www.bircu-journal.com/index.php/birci
Budapest International Research and Critics Institute-Journal (BIRCI-Journal)
Humanities and Social Sciences
ISSN 2615-3076 Online)
ISSN 2615-1715 (Print)
Budapest Institute

The Analysis of Leadership and Safety Behavior towards Safety Culture through Safety Climate

Ahmad Taufiq[1], Nila Krisnawati Hidayat[2], Firdaus Basbeth[3]
[1,2,3]*Master's Program in Master of Business Administration, Swiss German University*
ahmad.taufiq@student.sgu.ac.id, nila.hidayat@sgu.ac.id, firdaus.basbeth@ipmi.ac.id

Abstract

Safety culture is a core value that must be owned by the company. However, a systematic review of the factors that mediate the formation of a safety culture is rarely discussed. The purpose of this study is to investigate the relationship between leadership, safety behavior, and safety climate in the formation of a safety culture in the mining industry, especially in the heavy equipment sector. The type of research used is quantitative research through surveys using the mono method. The survey was conducted in a one-shot/crossectional manner at all levels of leaders consisting of Managers, Dept heads, Supervisors, Leaders, and OHS practitioners spread over 5 different areas. This study found that safety climate had the greatest influence factor in building a safety culture (36%), followed by leadership (35%) and safety behavior (29%). Moreover, the norm behavior group is the biggest contributor in building a safety culture in the mining industry. In conclusion, a systematic review study is expected to increase the level of safety culture, all stakeholders have a role in providing a better understanding of safety culture to reduce mining accidents in the future.

Keywords
leadership; safety behavior; safety climate; safety culture

I. Introduction

Mining is one of the most dangerous industries in the world (J. Chen et al., 2015). With the running of operations causing accidents both to humans and equipment, so that controls are needed to manage health and safety at work in mining as well as mitigate existing risks, the scale of mining operations will affect the amount of production produced, mining activities are very complex, resulting in risk multi-faceted. The risk of mining activities is the loss of life and disruption of the health of workers. This impact not only affects employees but also impacts the environment (Tubis et al., 2020)

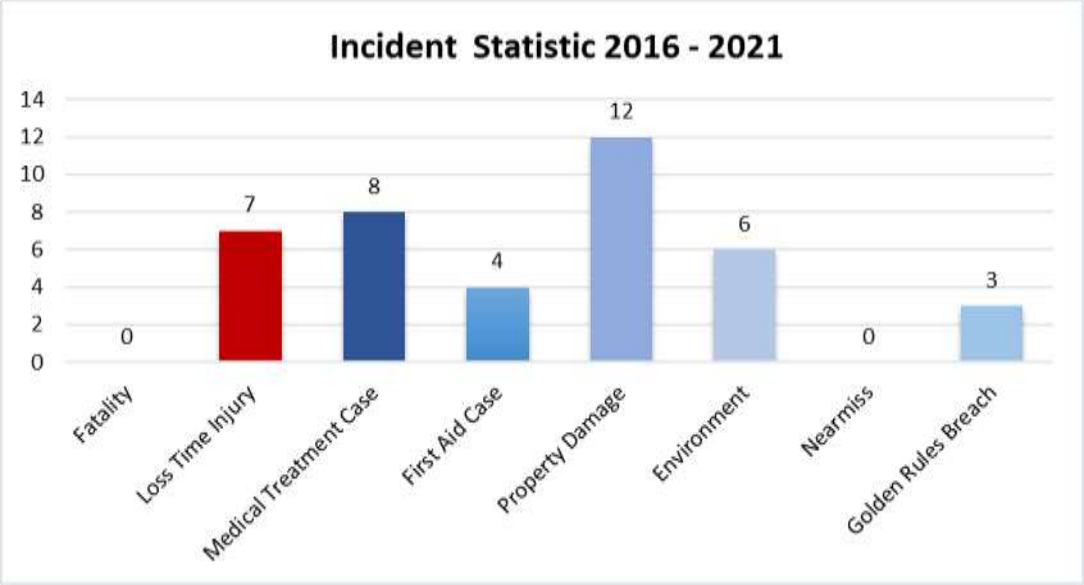
Activity for many community's coal mining activities themselves have several characteristics including capital and technology-intensive, large and specific risks, special equipment, dynamic (hazard and risk of change). Mining activities have hazards that can pose risks to humans and the environment. If these hazards are not controlled, they can cause mining accidents, diseases, and disasters that cause human casualties, and damage to equipment and the environment (Efremenkov et al., 2017).

To achieve the company's goal of achieving effective and efficient mining production targets safely and safely and complying with environmental principles, it is necessary to implement mining occupational health and safety management, Mining Operational Safety, and environment management as well as possible by applicable procedures and regulations (Liu & Li, 2014).

DOI: *https://doi.org/10.33258/birci.v5i3.6902*

Mining accidents reported by type of accident include mechanical failure (32 cases), poor safety management (19 cases), and supervisory leadership behavior (18 cases). Use of technology (21 cases), training (14 cases) and increased supervision (12 cases) (Noraishah Ismail et al., 2021)

