

The Influence of Digital Leadership and Digital Competence on the Performance of Printing Employees in Karawang

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Kata Kunci

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Abstrak

Due to digital transformation, companies face great challenges in adapting to technological advancements. As part of the creative industry, the digital printing sector has been heavily impacted by these changes. Therefore, this study aims to look at how digital leadership and digital competencies affect employee performance in the digital printing industry. This research was conducted quantitatively and has a cross-sectional design. This study involved all employees of digital printing companies in Karawang, with 103 respondents. Data is collected through questionnaires that are shared with employees working in the field. The hypothesis that digital leadership has a positive effect is rejected because the results of the analysis show that it has no significant effect on employee performance. In contrast, digital competencies have been shown to have a significant influence on employee performance; Good digital competencies allow for faster and more accurate completion of tasks, which in turn results in improved performance. In addition, employee performance is significantly influenced by both digital leadership and competence. According to the R-Square (R²) value of 0.473, these two variables contribute significantly to changes in overall employee performance.

1. Introduction

Digital transformation has become a global phenomenon, significantly changing how businesses interact and compete. According to Merritt & Vilchis-Flores (2024), advances in digital technology, such as automation, cloud computing, big data, and digital platforms, have affected the high-tech, creative, and service industries, as well as the digital printing industry. Bangsawan (2023) states that Indonesia is experiencing a considerable acceleration of digital transformation. As MSMEs and creative industries digitize, Indonesia's digital economy is projected to exceed USD 82 billion by 2023, according to data from the Ministry of Communication and Information of the Republic of Indonesia. Amid the growing need to promote digital media, packaging, and print products, Karawang, an industrial and creative economy region in West Java, is experiencing very rapid growth in the digital printing business (Astuti et al., 2025).

As the center of West Java's creative and economic industries, Karawang has experienced rapid growth in the digital printing industry. This is due to the increasing need to promote digital media, packaging, and print products (Astuti et al., 2025). However, this increase is also accompanied by a demand for human resources who can adapt to evolving technology and digital work patterns (Merritt & Vilchis-Flores, 2024). Most of the employees in this field come from educational backgrounds that are not directly related to technology, which is the main obstacle for them to master digital skills (Hendriadi et al., 2019: 1). Data from the central statistics agency (BPS) of

Karawang district (2023) shows that the number of migrants living in Karawang is increasing by around 10% every year. This increase is also attributed to the increase in the number of digital printing and service companies in the city.

Employee performance, according to Ramadhan and Siddiq (2024), is the primary factor in determining an organization's success. Employee performance shows how well employees fulfill their responsibilities. Rohayati (2024) stated that digital capabilities are the basis for companies to achieve operational efficiency, as employees' digital capabilities can affect the smoothness of work processes in companies that use technology. This aligns with research by Hidayat et al. (2023), which shows that digital competencies have a significant influence on job satisfaction but do not necessarily affect performance directly unless supported by other factors, such as leadership styles and flexible working conditions.

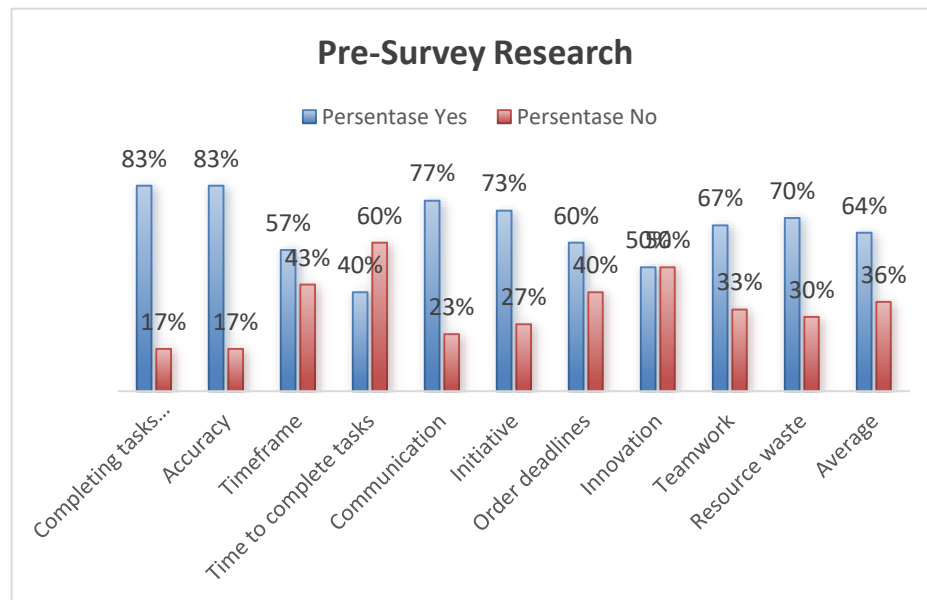


Fig 1. Pre-Survey Research

The results of the initial survey on employee performance indicate several important issues with some of the indicators evaluated. Overall, 64% of respondents reported obstacles to their performance, while 36% stated that their performance had not reached an optimal level. Accuracy is the biggest problem: 83% of respondents reported making mistakes because they didn't pay close attention to job details. In addition, 60% of respondents said time was wasted that could have been used more productively, and 50% did not find opportunities for innovation or improvement in their tasks. However, 67% of respondents still have difficulty working with their team and often miss deadlines, even though initiative and communication are considered adequate. Overall, these results suggest that urgent efforts are needed to improve work quality, timeliness, effort, and resource efficiency to improve future performance.

