



THE EFFECT OF TRAINING AND DEVELOPMENT PROGRAMS ON EMPLOYEE PERFORMANCE: THE MEDIATING ROLE OF COMPETENCE AT DIVISIONAL REGIONAL IV TANJUNG KARANG, PT KERETA API INDONESIA (PERSERO)

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ABSTRACT

Employee performance is an important aspect in supporting the operational success of railway companies, where accuracy, discipline, competence, and compliance with operational standards are essential. At PT Kereta Api Indonesia (Persero) Regional Division IV Tanjung Karang, participation in education and training programs increased throughout the 2023–2025 period. Nevertheless, employee competence and performance remained below the company's 100% target during the same period. This condition highlights the need to examine the effectiveness of training programs in improving employee performance, including through the development of employee competence. This study aims to analyze the effects of training programs on employee performance, the effect of training programs on competence, the effect of competence on employee performance, and the mediating role of competence in the relationship between training programs and employee performance at PT Kereta Api Indonesia (Persero) Regional Division IV Tanjung Karang. The study employed a quantitative approach using an explanatory research design. The sample consisted of 120 non-crew employees who had participated in the company's training programs, selected using a saturated sampling technique. Data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with the assistance of SmartPLS 4 through measurement model evaluation, structural model assessment, and hypothesis testing. The findings indicate that the training program has a positive and significant effect on employee performance, with a path coefficient of 0.472 and a T-statistic of 5.579. The training program also has a positive and significant effect on competence, with a path coefficient of 0.702 and a T-statistic of 16.457. Furthermore, competence has a positive and significant effect on employee performance, with a path coefficient of 0.384 and a T-statistic of 4.271. The indirect effect analysis demonstrates that competence partially mediates the relationship between the training program and employee performance, with an indirect effect of 0.270 and a T-statistic of 3.983. Overall, the training program and competence explain 62.5% of the variance in employee performance. These findings indicate that improving employee performance is associated not only with the direct implementation of training programs but also with the extent to which such programs

successfully develop employee competence. Therefore, the company should align training programs with the competency requirements of each position, strengthen technical and application-oriented training methods, and conduct continuous evaluations of employee competence and performance.

Keywords : Training Program, Competence, Employee Performance, Mediating Variable, PT Kereta Api Indonesia (Persero).

ABSTRAK

Kinerja karyawan menjadi salah satu aspek penting dalam mendukung keberhasilan operasional perusahaan perkeretaapian yang menuntut ketepatan, kedisiplinan, kompetensi, dan kepatuhan terhadap standar operasional. Pada PT Kereta Api Indonesia (Persero) Divisi Regional IV Tanjung Karang, jumlah peserta program pendidikan dan pelatihan (diklat) menunjukkan peningkatan selama periode 2023–2025. Namun, capaian kompetensi dan kinerja karyawan pada periode tersebut masih berada di bawah target perusahaan sebesar 100%. Kondisi tersebut menjadi dasar perlunya pengujian mengenai efektivitas program diklat dalam meningkatkan kinerja, termasuk melalui peningkatan kompetensi karyawan. Penelitian ini bertujuan menganalisis pengaruh program diklat terhadap kinerja karyawan, pengaruh program diklat terhadap kompetensi, pengaruh kompetensi terhadap kinerja, serta peran kompetensi dalam memediasi hubungan antara program diklat dan kinerja karyawan pada PT Kereta Api Indonesia (Persero) Divisi Regional IV Tanjung Karang. Penelitian menggunakan pendekatan kuantitatif dengan desain *explanatory research*. Sampel penelitian terdiri atas 120 karyawan non-kru yang telah mengikuti program diklat dan ditentukan melalui teknik *sampling jenuh*. Data dianalisis menggunakan *Structural Equation Modeling-Partial Least Squares (SEM-PLS)* dengan bantuan *SmartPLS 4* melalui pengujian model pengukuran, model struktural, dan hipotesis. Hasil penelitian menunjukkan bahwa program diklat berpengaruh positif dan signifikan terhadap kinerja karyawan dengan koefisien jalur sebesar 0,472 dan *T-statistics* 5,579. Program diklat juga berpengaruh positif dan signifikan terhadap kompetensi dengan koefisien jalur 0,702 dan *T-statistics* 16,457. Selanjutnya, kompetensi terbukti berpengaruh positif dan signifikan terhadap kinerja karyawan dengan koefisien jalur 0,384 dan *T-statistics* 4,271. Pengujian pengaruh tidak langsung menunjukkan bahwa kompetensi memediasi secara parsial hubungan antara program diklat dan kinerja karyawan, dengan nilai pengaruh tidak langsung sebesar 0,270 dan *T-statistics* 3,983. Secara keseluruhan, program diklat dan kompetensi mampu menjelaskan 62,5% variasi kinerja karyawan. Temuan ini menunjukkan bahwa peningkatan kinerja tidak hanya berkaitan dengan pelaksanaan program diklat secara langsung, tetapi juga dengan keberhasilan perusahaan dalam mengembangkan kompetensi karyawan melalui program tersebut. Oleh karena itu, perusahaan perlu menyelaraskan program diklat dengan kebutuhan kompetensi setiap jabatan, memperkuat pelatihan teknis dan metode pembelajaran aplikatif, serta melakukan evaluasi kompetensi dan kinerja secara berkelanjutan.