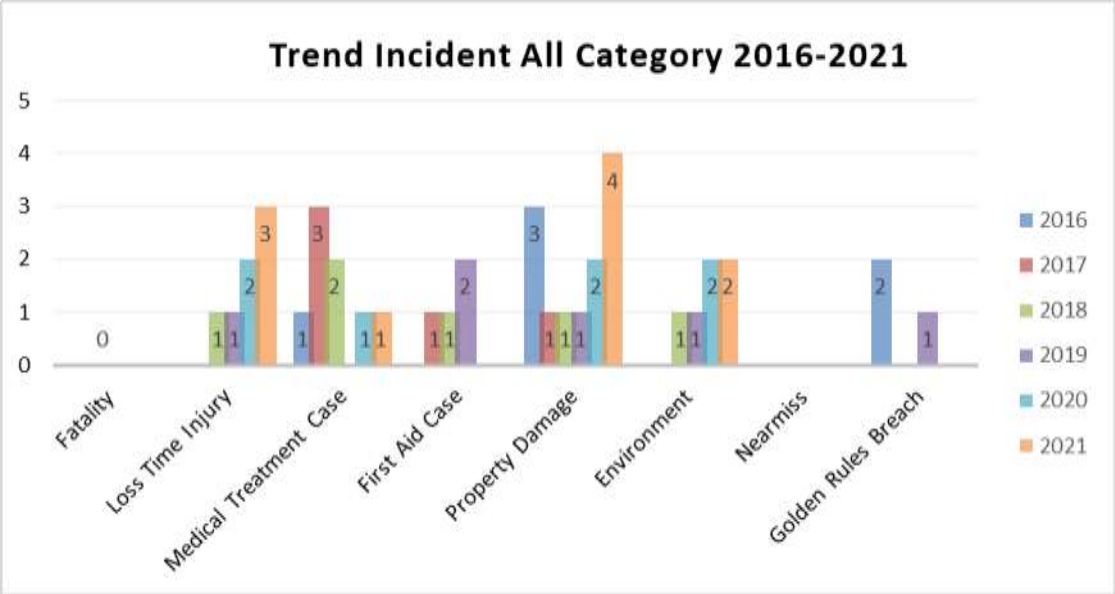
Safety performance in a company describes the performance in managing safety within a certain period, is used in analyzing accidents and determining incident improvement and prevention programs (Nieto et al., 2014). With the progress and development of mining activities accompanied by technological advances and the more intensive use of mining workers, the greater the risk of accidents and environmental destruction. In carrying out its operational activities from 2016-2021 (Fig 1) Leading heavy equipment company in Indonesia which is a distributor of heavy equipment has recorded several incident records, both from the light category to the severe category, never a year can pass without an incident



Source: Internal Report Company
Figure 1. *Incident Statistic*

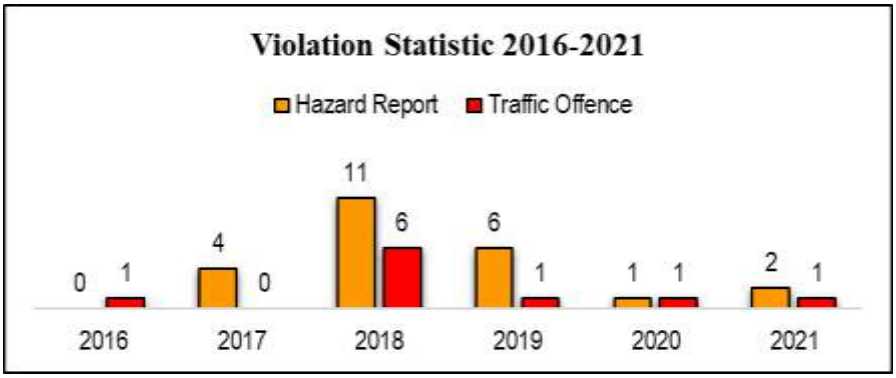
Based on the data presented, The number of accidents for the previous 5 years resulting in Lost time injury is very high and occurs every year with a total 7 cases, of course cannot be tolerated and is a pretty bad record for our safety performance, followed by property damage with a total 12 cases, medical treatment Injury with a total 8 cases, environment with a total 6 cases, first aid with a total 4 cases and golden rules with a total 3 cases, but we cannot capture near miss during that period, whether it really did not happen or there were no reports of nearmiss happening to workers to the supervisor. Meanwhile, management has set the incident threshold that is applied, which is 0 incidents for all categories every year.

A detailed explanation based on the increase in the number of accidents per case during 2016-2021 can be seen in (Fig 2)



Source: Internal Report Company
Figure 2. *Trend Incident, All Category*

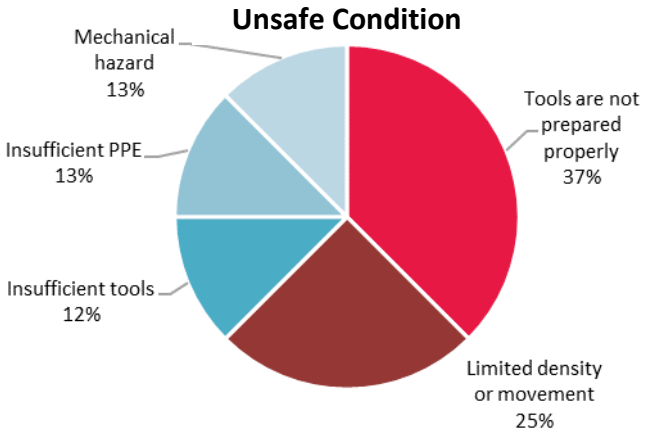
This is of course contrary to the number of violations committed by employees in the 2016-2021 period as many as 34 violations, both violations found by internal parties and violations found by customers (Fig 3).



Source: Internal Report Company
Figure 3*. Violation Statistic*

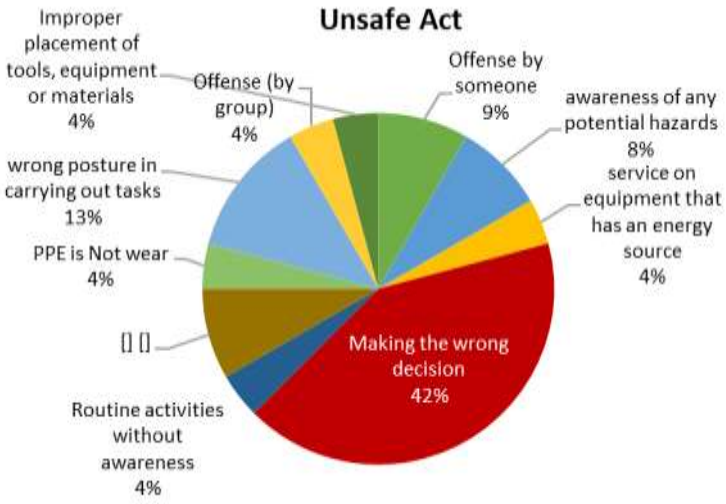
The direct cause of the accident consists of 2 factors including the direct cause and the basic cause, the direct cause is what drives the incident. (Unsafe conditions and unsafe acts), the underlying cause is what events occurred to contribute to the direct cause of the incident (personal factors and occupational factors) (Morrish, 2017).

