leadership and climate (path coef = 0.562 and 0.415, respectively). With safety climate acting as a mediator, safety leadership may influence safety performance (path coef= 0.3992).

Conclusion: Safety leadership and safety climate can be antecedents for the safety performance of East Kalimantan heavy equipment company employees. Companies need to strengthen safety leadership by ensuring leaders practice safety principles, as well as creating a safety climate that is conducive to increasing employee safety commitment.

Keywords: Decent work, Path Analysis, Safety Climate, Safety Leadership, Safety Performance

INTRODUCTION

Natural resources can increase national earnings and community welfare if properly managed. Based on ILO (2023), almost 3 million deaths every year are because of work accidents and diseases. This research hopes it can contribute to the UN Sustainable Development Goals (SDGs) to prevent an occupational accidents, fatalities or injuries to have decent work and sustainable growth.

Coal mining operations are high risk. At the largest mines in China (2000-2016), the elements that cause accidents are especially external, organizational, safety leadership, prerequisite factors for unsafe acts and unsafe act factors (Liu *et al.*, 2018; Baldissone *et al.*, 2019; Fa *et al.*, 2021). Paskarini *et al.* (2019) said that work accidents not only injure employees, and their lives and harm human resources but also increase the social prices of a country. Management's safety commitment has not been capable of eliminating incidents of belongings harm and minor accidents.

Wu, et al. (2008) stated that there are pathways that effect on safety performance, specifically safety leadership, through safety climate, and from safety leadership to safety performance. Safety leadership is interaction among leaders and employees, where there is mutual trust that grows, leader's alternate attention will impact employees to gain the enterprise's safety goals.

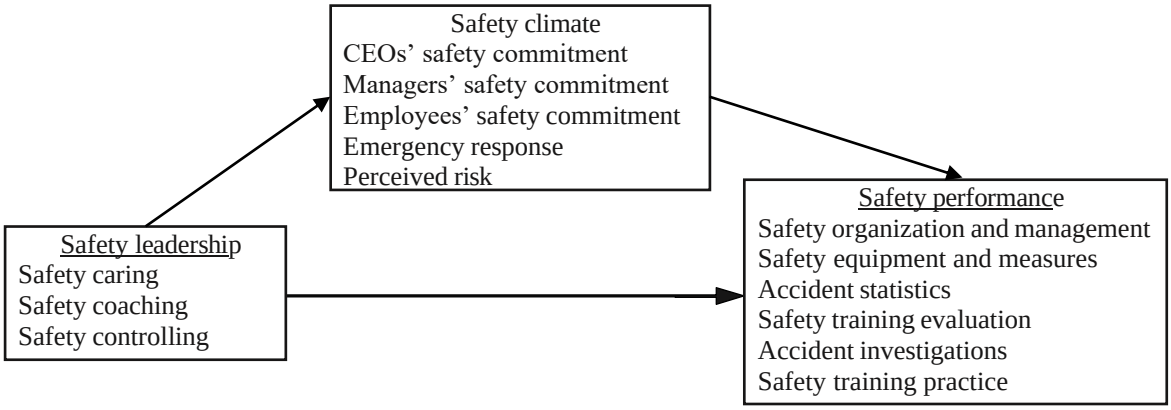

Figure 1. Model of Safety Leadership and Safety Climate Impact on Safety Performance (Wu et al., 2008)

Safety leadership dimensions based on Wu et al. (2008) are safety caring, safety coaching, and safety controlling. Safety caring is growing a harmonious work environment, adequate sources and personnel' needs regarding safety, accepting employees' input concerning safety, ensuring personnel recognize protection, overall performance, and offering reputation. Safety coaching is carrying out protection sincerely, setting an example in compliance with safety, offering outreach and know-how to employees regarding the importance of protection with the aid of concerned personnel in decision making related to protection. Safety controlling is supplying aid and firmness to personnel concerning the implementation of safety management system (SMS), imparting rewards for desirable worker safety behavior, accomplishing protection audits and providing follow up non conformities.