Kata Kunci : Program Diklat, Kompetensi, Kinerja Karyawan, Variabel Mediasi, PT Kereta Api Indonesia (Persero).

INTRODUCTION

Human resources play a strategic role in determining organizational success, particularly in railway transportation companies where safety, punctuality, service quality, and compliance with operational procedures are integral to daily operations. Effective human resource development enables organizations to strengthen employees' capabilities and align individual competencies with organizational objectives. Research on human resource development has shown that HRD practices, particularly training and development, can contribute to the development of employee competencies and organizational effectiveness (Potnuru et al., 2021; Otoo & Mishra, 2018). In addition, workplace learning has increasingly been recognized as an important mechanism for connecting employee development with organizational performance (Billett, 2020). PT Kereta Api Indonesia (Persero), including its Regional Division IV Tanjung Karang, requires employees who are not only capable of performing their duties in accordance with established operating standards but are also able to adapt to technological developments and changing job requirements. Under these conditions, human resource development becomes an important component of efforts to maintain productivity, improve service quality, and support the sustainability of railway operations.

One of the strategies adopted by organizations to develop human resource quality is the implementation of education and training programs. Such programs are generally designed to strengthen employees' knowledge, skills, abilities, and work attitudes so that they can perform their responsibilities more effectively and in accordance with organizational requirements. Empirical research indicates that training and development can contribute positively to employee and organizational performance (Saputri et al., 2020; Idris et al., 2023; Otoo & Mishra, 2018). However, the effectiveness of training depends not only on employees' participation but also on whether the knowledge and skills acquired during training are transferred and applied in the workplace. Hughes et al. (2019) emphasize that training transfer is essential for converting learning acquired during training into actual work performance, while Bozionelos et al. (2020) found that employer-sponsored training can improve learning, employability, and job performance. In the context of PT Kereta Api Indonesia (Persero), training programs are particularly important because employee competence is closely related to work activities that require accuracy, discipline, technological proficiency, compliance with operating standards, and a strong understanding of safety requirements. Therefore, the effectiveness of training cannot be assessed solely based on the number of employees participating in the programs but also on the extent to which training contributes to improved competence and observable changes in work performance.

Internal data from Regional Division IV Tanjung Karang indicate that employee participation in education and training programs increased considerably during the 2023–2025 period. The number of participants increased from 615 employees in 2023 to 728 in 2024 and reached 839 in 2025. The largest training program in terms of participation was Railway Safety and Operations Training, followed by Customer Service Training, Technology and Information Systems Training, Discipline and Work SOP Training, and Leadership and Teamwork Training. The increasing number of participants reflects the company's continuous efforts to develop its human resources. Nevertheless, a higher level of participation does not necessarily indicate that the training programs have achieved the expected level of effectiveness. This consideration is consistent with the training-transfer literature, which emphasizes that the benefits of training depend substantially on employees' ability and opportunity to apply newly acquired knowledge and skills in their actual work environment (Hughes et al., 2019; Hussain et al., 2020).

This issue becomes more apparent when examined in relation to employee performance. Performance assessments show an increase in the average performance score from 79.42% in 2023 to 83.23% in 2024 and 85.28% in 2025. Despite this positive trend, the achievement remained below the company's 100% target. In 2025, responsibility reached 88%, service 87%, and teamwork 86%, while punctuality reached only 82% and work quality 84%. These figures indicate that employee performance improved over the period but had not yet fully reached the performance standards established by the company. From an empirical perspective, previous research has demonstrated that training and HRD practices can be associated with employee performance, although the magnitude and mechanism of these relationships may differ across organizational contexts (Saputri et al., 2020; Otoo & Mishra, 2018; Idris et al., 2023). Such findings support the need to examine not only whether training is related to performance but also the process through which training may contribute to performance improvement.

A similar pattern can be observed in employee competence. The average competence achievement increased from 89.66% in 2023 to 91.67% in 2024 and 93.00% in 2025. Improvements were recorded across several competence indicators, including knowledge, understanding, skills, work values, attitudes, and interest. However, all indicators remained below the company's 100% target. In 2025, knowledge reached 93%, understanding 92%, skills 94%, work values 92%, attitude 92%, and interest 95%. Thus, although employee competence demonstrated a continuous upward trend, the existing level had not fully closed the gap between actual achievement and the standards expected by the company. The importance of competence in translating HRD initiatives into organizational outcomes is supported by Potnuru et al. (2021), who found that training and career

development significantly influence employee competencies. Similarly, Ardi et al. (2020) identified training and professional competence as relevant factors in explaining employee performance, while Garaika (2020) reported a significant positive relationship between competence and performance.