The use of tools that are not properly prepared is the highest contributing factor of 37% or 3 cases of unsafe conditions, followed by limited density or movement of 25% or 2 cases (Fig 4), in heavy equipment maintenance activities this is a basic thing which must be properly planned and prepared in advance by workers or supervisors



Source: Internal Report Company
***Figure 4**. Direct Cause, Unsafe Condition*

Cumulatively, making wrong decisions is the highest contributor to unsafe acts by 42% or 10 cases, and the second highest contributorthe is wrong posture in carrying out takes by 13% or 3 cases (Fig 5)

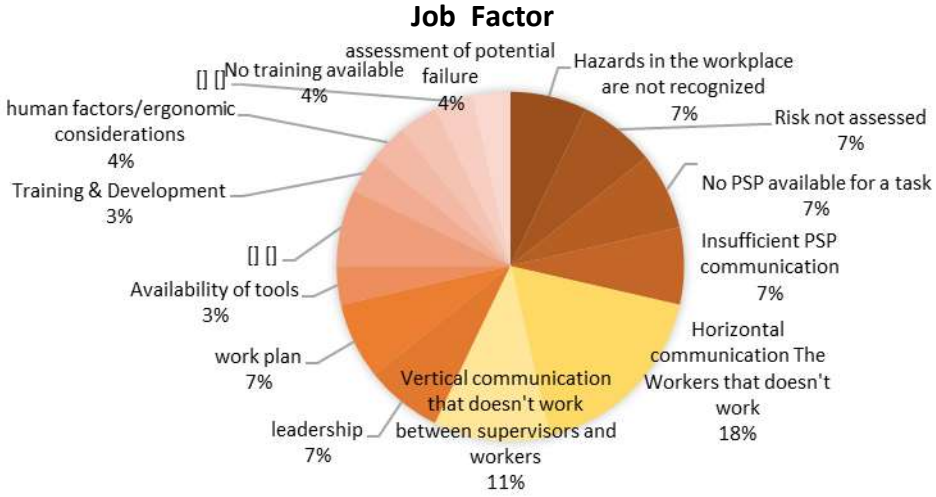


Source: Internal Report Company
***Figure 5**. Direct Cause, Unsafe Condition*

Top 3 based on incident analysis based on personal factors in the first order safe behavior are not identified by 32% or 6 cases, Improper aggressive attitude by 21% or 4 cases, The rush the employee implies 11% or 2 cases (Fig 6)

Source: Internal Report Company
***Figure 6**. Basic Cause, Personal Factor*

The last cause of accidents is work factors, apart from personal factors, work factors also contribute to incidents, in the first place the largest contributor is Horizontal communication The Workers that don't work by 18% or 5 cases, second place is Vertical communication that doesn't work. t work between supervisors and workers is 11% or 3 cases (Fig 7).



Source: Internal Report Company
***Figure 7.** Basic Cause, Job Factor*

Looking at the analysis described above based on the trend of incidents that occurred during 2016-2021, we see that there is a very basic problem in Leading heavy equipment company in Indonesia, literate by the low safety culture that is directly related to leadership and safety behavior of employees, even though they are in the same concession area. the degree to which a safety culture is implemented is very different at the company, subcontractor, or departmental level.

Based on the achievement of safety performance above, we also measure the Safety culture maturity level which involves all employees with various positions and tenures spread over 5 different locations to measure the extent to which the level of safety culture maturity is contrasted with the typical level of maturity within the same industry.

Source: Internal Report Company

Figure 8. *Safety culture maturity level*

The level of a company's safety culture describes the level of organizational culture, generally being an important and fundamental part of the organization in managing aspects directly related to safety management in its operations (Zhang et al., 2020). based on the survey that has been carried out, it is concluded that the average safety culture maturity level in the mining industry, especially in the heavy equipment sector is 3.6 or at the compliant level, while the safety culture of Leading heavy equipment company in Indonesia is at 2.8 or the reactive level.

Safety climate according to some researchers is influenced by safety behavior (H. Chen et al., 2021; Newaz et al., 2019; Zhou & Jiang, 2015), Safety commitment of top management, and supervisors have a direct influence on the safety commitment of colleagues which has an impact on the creation of positive safety behavior in the workplace (Schwatka & Rosecrance, 2016), safety climate has an important function in creating a safety behavior in the workplace, especially when workers are in a high-risk environment (Renecle et al., 2021).

II. Review of Literature

This chapter will be discussing the literature review of the constructs used in this research. Figure 2.1 illustrates the theoretical framework applied in this study.

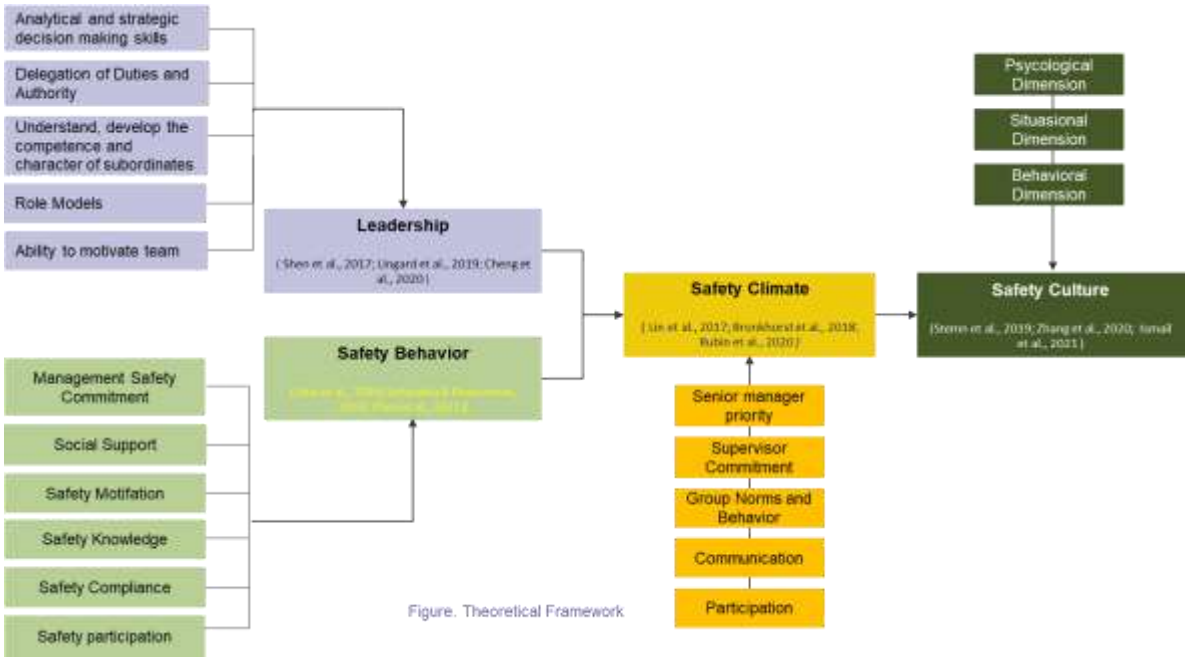


Figure 9. *Theoretical Framework*

The theory of safety culture firstly established by (IAEA, 1991) The latest study explains safety culture has a strong relationship on safety climate (Rubin et al., 2020) and Leadership (Grinerud et al., 2021) . Other researcher describes safety culture has a positive relationship on safety behavior (Y. Li et al., 2019).

