



WORK ENVIRONMENT, WORK SUPERVISION, JOB TRAINING, AND OCCUPATIONAL HEALTH AND SAFETY FOR CONSTRUCTION WORK PRODUCTIVITY

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ABSTRACT. This study examines how digital transformation contributes to foreign market entry through omnichannel integration and develops a sequential capability perspective linking these three constructs. A systematic literature review was conducted using 30 scholarly references identified through Scopus, Web of Science, and Google Scholar. The literature was systematically screened and synthesised based on its relevance to digital transformation, omnichannel integration, and foreign market entry. The findings support both proposed relationships. Digital transformation contributes to omnichannel integration by enabling shared information, interconnected processes, and coordinated customer interactions, although technological adoption alone is insufficient without organisational alignment. Omnichannel integration, in turn, facilitates foreign market entry by connecting digital and physical routes to customers, supporting market learning, and enabling progressive market development. The review further identifies omnichannel integration as the connecting capability that converts digital resources into coordinated foreign-market access. These findings suggest that firms should manage digital transformation, channel integration, and international expansion as interconnected strategic processes rather than separate initiatives. Future research should empirically validate the sequential model across industries, countries, and levels of digital maturity.

Keywords: Work Environment, Work Supervision, Job Training, Occupational Health and Safety, Work Productivity, Construction Industry

Introduction

Labor productivity is a critical determinant of construction project performance because it directly influences the achievement of quality, schedule, and resource targets. Productivity, however, does not develop independently of the conditions under which workers perform their tasks. It is shaped by the work environment, supervision, employee competence, training, and occupational safety practices that collectively influence how work is organized and executed. Previous research has demonstrated that work organization and environmental conditions are associated with productivity, while effective supervision and supervisors' safety capabilities contribute to both labor productivity and workplace safety.¹

¹ Bradley A Evanoff et al., "Influence of Work Organization and Work Environment on Missed Work, Productivity, and Use of Pain Medications among Construction Apprentices," *American Journal of Industrial*

The relationship between productivity and occupational safety becomes particularly important in construction, where workers are exposed to substantial operational risks. Evidence indicates that integrating safety practices into work processes can strengthen safety climate while supporting productivity, whereas productivity-improvement strategies may produce unintended effects on safety behaviour when productivity and safety are managed separately.² Other studies likewise demonstrate that occupational health and safety is closely associated with workforce productivity, suggesting that safety should not be understood solely as a mechanism for preventing accidents but also as an organizational condition that can support sustained productive performance.³

This issue is also evident at CV Griya Fajar Konstruksi in South Tangerang, which employs 200 workers. Project records indicate that daily productivity ranges from 14 to 25 m², accompanied by time-efficiency problems in several work activities. These conditions suggest that project output has not yet been achieved consistently and that productivity challenges need to be examined in relation to the work environment, supervision, training, and occupational health and safety practices that characterize daily operations.

Productivity challenges have occurred alongside persistent safety concerns. The number of workplace accidents increased from four cases in 2020 to seven cases in 2021 and eleven cases in 2022. Preliminary observations also identified non-compliance with work procedures, suboptimal use of personal protective equipment, and limitations in safety supervision and training. Such conditions are consistent with evidence emphasizing the importance of safety resources, enforcement, and organizational characteristics in shaping safety climate, as well as research demonstrating the contribution of training and occupational safety systems to employee productivity.⁴

Previous studies have examined several of these relationships individually, including the association between work environment and productivity, supervision and labour productivity, training and productivity and safety, and occupational health and safety and productivity.⁵ Research on safety climate, safety behaviour, and occupational health and safety management

Medicine 63, no. 3 (2020): 269–76; Richard Jimoh et al., “Influence of Supervision on Labour Productivity on Construction Sites in Abuja-Nigeria,” *Independent Journal of Management & Production* 8, no. 1 (2017): 64–84; Luz S Marín and Cora Roelofs, “Promoting Construction Supervisors’ Safety-Efficacy to Improve Safety Climate: Training Intervention Trial,” *Journal of Construction Engineering and Management* 143, no. 8 (2017): 4017037.

² Mostafa Soltaninejad, Mohammad Sadra Fardhosseini, and Yong Woo Kim, “Safety Climate and Productivity Improvement of Construction Workplaces through the 6S System: Mixed-Method Analysis of 5S and Safety Integration,” *International Journal of Occupational Safety and Ergonomics* 28, no. 3 (2022): 1811–21; Nariman Ghodrati et al., “Unintended Consequences of Productivity Improvement Strategies on Safety Behaviour of Construction Labourers; a Step toward the Integration of Safety and Productivity,” *Buildings* 12, no. 3 (2022): 317.

³ Queenie Wong, Noraina Mazuin Sapuan, and Muhammad Waris Ali Khan, “The Impact of Safety and Health towards Construction Workforce Productivity,” *Journal of Governance and Integrity* 6, no. 1 (2023): 504–14; Maryam Lari, “A Longitudinal Study on the Impact of Occupational Health and Safety Practices on Employee Productivity,” *Safety Science* 170 (2024): 106374; Fitri Rezeki, “PERAN DISIPLIN KERJA SEBAGAI MEDIASI KESELAMATAN, KESEHATAN KERJA DAN LINGKUNGAN KERJASERTA DAMPAKNYA TERHADAP PRODUKTIVITAS KARYAWAN PADA MASA PANDEMI COVID-19 DI PERUSAHAAN OTOMOTIF BEKASI: Occupational Safety & Health, Work Discipline, Work Environment, Employee Work Productivity,” *Eqien-Jurnal Ekonomi Dan Bisnis* 10, no. 1 (2022): 34–41.

⁴ Abdul Kadir et al., “Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses, and Influential Demographic Characteristics,” *Buildings* 12, no. 5 (2022): 639; Kelly Dwi Putri and Nora Anisa Br Sinulingga, “The Effect of Training and the Implementation of Occupational Health and Safety Systems on Employee Productivity of PT. PP. London Sumatra Indonesia Tbk Branch Office Medan,” *Journal of Economics and Business (JECOMBI)* 2, no. 1 (2021): 66–76.