The relationship between training programs, competence, and employee performance is therefore important to investigate because training does not necessarily translate directly into improved performance. Knowledge and skills acquired through training need to be transformed into work-related capabilities that can be effectively applied in daily tasks. Training transfer represents an important stage in this process because learning outcomes must be transferred from the training environment to actual work practices (Hughes et al., 2019). Research by Pangestika et al. (2023) provides empirical evidence that training and development can improve employee performance through competence as an intervening mechanism. Similarly, Ardi et al. (2020) examined the relationship among training, professional competence, and employee performance, supporting the relevance of competence in the training-performance relationship. Employees with adequate competence are expected to be better able to implement work procedures, operate relevant technologies, complete tasks accurately, maintain work quality, and fulfill organizational responsibilities and targets.

The need to examine this relationship is further supported by the research gap identified in the thesis. Previous studies have frequently examined education and training in relation to employee performance. However, research that specifically explains the mechanism through which training affects performance by positioning competence as a mediating variable remains important to develop, particularly within the railway industry. Existing empirical studies have demonstrated the relevance of competence as an explanatory mechanism between human resource development and organizational outcomes. For example, Chakravarthy et al. (2016) found that HRD interventions such as training contribute to employee competency development, which subsequently supports organizational effectiveness. More recently, Pangestika et al. (2023) directly examined training and development with competence as a mediating variable, while Widiyanti et al. (2025) demonstrated that training and competence are relevant factors associated with employee performance. Nevertheless, differences in organizational characteristics and occupational requirements indicate the need for further investigation in operationally sensitive industries such as railway transportation

This study focuses specifically on non-crew employees of PT Kereta Api Indonesia (Persero) Regional Division IV Tanjung Karang, comprising Train Traffic Controllers (PPKA), Signal House Officers (PRS), Railway Track Officers (PLR), and Level Crossing Guards (PJL). These positions are directly associated

with the smooth operation of railway services through train movement control, signaling system operation, railway track monitoring, and the protection of level crossings. Accordingly, their duties require technical competence, decision-making ability, accuracy, and strict compliance with company operating procedures. Within such an operational environment, competence development through training constitutes an important element in supporting effective job performance and reducing the potential for operational errors. The importance of training in safety-sensitive work environments is also supported by Hussain et al. (2020), who examined the effect of safety training and training-transfer interventions on workers' ability to apply safety-related learning in practice. Therefore, examining training, competence, and performance within railway operational positions provides a context-specific contribution to the existing human resource development literature.

Based on these empirical conditions, the increase in training participation, together with improvements in employee competence and performance, has not yet resulted in achievements that fully meet the company's established targets. This situation highlights the importance of examining whether training programs influence employee performance and the extent to which competence serves as a pathway linking training implementation to employee performance. Previous research provides evidence that training can be associated with performance outcomes (Saputri et al., 2020; Idris et al., 2023), while other studies demonstrate the importance of competence in connecting human resource development initiatives with organizational outcomes (Potnuru et al., 2021; Ardi et al., 2020). More specifically, Pangestika et al. (2023) found that competence can function as an intermediary mechanism in the relationship between training and employee performance. Therefore, this study aims to analyze the effect of education and training programs on employee performance, with competence as a mediating variable, at PT Kereta Api Indonesia (Persero) Regional Division IV Tanjung Karang.

LITERATUR REVIEW

Education and Training Program

A training and development program is an essential component of human resource management that is systematically designed to improve employees' knowledge, skills, abilities, and attitudes in carrying out their work responsibilities. Through appropriate training, employees can acquire new knowledge and develop practical skills that are relevant to their positions and organizational requirements. Training and development therefore serve not only as a mechanism for improving individual capabilities but also as an organizational investment intended to support better employee performance. Previous research

has demonstrated that well-designed training and development programs can contribute positively to employee performance by strengthening employees' abilities to perform their tasks effectively (Saputri et al., 2020; Pangestika et al., 2023; Ardi et al., 2020).

The implementation of training and development should be aligned with employees' actual job requirements and organizational objectives. Effective programs generally provide relevant learning materials, appropriate training methods, competent instructors, adequate facilities, and systematic evaluation. These elements allow employees to understand the material provided and apply the knowledge and skills gained from training in their daily work. In this regard, training effectiveness is reflected not merely in employees' participation in training activities but also in their ability to transfer acquired knowledge and skills into workplace practices. Research by Pangestika et al. (2023) found that training and development positively contributed to employee performance through competency improvement, while Saputri et al. (2020) reported a significant relationship between training and development and employee performance.

Based on the conceptual framework used in this study, the Training and Development Program can be assessed through several important dimensions, namely training materials, training methods, instructor competence, training facilities, and training evaluation. These dimensions describe whether the training program is appropriately designed, effectively delivered, and capable of supporting employees in applying the knowledge and skills obtained during training. Therefore, the quality of a training program can be viewed from both the process and outcome perspectives. Training that is relevant to employees' responsibilities and supported by competent instructors, suitable facilities, and effective evaluation is expected to strengthen employee capabilities and subsequently contribute to improved work performance (Ardi et al., 2020; Pangestika et al., 2023; Saputri et al., 2020).