2.1 Leadership

Leadership in an organization emerges as an important influence on the outcome of employee relations (Men & Jiang, 2016). Leadership is an important element of an organization. The leaders create trust and willingness of their subordinates to achieve the organization's vision and mission. Leadership has a direct relationship with the ability to influence people (Vujić et al., 2019). Analysis of organizational culture in a company has been carried out so far as a basis for evaluating leadership effectiveness (Latta, 2020).

2.2 Safety Behavior

The results of Heinrich's research (1985) form the basis for the theory of the causes of accidents which show that more than 80% of accidents are caused by unsafe behavior from humans, the rest is contributed by unsafe conditions in the work environment. Safety behavior in the mining industry is strongly Influenced by management's commitment to safety, social support, production pressure, and personal characteristics including knowledge and motivation about safety (Guo et al., 2016).

2.3 Safety Climate

The safety climate in an organization describes the psychological environment that provides motivation for safety behavior in defining employees' perceptions of policies, practices and procedures that signify the value and importance of safety in the workplace, acting as a framework for group norms, attitudes and individual behavior. (Fugas et al., 2012). The intervention carried out by the leader in showing a positive attitude in the changes made to daily procedures relevant to the aspects of safety and health is one of the most effective strategies in improving the safety climate (Bronkhorst et al., 2018).

2.4 Safety Culture

Safety culture is something that is created into a unity of values, norms and basic beliefs, which are implemented to all members of the organization through social interactions, both among fellow workers or workers with the organization (Yorio et al., 2019). Measuring safety culture at the organizational level is the first step in the Steps used in building a safety culture, it will make workers aware of the elements of safety culture by explaining the advantages and disadvantages of implementing a safety culture and increasing the level for the better (Jiang et al., 2020)

III. Research Method

The type of research used is quantitative research through surveys using mono method, the purpose of this research is to find out which important variables are used as references in improving safety culture through leadership factors & safety behavior by using safety climate as a mediating variable can significantly or precisely affect the formation and improvement of safety culture in an organization, which can affect the company in improving safety performance and will re-test with different evaluators on the basic theory & previous research (Mokarami et al., 2019).

IV. Result and Discussion

The results showed that there were seven hypotheses that had been developed at the beginning of the research that were built into the conceptual framework, from the seven hypotheses obtained correlations between variables including 6 hypotheses that had a significant correlation while there was 1 hypothesis that had no correlation. Each hypothesis will be detailed as follows.

4.1 Leadership and Safety Culture

The leadership strategy will affect the organization's capacity to create a positive safety culture (Grinerud et al., 2021), The positive impact of safety leadership on the organization needs to be implemented as soon as possible (Sudiarno & Ambarwati, n.d.) the direct effect t-statistic value between leadership and safety culture is 1983, indicating that there is a positive correlation between the inner models, to increase safety culture maturity level, it must be preceded by leadership from a leader, a leader must be a role model (KD3) for their subordinates in creating a safety culture. The majority of the leader's educational background are vocational high school graduates, this is also an influence on how to lead a leader.

4.2 Leadership and Safety Climate

Transformational leadership style very suitable to be applied in coal mines in the formation of a safety climate (Du & Sun, 2012), Leadership have the greatest influence on safety climate (Lingard et al., 2019). the direct effect t-statistic value between leadership and safety climate is 2,703, indicating that there is a positive correlation between the inner models, to increase workers' understanding of safety climate, it must be preceded by leadership from a leader, with the creation of a safety climate in an organization, it will grow group norms and behavior (ID3).

4.3 Safety Behavior and Safety Climate

Safety climate is a commitment that comes from top management, supervisors to provide understanding to workers on safety which has a positive impact on safety behavior (Schwatka & Rosecrance, 2016), Safety behavior have the greatest influence on safety climate (Renecle et al., 2021). The direct effect t-statistic value between safety behavior and safety climate is 3350, indicating that there is a positive correlation between the inner models, in creating a safety climate in an organization begins with the formation of safety behavior, the formation of safety behavior is influenced by the safety knowledge of workers (PD 4)

4.4 Safety Behavior and Safety Culture

Safety culture is very important in an organization to ensure an ideal safety climate, excellent safety behavior from employees and acceptable safety motivation (Al-Bayati, 2021), Safety behavior have the greatest influence on safety climate (Cui et al., 2013).

The direct effect t-statistic value between safety behavior and safety culture is 1974, indicating that there is a positive correlation between the inner models, in creating a safety culture in an organization begins with the formation of safety behavior, the formation of safety behavior has an impact on the behavioral dimension (BD 3)

4.5 Safety Climate and Safety Culture

Safety climate have the greatest influence on safety culture (Lin et al., 2017), safety culture and safety climate are the basis that miners use in risk-taking behavior (Rubin et al., 2020). The direct effect t-statistic value between safety climate and safety culture is 1972, indicating that there is a positive correlation between the inner models, the first step in establishing a safety culture in an organization is the formation of a safety climate, group norm behavior (ID 4) directly affects the behavior dimensions of workers (BD 3)

4.6 Safety Climate, Leadership and Safety Culture

In order to achieve improvements in the safety behavior of employees through higher levels of supervisory leadership, a good group safety climate is an essential condition (Kapp, 2012). Safety climate come form of commitment from management to occupational health and safety, mediating role in the formation of a safety culture through the leadership role of employees (Draghici et al., 2022), t-statistics 1992 can be stated that the safety climate mediates the influence of leadership on safety culture. When a leader becomes a role model in the organization, he will influence his subordinates in shaping safety behavior through group norm behavior interventions

4.7 Safety Climate, Safety Behavior and Safety Culture

Safety climate is able to strengthen understanding of the implementation of worker safety behavior in supporting the formation of a safety culture (Rafique et al., 2021).

safety climate and safety behavior in the workplace related to the occurrence of work accidents, Improving the safety climate and safety behavior can reduce the number of work accidents in the workplace (X. Liu et al., 2015)t-statistics 1.421 can be stated that the safety climate does not mediate the effect of safety behavior on safety culture. so that the safety climate is more dominant in mediating the influence of leadership on safety culture.