⁵ Jimoh et al., “Influence of Supervision on Labour Productivity on Construction Sites in Abuja-Nigeria”; Putri and Sinulingga, “The Effect of Training and the Implementation of Occupational Health and Safety Systems on Employee Productivity of PT. PP. London Sumatra Indonesia Tbk Branch Office Medan.”

systems has also expanded, although much of this literature focuses predominantly on specific safety outcomes rather than examining safety as part of a broader productivity framework.⁶ Consequently, empirical evidence integrating work-management factors, occupational health and safety, and labour productivity within a single analytical model remains relatively limited.

The research gap addressed in this study concerns the limited integration of work environment, work supervision, and work training as explanatory factors of occupational health and safety and labour productivity, together with the examination of occupational health and safety as a determinant of productivity. This study addresses that gap through an empirical investigation at CV Griya Fajar Konstruksi by incorporating working conditions, workforce management, and occupational safety into an integrated productivity model. This approach extends previous studies that have frequently examined these relationships separately and is consistent with the proposition that safety and productivity are interdependent dimensions of construction work that require integrated management.⁷

Accordingly, this study aims to analyse the effects of work environment, work supervision, and work training on occupational health and safety and labour productivity, as well as to examine the effect of occupational health and safety on labour productivity among employees of CV Griya Fajar Konstruksi. Conceptually, the study positions the work environment, supervision, and training as organizational factors that contribute to occupational health and safety while also shaping productivity, with occupational health and safety functioning as an additional determinant of productive performance. The findings are expected to provide empirical evidence to support more integrated approaches to managing occupational safety and workforce productivity in construction companies.

Literature Review

Work Environment and Occupational Health and Safety

The work environment encompasses the physical and organizational conditions surrounding employees that influence how work is performed, including workplace comfort, safety, facilities, and conditions that support employees in carrying out their duties effectively.⁸ In construction, these conditions are important because workers operate in environments where physical workplace conditions can directly influence the safety and effectiveness of work activities. A properly organized and safe work environment can reduce exposure to workplace hazards while supporting safer work practices. Evidence from the Indonesian construction industry indicates that safety resources and the implementation of safety practices are important components of safety climate, while research on construction workers also demonstrates that work environment and organizational conditions are associated with productivity.⁹ The relationship between working conditions and productivity further

⁶ Kadir et al., "Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses, and Influential Demographic Characteristics"; Xiaoying Li et al., "Understanding the Influence of Safety Climate and Productivity Pressure on Non-Helmet Use Behavior at Construction Sites: A Case Study," *Engineering, Construction and Architectural Management* 29, no. 1 (2022): 72–90; Ahmed Farouk Kineber et al., "Benefits of Implementing Occupational Health and Safety Management Systems for the Sustainable Construction Industry: A Systematic Literature Review," *Sustainability* 15, no. 17 (2023): 12697.

⁷ Soltaninejad, Fardhosseini, and Kim, "Safety Climate and Productivity Improvement of Construction Workplaces through the 6S System: Mixed-Method Analysis of 5S and Safety Integration"; Ghodrati et al., "Unintended Consequences of Productivity Improvement Strategies on Safety Behaviour of Construction Labourers; a Step toward the Integration of Safety and Productivity."

⁸ Larasati Sri, "Manajemen Sumber Daya Manusia. Cetakan Pertama," CV. Budi Utama. Yogyakarta, 2018; Pandi Afandi, "Manajemen Sumber Daya Manusia (Teori, Konsep Dan Indikator)," Riau: Zanafala Publishing 3 (2018); Dede Hertina et al., *Buku Ajar Manajemen Sumber Daya Manusia* (PT. Sonpedia Publishing Indonesia, 2023).

⁹ Kadir et al., "Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses, and Influential Demographic Characteristics"; Selvi Yana and Antoni Ludfi Arifin, "The Influence of the Occupational of Safety & Health and Work Environment on Work Employees Productivity at Production Division of PT Trimitra Chitrahasta," *Jurnal Fokus Manajemen* 3, no. 1 (2023): 27–32.

suggests that the environment in which construction work is performed can influence both operational performance and safety-related behaviour.¹⁰ Accordingly, a work environment that provides adequate physical conditions, safety resources, and supportive work arrangements is expected to strengthen OHS implementation.

H1: Work environment affects occupational health and safety.

Work Supervision and Occupational Health and Safety

Work supervision refers to the managerial process of monitoring, controlling, and evaluating work activities to ensure that implementation remains consistent with established plans, standards, and organizational requirements.¹¹ In construction, effective supervision is particularly important for maintaining compliance with work procedures, identifying deviations during work activities, and providing direction when corrective action is required. Consistent supervision also makes safety requirements operational rather than merely formal by ensuring that established standards are continuously observed in the workplace. Research on construction supervisors shows that strengthening supervisors' safety efficacy can improve safety climate, while evidence from the Indonesian construction sector indicates that weaknesses in safety enforcement and resources remain relevant challenges.¹² In addition, supervision has been associated with labour productivity because effective control of work activities can reduce deviations and improve the coordination of construction tasks.¹³ These findings suggest that effective and consistent supervision can strengthen workers' adherence to OHS requirements.

H2: Work supervision affects occupational health and safety.

Work Training and Occupational Health and Safety

Work training represents a structured process through which employees develop the knowledge, skills, and capabilities required to perform their tasks effectively and safely. In construction, safety-related training is particularly important because workers must understand potential hazards, safe work procedures, appropriate use of personal protective equipment, and appropriate responses to emergency situations. The effectiveness of training therefore depends not only on its provision but also on the relevance of its methods to actual workplace risks. Research has demonstrated that training methods can influence the effectiveness of safety learning, while learning from incidents provides an additional mechanism for improving construction workers' safety performance.¹⁴ Evidence also indicates that training combined with the implementation of OHS systems can contribute to employee productivity.¹⁵ These findings suggest that relevant and effective training can translate safety knowledge into safer work practices. Therefore, more effective work training is expected to strengthen the implementation of OHS in construction workplaces.

H3: Work training affects occupational health and safety

Work Environment and Labor Productivity

Labor productivity reflects the efficiency with which workers transform available resources into work outputs. In construction, productivity is influenced not only by workers' individual capabilities

¹⁰ Evanoff et al., "Influence of Work Organization and Work Environment on Missed Work, Productivity, and Use of Pain Medications among Construction Apprentices."

¹¹ Supriadi Siagian, "Manajemen Sumber Daya Manusia," *Yayasan Drestanta Pelita Indonesia*, 2023; T Hani Handoko, "Manajemen Sumber Daya Manusia (Edisi Revisi)," *Jakarta: Bumi Aksara*, 2017; Harianto Harianto, "Pengaruh Pengawasan Kerja Dan Disiplin Kerja Terhadap Kinerja Karyawan Pada Pt Centric Powerindo Di Kota Batam" (Prodi Manajemen, 2020).