Competence

Competence represents an important element of human resource quality because it reflects the combination of knowledge, skills, abilities, and behavioral characteristics required for employees to perform their responsibilities effectively. Employees with appropriate competence are generally better equipped to understand job requirements, solve work-related problems, adapt to changing conditions, and accomplish tasks according to established standards. Competence is therefore not limited to technical knowledge but also encompasses the practical ability and behavioral capacity to apply knowledge effectively in the workplace. Previous empirical studies have identified competence as an important factor associated with employee performance (Ardi et al., 2020; Garaika, 2020; Widiyanti et al., 2025).

Employee competence can develop through education, training, work experience, continuous learning, and opportunities to apply acquired knowledge in actual work situations. Training programs are particularly important because they provide employees with opportunities to strengthen their technical and interpersonal capabilities in accordance with organizational needs. The development of competence also requires continuous adaptation because changes in technology, work processes, and organizational demands may require employees to acquire new capabilities. Research by Ardi et al. (2020) examined the relationship between training, professional competence, and employee performance, while Garaika (2020) demonstrated the relevance of training and competence to employee performance. These findings indicate that competency development can function as an important mechanism through which human resource development initiatives contribute to workplace outcomes.

In this study, competence is represented by several dimensions, including knowledge, understanding, skills, values, attitudes, and interests. These dimensions describe employees' capacity to understand their work, perform tasks appropriately, demonstrate constructive work attitudes, and apply their abilities in accordance with organizational requirements. Competence becomes particularly important when employees are expected to transfer the knowledge and skills obtained through training into actual job performance. Recent research has likewise shown that employee competence has a significant relationship with employee performance and can serve as an important mechanism linking human resource development initiatives with performance outcomes (Widiyanti et al., 2025; Pangestika et al., 2023; Ardi et al., 2020).

Employee Performance

Employee performance refers to the results achieved by employees in carrying out their assigned duties and responsibilities in accordance with predetermined standards. Performance may be reflected through the quality and quantity of work completed, the timeliness of task accomplishment, discipline, responsibility, service orientation, and the ability to work collaboratively with others. From an organizational perspective, employee performance is an important indicator because the achievement of organizational objectives depends substantially on the extent to which employees can effectively perform their respective roles. Consequently, organizations need to ensure that employees possess the capabilities and resources required to achieve expected performance standards.

Employee performance is influenced by various individual and organizational factors, including competence, training, motivation, work environment, and opportunities for development. Competent employees are more likely to understand job requirements and apply appropriate knowledge and skills

when completing their responsibilities. Similarly, training and development can improve employees' capabilities and facilitate the transfer of newly acquired knowledge into workplace practices. Empirical evidence supports the importance of these factors. Saputri et al. (2020) found that training and development significantly influenced employee performance, while Ardi et al. (2020) examined training and professional competence as factors related to employee performance. More recent research by Widiyanti et al. (2025) also examined training and competence in relation to employee performance in the telecommunications sector.

In the context of this study, employee performance can be assessed through work quantity, work quality, timeliness, work discipline, service, responsibility, and teamwork. These indicators provide a comprehensive representation of how employees accomplish their responsibilities and contribute to organizational objectives. Performance is not solely determined by the amount of work completed but also by the quality of outputs, adherence to deadlines and procedures, responsibility for assigned duties, service delivery, and cooperation with colleagues. Therefore, improvements in employee performance can be supported through systematic training and continuous competency development. Previous research indicates that training and competence are important elements in strengthening employee performance, providing empirical support for examining the relationship among the Training and Development Program, Competence, and Employee Performance in this study (Pangestika et al., 2023; Ardi et al., 2020; Widiyanti et al., 2025).

Framework

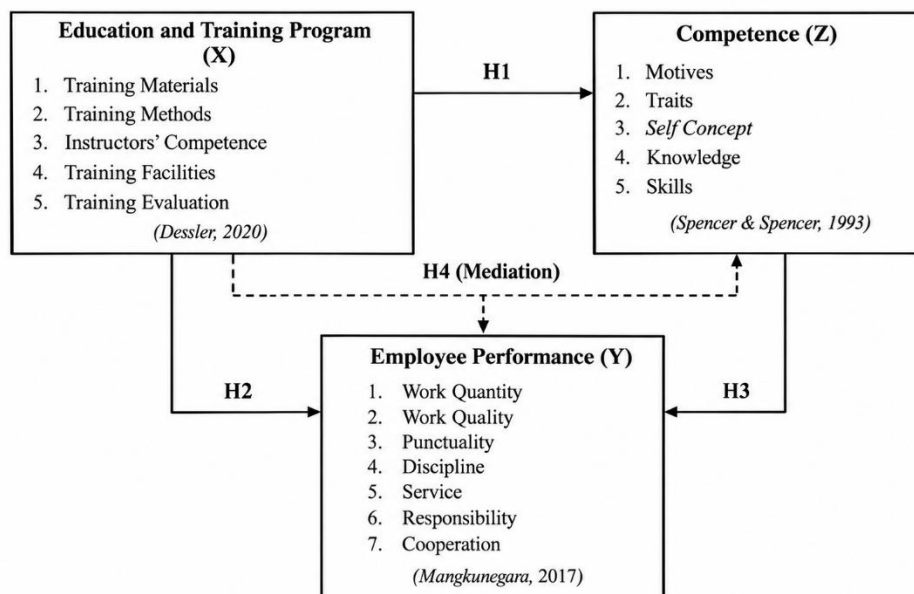


Figure 2. Framework

Hypotheses

H1: The Education and Training Program (Diklat) has a positive and significant effect on the Competence of employees at PT Kereta Api Indonesia (Persero) Divisi Regional IV Tanjung Karang.