Safety climate is the employee's perception of the enterprise's safety culture and work surroundings in addition to perceptions that can be stimulated through organizational and individual elements that influence personnel protection behavior (Griffin and Curcuruto, 2016; Schwatka et al., 2016; Zhao et al., 2022). Safety climate dimensions based on Wu et al. (2008) are CEO, manager and employee safety commitment, emergency response, and perceived risk. The commitment and leader's movement, management, and employees by organizing safety guidelines and programs, supplying assets, supporting centers, infrastructure, a safe place of business, minimizing risk exposure, and reducing the prevalence of injuries. Fiqih (2023) explains that management dedication may be very essential in influencing management and employees to participate in

imposing the protection guidelines and applications that have been determined

Emergency response is a concept within the field of safety associated with emergencies that can threaten personnel and groups, such as natural disasters, fires, explosions, and riots. Fiqih (2023) states that it'll offer safety and a sense of protection for them while an emergency takes place. According to Gidron (2013), perceived risk is a person's subjective assessment of the hazard of a sickness or awful result they experience, often related to certain risky behavior. The level of perceived danger may be related to preceding publicity to a condition, a person's information of such situations, exposure to any of the risk elements, and factor personality. Fiqih (2023) explains that during relation to protection, perceived risk will impact worker conduct.

Safety performance influences safety results (injuries and accidents), and it can be related to various causes (Setiono et al., 2019; Atikasari et al., 2022; Zhao *et al.*, 2022)). Safety performance dimensions based on Wu et al. (2008) are safety organization and management, safety equipment and measures, accident statistics, safety training evaluation, accident investigations, safety training practice. Safety organization and management is the implementation of SMS in East Kalimantan heavy equipment companies. (Duarteet al., 2021) stated that heavy device accidents commonly arise all through repair and protection movements. Coincidence prevention is accomplished by identifying and controlling mining dangers, lively monitoring, in the operation and upkeep of equipment. The operator understands and guarantees the circumstance of the work equipment earlier than operating it. Personnel should be psychologically and bodily healthful in order now not to interfere with response time or senses, employees are given training and education related to painting and safety. Inexperienced personnel are greater susceptible to system-related accidents. Educational programs growth consciousness of the use of personal protective equipment (PPE) and subject personnel.

The provision and measurement of safety equipment is achieved by supplying PPE, fire prevention equipment and measuring the workplace environment and employees fitness. Recording the number of accidents and accident investigations, as well as accident investigations carried out so that corrective movement may be taken and preventive deliberate in order that the incident does no longer manifest again. Safety training evaluation and practices is the implementation of training and post-training evaluation. Widajati et al. (2017) stated that safety training is associated with the creation of work dangers and risks, so that employees can make efforts to mitigate work-related accidents and diseases independently.

This model (Wu et al., 2008) explains the relationship among safety leadership, safety climate, and safety performance based on social systems ideas using a questionnaire. Safety climate partially mediates the relationship between safety leadership and safety performance shown on path analysis results. Canonical correlation evaluation suggests that protection manage is one of the safety leadership elements that has the main impact on CEO and supervisor's safety commitment in safety climate, on safety organization and management, safety equipment and actions, as well as accident investigation on safety performance. The results of statistical evaluation show that organizational leaders should develop strategies to enhance their enterprise's safety climate, which has a positive effect on safety performance.

It is uncommon to find study journals that talk about the connection among safety leadership and safety climate on safety performance in heavy equipment companies. So, the general goal of this research is to investigate the effect of safety climate and safety leadership on the safety performance of East Kalimantan heavy equipment company employees.

METHODS

The form of studies completed is quantitative studies with an analytical observational research layout. The design is a cross sectional study to investigate the influence of safety climate and safety leadership on safety performance on East Kalimantan heavy equipment company employees and examine it with the model of Wu et al. (2008). The studies turned into from East Kalimantan heavy equipment company employees in December 2023.

The inclusion criteria for population is all employees at staff/officer level to the top (service, part and safety department) and exclusion of new employees (less than 1 year), operators or regular employees, as well as employees who are not willing to fill out the Informed Consent form. From the inclusion and exclusion criteria, the population members who comply with the research criteria are 100 people. The respondents' samples were simple random sampling, according to Lemeshow's Formula. There have been sixty five personnel who took component on this studies.