¹² Kadir et al., "Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses, and Influential Demographic Characteristics"; Marin and Roelofs, "Promoting Construction Supervisors' Safety-Efficacy to Improve Safety Climate: Training Intervention Trial."

¹³ Jimoh et al., "Influence of Supervision on Labour Productivity on Construction Sites in Abuja-Nigeria."

¹⁴ Paweł Bęś and Paweł Strzałkowski, "Analysis of the Effectiveness of Safety Training Methods," *Sustainability* 16, no. 7 (2024): 2732; Albert P C Chan et al., "Improving Safety Performance of Construction Workers through Learning from Incidents," *International Journal of Environmental Research and Public Health* 20, no. 5 (2023): 4570.

¹⁵ Putri and Sinulingga, "The Effect of Training and the Implementation of Occupational Health and Safety Systems on Employee Productivity of PT. PP. London Sumatra Indonesia Tbk Branch Office Medan."

but also by the conditions that enable them to maintain concentration, physical well-being, comfort, and continuity throughout the work process. An adequate work environment can reduce disturbances, excessive fatigue, accident risks, and lost working time, thereby supporting more efficient task completion. Empirical research among construction apprentices has linked work organization and the work environment to productivity, while research in industrial settings has similarly demonstrated the relevance of occupational safety and work environment to employee productivity.¹⁶ Evidence from the construction industry further indicates that unsatisfactory working conditions can have adverse consequences for productivity.¹⁷ Thus, a work environment that provides adequate physical conditions, supports worker well-being, and minimizes operational disruptions is expected to enhance labour productivity.

H4: Work environment affects labor productivity

Work Supervision and Labor Productivity

Work supervision functions as a mechanism for maintaining construction activities within established standards, targets, and work plans. Effective supervision enables supervisors to identify errors, coordinate work activities, control resource utilization, verify the appropriateness of work methods, and implement corrective action when deviations occur. These mechanisms can reduce unnecessary expenditure of time and effort while keeping construction activities aligned with project targets. Empirical evidence from construction projects indicates that supervision is associated with labour productivity, demonstrating the importance of supervisory control in construction work.¹⁸ Research on supervisor capabilities further shows that effective supervisory intervention can improve workplace safety conditions, which may also reduce disruptions associated with unsafe work practices.¹⁹ In this sense, supervision contributes to productivity not simply through direct control but through the continuous coordination and correction of work processes. Therefore, more effective and consistent supervision is expected to improve labour productivity.

H5: Work supervision affects labor productivity.

Work Training and Labor Productivity

Work training constitutes an investment in human resource development through which employees acquire competencies that enable them to perform tasks more accurately, safely, and efficiently. In construction, training can improve workers' understanding of appropriate work methods, reduce operational errors, accelerate task completion, and facilitate adaptation to changing technical requirements. Empirical evidence indicates that training contributes to contractor work productivity, while studies combining training with OHS system implementation have also reported its relevance to employee productivity.²⁰ The effectiveness of training is particularly important because knowledge and skills acquired through training can influence how workers execute routine activities and respond to operational risks. Safety-training research further demonstrates that training methods differ in their effectiveness in producing learning outcomes, reinforcing the importance of designing training according to workers' actual needs and work characteristics.²¹ Accordingly, work training that is relevant, practical, and effectively delivered is expected to enhance labour productivity.

H6: Work training affects labor productivity.

¹⁶ Evanoff et al., "Influence of Work Organization and Work Environment on Missed Work, Productivity, and Use of Pain Medications among Construction Apprentices"; Yana and Arifin, "The Influence of the Occupational Safety & Health and Work Environment on Work Employees Productivity at Production Division of PT Trimitra Chitrahasta."

¹⁷ M Abrey and J J Smallwood, "The Effects of Unsatisfactory Working Conditions on Productivity in the Construction Industry," *Procedia Engineering* 85 (2014): 3–9.

¹⁸ Jimoh et al., "Influence of Supervision on Labour Productivity on Construction Sites in Abuja-Nigeria."

¹⁹ Marín and Roelofs, "Promoting Construction Supervisors' Safety-Efficacy to Improve Safety Climate: Training Intervention Trial."

²⁰ Putri and Sinulingga, "The Effect of Training and the Implementation of Occupational Health and Safety Systems on Employee Productivity of PT. PP. London Sumatra Indonesia Tbk Branch Office Medan"; Parlinda Parlinda and Hasan Ubaidillah, "Training, Motivation, and Environment: Boosting Contractor Work Productivity: Pelatihan, Motivasi Kerja, Dan Lingkungan Kerja: Meningkatkan Produktivitas Kerja Kontraktor," *Academia Open* 8, no. 1 (2023): 10–21070.

²¹ Beś and Strzałkowski, "Analysis of the Effectiveness of Safety Training Methods."

Occupational Health and Safety and Labor Productivity

Occupational health and safety comprise measures designed to protect workers from occupational accidents, work-related illness, and other hazards while maintaining safe and healthy working conditions. In construction, effective OHS management can support continuity of operations by reducing accidents, lost working time, operational disruptions, and productivity losses associated with unsafe working conditions. Research using an integrated 6S approach demonstrates that safety and productivity can be addressed simultaneously within construction workplaces, indicating that safety practices need not be separated from productivity-improvement efforts.²² Other empirical evidence has identified a relationship between occupational safety and health and construction workforce productivity, while longitudinal research provides further evidence of the relationship between OHS practices and employee productivity over time.²³ Studies in Indonesia have likewise reported the relevance of occupational safety and health to workforce productivity, including evidence from construction workers.²⁴ Taken together, these findings indicate that OHS can function as an operational condition supporting stable and efficient work processes. Therefore, stronger implementation of OHS is expected to improve labour productivity.

H7: Occupational health and safety affect labor productivity.

Research methods

This study employed a quantitative approach with an associative research design to examine the relationships among the variables under investigation. The study was conducted at CV Griya Fajar Konstruksi, South Tangerang, with a population of 200 employees consisting of 17 foremen, 108 construction workers, and 75 masons. Because the population was fully accessible, a census or total sampling technique was applied, in which all members of the population were included as research respondents.²⁵ Primary data were collected through a Likert-scale questionnaire, while interviews and observations were used as supporting data. Secondary data were obtained from company documents and relevant literature. The research instruments were designed to measure work environment, work supervision, work training, occupational health and safety (OHS), and labour productivity.