H2: The Education and Training Program (Diklat) has a positive and significant effect on Employee Performance at PT Kereta Api Indonesia (Persero) Divisi Regional IV Tanjung Karang.

H3: Competence has a positive and significant effect on Employee Performance at PT Kereta Api Indonesia (Persero) Divisi Regional IV Tanjung Karang.

H4: Competence mediates the effect of the Education and Training Program (Diklat) on Employee Performance at PT Kereta Api Indonesia (Persero) Divisi Regional IV Tanjung Karang.

RESEARCH METHODOLOGY

This study employed a quantitative approach with an explanatory research design to examine the causal relationships among the Training and Education Program, Competence, and Employee Performance. A survey method with a cross-sectional design was applied, in which data were collected during a specific period through questionnaires distributed to the respondents. The study involved three variables: the Training and Education Program (X) as the independent variable, Competence (Z) as the mediating variable, and Employee Performance (Y) as the dependent variable. This research design was used to examine the direct effects of the Training and Education Program on Competence and Employee Performance, as well as its indirect effect on Employee Performance through Competence as a mediating variable.

The study was conducted at Regional Division IV Tanjung Karang of PT Kereta Api Indonesia (Persero). The research population consisted of 120 non-crew employees who had participated in education and training programs organized by the company. The respondents represented four non-crew positions: Train Travel Controllers (PPKA), Signal House Officers (PRS), Rail Track Officers (PLR), and Level Crossing Guards (PJL). Because the population was relatively limited and all members could be reached, a saturated sampling technique or census was employed. Accordingly, all 120 members of the population were included as research respondents.

The study utilized both primary and secondary data. Primary data were obtained directly from respondents through questionnaires designed to measure their perceptions of the implementation of the Training and Education Program, Competence, and Employee Performance. Secondary data were obtained from company documents, including organizational profiles, training participation

records, competency data, employee performance assessments, and relevant academic literature. Data were collected through questionnaires, observations, documentation, and a literature review. The questionnaire employed a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

The Training and Education Program was measured using five indicators: training materials, training methods, instructor competence, training facilities, and training evaluation. Competence was measured using five indicators: motives, traits, self-concept, knowledge, and skills. Employee Performance was assessed through work quality, work quantity, timeliness, responsibility, and teamwork. Each indicator was operationalized into several questionnaire items and measured using a five-point Likert scale.

Data were analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) with SmartPLS 4. The use of PLS-SEM was appropriate because the study examined simultaneous relationships among latent constructs, including both direct and indirect relationships involving a mediating variable. Hair et al. (2019) provide methodological guidelines for the application and reporting of PLS-SEM, including the evaluation of measurement and structural models and the assessment of relationships among latent constructs. The analysis consisted of two main stages: evaluation of the outer model and evaluation of the inner model. The outer model was assessed through convergent validity, discriminant validity, and construct reliability. Convergent validity was evaluated using outer loadings and Average Variance Extracted (AVE), while discriminant validity was assessed using the Fornell-Larcker criterion and the Heterotrait-Monotrait Ratio (HTMT). Construct reliability was examined using Cronbach's Alpha and Composite Reliability.

The inner model evaluation examined the explanatory capability of the structural model using the coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). Hypothesis testing was conducted using the bootstrapping procedure in SmartPLS 4 by examining path coefficients, t-statistics, and p-values. A hypothesis was considered statistically significant when the t-statistic exceeded 1.96 and the p-value was below 0.05. The indirect-effect analysis was conducted to determine the mediating role of Competence in the relationship between the Training and Education Program and Employee Performance.

RESULTS AND DISCUSSION

Convergent Validity (Loading Factor)

Table 1. Loading Factor Test Results

	Training Program (X)	Employee performance (Y)	Competence (Z)	Description
X1	0,870			Valid
X10	0,839			Valid
X2	0,867			Valid
X3	0,820			Valid
X4	0,780			Valid
X5	0,819			Valid
X6	0,831			Valid
X7	0,809			Valid
X8	0,817			Valid
X9	0,834			Valid
Y1		0,856		Valid
Y10		0,787		Valid
Y2		0,769		Valid
Y3		0,794		Valid
Y4		0,755		Valid
Y5		0,764		Valid
Y6		0,715		Valid
Y7		0,797		Valid
Y8		0,782		Valid
Y9		0,793		Valid
Z1			0,778	Valid
Z10			0,829	Valid
Z2			0,783	Valid
Z3			0,828	Valid
Z4			0,831	Valid
Z5			0,808	Valid
Z6			0,761	Valid
Z7			0,798	Valid
Z8			0,764	Valid
Z9			0,777	Valid

Source: Processed data, 2026.