4.8 Research Contribution

This study enriches the literature on the correlation between the constructs used and as a model to link Leadership, safety behavior, Safety Climate with safety culture. The findings of this study are used to fill and answer gaps and support theoretical ideas from several previous studies and most importantly contribute to organizations and industry, especially in mining and heavy equipment.

4.9 Theoretical Contribution

This study provides theoretical contributions related to the concept and correlation between leadership construction, safety behavior in supporting the creation of a safety climate that influences the formation of a safety culture in the heavy equipment industry.

The First, this study examines the relationship between leadership and safety culture. This confirms that leadership has a positive relationship to safety culture.

The Second, this study examines the relationship between leadership and safety climate. This confirms that leadership has a positive relationship to safety climate.

The Third, this study examines the relationship between safety behavipr and safety climate. This confirms that safety behavior has a positive relationship to safety climate.

Fourth, this study examines the relationship between safety behavior and safety culture. This confirms and emphasizes that safety behavior has a positive relationship with safety culture.

Fifth, this study examines the relationship between safety climate and safety culture. This confirms and emphasizes that safety climate has a positive relationship with safety culture.

Sixth, this study examines the relationship between safety climate, leadership and safety culture. This confirms and emphasizes that the safety climate will positively mediate the influence of Leadership on the safety culture.

Lastly, this study examines the relationship between safety climate, safety behavior and safety culture. This confirms and emphasizes that the safety climate will positively mediate the influence of safety behavior on the safety culture.

V. Conclusion

Based on the research that has been done, it can be concluded that the formation of a safety culture in Leading heavy equipment company in Indonesia is strongly influenced by leadership, safety behavior, and safety climate,

In creating a safety culture at Leading heavy equipment company in Indonesia, the most important thing to do is to strengthen the leadership factor for all levels of supervisors in the department, with an emphasis that a leader must be a role model for his subordinates, especially in the safety aspect, the composition of an ideal leader with workers sometimes becomes an obstacle in implementing safety and occupational health safe operation.

After the establishment of leadership implementation at the departmental level in all work areas, it will directly shape the safety behavior of workers. safety behavior is a necessity for workers in carrying out operational activities, safe operation demands are a priority for all levels of workers, the formation of safety behavior for workers can be done by providing safety knowledge through various processes including induction, training, inspection, direct observation. by supervisors, behavioral observations of workers can be done by providing direct feedback when finding unsafe behavior and providing immediate repairs on the spot, as well as giving direct appreciation to workers when carrying out

safety behavior in their work processes, so that trust arises between leaders and subordinates in fostering safety behavior. on workers.

The last, after creating safety behavior by workers, it will stimulate the formation of a safety climate that describes workers' perceptions of management attitudes such as policies, procedures and work practices related to the implementation of work safety in the work environment. Management involvement is the key in establishing a safety climate in the organization, with a good safety climate it will create a group norm of behavior.

Safety climate mediates the relationship between safety behavior and safety culture, safety climate provides information to employees regarding safety priorities during the production process based on risk analysis. A positive safety climate will increase the frequency of safety behavior among workers, when safety behavior among workers can be implemented properly it will support group behavior to be able to implement safety behavior which in the end is productivity. The relationship between variables in the formation of a safety culture can be concluded that:

1. Leadership has a positive effect to safety culture
2. Leadership has a positive effect to safety climate
3. Safety behavior has a positive effect to safety climate
4. Safety behavior has a positive effect to safety culture
5. Safety climate has a positive effect to safety culture
6. Safety climate will positively mediate the influence of leadership on the safety culture
7. Safety climate not mediate the influence of safety behavior on the Safety culture

Based on the explanation above, it is very clear that the formation of a safety culture at Leading heavy equipment company in Indonesia begins with the process of forming employee leadership, then the formation of safety behavior among workers and the last is the formation of a safety climate among workers. In establishing a safety culture in the workplace, all levels of supervisors and workers have the same role, all must be proactive, agile, and adaptive to internal or external factors that affect the formation of a safety culture in the organization.

References

Akossou, A., Akossou, A. Y. J., & Palm, R. (2013). Impact of Data Structure on the Estimators R-Square And Adjusted R-Square in Linear Regression. https://www.researchgate.net/publication/289526309

Al-Bayati, A. J. (2021). Impact of construction safety culture and construction safety climate on safety behavior and safety motivation. Safety, 7(2). https://doi.org/10.3390/SAFETY7020041

Al-Refaie, A., Mukattash, S., & Al-Durgham, L. (2016). EXAMINING THE SAFETY PERFORMANCE AND SAFETY BEHAVIOR IN A NUCLEAR POWER PLANT USING STRUCTURAL EQUATION MODELING. Journal of Nature Science and Sustainable Technology, 10(3).

Association for Computing Machinery. Special Interest Group on Information Retrieval. (2013). SIGIR '13 : the proceedings of the 36th International ACM SIGIR Conference on Research & Development in Information Retrieval : July 28-August 1, 2013, Dublin, Ireland. ACM.

Association for Global Business. (1991). Journal of global business : JGB. 11(September), volumes.