The variables used in this research are: endogenous variables (safety climate and safety performance) and exogenous variables (safety leadership). Operational definition for safety leadership refers to the interaction process among the chief and his subordinates in East Kalimantan heavy equipment company in order that the leader can exhibit his influence to obtain the company's safety goals. Safety climate refers to the perception of East Kalimantan heavy equipment company employees regarding various organizational characteristics that can influence employee safety behavior. Safety performance refers to the overall

performance of the East Kalimantan heavy equipment enterprise's protection management system in implementing safety management. The dimensions used for this research were adapted from research with the aid of Wu, et al. (2008). Safety leadership dimensions are safety caring, safety coaching, and safety controlling. Safety climate dimensions are CEO's safety commitment, manager's safety commitment, employee safety commitment, perceived risk, and emergency response. Safety performance dimensions are safety organization and management, safety equipment and measures, accident statistics, safety training evaluation, accident investigation, safety training practices.

The measurement questionnaire is to decide numerous factors that impact safety leadership, safety climate and safety performance. For favorable statements with a Likert scale rating of 1 strongly disagree, score 2 disagree, score 3 agree, score 4 strongly agree. Unfavorable statements with a Likert scale rating of 1 strongly agree, rating 2 agree, score three disagree, rating 4 strongly disagree. The weighting is performed by means of averaging the scores of every safety leadership, safety climate and safety performance size (6 dimensions) for every employee, then averaging the total consequences (Wu et al., 2007).

This studies uses crosstab evaluation from SPSS and SEM with SMARTPLS to decide the influence among variables. The validity analysis of safety leadership and safety climate statements, all calculated r values are higher than r table (0.3061). This means that safety leadership statement no. 1-35 and safety climate no. 1-46 were valid and can be used in further research. From the validity analysis of the safety performance statement, all calculated r values higher than r table (0.3061), except no. 17 (0.150). This means that safety performance statement no. 1-39 are valid, except no. 17 (The Company establishes safety and health labels in the workplace). Henceforth, Safety Performance statement no. 17 had been removed, so for further evaluation 38 statements were used.

This study has complied with the ethical evaluation from the fitness studies Health Research Ethics Committee, Faculty of Public Health, Universitas Airlangga No: 197/EA/KEPK/2023.

RESULTS AND DISCUSSION

The employee characteristics determined in this research consist of age, gender, education, length of service, work area, position, and history of work accidents and safety training. The respondents are 65 employees from East Kalimantan heavy equipment company. Below is a summary of the results of the questionnaire regarding employee characteristics.

Table 1. Distribution of Employee Characteristics at East Kalimantan Heavy Equipment Companies

Employee Characteristics	Category	Frequency	
		(n)	(%)
Gender	Man	64	98.5
	Woman	1	1.5
Age	Below 24 years	11	16.9
	25-44 years	48	73.8
	Over 45 years	6	9.2
Years of service	Below 5 years	22	33.9
	6-10 years	12	18.5
	11-15 years	20	30.8
	Over 16 years	11	16.9
Work area	Workshops	31	47.7
	Warehouse/ logistics	6	9.2
	Mine	15	23.1
	Office	13	20.0
Position	Department head	2	3.1
	Supervisors	3	4.6
	Leader /coordinator	5	7.7
	EHS Practitioner/ safety Section	7	10.8
	Mechanic	36	55.4
	Staff / Officers	12	18.5
Accident History	Once	7	10.8
	Never	58	89.2
Safety training	Once	59	90.8
	Never	6	9.2

According to the frequency distribution results in table 1, the majority of employees are male. Helmi (2023) said that women place more emphasis on carrying out their duties well and harmonious work relationships, while men tend to view achievement as competition. Based on Wu, et al. (2007) categorized and minimum employees' age into below 24 years, 25-44 years and over 45 years. East Kalimantan heavy equipment companies require new employees to be 18 to 55 years old. The age of most people of personnel within the range of 25-44 years, amounting to 73.8%. The employees aged beneath 24 years had been 16,9% and over 45 years had been 9.2%.