The data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS to examine latent constructs and their predictive relationships.²⁶ The measurement model was assessed using outer loadings, average variance extracted (AVE), discriminant validity, Cronbach's alpha, and composite reliability, while the structural model was evaluated using path coefficients and R^2 .²⁷ Hypotheses were tested through bootstrapping at a 5 percent significance level using a two-tailed test, with significance indicated by $t > 1.96$ and $p < 0.05$; relationship direction was determined by the path coefficient.²⁸ The analysis examined the effects of work environment, work supervision, and work training on occupational health and safety and labour productivity, as well as the effect of occupational health and safety on labour productivity.

²² Soltaninejad, Fardhosseini, and Kim, "Safety Climate and Productivity Improvement of Construction Workplaces through the 6S System: Mixed-Method Analysis of 5S and Safety Integration."

²³ Wong, Sapuan, and Khan, "The Impact of Safety and Health towards Construction Workforce Productivity"; Lari, "A Longitudinal Study on the Impact of Occupational Health and Safety Practices on Employee Productivity."

²⁴ Yana and Arifin, "The Influence of the Occupational of Safety & Health and Work Environment on Work Employees Productivity at Production Division of PT Trimitra Chitrahasta"; F Damayanti, "Suhudi, & Febrianto, RS (2025). Occupational Safety, Health, and Awareness as Determinants of Productivity: A PLS-SEM Study of Construction Workers in Malang," *Asian Journal Science and Engineering* 4, no. 1 (n.d.): 18–24.

²⁵ P D Sugiyono, "Sugiyono, Metode Penelitian Kuantitatif Kualitatif Dan R&D," CV. Alfabeta, Bandung 25 (2019).

²⁶ Joseph F Hair et al., *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook* (Springer, 2021).

²⁷ Joseph Hair and Abdullah Alamer, "Partial Least Squares Structural Equation Modeling (PLS-SEM) in Second Language and Education Research: Guidelines Using an Applied Example," *Research Methods in Applied Linguistics* 1, no. 3 (2022): 100027.

²⁸ Marko Sarstedt et al., "Progress in Partial Least Squares Structural Equation Modeling Use in Marketing Research in the Last Decade," *Psychology & Marketing* 39, no. 5 (2022): 1035–64.

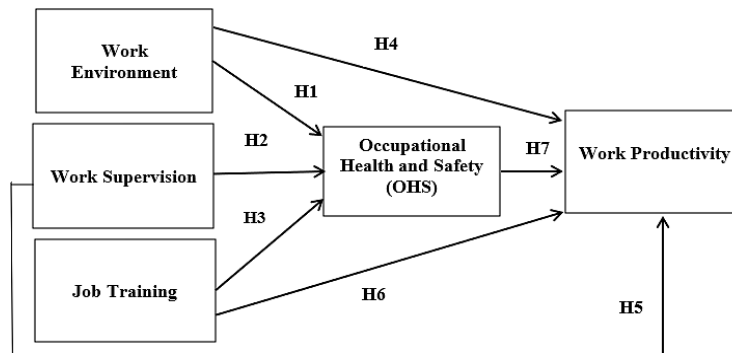


Figure 1. Conceptual Framework of the Study

The conceptual framework presented in Figure 1 illustrates the relationships among work environment, work supervision, work training, occupational health and safety, and labour productivity through seven hypotheses. The model examines the effects of work environment, work supervision, and work training on occupational health and safety and labour productivity, as well as the effect of occupational health and safety on labour productivity.

Results And Discussion

Respondent Characteristics

This study involved 200 employees of CV Griya Fajar Konstruksi who were engaged in the company's operational activities. The respondents represented diverse demographic characteristics, including gender, age, and educational attainment. The distribution of these characteristics provides an initial overview of the profile of the sample used in the subsequent analysis.

Table 1. Respondent Characteristics

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	147	73.5
	Female	53	26.5
Age	25–30 years	112	56.0
	31–35 years	23	11.5
	36–40 years	24	12.0
	41–45 years	11	5.5
	46–50 years	12	6.0
	51–55 years	11	5.5
	>55 years	7	3.5
Education	Senior High School	65	32.5
	Bachelor's degree	121	60.5
	Master's degree	14	7.0
Total		200	100.0

Source: Primary data, processed by the authors, 2025.

As shown in Table 1, the respondent composition was dominated by male employees, accounting for 73.5 percent, while female employees represented 26.5 percent. In terms of age, respondents aged 25–30 years constituted the largest group at 56.0 percent, followed by those aged 36–40 years at 12.0 percent and 31–35 years at 11.5 percent. Meanwhile, respondents aged 41–45 years and 51–55 years each accounted for 5.5 percent, those aged 46–50 years represented 6.0 percent, and respondents aged over 55 years accounted for 3.5 percent. Regarding educational attainment, bachelor's degree holders constituted the largest proportion at 60.5 percent, followed by senior high school graduates at 32.5 percent and master's degree holders at 7.0 percent. Overall, the distribution indicates that the sample was predominantly composed of employees within the productive-age group, with educational backgrounds that varied across the sample.

Measurement Model Evaluation

The measurement model was evaluated to determine the extent to which the indicators adequately represented Work Environment, Work Supervision, Job Training, Work Productivity, and OHS. The

evaluation included outer loadings, convergent validity, discriminant validity, and construct reliability. Overall, the five constructs were measured using 50 indicators.

Table 2. Outer Loading Evaluation of the Constructs

Construct	Number of Indicators	Outer Loading
Work Environment	10	0.873–0.976
Work Supervision	10	0.764–0.969
Job Training	10	0.785–0.950
Work Productivity	10	0.753–0.885
OHS	10	0.764–0.916

Source: SmartPLS 3.0 output, processed by the authors, 2025.

The results presented in Table 2 show that all indicators had outer loading values above 0.70, with an overall range of 0.753–0.976. The lowest value was observed for indicator MK06 at 0.753, whereas the highest value was recorded for indicator K09 at 0.976. These findings indicate that all indicators made adequate contributions to representing their respective constructs and therefore met the commonly applied criterion for indicator reliability.²⁹

Table 3. Construct Reliability and Validity

Construct	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Work Environment	0.977	0.978	0.980	0.830
Work Supervision	0.973	0.974	0.976	0.822
Job Training	0.977	0.978	0.980	0.828
Work Productivity	0.959	0.964	0.964	0.731
OHS	0.980	0.980	0.982	0.847

Source: SmartPLS 3.0 output, processed by the authors, 2025.