Bonett, D. G., & Wright, T. A. (2015a). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning. Journal of Organizational Behavior,

36(1), 3–15. https://doi.org/10.1002/job.1960
Bonett, D. G., & Wright, T. A. (2015b). Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning. Journal of Organizational Behavior, 36(1), 3–15. https://doi.org/10.1002/job.1960
Boyle, E., Cassidy, J. D., & Côté, P. (2019). Determining the reliability and convergent validity of a return-to-work status questionnaire. Work, 63(1), 69–80. https://doi.org/10.3233/WOR-192909
Bronkhorst, B., Tummers, L., & Steijn, B. (2018). Improving safety climate and behavior through a multifaceted intervention: Results from a field experiment. Safety Science, 103, 293–304. https://doi.org/10.1016/j.ssci.2017.12.009
Cepeda-Carrion, G., Cegarra-Navarro, J. G., & Cillo, V. (2019). Tips to use partial least squares structural equation modelling (PLS-SEM) in knowledge management. In Journal of Knowledge Management (Vol. 23, Issue 1, pp. 67–89). Emerald Group Holdings Ltd. https://doi.org/10.1108/JKM-05-2018-0322
Chen, H., Li, H., & Goh, Y. M. (2021a). A review of construction safety climate: Definitions, factors, relationship with safety behavior and research agenda. Safety Science, 142. https://doi.org/10.1016/j.ssci.2021.105391
Chen, H., Li, H., & Goh, Y. M. (2021b). A review of construction safety climate: Definitions, factors, relationship with safety behavior and research agenda. Safety Science, 142. https://doi.org/10.1016/j.ssci.2021.105391
Chen, J., Li, K., Chang, K. J., Sofia, G., & Tarolli, P. (2015). Open-pit mining geomorphic feature characterisation. International Journal of Applied Earth Observation and Geoinformation, 42, 76–86. https://doi.org/10.1016/j.jag.2015.05.001
Cheng, L., Guo, H., & Lin, H. (2020). The influence of leadership behavior on miners' work safety behavior. Safety Science, 132. https://doi.org/10.1016/j.ssci.2020.104986
Copuš, L., Šajgalíková, H., & Wojčák, E. (2019). Organizational Culture and its Motivational Potential in Manufacturing Industry: Subculture Perspective. Procedia Manufacturing, 32, 360–367. https://doi.org/10.1016/j.promfg.2019.02.226
Corrigan, S., Kay, A., Ryan, M., Ward, M. E., & Brazil, B. (2019). Human factors and safety culture: Challenges and opportunities for the port environment. Safety Science, 119, 252–265. https://doi.org/10.1016/j.ssci.2018.03.008
Cui, L., Fan, D., Fu, G., & Zhu, C. J. (2013). An integrative model of organizational safety behavior. Journal of Safety Research, 45, 37–46. https://doi.org/10.1016/j.jsr.2013.01.001
Draghici, A., Dursun, S., Bașol, O., Boatca, M. E., & Gaureanu, A. (2022). The Mediating Role of Safety Climate in the Relationship between Transformational Safety Leadership and Safe Behavior—The Case of Two Companies in Turkey and Romania. Sustainability, 14(14), 8464. https://doi.org/10.3390/su14148464
Du, X., & Sun, W. (2012). Research on the relationship between safety leadership and safety climate in coalmines. Procedia Engineering, 45, 214–219. https://doi.org/10.1016/j.proeng.2012.08.146
Efremenkov, A. B., Khoreshok, A. A., Zhironkin, S. A., & Myaskov, A. v. (2017). Coal Mining Machinery Development As An Ecological Factor of Progressive Technologies Implementation. IOP Conference Series: Earth and Environmental Science, 50(1). https://doi.org/10.1088/1755-1315/50/1/012009
Fugas, C. S., Silva, S. A., & Meliá, J. L. (2012). Another look at safety climate and safety behavior: Deepening the cognitive and social mediator mechanisms. Accident Analysis and Prevention, 45, 468–477. https://doi.org/10.1016/j.aap.2011.08.013

Grinerud, K., Aarseth, W. K., & Robertsen, R. (2021a). Leadership strategies, management decisions and safety culture in road transport organizations. Research in Transportation Business and Management, 41. https://doi.org/10.1016/j.rtbm.2021.100670

Grinerud, K., Aarseth, W. K., & Robertsen, R. (2021b). Leadership strategies, management decisions and safety culture in road transport organizations. Research in Transportation Business and Management, 41. https://doi.org/10.1016/j.rtbm.2021.100670

Guo, B. H. W., Yiu, T. W., & González, V. A. (2016). Predicting safety behavior in the construction industry: Development and test of an integrative model. Safety Science, 84, 1–11. https://doi.org/10.1016/j.ssci.2015.11.020

Hagge, M., McGee, H., Matthews, G., & Aberle, S. (2017). Behavior-Based Safety in a Coal Mine: The Relationship Between Observations, Participation, and Injuries Over a 14-Year Period. Journal of Organizational Behavior Management, 37(1), 107–118. https://doi.org/10.1080/01608061.2016.1236058

Hair, J. F., Sarstedt, M., Hopkins, L., & Kuppelwieser, V. G. (2014). Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research. In European Business Review (Vol. 26, Issue 2, pp. 106–121). Emerald Group Publishing Ltd. https://doi.org/10.1108/EBR-10-2013-0128

Hamed Taherdoost, A., & Lumpur, K. (2016). Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research. In International Journal of Academic Research in Management (IJARM) (Vol. 5, Issue 3). https://ssrn.com/abstract=3205040

Hecker, S., & Goldenhar, L. (2014). Understanding Safety Culture and Safety Climate in Construction: Existing Evidence and a Path Forward.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Ismail, S. N., Ramli, A., & Aziz, H. A. (2021). Influencing factors on safety culture in mining industry: A systematic literature review approach. Resources Policy, 74. https://doi.org/10.1016/j.resourpol.2021.102250

Jiang, W., Fu, G., Liang, C. yang, & Han, W. (2020a). Study on quantitative measurement result of safety culture. Safety Science, 128. https://doi.org/10.1016/j.ssci.2020.104751

Jiang, W., Fu, G., Liang, C. yang, & Han, W. (2020b). Study on quantitative measurement result of safety culture. Safety Science, 128. https://doi.org/10.1016/j.ssci.2020.104751

Kapp, E. A. (2012). The influence of supervisor leadership practices and perceived group safety climate on employee safety performance. Safety Science, 50(4), 1119–1124. https://doi.org/10.1016/j.ssci.2011.11.011

Kock, N., & Mayfield, M. (2015). PLS-based SEM Algorithms: The Good Neighbor Assumption, Collinearity, and Nonlinearity. In Information Management and Business Review (Vol. 7, Issue 2).