Wu et al. (2007) categorized employees' working years as underneath 5 years, 6-10 years, 11-15 years and over 16 years. The biggest number of employees on this observe have been people were those with a working period of less than 5 years at 33.9% and 11-15 years amounting to 30.8%. Employees with 6-10 years of service were 18.5% and over 16 years were 16.9%.

Primarily based on studies outcomes, most people of labor regions are in workshops at 47.7% and mines at 23.1%. Apart from that, it was also 20% in the office and 9.2% in the warehouse. This research also shows that most of the people of

personnel are mechanics 55.4%. Apart from that, there are also staff / officers at 18.5%, safety practitioners at 10.8%, leaders at 7.7%, supervisors at 4.6%, and department heads at 3.1%.

Table 2. Description of Perceptions of Safety Leadership, Safety Climate, and Safety Performance among East Kalimantan Heavy Equipment Company Employees

Variable and Dimensions	Mean Score
Safety Leadership	
Safety coaching (SCoa)	3.53
Safety controlling (SCo)	3.53
Safety caring (SCa)	3.51
Safety Climate (SC)	
Managers' safety commitment (MSC)	3.65
CEOs' safety commitment (CSC)	3.63
Employee safety commitment (ESC)	3.60
Emergency response (ER)	3.55
Perceived risk (PR)	3.49
Safety Performance	
Accident statistics (AS)	3.57
Safety equipment and measures (SEM)	3.56
Safety training evaluation (STE)	3.55
Accident investigations (AI)	3.55
Safety training practice (STP)	3.55
Safety organization & management (SOM)	3.53

The outcomes of the research display that employee participation in safety training at East Kalimantan heavy equipment companies. Most employees (90.8%) have participated in safety training, whilst 9.2% have not. Primarily based in thisstudies, 10.8% of employees experienced a record of work accidents, whilst 89.2% never had them. Work-related accidents referred to minor injuries and work accidents that require medical treatment or lost *time injury*.

Based on table 2 it turned into found that the common employee belief of the assertion approximately about safety leadership, safety climate, and safety performance contained in the questionnaire were high (above 3). The employees strongly agree with the statements.

Crosstab Analysis

The evaluation uses crosstab analysis to expose the outcomes of cross tabulation between safety leadership and safety climate, safety climate and safety performance, safety leadership and safety performance among East Kalimantan heavy equipment company employees.

From table 3, it was determined that employees with high safety leadership and safety climate perceptions had excessive safety performance. It means that safety leadership and safety climate impact safety performance in East Kalimantan heavy equipment company personnel.

Table 3. Cross Tabulation of Safety Leadership and Safety Climate on Safety Performance among East Kalimantan Heavy Equipment Company Employees

		Safety Climate				Safety Performance			
		Low		High		Low		High	
		(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Safety Leadership	**Low**	2	3.10%	0	0.00%	2	3.10%	0	0.00%
	High	0	0.00%	63	96.90%	0	0.00%	63	96.90%
Safety Climate	**Low**					2	3.10%	0	0.00%
	High					0	0.00%	63	96.90%

Path Analysis

Structural Equation Model (SEM) analysis using the SMARTPLS software become used to analyze the hypothetical model of Wu et al. (2008) which impact safety leadership and safety climate variables on safety performance, in addition to explaining the relationship among latent variables. The measurement (outer) version is used to analyze whether the statements inside the questionnaire meet the perfect device necessities. In convergent validity analysis, a dimension is said to be valid if the factor loading value is greater than or equal to 0.7 (Rahadi, 2021; Muhson, 2022).

From the consequences of the analysis above (table 4), it can be visible that the outer loading values of the scale of the latent variables of safety leadership, safety climate and safety performance are greater than 0.7. This indicates all dimensions of the latent variable safety leadership, safety climate and safety performance are valid and be utilized in similarly studies.

