SAFETY PARTICIPATION ON INDUSTRIAL COMPANY: EMPHASIZE SAFETY LEADERSHIP AND SAFETY CLIMATE WITH SAFETY KNOWLEDGE AS MEDIATION

Aiman Muhamad Bauzir¹
Tri Siwi Agustina²

ABSTRACT

Purpose: This study aims to empirically test how safety participation can be improved through safety leadership, safety climate to foster safety knowledge in employees.

Theoretical Framework: This study uses Omnibearing Leadership Theory to link between variables investigated related to the relationship between safety leadership and safety participation.

Design/methodology/approach: The population in this study is employees of the production department at PT. X. While the samples involved in this study were 707 samples. Online questionnaire using accidental sampling. The questionnaires collected and included in the criteria amounted to 405 respondents.

Finding: The results of the study empirically that safety participation is influenced by safety leadership, safety climate through safety knowledge.

Research, Practical & Social Implication: This research has theoretical implications and practical implications. Theoretically, it can be used as reading material by further researchers, as well as expanding research rules related to the topic of employee safety participation in the company. While practically it can be used as company evaluation material related to the research topic.

Originality, value: This research is different from other research, especially from the conceptual model used, besides that this research was conducted in a chemical company that implements a safety management system.

Keywords: Safety Leadership, Safety Climate, Safety Knowledge, Safety Participation.

PARTICIPAÇÃO DE SEGURANÇA EM EMPRESAS INDUSTRIAIS: ENFATIZAR A LIDERANÇA DE SEGURANÇA E O CLIMA DE SEGURANÇA COM CONHECIMENTO DE SEGURANÇA COMO MEDIAÇÃO

RESUMO

Objetivo: Este estudo visa testar empiricamente como a participação na segurança pode ser melhorada através da liderança em segurança e do clima de segurança para promover o conhecimento sobre segurança nos funcionários.

Referencial Teórico: Este estudo utiliza a Teoria da Liderança Omnibearing para vincular as variáveis investigadas relacionadas à relação entre liderança em segurança e participação na segurança.

Desenho/metodologia/abordagem: A população deste estudo são funcionários do departamento de produção da PT. X. Enquanto as amostras envolvidas neste estudo foram 707 amostras. Questionário online usando amostragem acidental. Os questionários coletados e incluídos nos critérios totalizaram 405 respondentes.

Constatação: Os resultados do estudo mostram empiricamente que a participação na segurança é influenciada pela liderança em segurança, clima de segurança através do conhecimento de segurança.

¹ Irlangga University, Surabaya, East Java, Indonesia. E-mail: aimanbwzr@gmail.com
Orcid: https://orcid.org/0009-0009-6804-4361

² Airlangga University, Surabaya, East Java, Indonesia. E-mail: siwi@feb.unair.ac.id
Orcid: https://orcid.org/0000-0002-7004-002X
PARTICIPACIÓN EN SEGURIDAD EN LA EMPRESA INDUSTRIAL: ENFATIZAR EL LIDERAZGO Y EL CLIMA DE SEGURIDAD CON EL CONOCIMIENTO DE SEGURIDAD COMO MEDIACIÓN

RESUMEN

Propósito: Este estudio tiene como objetivo probar empíricamente cómo se puede mejorar la participación en seguridad a través del liderazgo en seguridad y el clima de seguridad para fomentar el conocimiento sobre seguridad en los empleados.

Marco teórico: este estudio utiliza la teoría del liderazgo omnipresente para vincular las variables investigadas relacionadas con la relación entre el liderazgo en seguridad y la participación en seguridad.

Diseño/metodología/enfoque: La población de este estudio son empleados del departamento de producción de PT. X. Mientras que las muestras involucradas en este estudio fueron 707 muestras. Cuestionario online mediante muestreo accidental. Los cuestionarios recogidos e incluidos en los criterios ascendieron a 405 encuestados.

Hallazgo: Los resultados del estudio empírico indican que la participación en seguridad está influenciada por el liderazgo en seguridad, el clima de seguridad a través del conocimiento en seguridad.