Latta, G. F. (2020). A complexity analysis of organizational culture, leadership and engagement: integration, differentiation and fragmentation. International Journal of Leadership in Education, 23(3), 274–299. https://doi.org/10.1080/13603124.2018.1562095

Li, J., Li, Y., & Liu, X. (2015). Development of a Universal Safety Behavior Management

System for Coal Mine Workers. In Iran J Public Health (Vol. 44, Issue 6). http://ijph.tums.ac.ir

Li, Y., Wu, X., Luo, X., Gao, J., & Yin, W. (2019). Impact of safety attitude on the safety behavior of coal miners in China. Sustainability (Switzerland), 11(22). https://doi.org/10.3390/su11226382

Lin, S. C., Mufidah, I., & Persada, S. F. (2017a). Safety-culture exploration in Taiwan's metal industries: identifying theworkers' background influence on safety climate. Sustainability (Switzerland), 9(11). https://doi.org/10.3390/su9111965

Lin, S. C., Mufidah, I., & Persada, S. F. (2017b). Safety-culture exploration in Taiwan's metal industries: identifying theworkers' background influence on safety climate. Sustainability (Switzerland), 9(11). https://doi.org/10.3390/su9111965

Lingard, H., Zhang, R. P., & Oswald, D. (2019a). Effect of leadership and communication practices on the safety climate and behaviour of construction workgroups. Engineering, Construction and Architectural Management, 26(6), 886–906. https://doi.org/10.1108/ECAM-01-2018-0015

Lingard, H., Zhang, R. P., & Oswald, D. (2019b). Effect of leadership and communication practices on the safety climate and behaviour of construction workgroups. Engineering, Construction and Architectural Management, 26(6), 886–906. https://doi.org/10.1108/ECAM-01-2018-0015

Liu, Q. L., & Li, X. C. (2014). Modeling and evaluation of the safety control capability of coal mine based on system safety. Journal of Cleaner Production, 84(1), 797–802. https://doi.org/10.1016/j.jclepro.2013.11.048

Liu, X., Huang, G., Huang, H., Wang, S., Xiao, Y., & Chen, W. (2015). Safety climate, safety behavior, and worker injuries in the Chinese manufacturing industry. Safety Science, 78, 173–178. https://doi.org/10.1016/j.ssci.2015.04.023

May, N. C., Batiz, E. C., & Martinez, R. M. (2019). Assessment of leadership behavior in occupational health and safety. Work, 63(3), 405–413. https://doi.org/10.3233/WOR-192946

Men, L. R., & Jiang, H. (2016). Cultivating Quality Employee-Organization Relationships: The Interplay among Organizational Leadership, Culture, and Communication. International Journal of Strategic Communication, 10(5), 462–479. https://doi.org/10.1080/1553118X.2016.1226172

Mokarami, H., Alizadeh, S. S., Rahimi Pordanjani, T., & Varmazyar, S. (2019). The relationship between organizational safety culture and unsafe behaviors, and accidents among public transport bus drivers using structural equation modeling. Transportation Research Part F: Traffic Psychology and Behaviour, 65, 46–55. https://doi.org/10.1016/j.trf.2019.07.008

Morrish, C. (2017). Incident prevention tools–incident investigations and pre-job safety analyses. International Journal of Mining Science and Technology, 27(4), 635–640. https://doi.org/10.1016/j.ijmst.2017.05.009

Nævestad, T. O., Phillips, R. O., Størkersen, K. v., Laiou, A., & Yannis, G. (2019). Safety culture in maritime transport in Norway and Greece: Exploring national, sectorial and organizational influences on unsafe behaviours and work accidents. Marine Policy, 99, 1–13. https://doi.org/10.1016/j.marpol.2018.10.001

Naji, G. M. A., Isha, A. S. N., Mohyaldinn, M. E., Leka, S., Saleem, M. S., Rahman, S. M. N. B. S. A., & Alzoraiki, M. (2021). Impact of safety culture on safety performance; mediating role of psychosocial hazard: An integrated modelling approach. International Journal of Environmental Research and Public Health, 18(16). https://doi.org/10.3390/ijerph18168568

Newaz, M. T., Davis, P., Jefferies, M., & Pillay, M. (2019). The psychological contract: A missing link between safety climate and safety behaviour on construction sites. Safety Science, 112, 9–17. https://doi.org/10.1016/j.ssci.2018.10.002

Nieto, A., Gao, Y., Grayson, L., & Fu, G. (2014). A comparative study of coal mine safety performance indicators in China and the USA. International Journal of Mining and Mineral Engineering, 5(4), 299–314. https://doi.org/10.1504/IJMME.2014.066578

Noraishah Ismail, S., Ramli, A., & Abdul Aziz, H. (2021). Research trends in mining accidents study: A systematic literature review. Safety Science, 143. https://doi.org/10.1016/j.ssci.2021.105438

Petitta, L., Probst, T. M., Barbaranelli, C., & Ghezzi, V. (2017a). Disentangling the roles of safety climate and safety culture: Multi-level effects on the relationship between supervisor enforcement and safety compliance. Accident Analysis and Prevention, 99, 77–89. https://doi.org/10.1016/j.aap.2016.11.012

Petitta, L., Probst, T. M., Barbaranelli, C., & Ghezzi, V. (2017b). Disentangling the roles of safety climate and safety culture: Multi-level effects on the relationship between supervisor enforcement and safety compliance. Accident Analysis and Prevention, 99, 77–89. https://doi.org/10.1016/j.aap.2016.11.012

Rafique, M., Ahmed, S., & Ismail, M. (2021). Impact of Safety Climate on Safety Behaviour in Construction Projects: Mediating Mechanism and Interacting Effect. Journal of Construction in Developing Countries, 26(2), 163–181. https://doi.org/10.21315/jcdc2021.26.2.8

Renecle, M., Curcuruto, M., Gracia Lerín, F. J., & Tomás Marco, I. (2021). Enhancing safety in high-risk operations: A multilevel analysis of the role of mindful organising in translating safety climate into individual safety behaviours. Safety Science, 138. https://doi.org/10.1016/j.ssci.2021.105197

Rubin, M., Giacomini, A., Allen, R., Turner, R., & Kelly, B. (2020a). Identifying safety culture and safety climate variables that predict reported risk-taking among Australian coal miners: An exploratory longitudinal study. Safety Science, 123. https://doi.org/10.1016/j.ssci.2019.104564