Based on the outer loading test presented in Table 4.6, all indicators of each construct obtained loading factor values above 0.70, indicating that they meet the requirements for convergent validity. The Training Program construct (X) recorded outer loading values ranging from 0.780 to 0.870, with the highest value

obtained by indicator X1 at 0.870 and the lowest by indicator X4 at 0.780. For the Employee Performance construct (Y), the outer loading values ranged from 0.715 to 0.856, with indicator Y1 showing the highest value of 0.856, while indicator Y6 recorded the lowest value of 0.715. Meanwhile, the Competence construct (Z) demonstrated outer loading values between 0.761 and 0.831, with indicator Z4 achieving the highest value of 0.831 and indicator Z6 the lowest at 0.761. These findings confirm that all indicators used to measure the Training Program, Employee Performance, and Competence constructs satisfy the criteria for convergent validity and adequately represent their respective constructs. Therefore, all indicators can be retained and employed in the subsequent stages of analysis.

Average Variance Extracted (AVE)

Table 2. AVE Test Results

	Average variance extracted (AVE)	Ket
Employee Performance (Y)	0,611	Valid
Competence (Z)	0,634	Valid
Training and Development Program (X)	0,687	Valid

Source: Processed data, 2026.

Based on the Average Variance Extracted (AVE) test results, all constructs obtained AVE values above 0.50, indicating that they meet the criteria for convergent validity. The AVE values were 0.611 for Employee Performance (Y), 0.634 for Competence (Z), and 0.687 for the Training Program (X). Therefore, all constructs are considered valid and suitable for use in the subsequent analysis.

Discriminant Validity

Table 3. Fornel Test Results

	Employee Performance (Y)	Competence (Z)	Training and Development Program (X)
Employee Performance (Y)	0,782		
Competence (Z)	0,716	0,796	
Training and Development Program (X)	0,741	0,702	0,829

Source: Processed data, 2026.

Based on the Fornell-Larcker criterion, the $\sqrt{\text{AVE}}$ value of each construct is

higher than its correlations with other constructs. Employee Performance (Y) has a $\sqrt{\text{AVE}}$ of 0.782, Competence (Z) of 0.796, and the Training Program (X) of 0.829. These results indicate that each construct adequately distinguishes its indicators from those of other constructs. Therefore, all variables meet the requirements for discriminant validity and are suitable for subsequent analysis.

Table 4. HTMT Test Results

	Employee Performance (Y)	Competence (Z)	Training and Development Program (X)
Employee Performance (Y)			
Competence (Z)	0,762		
Training and Development Program (X)	0,786	0,741	

Source: Processed data, 2026.

Based on the HTMT test results, all values between constructs were below the threshold of 0.90, with 0.762 for Competence–Employee Performance, 0.786 for Training Program–Employee Performance, and 0.741 for Training Program–Competence. Therefore, all constructs meet the discriminant validity criteria and are suitable for further analysis.

Table 5. Reliability Test Results

	Cronbach's alpha	Composite reliability	Description
Employee Performance (Y)	0,929	0,940	Reliable
Competence (Z)	0,936	0,945	Reliable
Training and Development Program (X)	0,949	0,956	Reliable

Source: Processed data, 2026

The reliability test results show that all constructs have Cronbach's Alpha and Composite Reliability values above 0.70, indicating good internal consistency. Employee Performance (Y) recorded values of 0.929 and 0.940, Competence (Z) 0.936 and 0.945, and Training Program (X) 0.949 and 0.956, respectively. Thus, all constructs are considered reliable and suitable for further analysis.

R-Square

Table 6. R-Square Test Results

	R-square	R-square adjusted
Employee Performance (Y)	0,625	0,618
Competence (Z)	0,493	0,489

Source: Processed data, 2026

Based on the coefficient of determination (R-Square) test, Employee Performance (Y) obtained an R-Square value of 0.625 and an Adjusted R-Square of 0.618, indicating that 62.5% of its variation is explained by Training Programs and Competence, while the remaining 37.5% is explained by other factors outside the model. Competence (Z) obtained an R-Square of 0.493 and an Adjusted R-Square of 0.489, meaning that 49.3% of its variation is explained by Training Programs, while the remaining 50.7% is influenced by other factors. Overall, the structural model demonstrates adequate explanatory power.

VIF**Table 7. VIF results**

	Employee Performance (Y)	Competence (Z)	Training and Development Program (X)
Employee Performance (Y)			
Competence (Z)	1,972		
Training and Development Program (X)	1,972	1,000	

Source: Processed data, 2026

The VIF results show that all VIF values are below the recommended threshold of 5.00, indicating no multicollinearity in the model. The VIF values for Competence (Z) and Training Program (X) on Employee Performance (Y) are both 1.972, while the VIF of Training Program (X) on Competence (Z) is 1.000. Thus, the model satisfies the multicollinearity assumption and is suitable for further structural analysis.