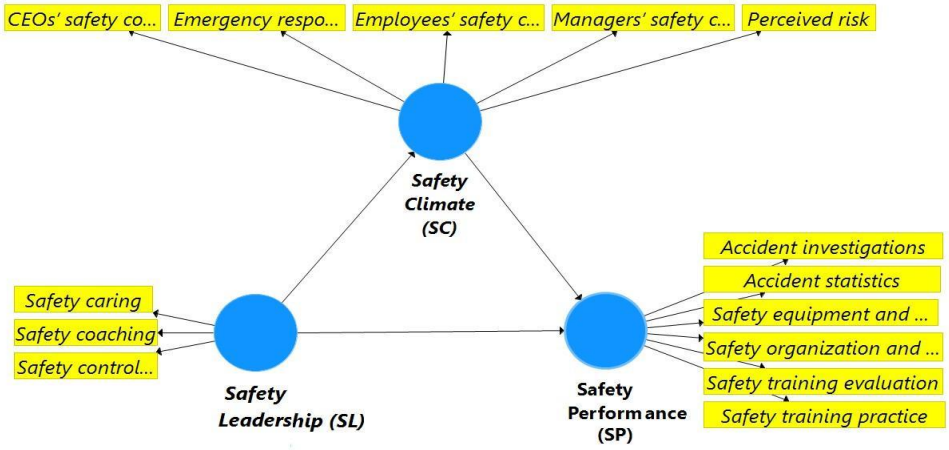

Figure 1. Initial Model Outer Model Testing (SEM- SMARTPLS)

Table 4. Construct Reliability and Validity Calculation Results

Variable	Dimensions	Outer Loading	P Value s	Cronbach's Alpha	Composite Reliability	AVE
Safety Climate (SC)	CSC	0.896	0.000	0.928	0.945	0.776
	MSC	0.895	0.000			
	ESC	0.901	0.000			
	E.R	0.846	0.000			
	PR	0.866	0.000			
Safety Leadership (SL)	Sca	0.955	0.000	0.937	0.960	0.889
	SCOA	0.956	0.000			
	SCo	0.918	0.000			
Safety Performance (SP)	SOM	0.917	0.000	0.951	0.961	0.806
	SEM	0.943	0.000			
	AS	0.871	0.000			
	STE	0.833	0.000			
	A.I	0.895	0.000			
	STP	0.923	0.000			

Safety coaching value (SCoa) is the highest in the safety leadership dimension, employee safety commitment (ESC) in the safety climate, and safety equipment and measures (SEM) in the safety performance. Which mean those elements are the most influential the variable safety leadership, safety climate and safety performance. which means that it at least influences the safety leadership variable.

Construct validity is assessed based on the AVE value, said to be good and discriminant validity is satisfactory if it is more than 0.5, (Rahadi, 2021; Muhson, 2022). From the analysis results (table 5.8), it can be seen that the AVE Safety Climate value is 0.776, Safety Leadership is 0.889, and Safety Performance is 0.806. This means that the AVE value is greater than 0.5, meaning that the discriminant validity is met.

Construct reliability is classified primarily based on by Cronbach's Alpha and Composite Reliability. The reliability value is good if α and composite reliability are more than 0.7 (Rahadi, 2021; Muhson, 2022). From table 4, Cronbach's Alpha value Safety Leadership (0.937), Safety Climate (0.928), and Safety Performance (0.951), Composite reliability value Safety Leadership (0.960), Safety Climate (0.945), and Safety Performance (0.961) indicate that construct reliability meets.

The inner model analysis is supposed to decide whether there may be an influence among variables, the usage of t analysis. Outer loading value of the latent variable (table 4) is said to be valid if it is greater than 0.7 (Rahadi, 2021; Muhson, 2022). So that the outer loading value of the safety leadership, safety climate, and safety performance latent variable dimension is valid. So, these fourteen dimensions may be used in SEM analysis.