Investigación, implicaciones prácticas y sociales: esta investigación tiene implicaciones teóricas e implicaciones prácticas. En teoría, puede ser utilizado como material de lectura para otros investigadores, así como para ampliar las reglas de investigación relacionadas con el tema de la participación segura de los empleados en la empresa. Si bien prácticamente se puede utilizar como material de evaluación de empresas relacionado con el tema de investigación.

Originalidad, valor: Esta investigación se diferencia de otras investigaciones, especialmente por el modelo conceptual utilizado, además de que esta investigación se realizó en una empresa química que implementa un sistema de gestión de seguridad.

Palabras clave: Liderazgo en Seguridad, Clima de Seguridad, Conocimiento en Seguridad, Participación en Seguridad.

1 INTRODUCTION

Work safety is a top priority in the business world, because when work accidents occur, losses are not only borne by victims, companies also lose productivity and reputation in the industry (Khasanah et al., 2019). Work accidents in the workplace have transparent and
predictable causes to be prevented (Supardi et al., 2021). Tracing the cause of accidents is one of the efforts to prevent accidents including workers, equipment, management and the environment (Y. Liu et al., 2012) These prevention efforts are important to do with the aim that employees feel safe and comfortable while working. On the other hand, a high level of occupational safety will have an influence on improving employee work outcomes (Vinodkumar & Bhasi, 2010; Zaman et al., 2019). Safety in the workplace is an issue that involves organizational / group factors such as safety culture, policies, leaders and job characteristics, while individual factors such as safety attitudes, knowledge, skills (Basahel, 2021). A process to create job security carried out by management and employees by focusing on attention and action towards themselves and others, as well as efforts to behave safely is called behavior-based safety (Budiman et al., 2022; Zhao et al., 2022).

One way to identify safe conditions and unsafe conditions can be done by taking a behavioral approach or called BBS (Behavior Based Safety). (Neal & Griffin, 2006) distinguish between two types of safety behavior, namely safety compliance and safety participation. Safety participation and safety compliance have an important role in efforts to achieve safety performance. However, safety participation involves more responsible activities as a support to reduce risks and create a safe environment for workers (Zhao et al., 2022) Safety compliance, on the other hand, is the main activity needed to reduce risk, such as wearing appropriate safety equipment and following safety procedures (Rahmadhan et al., 2021). When safety participation can be implemented properly, it will create higher opportunities for employees to be leadership and responsible in reducing risk and creating a safe environment. This can increase the positive impact of safety compliance and help reduce accidents and undesirable events (Zhao et al., 2022).

Safety participation is one of the activities that can be carried out effectively to improve work safety and security (Basahel, 2021). Employees who actively participate (participate) in the work safety program development program make a large contribution to reducing the number of work accidents (Ansori et al., 2021). Safety participation describes behaviors that do not directly contribute to individual safety, but behaviors that help develop an environment to support safety (Mirza et al., 2022).

If the individual does not have sufficient motivation to comply with safety regulations or participate in safety activities, then he will not participate to perform these actions (Memon et al., 2021). Leadership in an employee is very important in creating a culture that supports the improvement of occupational safety and health performance of an organization (Hedaputri et al., 2021) Worker safety that takes place consistently depends on how leaders implement a
safety standard and also depends on the skills and qualities of leaders (Subramaniam et al., 2023) Safety leadership has the ability to guide their employees in improving safety performance (Subramaniam et al., 2023). Safety leadership efforts with the ability to provide safety knowledge to employees will result in safety participation (Seo & Lee, 2022). Safety leadership has an important role in the success of safety and health programs in order to create a safe and healthy work environment (Putri et al., 2022). Safety knowledge and skills are needed to ensure security and health so as to help reduce accidents and the possibility of accidents (Omidi et al., 2023) While safe and healthy behavior will be created from the support of conditions or climate of the work environment (safety climate). So that there will be a relationship between individuals and the work environment and help achieve increased success of safety and health programs in the work environment (safety participation) (Mirza et al., 2022).

The results of previous research that safety leadership affects safety knowledge (Basahel, 2021; Rahmadhan et al., 2021). And research related to safety leadership is more associated with safety behavior (Cheung et al., 2021; Princess et al., 2022; Stiawan, 2024). Other researchers also stated that safety leadership is an important factor in influencing safety participation in companies (Basahel, 2021; Sadiq, 2020; Zhao et al., 2022). However, it is different from the results of other studies that show that safety leadership has a limited impact and does not have a significant impact on safety participation (Guldenmund, F. W., & Hale, 2012; Stewart, M. G., Courtnage, C., & Mearns, 2011).