Q-Square**Table 8. Q-Square Results**

	Q²predict	RMSE	MAE
Competence (Z)	0,481	0,734	0,596
Employee Performance (Y)	0,539	0,692	0,526

Source: Processed data, 2026

The Q² Predict results show that Competence (Z) has a Q² Predict value of 0.481, with an RMSE of 0.734 and MAE of 0.596, while Employee Performance (Y) has a Q² Predict value of 0.539, with an RMSE of 0.692 and MAE of 0.526. Since both Q² Predict values are greater than 0, the model demonstrates good predictive relevance. The relatively low RMSE and MAE values also indicate acceptable prediction errors. Thus, the structural model has good predictive capability for explaining the relationships among the variables studied.

F-Square

Table 9. F- Square Results

	Employee Performance (Y)	Competence (Z)	Training and Development Program (X)
Employee Performance (Y)			
Competence (Z)	0,200		
Training and Development Program (X)	0,300	0,972	

Source: Processed data, 2026

The effect size (f^2) results indicate that Training Program (X) has a moderate effect on Employee Performance (Y) ($f^2 = 0.300$), as does Competence (Z) on Employee Performance (Y) ($f^2 = 0.200$). Meanwhile, Training Program (X) has a very strong effect on Competence (Z), with an f^2 value of 0.972. Thus, the Training Program makes a very strong contribution to Competence, while both the Training Program and Competence have moderate effects on Employee Performance.

Model Fit

Table 10. Model Fit Results

	Saturated model	Estimated model
SRMR	0,048	0,048

Source: Processed data, 2026

The model fit test shows an SRMR value of 0.048 for both the Saturated Model and Estimated Model. As this value is below the recommended threshold of 0.08, the model demonstrates a good fit and meets the goodness-of-fit criteria.

Hypothesis Testing

Direct Effect

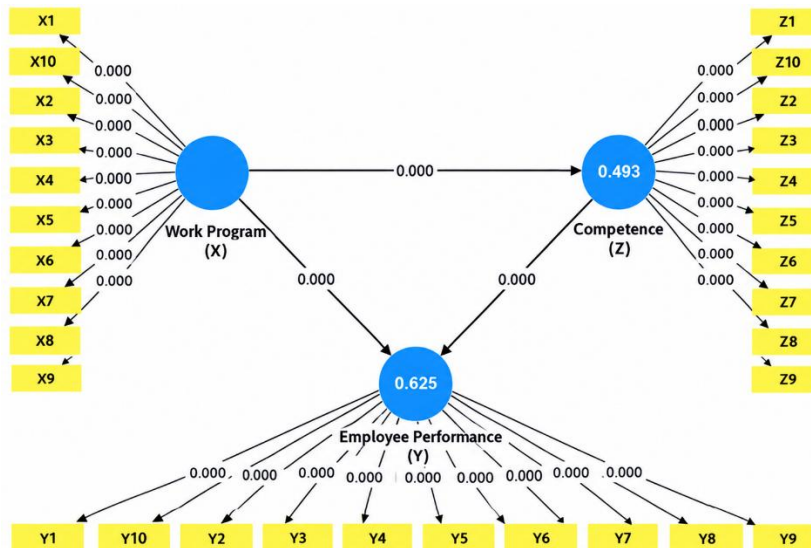


Figure 2. Path Coefficient Test Results

Table 11. Table of Path Coefficients Test Results

	Original sample (O)	T statistics	P values	Description
Competence (Z) -> Employee Performance (Y)	0,384	4,271	0,000	Accepted
Training and Development Program (X) -> Employee Performance (Y)	0,472	5,579	0,000	Accepted
Training and Development Program (X) -> Competence (Z)	0,702	16,457	0,000	Accepted

Source: Processed data, 2026

Based on the bootstrapping results, Training Programs (X) have a positive and significant effect on Employee Performance (Y), with a path coefficient of 0.472, a T-statistic of 5.579, and a P-value of 0.000. Training Programs (X) also have a positive and significant effect on Competence (Z), as indicated by a path coefficient of 0.702, a T-statistic of 16.457, and a P-value of 0.000. Furthermore, Competence (Z) has a positive and significant effect on Employee Performance (Y), with a path coefficient of 0.384, a T-statistic of 4.271, and a P-value of 0.000. Overall, all relationships among the variables are positive and significant, as the T-statistics exceed 1.96 and the P-values are below 0.05. Therefore, all proposed hypotheses are supported.

Indirect Effect**Table 12. Specific Indirect Test Results**

	Original sample (O)	T statistics	P values	Description
Training Program (X) -> Competence (Z) -> Employee Performance (Y)	0,270	3,983	0,000	Accepted

Source: Processed data, 2026

Based on the indirect effect test using the bootstrapping method, the Training Program (X) has a positive and significant effect on Employee Performance (Y) through Competence (Z). This is indicated by an Original Sample of 0.270, T-statistics of 3.983, and P-values of 0.000. Since the T-statistics exceeds 1.96 and the P-value is below 0.05, Competence significantly mediates the relationship between the Training Program and Employee Performance. Thus, improving the quality of training programs can enhance employee competence, which subsequently contributes to better performance. Since both the direct and indirect effects are significant, Competence functions as a partial mediator.