Rubin, M., Giacomini, A., Allen, R., Turner, R., & Kelly, B. (2020b). Identifying safety culture and safety climate variables that predict reported risk-taking among Australian coal miners: An exploratory longitudinal study. Safety Science, 123. https://doi.org/10.1016/j.ssci.2019.104564

Schwatka, N. v., & Rosecrance, J. C. (2016a). Safety climate and safety behaviors in the construction industry: The importance of co-workers commitment to safety. Work, 54(2), 401–413. https://doi.org/10.3233/WOR-162341

Schwatka, N. v., & Rosecrance, J. C. (2016b). Safety climate and safety behaviors in the construction industry: The importance of co-workers commitment to safety. Work, 54(2), 401–413. https://doi.org/10.3233/WOR-162341

Senjaya, V., & Anindita, R. (2020). The Role of Transformational Leadership and Organizational Culture towards Organizational ... 767 JAM 18, 4 Indexed in Google Scholar THE ROLE OF TRANSFORMATIONAL LEADERSHIP AND ORGANIZATIONAL CULTURE TOWARDS ORGANIZATIONAL COMMITMENT THROUGH JOB SATISFACTION AMONG MINING INDUSTRY EMPLOYEES. Journal of Applied Management (JAM), 18(4). https://doi.org/10.21776/ub.jam.2020.018.04.15

Shen, Y., Ju, C., Koh, T. Y., Rowlinson, S., & Bridge, A. J. (2017). The impact of transformational leadership on safety climate and individual safety behavior on construction sites. International Journal of Environmental Research and Public

Health, 14(1). https://doi.org/10.3390/ijerph14010045
Shrestha, N. (2021). Factor Analysis as a Tool for Survey Analysis. American Journal of Applied Mathematics and Statistics, 9(1), 4–11. https://doi.org/10.12691/ajams-9-1-2
Silla, I., Gracia, F. J., & Peiró, J. M. (2020). Upward voice: Participative decision making, trust in leadership and safety climate matter. Sustainability (Switzerland), 12(9). https://doi.org/10.3390/su12093672
Singh, A. S. (2017). Licensed under Creative Common COMMON PROCEDURES FOR DEVELOPMENT, VALIDITY AND RELIABILITY OF A QUESTIONNAIRE. In International Journal of Economics, Commerce and Management United Kingdom (Issue 5). http://ijecm.co.uk/
Stemn, E., Bofinger, C., Cliff, D., & Hassall, M. E. (2019). Examining the relationship between safety culture maturity and safety performance of the mining industry. Safety Science, 113, 345–355. https://doi.org/10.1016/j.ssci.2018.12.008
Sudiarno, A., & Ambarwati, R. (n.d.). Shaping The Climate and Culture of Safety Through Safety Leadership in Power Plant. http://ssrn.com/link/ITES-2018.html
Tear, M. J., Reader, T. W., Shorrock, S., & Kirwan, B. (2020). Safety culture and power: Interactions between perceptions of safety culture, organisational hierarchy, and national culture. Safety Science, 121, 550–561. https://doi.org/10.1016/j.ssci.2018.10.014
Trizano-Hermosilla, I., & Alvarado, J. M. (2016a). Best alternatives to Cronbach's alpha reliability in realistic conditions: Congeneric and asymmetrical measurements. Frontiers in Psychology, 7(MAY). https://doi.org/10.3389/fpsyg.2016.00769
Trizano-Hermosilla, I., & Alvarado, J. M. (2016b). Best alternatives to Cronbach's alpha reliability in realistic conditions: Congeneric and asymmetrical measurements. Frontiers in Psychology, 7(MAY). https://doi.org/10.3389/fpsyg.2016.00769
Tubis, A., Werbińska-Wojciechowska, S., & Wroblewski, A. (2020). Risk assessment methods in mining industry-A systematic review. In Applied Sciences (Switzerland) (Vol. 10, Issue 15). MDPI AG. https://doi.org/10.3390/app10155172
Vujić, D., Karabašević, D., Maksimović, M., & Novaković, S. (2019). The role of leaders in creating an organizational culture that fosters the concept of preservation the natural resources. Mining and Metallurgy Engineering Bor, 1–2, 61–72. https://doi.org/10.5937/mmeb1902061v
Wakefield, J. G., McLaws, M. L., Whitby, M., & Patton, L. (2010). Patient safety culture: Factors that influence clinician involvement in patient safety behaviours. Quality and Safety in Health Care, 19(6), 585–591. https://doi.org/10.1136/qshc.2008.030700
Wang, B., & Wu, C. (2019). Safety culture development, research, and implementation in China: An overview. In Progress in Nuclear Energy (Vol. 110, pp. 289–300). Elsevier Ltd. https://doi.org/10.1016/j.pnucene.2018.10.002
Xue, M., Al-Turjman, F., & Saravanan, V. (2021). A labor safety performance and involvement of workers in accident reduction and prevention. In Aggression and Violent Behavior. Elsevier Ltd. https://doi.org/10.1016/j.avb.2021.101560
Yorio, P. L., Edwards, J., & Hoeneveld, D. (2019). Safety culture across cultures. In Safety Science (Vol. 120, pp. 402–410). Elsevier B.V. https://doi.org/10.1016/j.ssci.2019.07.021
Yu, K., Cao, Q., Xie, C., Qu, N., & Zhou, L. (2019). Analysis of intervention strategies for coal miners' unsafe behaviors based on analytic network process and system dynamics. Safety Science, 118, 145–157. https://doi.org/10.1016/j.ssci.2019.05.002
Zhang, J., Fu, J., Hao, H., Fu, G., Nie, F., & Zhang, W. (2020a). Root causes of coal mine accidents: Characteristics of safety culture deficiencies based on accident statistics.

Process Safety and Environmental Protection, 136, 78–91. https://doi.org/10.1016/j.psep.2020.01.024

Zhang, J., Fu, J., Hao, H., Fu, G., Nie, F., & Zhang, W. (2020b). Root causes of coal mine accidents: Characteristics of safety culture deficiencies based on accident statistics. Process Safety and Environmental Protection, 136, 78–91. https://doi.org/10.1016/j.psep.2020.01.024

Zhou, F., & Jiang, C. (2015). Leader-member Exchange and Employees' Safety Behavior: The Moderating Effect of Safety Climate. Procedia Manufacturing, 3, 5014–5021. https://doi.org/10.1016/j.promfg.2015.07.671