Safety climate has been defined by (Zohar, 1980) as employees' perception of safety in themselves in the work area. Dedobbeleer & Béland (1991) also define safety climate as people's perception of management actions regarding safety. Safety climate is knowledge about occupational safety in science and its application is to prevent the possibility of work accidents or diseases caused by work and the work environment (Rahmadhan et al., 2021). Previous research has shown that safety climate has an important role in influencing safety knowledge in companies (Ansori et al., 2021; Clarke & Ward, 2006).

Safety climate is proven to affect safety behavior to provide additional knowledge about how much influence it has on safety behavior as a manifestation of safety participation (Ismail, 2015; Rahmadhan et al., 2021; Xu et al., 2022). Different results show that climate safety does not have a significant impact on safety participation (Guldenmund, F. W., & Hale, 2012).

This study uses safety knowledge as a mediation variable. The importance of knowledge of Occupational Health and Safety (K3) aims to minimize or eliminate potential hazards or work risks that cause pain, accidents and losses that may occur. For this reason, this study develops safety knowledge as a mediating variable that affects the relationship of safety
leadership to safety participation. Safety leadership is a skill to meet the goal of fostering a work safety culture within the company, leaders must be able to activate and move all subordinates (Stiawan, 2024). If the leader has good safety leadership, then most likely his employees are also good safety knowledge (Sadiq, 2020; Zulkifly et al., 2021). Criteria for safety leadership, leaders must be responsible to their employees to have the necessary knowledge, confidence and awareness to do work safely and comfortably to reduce the risk of accidents in the workplace (Hedaputri et al., 2021).

Chairman of PT. X supports the implementation of occupational safety and health policies in the company environment, especially in the production department. The support is implemented by supervising the implementation of safety management in the company environment which aims to check the implementation of safety commitments in work activities. The results of the supervision become one of the topics of management review at the leadership meeting as evaluation material and to find out solutions if there are obstacles in the implementation of safety management.

PT. X has established the safety of local communities and employees as the first management principle under the health and safety management policy ‘Creating an Only One Safety-First Culture’ that puts the safety of local communities and employees as a top priority in management to implement the safety management philosophy. PT. X has now established and implemented a safety management system committed to the development of Only One Safety-First Culture where occupational safety is a top priority. This study aims to examine the role of safety leadership and safety climate on safety participation through safety knowledge. Safety leadership must be owned by the leadership of a company to support the sustainability of the health and safety of its workers.

2 LITERATURE REVIEW

2.1 THEORITICAL FRAME WORK

Omnibearing Leadership Theory, developed by Bass, (1995), is a framework that divides leadership into three distinct dimensions: transformational, transactional, and passive leadership styles. This theory is relevant for understanding the relationship between safety leadership and safety participation. Safety leadership comes from general leadership theory (Zhao et al., 2022). Some researchers think that safety leadership is the process of influencing all employees to pursue their organization's safety goals (Bass et al., 2003; Den Hartog et al.,
1997). A responsible leadership role in safety, management, and performance relationships is implied, as a large part of an organization's primary goal is to ensure safety values are in the minds of employees (Skeepers & Mbohwa, 2015). The personalities, values, and choices employees make, the people they trust, the attractiveness they respond to, and the way they invest their time and energy in an organization are all results of leadership values. This is what distinguishes safety leadership from other types of leadership (Saleem & Malik, 2022). Tao et al. (2020) reviewed theoretical research from domestic and foreign experts on safety leadership from 1999 to 2019, and sequenced the evolutionary process. Zhao et al. (2022) also emphasize that safety leadership should have sufficient leadership skills about safety (e.g., safety knowledge and decision-making abilities, etc.), and utilize these skills to improve the overall safety environment. Safety participation on the other hand, is the degree to which employees are actively engaged in safety-related activities, such as following safety rules, reporting hazards and participating in safety training (Zhao et al., 2022).