Based on Table 3, the AVE values for all constructs ranged from 0.731 to 0.847, exceeding the commonly accepted threshold of 0.50. Internal consistency was also supported by Cronbach's alpha values ranging from 0.959 to 0.980 and composite reliability values ranging from 0.964 to 0.982. All values exceeded the commonly applied threshold of 0.70. These results indicate that the five constructs demonstrated adequate convergent validity and strong internal consistency.³⁰

Heterotrait-Monotrait Ratio

Discriminant validity was further assessed using the Heterotrait-Monotrait Ratio (HTMT). This approach evaluates the extent to which constructs are empirically distinct by comparing correlations across different constructs with correlations among indicators measuring the same construct.³¹

Table 4. Heterotrait-Monotrait Ratio (HTMT)

Construct	Work Productivity	Work Environment	Job Training	OHS	Work Supervision
Work Productivity					
Work Environment	0.842				
Job Training	0.803	0.888			
OHS	0.903	0.829	0.891		
Work Supervision	0.872	0.821	0.824	0.820	

Source: SmartPLS 3.0 output, processed by the authors, 2025.

The HTMT values in Table 4 ranged from 0.803 to 0.903. The highest value was observed between OHS and *Work Productivity*, at 0.903. Several construct pairs exceeded the more conservative threshold of 0.85, while the value of 0.903 was also slightly above the commonly used 0.90 threshold. These findings indicate that discriminant validity warrants further consideration, particularly for the

²⁹ Hair et al., *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*.

³⁰ Hair et al.

³¹ Hair and Alamer, "Partial Least Squares Structural Equation Modeling (PLS-SEM) in Second Language and Education Research: Guidelines Using an Applied Example."

relationship between OHS and *Work Productivity* and for several other construct pairs. Accordingly, discriminant validity should not be regarded as fully established solely on the basis of the HTMT results and would benefit from additional assessment before the measurement model is considered conclusively discriminant.³²

Structural Model Assessment

After the measurement model evaluation was completed, the analysis proceeded to the **structural** model to assess the extent to which the exogenous constructs explain the endogenous constructs and to examine the direction and significance of the relationships among the variables. The structural model was evaluated using the coefficient of determination (R^2), path coefficients, t -statistics, and p -values.³³

Table 5. R-Square

Endogenous Construct	R^2	Adjusted R^2
Work Productivity	0.734	0.726
OHS	0.965	0.964

Source: SmartPLS 3.0 output, processed by the authors, 2025.

The results in Table 5 show an R^2 value of 0.734 for *Work Productivity*. This indicates that Work Environment, Work Supervision, Job Training, and OHS jointly explain 73.4 percent of the variance in Work Productivity, while the remaining 26.6 percent is associated with factors outside the model. For OHS, the R^2 value of 0.965 indicates that Work Environment, Work Supervision, and Job Training jointly explain 96.5 percent of the variance in OHS, while the remaining 3.5 percent is attributable to factors not included in the model.

The magnitude of the R^2 values indicates that the model has substantial explanatory power for both endogenous constructs. However, R^2 does not indicate the direction or statistical significance of relationships among the constructs. Therefore, further assessment was conducted using the path coefficients to examine the individual structural relationships.³⁴

Table 6. Structural Model Results

Relationship	Original Sample (O)	Sample Mean (M)	STDEV	T Statistics	P Values
Work Environment → OHS	0.822	0.805	0.182	4.526	0.000
Work Supervision → OHS	0.521	0.563	0.204	2.554	0.011
Job Training → OHS	-0.437	-0.460	0.206	2.123	0.034
Work Environment → Work Productivity	0.448	-0.459	0.130	3.454	0.001
Work Supervision → Work Productivity	0.585	0.624	0.196	2.975	0.003
Job Training → Work Productivity	-0.285	-0.314	0.139	2.053	0.041
OHS → Work Productivity	0.989	0.988	0.074	14.693	0.000

Source: SmartPLS 3.0 output, processed by the authors, 2025.

The path coefficients in **Table 6** reveal different relationship patterns among the constructs. Work Environment shows a positive relationship with OHS ($\beta = 0.822$; $p < 0.001$), as does Work Supervision ($\beta = 0.521$; $p = 0.011$). In contrast, Job Training shows a negative coefficient in relation to OHS ($\beta = -0.437$; $p = 0.034$). For Work Productivity, Work Environment has a positive coefficient of 0.448 ($p = 0.001$), while Work Supervision has a coefficient of 0.585 ($p = 0.003$). Job Training again shows a negative relationship with Work Productivity ($\beta = -0.285$; $p = 0.041$). The relationship between OHS and Work Productivity is the strongest among the structural paths, with $\beta = 0.989$ ($p < 0.001$).

Table 6 also shows a discrepancy between the sample mean and the original sample for the relationship between Work Environment and Work Productivity. The sample mean is -0.459 , whereas the original sample coefficient is 0.448 . This difference does not alter the interpretation of the structural relationship because the path coefficient is interpreted based on the original sample estimate. Accordingly, the relationship between Work Environment and Work Productivity is interpreted as positive, with a coefficient of 0.448 .

³² Hair and Alamer.

³³ Hair et al., *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook*.

³⁴ Hair et al.

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS at a 5 percent significance level. The critical t -statistic used was 1.977. Accordingly, a hypothesis was considered supported when the empirical direction of the coefficient was consistent with the proposed hypothesis, the t -statistic exceeded 1.977, and the p -value was below 0.05.³⁵

Table 7. Hypothesis Testing Results

Hypothesis	Relationship	β	T-statistic	P-value	Decision
H1	Work Environment $\rightarrow$ OHS	0.822	4.526	0.000	Supported
H2	Work Supervision $\rightarrow$ OHS	0.521	2.554	0.011	Supported
H3	Job Training $\rightarrow$ OHS	-0.437	2.123	0.034	Not supported
H4	Work Environment $\rightarrow$ Work Productivity	0.448	3.454	0.001	Supported
H5	Work Supervision $\rightarrow$ Work Productivity	0.585	2.975	0.003	Supported
H6	Job Training $\rightarrow$ Work Productivity	-0.285	2.053	0.041	Not supported
H7	OHS $\rightarrow$ Work Productivity	0.989	14.693	0.000	Supported

Source: SmartPLS 3.0 output, processed by the authors, 2025.