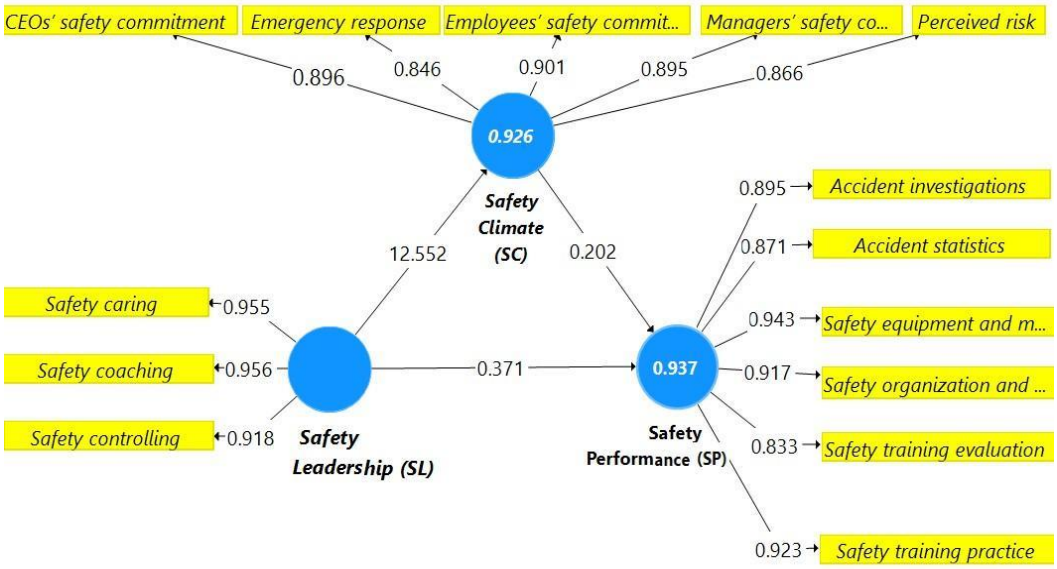

Figure 2. Outer Model Test Results (SEM- SMARTPLS)

Table 5. Path Coefficients Calculation Results

	Path Coefficients	P Values	T Statistics
Safety Climate →Safety Performance	0.415	0.022	2.2306
Safety Leadership → Safety Climate	0.962	0.000	75.303
Safety Leadership → Safety Performance	0.562	0.002	3.088
Safety Leadership → Safety Climate →Safety Performance	0.3992	0.021	2.312

Bootstrap analysis is used as a hypothesis evaluation, to assess the level of significance or strength of the relationship by looking at the probability of direct consequences (path coefficient), oblique outcomes and general consequences. The path coefficient value ranges from -1 to 1. The higher the value, the stronger the relationship between the two constructs (variables). The impact among variables is positive if the Path Coefficients value is positive. If the probability value (P Values) is smaller than the level of significance (α 5% or 0.05). It indicates that the variable is significant, so it is stated that there is an impact of exogenous variables on endogenous variables, or if T count more than T table for data of 65 (df of 64, α is 0.05 one tailed test) is 1.997, meaning the variable is significant.

From table 5, the direct impact of safety leadership on safety climate (Path coef 0.962 and P Values 0.000), safety climate on safety performance (Path coef 0.415 and P Values 0.022), and safety leadership on safety performance (Path coefficient 0.562 and P Values 0.002) are positive and significant. This means that the connection among two constructs (variables) is strong, better safety leadership tends to improve the safety climate, and so hypothesis 1 is accepted. The higher the safety climate tends to enhance safety performance, so hypothesis 2 is accepted. The higher the safety leadership tends to increase safety performance, so hypothesis 3 is accepted.

Statistical T Values safety climate on safety performance (2.2306); safety leadership on safety climate (75,303); safety leadership on safety performance (3,088) is greater than the T table (1.997). Which means the variable is significant. The significance of the indirect effect of safety leadership and safety climate on safety performance is the multiplication of path coefficient safety leadership on safety climate with safety climate on safety performance, 0.962 x 0.415 = 0.3992. There is an impact of safety leadership on safety performance with a safety climate mediating variable of 0.3992 (hypothesis 4). Increasing one unit of safety leadership will enhance definitely enhance safety performance indirectly through a safety climate of 39.92%.