2.2 SAFETY LEADERSHIP ON SAFETY KNOWLEDGE

Safety leadership is a leader's ability to influence employee safety behaviors and attitudes, which in turn can lead to better safety outcomes such as reduced accident rates and improved safety performance (Zhao et al., 2022; Zulkifly et al., 2021). Safety leadership encompasses a variety of leadership styles, including transformational, transactional, and passive leadership, that can affect safety climate and safety participation. (Cheung et al., 2021). Safety leadership is a skill to meet the goal of fostering a work safety culture within the company, leaders must be able to activate and move all their subordinates (Basahel, 2021). If the leader has good safety leadership, then most likely his employees are also good safety knowledge. In safety leadership, leaders must be responsible to their employees to have the necessary knowledge, confidence and awareness to do work safely and comfortably to reduce the risk of accidents in the workplace (Stiawan, 2024) Safety leadership is the responsibility of leaders in supporting the development of policies and practices that create safer societies (L. Liu et al., 2021) Therefore, leaders must have expertise in fostering a work safety culture within the company that is useful for the formation of active workers and initiatives to prioritize safety in every activity.

Previous research stated that safety leadership has a role in fostering safety knowledge by providing information related to work safety (Basahel, 2021). Safety leadership has a role in reducing the rate of work accidents by providing influence and motivation through the delivery
of information related to safety at work (Rahman et al., 2023) Based on this description, the hypothesis of this study is:

H1. Safety leadership has a positive effect on safety knowledge

2.3 SAFETY LEADERSHIP ON SAFETY PARTICIPATION

Leadership has been identified as an important factor influencing safety participation. Safety leadership can enable employees to participate in the company's work more actively and efficiently, thus making them responsible for the company's work safety (Bilgiç et al., 2018). When leaders show concern for their employees, employees are more likely to perform extra role safety behaviors to show positive feedback to their leaders (Mullen et al., 2017). Clarke & Ward (2006) found that in the manufacturing industry, the effective application of safety objectives by leaders has a significant direct positive impact on safety participation. Similarly, similar results have been found in eastern countries (Zhao et al., 2022). That is, under different national and industry backgrounds, safety leadership is related to safety participation. Therefore, the hypothesis that safety leadership is positively related to safety participation. Different leadership styles and leader behaviors both have different influences on employee safety participation. Both transformational leadership and transactional leadership can play an important role in safety participation, but the effects of transformational leadership are more pronounced (Clarke & Ward, 2006; Mullen et al., 2017). From the results of previous research, it can be seen that the role of safety leadership affects safety participation (Basahel, 2021; Zhao et al., 2022). Based on this description, the hypothesis of this study is:

H2. Safety leadership has a positive effect on safety participation

2.4 SAFETY CLIMATE ON SAFETY KNOWLEDGE

Safety climate is an important factor in influencing safety knowledge. A good safety climate will influence employees to have better knowledge about safety and follow good safety practices, which will improve safety in the company (Seo &; Lee, 2022). Safety climate is a condition built by behavior, policies and management culture in an organization. This safety climate affects safety knowledge in various ways.

Management behavior in implementing occupational safety regulations affects safety knowledge (Ansori et al., 2021). If management follows and encourages safety practices, then employees will have a good knowledge of safety. Policies and ordinances that encourage
employees to engage and monitor safety affect safety knowledge. Employees who are involved and oversee safety will be more reminded and follow safety practices. A good safety climate and organizational culture that encourages safety affect safety knowledge. If the organization has a culture that encourages safety, then employees will be more reminded and follow safety practices.

Previous research has proven that safety climate has an influence on safety knowledge (Ansori et al., 2021; Seo & Lee, 2022) because the safety climate is formed due to the company's efforts to make profitable policies with the understanding that it can make employees work safely in the company environment, usually through posters pasted on the wall, agreed work regulations, and company responsibility towards employees who have work accidents (Rahmadhan et al., 2021). Based on previous explanations and research, the hypothesis is as follows:

H3. Safety climate has a positive effect on safety knowledge

2.5 SAFETY CLIMATE ON SAFETY PARTICIPATION

A positive safety climate can promote employee safety behaviors, reduce risk, and improve safety practices (Felknor et al., 2020), and can also promote employees to actively discuss safety issues and consequently significantly increase employee safety participation (Hon et al., 2014). Safety climate affects safety participation because it is an employee's perception of the state of work safety in their work environment. Safety climate is formed from various factors, such as policies, procedures and practices related to work safety (Seo & Lee, 2022). A good safety climate can affect employee safety participation by increasing their safety knowledge, motivation, attitudes and behaviors. In addition, safety climate can also be used to see employee perceptions regarding the application and understanding of field conditions related to safety (Abubakar et al., 2020). The implementation of a good safety climate can positively affect employee safety knowledge, motivation, attitudes, and behaviors, and reduce the consequences of incidents (Putra et al., 2022).