Based on the results in Table 7, H1 and H2 are supported because Work Environment and Work Supervision demonstrate positive and statistically significant relationships with OHS. Work Environment produces $\beta = 0.822$, $t = 4.526$, and $p < 0.001$, while Work Supervision produces $\beta = 0.521$, $t = 2.554$, and $p = 0.011$. In contrast, Job Training has a negative and statistically significant relationship with OHS ($\beta = -0.437$; $t = 2.123$; $p = 0.034$). Therefore, H3 is not supported because the empirical direction of the relationship is opposite to the positive direction proposed in the hypothesis. For Work Productivity, Work Environment ($\beta = 0.448$; $t = 3.454$; $p = 0.001$) and Work Supervision ($\beta = 0.585$; $t = 2.975$; $p = 0.003$) demonstrate positive and statistically significant relationships, supporting H4 and H5.

Furthermore, Table 7 indicates that Job Training has a negative and statistically significant relationship with Work Productivity ($\beta = -0.285$; $t = 2.053$; $p = 0.041$). Although the statistical significance criterion is met, the direction of the relationship is inconsistent with the hypothesized positive relationship; therefore, H6 is not supported. Meanwhile, OHS demonstrates the strongest positive relationship with Work Productivity ($\beta = 0.989$; $t = 14.693$; $p < 0.001$), supporting H7. Overall, the hypothesis testing results indicate that H1, H2, H4, H5, and H7 are supported, whereas H3 and H6 are not supported because their empirical coefficients have directions opposite to those proposed in the hypotheses.

The Effect of Work Environment on K3

The results demonstrate that Work Environment has a positive and statistically significant effect on K3, supporting H1. This finding indicates that occupational safety is influenced not only by formal safety regulations but also by the conditions in which workers perform their daily activities. A work environment that is orderly, safe, and supported by adequate facilities can facilitate more consistent implementation of safety procedures. This finding is consistent with the view that the work environment constitutes an important element influencing the implementation of work activities and employee conditions.³⁶

The finding is also consistent with evidence emphasizing the importance of safety climate in the Indonesian construction industry and with research linking the work environment to occupational safety and productivity.³⁷ Research further indicates that safety climate and productivity pressure are

³⁵ Sarstedt et al., "Progress in Partial Least Squares Structural Equation Modeling Use in Marketing Research in the Last Decade."

³⁶ Afandi, "Manajemen Sumber Daya Manusia (Teori, Konsep Dan Indikator)"; Sri, "Manajemen Sumber Daya Manusia. Cetakan Pertama."

³⁷ Kadir et al., "Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses, and Influential Demographic Characteristics"; Yana and Arifin, "The Influence of the Occupational of Safety & Health and Work Environment on Work Employees Productivity at Production Division of PT Trimitra Chitrahasta."

associated with workers' safety behaviour, including PPE use.³⁸ These findings strengthen the position of Work Environment within the K3 system. In construction activities, therefore, maintaining appropriate working conditions is not merely a matter of worker comfort but is also related to the practical implementation of occupational safety.

The Effect of Work Supervision on K3

Work Supervision has a positive and statistically significant effect on K3, supporting H2. This finding indicates that effective supervision can contribute to the implementation of occupational safety by enabling deviations from established procedures to be identified and corrected during work activities. Supervision also provides a mechanism for ensuring that safety standards are translated into actual work practices. This finding is consistent with the management perspective that supervision functions as a control mechanism for monitoring the implementation of work.³⁹

The result further supports research showing that supervisor capabilities are associated with improvements in safety climate and that safety monitoring and enforcement are important in the construction industry.⁴⁰ Research on learning from incidents also emphasizes the importance of identifying problems and using them as a basis for corrective action and continuous improvement.⁴¹ Thus, the positive relationship between Work Supervision and K3 indicates that supervision has a role that extends beyond administrative control. It provides an operational mechanism through which safety requirements can be monitored, reinforced, and corrected in the workplace.

The Effect of Job Training on K3

Job Training shows a negative and statistically significant relationship with K3, resulting in H3 not being supported. This finding differs from the theoretical expectation that training should strengthen workers' knowledge, skills, and ability to perform work safely. Training is generally positioned as an instrument for developing employee capabilities and work-related competencies.⁴² However, the effectiveness of safety training may depend on the methods used and how training content is applied in practice.⁴³ The empirical result indicates that the presence of training in the observed setting was not accompanied by a positive relationship with K3.

This finding differs from previous research reporting a positive relationship between training and occupational safety and health implementation.⁴⁴ Research on training effectiveness, however, indicates that training outcomes can vary according to the methods, content, and manner in which training is delivered.⁴⁵ In the construction sector, the relationship between training and safety may therefore depend on whether training is sufficiently relevant to actual work risks and whether the knowledge gained is transferred into daily safety practices. Evidence from the Indonesian construction industry also shows that the existence of safety-related systems and climate does not necessarily eliminate challenges in their implementation.⁴⁶ Accordingly, the unsupported H3 should not be interpreted as evidence that training is unnecessary. Rather, it qualifies the expected positive relationship by indicating that the contribution of training to K3 may depend on the quality, relevance, practical orientation, and implementation of the training process.

³⁸ Li et al., "Understanding the Influence of Safety Climate and Productivity Pressure on Non-Helmet Use Behavior at Construction Sites: A Case Study."

³⁹ Handoko, "Manajemen Sumber Daya Manusia (Edisi Revisi)"; Harianto, "Pengaruh Pengawasan Kerja Dan Disiplin Kerja Terhadap Kinerja Karyawan Pada Pt Centric Powerindo Di Kota Batam."

⁴⁰ Marín and Roelofs, "Promoting Construction Supervisors' Safety-Efficacy to Improve Safety Climate: Training Intervention Trial"; Kadir et al., "Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses, and Influential Demographic Characteristics."

⁴¹ Chan et al., "Improving Safety Performance of Construction Workers through Learning from Incidents."

⁴² Raymond Noe et al., "Human Resources Management: Gaining a Competitive Advantage, Tenth Global Edition," New York, MA: McGraw-Hill Education.[Google Scholar], 2019.