General effect safety leadership and safety climate on safety performance is the sum of the direct effect values (Path coef safety leadership to safety performance) added with the indirect effect, 0.562 + 0.3992 = 0.9612. There is a positive total impact of safety leadership on safety performance. Safety leadership has a better impact on safety performance directly (0.562) when in comparison with safety climate as a mediating variable (0.3992). Or it can be interpreted that better safety leadership will enhance the safety performance through and not through the safety climate. Improvements in one safety leadership unit will enhance safety performance by 96.12%.

The R^2 value is to decide the predictive strength of the structural version, how a lot the unbiased variable is able to provide an explanation for the variance of the based variable. The coefficient value of determination R^2 is expected to be between 0 and 1. According to Ghozali and Latan (2015) R^2 0.75 is said to be a strong model, 0.50 is quite moderate, and 0.25 is weak. R^2 value of the influence of safety leadership on safety climate is 0.926. Safety leadership strongly influences the safety climate by 92.6%. The R^2 value of the simultaneous influence of safety leadership and safety climate on safety performance is 0.937. Safety leadership and safety climate strongly influence safety performance by 93.7%, and 6.3% is motivated through different variables that have no longer been studied.

The company holds safety coaching and training for new employees, daily toolbox meetings, regular safety meetings with other departments and subcontractors, as well as various training to fulfill client competencies and requirements. Top management and the Department Head create a harmonious work climate with both employees involved in the work process and clients by participating in Health Challenges or other safety activities organized by the mine owner/contractor, or organizing activities with subcontractors to commemorate religious and national holidays, and company celebration. The company provides safe work rules and personal protective equipment (PPE) for employees in quantities and types according to their intended use.

Each Department Head is dedicated to achieving the organization's vision and mission, has has duty for the executive and operational control of mining protection and the surroundings according with their location of responsibility in addition to maintaining communication and always taking part with different department. The Service Department is tasked with carrying out maintenance, upkeep, repair of facilities and infrastructure. The Parts Department is tasked with managing the availability of spare parts and work tools to meet maintenance service needs for heavy equipment units and vehicles. The ESR (Environment and Social Responsibility) Department is responsible for monitoring and reporting on Safety Management System (SMS) implementation and operational safety, including the issuance of ID Cards and KIMPER (Mining Entry Permit Cards). All departments carry out work by implementing SMS and operational safety.

Perceived risks after injury or accident are socialized as part of lessons to learn during safety talks/briefings/tool box meetings, through company safety advertising/ banners, as well as social media (WhatsApp Group and email), Hazard Identification Risk Assessment and Risk Control (HIRARC) is being reviewed as a new/additional control for the risks. Sultan, et al. (2023) said that the risk assessment consists of four levels (levels), including very high, high, mild, and low risk. Severe and extreme risk must be controlled to be acceptable/tolerable.

In 2016-2022, there were 10 cases of paramedic treatment, 5 asset damage, 3 violations of the golden policies, 2 first aid treatment, and 1 lost time because of injury (LTI). The results of employees' health examinations from January to December 2022, found that 223 had hypercholesterolemia with total cholesterol of more than 200 and 43 with low-density lipoprotein (LDL) more than 150; 100 hypertension (systolic more than 130) and 64 (diastolic more than 80); 127 employees were obese (body mass index-BMI more than 25); and 18 diabetes (blood sugar more than 110). Kim *et al.* (2021) said that these metabolic issues are exacerbated by the habit of smoking.

East Kalimantan heavy equipment companies implement the Mineral and Coal Mining SMS. This system is part of the safety, operational, quality and organizational integration system, the overall company management system, in the context of controlling mining safety risks. HIRARC and Job Safety Analysis (JSA) are made earlier as the obligation to identify and control hazards in order to work safely. Each department and work area, including offices, warehouses, workshops and mining areas made HIRARC according to the activities and compliance with statutory regulations.

Safety performance is stimulated by safety leadership through safety climate and safety leadership leading to safety performance directly (Wu, 2008; Wu et al ., 2008). Wu et al. (2011) stated that safety leadership has an effective impact on safety climate and safety performance. The direct impact of safety leadership on safety performance is better than the indirect impact. Safety climate as a mediator of safety leadership and safety performance. In the research of Wu et al. (2008), safety leadership has less impact when safety climate is included in the regression model, so it can be said that safety climate mediates the connection among safety leadership and safety performance.