A good safety climate can affect employee safety participation by increasing their safety knowledge, motivation, attitudes, and behaviors. This is because a good safety climate can provide clear information and roles regarding safety policies, adequate procedures, and work pressure that can be accepted by employees (Tanjung et al., 2020) Safety climate is proven to affect safety participation (Ansori et al., 2021; Bilgiç et al., 2018; Seo & Lee, 2022). Based on this description, the hypothesis of this study is:
H4. Safety climate has a positive effect on safety participation

2.6 SAFETY KNOWLEDGE ON SAFETY PARTICIPATION

Safety knowledge is an understanding of how to maintain security and health in the workplace. This includes an understanding of the hazards that may occur in the workplace, as well as precautions to be taken to reduce the risk of accidents (Hedaputri et al., 2021). Basic safety training is designed to teach the workforce how to reduce potential risks and prevent accidents in the work environment (Stiawan, 2024). By understanding the principles and best practices in maintaining safety, individuals can take appropriate preventive steps and avoid risky situations.

Safety knowledge is an effort to let employees know how to perform tasks in a safe way. Employees who have safety knowledge will be more aware of the consequences of their actions if they do not comply with work procedures (Hedaputri et al., 2021). This shows that employees with high safety knowledge can improve safety compliance. In addition, safety knowledge also allows workers to have safety-related instructions and demonstrate safety-related behaviors (Subramaniam et al., 2023).

Safety knowledge is the knowledge of employees about safety practices and procedures (Vinodkumar & Bhasi, 2010). Safety knowledge is also used in anticipation to reduce injuries (Runyan, 1991). In particular, safety knowledge allows workers to have safety-related instructions and demonstrate safety-related behaviors (Basahel, 2021). A person who has good safety knowledge and shares this knowledge with others will receive significant personal benefits such as increased self-esteem, increased competence, increased social affiliation, increased reputation and a stronger sense of organizational commitment (Hedaputri et al., 2021).

Vinodkumar & Bhasi, (2010) said there are three indicators to measure safety knowledge, namely knowledge of the use of safety equipment, knowledge of types of occupational hazards and knowledge of emergency response. Based on this description, the hypothesis of this study is:

H5. Safety knowledge has a positive effect on safety participation
2.7 SAFETY KNOWLEDGE AS MEDIATION BETWEEN SAFETY LEADERSHIP AND SAFETY PARTICIPATION

Safety knowledge serves as a mediator between safety leadership and safety participation because it bridges the gap between the two concepts. Safety leadership refers to the actions and behaviors of leaders that promote a safety culture in the workplace, while safety participation involves the active involvement of employees in safety practices and processes (Seo & Lee, 2022; Zhang et al., 2022). Safety knowledge, on the other hand, is an understanding and awareness of safety procedures, hazards, and risks. The relationship between safety leadership and safety participation is influenced by safety knowledge. When leaders demonstrate good safety practices and advocate for safety, their actions can have a positive impact on their team members' safety knowledge. This increased safety knowledge can lead to higher levels of safety participation, as employees are more likely to engage in safe behaviors and report hazards when they have a better understanding of safety procedures and risks.

In addition, safety knowledge can also be influenced by the effectiveness of safety leadership. When leaders have a solid understanding of safety procedures and risks, they can communicate safety expectations more effectively and provide guidance to their team members. This can result in a more engaged and informed workforce, which in turn can improve safety performance (Basahel, 2021; Stiawan, 2024). In short, safety knowledge acts as a mediator between safety leadership and safety participation by facilitating the transfer of knowledge and safety knowledge from leaders to employees, and by improving the effectiveness of safety leadership practices.