⁴³ Beś and Strzałkowski, "Analysis of the Effectiveness of Safety Training Methods."

⁴⁴ Beś and Strzałkowski.

⁴⁵ Kadir et al., "Safety Climate in the Indonesian Construction Industry: Strengths, Weaknesses, and Influential Demographic Characteristics."

The Effect of Work Environment on Work Productivity

Work Environment has a positive and statistically significant effect on Work Productivity, supporting H4. This finding indicates that appropriate working conditions can support the effective use of workers' time, energy, and available resources. A well-organized work environment can reduce disruptions in work processes and help workers perform their assigned tasks more efficiently. The result is consistent with research showing that work organization and work environment are associated with productivity among construction workers, as well as research identifying a relationship between work environment and employee productivity.⁴⁶

The finding is also consistent with evidence concerning the consequences of inadequate working conditions for productivity.⁴⁷ Previous research has further identified relationships among work environment, occupational safety and health, and productivity.⁴⁸ Taken together, these findings indicate that the work environment can function as part of the operational conditions supporting productivity. In construction work, conditions that interfere with task execution may contribute to delays, errors, waiting time, or rework. Therefore, productivity improvement needs to consider the quality of the working environment alongside work targets and output requirements.

The Effect of Work Supervision on Work Productivity

Work Supervision has a positive and statistically significant effect on Work Productivity, supporting H5. The finding indicates that supervision can contribute to productivity by maintaining alignment between work activities and established targets, identifying errors at an early stage, clarifying responsibilities, and limiting unnecessary rework. This result is consistent with research specifically examining construction sites and identifying a relationship between supervision and labour productivity, as well as research emphasizing the role of supervision in work implementation.⁴⁹

Nevertheless, the productivity function of supervision needs to be distinguished from the mere intensification of pressure on workers. Evidence shows that productivity-improvement strategies that are not integrated with safety considerations may generate unintended consequences for safety behaviour.⁵⁰ The present finding therefore supports the role of supervision in productivity while reinforcing the need for supervision to address productivity, work quality, and safety simultaneously. In this sense, supervision can function as a coordinating mechanism that helps maintain efficient work processes without separating productivity objectives from K3 requirements.

The Effect of Job Training on Work Productivity

Job Training shows a negative and statistically significant relationship with Work Productivity, resulting in H6 not being supported. This finding differs from the theoretical expectation that training should improve employee capabilities and consequently contribute to higher productivity. It also differs from previous studies reporting positive relationships between training and productivity.⁵¹ The empirical result therefore represents an important qualification to the expected role of training in the present research setting.

⁴⁶ Evanoff et al., "Influence of Work Organization and Work Environment on Missed Work, Productivity, and Use of Pain Medications among Construction Apprentices"; Yana and Arifin, "The Influence of the Occupational of Safety & Health and Work Environment on Work Employees Productivity at Production Division of PT Trimitra Chitrahasta."

⁴⁷ Abrey and Smallwood, "The Effects of Unsatisfactory Working Conditions on Productivity in the Construction Industry."

⁴⁸ Rezeki, "PERAN DISIPLIN KERJA SEBAGAI MEDIASI KESELAMATAN, KESEHATAN KERJA DAN LINGKUNGAN KERJASERTA DAMPAKNYA TERHADAP PRODUKTIVITAS KARYAWAN PADA MASA PANDEMI COVID-19 DI PERUSAHAAN OTOMOTIF BEKASI: Occupational Safety & Health, Work Discipline, Work Environment, Employee Work Productivity."

⁴⁹ Jimoh et al., "Influence of Supervision on Labour Productivity on Construction Sites in Abuja-Nigeria."

⁵⁰ Ghodrati et al., "Unintended Consequences of Productivity Improvement Strategies on Safety Behaviour of Construction Labourers; a Step toward the Integration of Safety and Productivity."

⁵¹ Parlinda and Ubaidillah, "Training, Motivation, and Environment: Boosting Contractor Work Productivity: Pelatihan, Motivasi Kerja, Dan Lingkungan Kerja: Meningkatkan Produktivitas Kerja Kontraktor"; Putri and Sinulingga, "The Effect of Training and the Implementation of Occupational Health and Safety Systems on Employee Productivity of PT. PP. London Sumatra Indonesia Tbk Branch Office Medan."

The negative coefficient should not, however, be interpreted as evidence that training inherently reduces productivity. Previous research indicates that training effectiveness can be influenced by the content, method, and implementation of the training process.⁵² In construction activities, the contribution of training to productivity may depend on its relevance to actual job requirements and the extent to which acquired knowledge and skills are transferred into daily work. The present finding therefore qualifies previous findings by showing that the provision of training alone does not guarantee a positive productivity outcome. The relationship may also be influenced by the relevance of training content, its practical application, timing, and integration with actual work processes.

The Effect of K3 on Work Productivity

K3 has a positive and statistically significant effect on Work Productivity, supporting H7. This finding is consistent with the International Labour Organization's position that occupational safety and health can serve as a means of supporting productivity.⁵³ When workers are better protected from occupational hazards and work-related health disruptions, conditions that may interrupt work processes and contribute to lost working time can be reduced. The present finding is also consistent with empirical research demonstrating positive relationships between occupational safety and health and productivity or worker performance across construction and related work settings.⁵⁴

The strength of the relationship observed in this study is particularly relevant when considered alongside research showing that productivity pressure may affect safety behavior when productivity and safety are managed separately.⁵⁵ The present result therefore reinforces the importance of treating K3 as an integral component of productivity management rather than as a separate compliance function. Research on OHS management systems further indicates that systematic management of occupational safety and health is connected with organizational performance and sustainability in the construction sector.⁵⁶

The strength of this relationship should nevertheless be interpreted with caution. The HTMT value between OHS and Work Productivity is 0.903, which exceeds the commonly applied threshold of 0.90, while the path coefficient from OHS to Work Productivity is also very high ($\beta = 0.989$). Although the structural result supports H7, these values suggest a relatively strong empirical overlap between the two constructs. Therefore, the finding should be understood as evidence of a very strong relationship within the proposed model rather than as evidence that OHS fully determines Work Productivity. Further

⁵² Bęś and Strzałkowski, "Analysis of the Effectiveness of Safety Training Methods."

⁵³ I L O Keselamatan, "Kesehatan Kerja Sarana Untuk Produktivitas," *Jakarta: International Labour Organization*, 2013.