Supardi et al. (2021) say safety leadership has a beneficial impact on safety performance; the more effective safety leadership is applied in a organization, the extra the growth in safety performance. Hon et al. (2014) defined that control commitment and worker involvement have a more relationship with perceived safety performance than other safety climate factors, procedures and inappropriate work practices.

Wu et al. (2016) stated a considerable dating among safety leadership and safety performance, safety culture acts as a crucial mediator. In addition, among all leadership dimensions, the influence of safety coaching has the most extensive influence on project safety culture

and safety leadership. Further, among all leadership dimensions, the impact of safety education has the maximum tremendous have an impact on undertaking safety culture and safety leadership. Consequently, it is recommended that leadership and control ought to domesticate air of mystery and the capacity to persuade and behave as an example to others. The effects also display that the safety worrying size is extra needed in the frontline environment.

Leaders behave as role models to enhance safety awareness and goals, provide inspirational motivation, intellectual simulation and mentors in employee safety and welfare. Enhancing employee safety commitment where employees show safety participation beyond individual interests for the sake of collective safety, dare to voice their concerns, find new ideas and approaches to solve safety-related problems. (Jiang and Probst, 2016; Utami, 2017; Cąliş and Buÿükakinci, 2019).

Wu (2008) stated that safety coaching refers to the leader's ability to be a role model to subordinates, stimulate employees' abilities, give feedback and enable employees to participate in discussion. According to Cąliş and Buÿükakinci (2019), as mentors and role models, they must guide, awaken employees' abilities, give awareness and allow them to take apart in the decision-making process. Khasanah et al. (2019) stated that leaders must encourage employees to solve their problems, focus on goals, and improve their performance. Northouse (2019) in the book Leadership: Theory and Practices explains the path-goal theory. Leaders need to offer guidance, course and motivation for followers; to assist define and make clear dreams; and triumph over limitations. Within the protection education method, the chief focus conversation on reaching goals and meeting the socio-emotional desires of followers (Grill and Nielsen, 2019) Advantageous safety leadership provides comments so that leaders are concerned in making plans, coordinating, modeling, and monitoring. The training and mentoring method is part of the management system (Nugroho, et al., 2022). Schooling/educational sports are needed to fulfill/increase expertise and protection talents and fulfil fulfill works requirements (Ani and Prabu Aji, 2023).

The advantage of research using SEM-SMARTPLS analysis is that it makes it easier to test the direct and indirect relationship between safety leadership and safety climate variables on safety performance. Research shows that safety leadership and safety climate are antecedents of safety performance according to Wu et al.'s model. (2008) which can be applied to East Kalimantan heavy equipment companies. This study has two limitations that need to be noted. First, this research only covers one heavy equipment company in East Kalimantan, so its external validity may be limited. The application of the conclusions of this research to other heavy equipment companies or in different locations requires further analysis. Second, the research respondents are all staff level workers up to service, parts and safety department management, which is a smaller number compared to new workers and manual laborers or operators who may have different interactions and perceptions of safety with staff and management. Therefore, the conclusions in this paper should not be generalized to employee groups other than staff to service, parts and safety department management.

CONCLUSION

There may be a high-quality effect of safety leadership at the safety climate of East Kalimantan heavy equipment company employees. There is an advantageous effect of safety climate and safety leadership on the safety performance. Both variables have an impact on the safety performance of East Kalimantan heavy equipment company employees.

Companies need to strengthen safety leadership by ensuring leaders practice a transformational leadership style to improve the safety climate by increasing employee safety commitment. Some action can be taken to optimize safety performance after an accident/emergency such as analysis of training needs, outreach/training/Focus Group Discussion/ Behavior Based Safety to discuss lessons to learn from the incident, review risk management if there are changes in procedures or work processes that cause additional or new risks, and emergency recovery plan. Future research could include safety motivation and safety knowledge variables which might also influence employee safety performance at East Kalimantan heavy equipment companies

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None.

Author Contributions

MYP: conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, roles/writing-original draft, writing-review & editing. TM: thesis advisor lecturer

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