H6. Safety leadership influences safety participation through safety knowledge

2.8 SAFETY KNOWLEDGE AS MEDIATION BETWEEN SAFETY CLIMATE AND SAFETY PARTICIPATION

Safety climate is a feeling or state related to safety in the work environment. Safety knowledge is the knowledge needed to manage risk and manage safety. Based on research, safety climate has a positive impact on employee safety participation (Ansori et al., 2021; Bosak et al., 2013). Safety climate directs employees to follow safety practices and follow regulations set by the company. Safety climate also encourages employees to attend seminars, meet and exchange ideas with other employees to raise awareness about safety. Safety climate also encourages employees to attend safety training and become better at managing risk. The
results also show that safety knowledge has an important role in safety participation. Safety knowledge allows employees to understand safety practices, follow regulations and attend safety training (Subramaniam, 2016; Subramaniam et al., 2023). Safety knowledge also allows employees to attend seminars and exchange ideas with other employees. In addition, safety knowledge also allows employees to attend safety training and become better at managing risk (Seo &; Lee, 2022).

In addition, safety knowledge also has an important role in directing employees to follow safety practices and follow regulations in the work environment. Safety knowledge enables employees to understand risks and follow safety practices necessary to manage risks. Safety knowledge also allows employees to attend safety training and become better at managing risk. Research also shows that safety climate has an important role in directing employees to follow safety practices and follow regulations in the work environment (Clarke &; Ward, 2006). Safety climate allows employees to follow the safety practices necessary to manage risk. Safety climate also allows employees to attend safety training and become better at managing risk.

H7. Safety climate affects safety participation through safety knowledge

3 RESEARCH METHOD

This research uses a quantitative approach, where the quantitative approach is research that uses numbers as data obtained from measurements or calculations of the variables studied (Ghozali, 2018). In developing and testing hypotheses or theories that have been formulated previously between exogenous to endogenous variables, this study uses a quantitative approach. In this study using safety leadership and safety climate are exogenous variables that will affect safety participation as an endogenous variable, then safety knowledge as a mediation variable.

All these variables will be generalized with structural equation models (SEM) with smartPLS software. The population in this study is PT X employees who are directly responsible for and related to the implementation of safety management in the company which is 707 people. The sampling technique uses accidental sampling, so that the determination of the sample is based on coincidences encountered by the researcher. Questionnaires were collected as many as 412 questionnaires, but those who could be used as respondents in this study were 405 respondents.

Safety leadership in this study is defined as the process of interaction between leaders and employees of PT. X is used to influence subordinates in order to achieve individual and
organizational safety goals. There are three dimensions in safety leadership consisting of safety motivation, safety policy and safety concern (Basahel, 2021; Lu & Yang, 2010). While safety knowledge is the knowledge of PT. X to safety practices and procedures implemented at PT. X. There are dimensions used, namely knowledge of the use of safety equipment, knowledge of types of occupational hazards and knowledge of handling work emergency situations (Basahel, 2021; Vinodkumar & Bhasi, 2010). Operationally, the safety climate in this study was defined as the perception of PT. X to the safety aspects contained in the organization. Dimensions in climate security consist of commitment to safety, perceived risk, response to conservation (Khasanah et al., 2019; Wu et al., 2008). Safety participation in these findings is the individual behavior of PT workers X that does not directly contribute to one's own safety, but can also support the realization of safety in the workplace. The dimension of safety participation consists of safety engagement, safety enforcement efforts (Basahel, 2021; Lu & Yang, 2010).

4 RESULTS AND DISCUSSION

Demographic findings in research conducted at PT. X. The questionnaire was filled out most by respondents with male gender. Most respondents were aged > 25 – 35 years. The length of work is more than 10 years at most.