⁵⁴ Soltaninejad, Fardhosseini, and Kim, "Safety Climate and Productivity Improvement of Construction Workplaces through the 6S System: Mixed-Method Analysis of 5S and Safety Integration"; Wong, Sapuan, and Khan, "The Impact of Safety and Health towards Construction Workforce Productivity"; Lari, "A Longitudinal Study on the Impact of Occupational Health and Safety Practices on Employee Productivity"; Damayanti, "Suhudi, & Febrianto, RS (2025). Occupational Safety, Health, and Awareness as Determinants of Productivity: A PLS-SEM Study of Construction Workers in Malang"; Ahmad Baghdadi, "An Evaluation Study of the Impact of Occupational Health and Safety on Productivity in Saudi Arabia Construction Industry," *Am. J. Civil Eng. Archit* 12, no. 2 (2024): 36–43; Tetu Mwenda Mutegi, Paul Mugambi Joshua, and Jesse Maina Kinyua, "Workplace Safety and Employee Productivity of Manufacturing Firms in Kenya," *Cogent Business & Management* 10, no. 2 (2023): 2215569; Moses Segbenya and Esi Yeboah, "Effect of Occupational Health and Safety on Employee Performance in the Ghanaian Construction Sector," *Environmental Health Insights* 16 (2022): 11786302221137222; D K Sunarjo and M Amin, "Construction Project Performance Based on Occupational Safety, Occupational Health and Work Motivation," *Asian J. Eng. Soc. Health* 3, no. 10 (2024): 2297–2306.

⁵⁵ Ghodrati et al., "Unintended Consequences of Productivity Improvement Strategies on Safety Behaviour of Construction Labourers; a Step toward the Integration of Safety and Productivity."

⁵⁶ Kineber et al., "Benefits of Implementing Occupational Health and Safety Management Systems for the Sustainable Construction Industry: A Systematic Literature Review"; Genny Torcoroma Navarro Claro, José Andrés Bayona Soto, and José Gregorio Arévalo Ascanio, "Impact of the Occupational Health and Safety Management System (OHSMS) on Human Talent Management and Organizational Performance in the Construction Sector," *Frontiers in Built Environment* 11 (2025): 1618356; Aicha Bourahla, Gabriela Fernandes, and Luis Miguel D F Ferreira, "Managing Occupational Health and Safety Risks in Construction Projects to Achieve Social Sustainability—A Review of Literature," *Procedia Computer Science* 239 (2024): 1053–61.

research may consider refining the measurement indicators or examining the constructs in different construction settings to assess their empirical distinctiveness.

Taken together, the seven structural relationships provide an integrated picture of the factors associated with K3 and Work Productivity in the research setting. Work Environment and Work Supervision demonstrate positive and statistically significant effects on both K3 and Work Productivity, while K3 has the strongest positive effect on Work Productivity. Job Training, in contrast, shows negative and statistically significant relationships with both K3 and Work Productivity, resulting in H3 and H6 not being supported because the empirical directions differ from those hypothesized. This pattern suggests that the relationship between human resource practices and these outcomes may depend not only on whether a program is provided but also on how appropriately it is implemented in actual work processes. The findings therefore reinforce previous evidence concerning the importance of the work environment, supervision, and K3 while qualifying the assumption that training necessarily produces positive outcomes simply through its provision. Previous research similarly points to the interconnectedness of work environment, occupational safety and health, and productivity, while emphasizing that the effectiveness of K3 interventions depends on their implementation.⁵⁷

Managerial Implications

The contribution of this study lies in emphasizing that productivity in construction companies needs to be developed through a supportive work environment, consistent supervision, effective implementation of occupational health and safety (OHS), and training that is relevant to job requirements. For the management of CV Griya Fajar Konstruksi, this can be achieved through proper work-area organization, the provision of personal protective equipment (PPE) and safety facilities, direct supervision of high-risk activities, and immediate correction of procedural violations. OHS should be positioned as an integral component of project management because the findings indicate that OHS has the strongest relationship with Work Productivity. Therefore, the achievement of productivity targets should not rely on increasing work pressure, but rather on establishing a work system that maintains safety while supporting smooth work processes.

The negative relationships between Job Training and OHS and between Job Training and Work Productivity also provide important implications for management to evaluate the content, methods, target participants, and application of training outcomes rather than merely increasing training frequency. Training should be aligned with job-related risks and requirements, emphasize practical field-based activities, and be followed by evaluations of changes in workers' capabilities and behavior. Integrating a supportive work environment, consistent supervision, strong OHS practices, and targeted training can help the company establish work processes that are safe, well-directed, competent, and efficient, thereby supporting sustainable productivity.

Conclusion

This study shows that Work Environment and Work Supervision have positive and significant effects on OHS and Work Productivity, while OHS has a positive and strongest effect on Work Productivity. In contrast, Job Training shows negative and significant relationships with OHS and Work Productivity, resulting in H3 and H6 not being supported. Thus, five of the seven hypotheses are supported. These findings indicate that productivity in construction companies is better supported by adequate working conditions, effective supervision, and consistent OHS implementation. At the same time, the negative relationships involving Job Training suggest that the existence of training programs does not necessarily guarantee improvements in safety and productivity, making the relevance of training content and its application in actual work processes important considerations.

⁵⁷ Rezeki, "PERAN DISIPLIN KERJA SEBAGAI MEDIASI KESELAMATAN, KESEHATAN KERJA DAN LINGKUNGAN KERJASERTA DAMPAKNYA TERHADAP PRODUKTIVITAS KARYAWAN PADA MASA PANDEMI COVID-19 DI PERUSAHAAN OTOMOTIF BEKASI: Occupational Safety & Health, Work Discipline, Work Environment, Employee Work Productivity"; Gaia Vitrano and Guido J L Micheli, "Effectiveness of Occupational Safety and Health Interventions: A Long Way to Go," *Frontiers in Public Health* 12 (2024): 1292692.

This study reinforces the view that OHS is not merely an instrument for protecting workers but also an important component of construction productivity. The findings concerning Job Training extend previous research by showing that the relationship between training, OHS, and productivity is not necessarily positive and may depend on the quality of its implementation. The findings also provide a basis for companies to prioritize improvements in the work environment, supervision, and OHS implementation while reassessing training effectiveness to ensure greater alignment with workplace needs and operational risks.

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