Discussion**1. The Effect of Education and Training Programs on Employee Performance**

The results indicate that the Education and Training Program has a positive and significant effect on Employee Performance, with a path coefficient of 0.472, T-statistics of 5.579, and P-values of 0.000. This finding indicates that better implementation of training programs contributes to higher employee performance by improving employees' knowledge, skills, technical abilities, and work attitudes. This finding is consistent with Carlisle et al. (2019), who found that training effectiveness has a significant relationship with employee task performance.

2. The Effect of Education and Training Programs on Competence

The Education and Training Program has a positive and significant effect on Competence, as indicated by a path coefficient of 0.702, T-statistics of 16.457, and P-values of 0.000. This result indicates that effective training programs can improve employees' knowledge, technical skills, work abilities, and professional attitudes, thereby enhancing their competence to meet job requirements. This finding is supported by Potnuru et al. (2021), who found that human resource development practices, particularly training and career development, have a significant effect on employee

competencies.

3. The Effect of Competence on Employee Performance

Competence has a positive and significant effect on Employee Performance, with a path coefficient of 0.384, T-statistics of 4.271, and P-values of 0.000. This finding indicates that employees with higher levels of competence are more capable of completing their tasks accurately, effectively, and in accordance with organizational operational standards. Competence also supports employees' ability to make decisions and solve work-related problems. This result is consistent with Mishra et al. (2022), who found that competence, including knowledge, skills, and work attitudes, has a positive effect on employee performance.

4. The Role of Competence as a Mediating Variable

The Specific Indirect Effect test shows that the Education and Training Program has a positive and significant effect on Employee Performance through Competence, with an indirect effect coefficient of 0.270, T-statistics of 3.983, and P-values of 0.000. This finding indicates that improvements in training programs can enhance employee competence, which subsequently contributes to improved performance. Since both the direct and indirect effects are significant, Competence functions as a partial mediator. This finding is consistent with Agyemang et al. (2026), which indicates that competence can form part of the mechanism linking training effectiveness to employee performance.

CONCLUSION

1. The Education and Training Program has a positive and significant effect on Employee Competence. Better implementation of training programs enhances employees' knowledge, skills, professional attitudes, and technical abilities.
2. The Education and Training Program has a positive and significant effect on Employee Performance. Effective training programs can improve employees' work quality, punctuality, responsibility, discipline, and productivity.
3. Competence has a positive and significant effect on Employee Performance. Higher employee competence leads to better performance in carrying out tasks in accordance with the Standard Operating Procedures (SOPs) of PT Kereta Api Indonesia (Persero).
4. Competence partially mediates the effect of the Education and Training Program on Employee Performance. This means that training programs

improve employee performance both directly and indirectly through increased employee competence.

IMPLICATION

1. Implications for the Education and Training Program

The analysis shows that item X10 had the lowest mean score of 3.42, while X1 and X6 had the highest score of 3.59. Although all indicators were categorized as good, the company needs to improve training effectiveness through regular Training Needs Analysis (TNA) and the use of operational simulations, case studies, and on-the-job training to ensure that training content matches job requirements and can be effectively applied in the workplace.

2. Implications for Competence

Item Z7 had the lowest mean score of 3.20, while Z5 had the highest score of 3.39, indicating that certain aspects of employee competence still need improvement. The company can enhance competence through technical training, professional certification, *coaching*, *mentoring*, and *knowledge sharing*, supported by regular competency assessments to develop more targeted training programs.

3. Implications for Employee Performance

Items Y3 and Y9 recorded the lowest mean scores, at 2.81 and 2.82, respectively, indicating areas that require further attention to improve employee performance. The company is advised to conduct regular performance monitoring and evaluation, particularly 3–6 months after training, through supervisor assessments, work observations, and performance indicator reviews to ensure that the training outcomes are effectively applied in the workplace.

4. Implications for the Management of PT Kereta Api Indonesia (Persero) Divisi Regional IV Tanjung Karang

Competence was found to function as a partial mediator in the relationship between the Training Program and Employee Performance. Therefore, management should integrate training programs with competency management, particularly for PPKA, PRS, PLR, and PJI, through job-specific training and post-training monitoring conducted 3–6 months after training. The evaluation results can be used to improve training materials and methods, design follow-up training programs, and support employee development.

SUGGESTION

1. Extend the observation period to capture the long-term effects of environmental accounting on financial performance and firm value.
2. Use more sensitive measures of *green accounting*, such as graded disclosure indices or environmental cost data reported in financial statement notes.
3. Include additional determinants of mining firm value, such as commodity prices, capital structure, institutional ownership, and corporate governance quality.
4. Conduct cross-sector comparisons to determine whether the observed relationships are specific to industries with high environmental risks.
5. Consider other mediating variables beyond profitability, such as corporate risk, cost of capital, or corporate reputation.
6. Incorporate data distribution assessments and robustness tests as standard analytical procedures to ensure that findings are not driven by extreme observations.

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