Table 1
Descriptive Analysis

<table>
<thead>
<tr>
<th>Respondent criteria</th>
<th>Categories</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Woman</td>
<td>28</td>
<td>6.9%</td>
</tr>
<tr>
<td></td>
<td>Man</td>
<td>377</td>
<td>93.1%</td>
</tr>
<tr>
<td>Age</td>
<td>20 – 25 years</td>
<td>79</td>
<td>19.6%</td>
</tr>
<tr>
<td></td>
<td>&gt;25 – 35 years</td>
<td>179</td>
<td>44.2%</td>
</tr>
<tr>
<td></td>
<td>&gt;35 – 45 years</td>
<td>46</td>
<td>11.3%</td>
</tr>
<tr>
<td></td>
<td>&gt;45 – 55 years</td>
<td>101</td>
<td>24.9%</td>
</tr>
<tr>
<td>Years of service</td>
<td>1 – 3 years</td>
<td>117</td>
<td>28.9%</td>
</tr>
<tr>
<td></td>
<td>3 – 5 years</td>
<td>55</td>
<td>13.6%</td>
</tr>
<tr>
<td></td>
<td>5 – 10 years</td>
<td>45</td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>&gt;10 years</td>
<td>188</td>
<td>46.4%</td>
</tr>
</tbody>
</table>

Source: Prepared by Authors (2024)

4.1 STRUCTURAL MODEL ANALYSIS

Figure 1 is the result of the loading factor using SmartPLS. The loading factor value used in this study >0.60 (Ghozali, 2019). Data calculation was carried out 2 rounds, because in the first round it was found that the loading factor value did not meet the requirements. The
middle blue circle indicates that the safety knowledge variable obtained an R2 value of 0.590. This shows that 59.0% of safety knowledge can be explained by safety leadership variables and safety climate. Furthermore, safety participation has an R2 value of 0.604 which means that 60.4% of these variables can be explained by safety knowledge, safety leadership and safety climate.

Figure 1
Outer Model PLS Algorithm

Seen in table 2 the concurrent reliability test should score more than 0.5 according to the AVE value. The results obtained for AVE values on the following variables: Safety Leadership, Safety Climate, Safety Knowledge, Safety Participation show all variables > 0.05. The Cronbach alpha and Composite Reliability values are appropriate because they are greater than or equal to 0.7 so that all variables in the study are declared valid and reliable.

Table 2
Construct Reliability and Validity

<table>
<thead>
<tr>
<th></th>
<th>Cronbach's Alpha</th>
<th>rho_A</th>
<th>Composite Reliability</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Climate</td>
<td>0.869</td>
<td>0.873</td>
<td>0.899</td>
<td>0.565</td>
</tr>
<tr>
<td>Safety Knowledge</td>
<td>0.918</td>
<td>0.919</td>
<td>0.936</td>
<td>0.709</td>
</tr>
<tr>
<td>Safety Leadership</td>
<td>0.945</td>
<td>0.947</td>
<td>0.952</td>
<td>0.603</td>
</tr>
<tr>
<td>Safety Participation</td>
<td>0.854</td>
<td>0.873</td>
<td>0.896</td>
<td>0.637</td>
</tr>
</tbody>
</table>

Source: Prepared by Authors (2024)
The test results in table 3 display a structural model that provides detailed information about the hypotheses investigated, including direct correlation and mediation. The results showed a significant relationship between safety leadership on safety knowledge where safety leadership is able to move employees in reducing the risk of work accidents, t-value = 8.565. There is an influence of safety leadership and safety participation shown by a t-value of 5.637. These results show the acceptance of hypotheses related to the direct influence between safety leadership on safety knowledge (H1) and safety participation (H2).

The results also show the acceptance of the third and fourth hypotheses, namely the influence of safety climate and safety knowledge, as evidenced by a calculated t value of 10.515. The variable safety climate on safety participation has a significant impact, this is proven by t-value = 3.116. So, there is an influence of safety knowledge on safety participation which plays a role in providing knowledge to maintain work safety, with a t-value of 6.410, so the fifth hypothesis is accepted.

The explanation above that all hypotheses related to the direct influence between the variables of safety leadership, safety climate and safety knowledge on safety participation are accepted. And from the results of the analysis listed in table 4 it can be seen that the effect of mediation also shows the acceptance of all hypotheses.

**Table 3**

*Hypothesis test result*

| Hypothesis                        | Original Sample (O) | T Statistics (|O/STDEV|) | P Values | Conclusion |
|-----------------------------------|---------------------|----------------|----------|------------|
| Safety Climate -> Safety Knowledge | 0.463               | 10.515         | 0.000    | Accepted   |
| Safety Climate -> Safety Participation | 0.158            | 3.116          | 0.002    | Accepted   |
| Safety Knowledge -> Safety Participation | 0.377            | 6.410          | 0.000    | Accepted   |
| Safety Leadership -> Safety Knowledge | 0.343            | 8.565          | 0.000    | Accepted   |
| Safety Leadership -> Safety Participation | 0.254            | 5.637          | 0.000    | Accepted   |

The results of table 4 testing in this study show the role of safety knowledge as a mediator between safety leadership and safety climate on safety participation. The results of the analysis show that safety knowledge can mediate the influence between safety leadership and safety climate on safety participation, so that the 6th and 7th mediation hypotheses are accepted.
The relationship of safety leadership and safety knowledge is critical in reducing the occurrence of accidents in the company. This safety leadership has a role to play in reducing the risk of workplace accidents by motivating employee safety knowledge. Safety leadership is proven to have a positive relationship with safety knowledge, when a leader is able to activate or move employees to crush the work safety culture and has high knowledge by providing work safety information and awareness to do safe work, therefore employees also have good safety knowledge. This is in accordance with research conducted by (Basahel, 2021; Rahman et al., 2023).

The results showed that safety leadership in safety participation has a positive influence, in this case safety leadership shows a sense of concern for employees so that employees will provide feedback to participate in working in the company effectively and efficiently, besides that employees will feel more responsible for the work obtained and responsible for work safety at work. Consistent findings were made (Basahel, 2021; Zhao et al., 2022). The safety climate has an important role to play in influencing safety knowledge. With research results that show the safety climate has a positive impact on safety knowledge. It is by providing knowledge, practices about safety then safety knowledge and the level of safety in the company increases. In addition, a good safety climate and organizational culture that encourages safety influence safety knowledge. If the organization has a culture that encourages safety, employees will work safely in the company environment, this result is in line with research (Ansori et al., 2021; Seo &; Lee, 2022).

The safety climate is significantly able to create positive employee participation to reduce the occurrence of accidents in addition to promoting employees to take part in discussing work safety issues so as to increase employee safety participation in the company. In this case, the accident climate can provide policies and procedures that are sufficiently related to work safety that can be accepted by employees. These findings are the same as those investigated by (Ansori et al., 2021; Bilgiç et al., 2018; Seo &; Lee, 2022).
The findings show that safety knowledge has a positive effect on safety participation. This is because safety knowledge provides an understanding of the risks that may occur in the workplace, as well as preventive actions or training to reduce the risk of accidents. This shows when employees who have safety knowledge and have a high commitment will do their work with prudence and carry out their actions according to the procedures implemented by the company. The appropriate research was conducted by (Basahel, 2021; Hedaputri et al., 2021; Subramaniam et al., 2023).

The last discussion is how safety knowledge acts as a mediator between safety leadership, safety climate and safety participation. Safety leadership and safety knowledge on safety participation. Safety leadership that displays safety practices well, and informs them to employees can positively increase safety knowledge so that employee participation in occupational safety increases. This is in accordance with research conducted by (Basahel, 2021; Stiawan, 2024).

On the other hand, safety climate and safety knowledge on safety participation have a significant relationship in creating a comfortable work environment. In this case, the employee safety climate is able to direct employees to follow company rules so that employee knowledge of the importance of safety increases and employee involvement in managing the risk of accidents that occur in the workplace. These findings are consistent with the investigations conducted (Ansori et al., 2021; Bosak et al., 2013; Subramaniam, 2016; Subramaniam et al., 2023).

5 CONCLUSION

The results of the study have empirically proven the relationship between existing variables. Employees are required to have safety knowledge and employee involvement in managing the risk of workplace accidents. This is because employees are able to accept existing policies and procedures in the company, the existence of safety leadership that supports and motivates employees will increase employee awareness in carrying out duties according to the rules set by the company. This research provides theoretical and practical implications, theoretically can be used as reading material by future researchers, and expands research rules related to the topic of employee safety participation in the company. Practically, this research can also be used as evaluation material for companies so that implementing company policies or rules can be carried out appropriately and provide decisions related to research topics. The limitation of this study is still biased responses from respondents because of the limited number.
REFERENCES


Safety Participation on Industrial Company: Emphasize Safety Leadership and Safety Climate with Safety Knowledge as Mediation