Rohayati (2024) stated that digital capabilities are the basis for companies to achieve operational efficiency, as employees' digital capabilities can affect the smoothness of work processes in companies that use technology. Shabrina (2021) states that leaders are responsible for setting the outline of change, building a work environment, and providing support for employee development. According to Yulianti and Maulina (2024), digital leaders can lead employees to develop digital skills, change technology-based work procedures, and create innovative work environments, which, in turn, drive improvements. According to Ulum & Wulansari (2025), digital competencies do not directly affect performance. This only happens when a good work environment and a flexible leadership approach are implemented (Ulum & Wulansari, 2025).

According to previous research by Artüz & Bayraktar (2021), enhancing employees' digital competencies improves their performance and productivity. Ongel et al. (2023) show that employee performance can be improved by implementing effective digital leadership. MM Masyhuroh et al. (2025) state that leading, managing, and coordinating the effective use of digital technology to drive change, innovation, and excellence in a business or organization. According to other research, employee performance is not significantly affected by digital leadership. However, Abdullah et al. (2022) stated that new digital leadership will have an impact if supported by digital culture. However, no research has combined digital leadership and digital competencies to explain how employees engage in digital leadership simultaneously, especially in digital printing. One of the most recent developments is the focus on a customizable work environment and innovative leadership style, which is critical to improving employee performance and the competitiveness of the service sector. The purpose of this study is to

examine how digital leadership affects employee performance and whether digital competencies serve as mediators between the two.

2. Literature Review

2.1 Digital Leadership

G. Ongena (2024) said that digital leadership is the ability of a leader in the digital era that includes various abilities, such as technology adaptation and leading digital transformation in the organization. Fahri AE et al. (2022) stated that digital leadership is a leadership approach that emphasizes implementing digital transformation in organizations to facilitate a digital work environment. Abbu et al. (2022) said that digital leadership refers to pa To measure digital leadership, there are several dimensions and metrics; 1) AI ethics (ethics of using AI), which shows transparent and accountable leaders; 2) is an inspiration of engagement (inspires engagement), which shows employee motivation and engagement; 3) skill acquisition/development, which indicates technology training and technology utilization.

2.2 Digital Competence

Digital competencies, according to Ferrari (2022), are a set of knowledge, abilities, attitudes, and skills. According to Riina et al. (2024) the ability to use digital devices is part of digital competence, while Helsper et al. (2020) define digital competence as the ability to use information and communication technology (ICT). There are several dimensions and indicators used to measure digital competence: 1) digital engineering skills, which demonstrate the ability to operate digital devices and master their applications; 2) Digital communication, which shows digital conversation and negotiation; and digital analysis, which shows the analysis and use of digital technology.

2.3 Employee Performance

Employee performance, according to Ramadan and Siddiq (2024) is the main factor that determines the success of the organization. Employee performance shows how well employees fulfill their responsibilities. According to Susanto et al. (2024), employee performance encompasses punctuality, task quality, and task quantity. According to Hartini et al. (2021), employee performance results from the work employees perform in carrying out their duties in accordance with the responsibilities assigned by the company. To measure employee performance, there are several dimensions and indicators: 1) the quality of work, which shows the precision and conformity of the standard; 2) the quantity of work, which indicates the number of tasks completed and the volume of work handled; 3) Punctuality, which indicates the accuracy and completion of the deadline.

2.4 Frame of Mind

A leader, especially in the service industry, must leverage, encourage, and manage digital technology initiatives, create technology-based visions and strategies, and help employees increase productivity in a digital environment. In this study, the measure of digital leadership is based on the theory by Abbu et al. (2022) and includes aspects such as the ethics of using AI and other digital technologies, encouraging engagement, and fostering skill development. However, digital capabilities are defined as a person's ability to utilize technology effectively, safely, and responsibly in a variety of situations, both in professional and social environments, according to the theory of Helsper, E. J. et al. (2020). Digital skills include digital engineering, digital communication, and digital analysis. Therefore, employee performance is defined as an assessment of the quality and volume of work performed, which indicates the level of achievement of the organization's targets and vision. In this study, the theory of Hartini et al. (2021) stipulates that employee performance measurement consists of work quality, work quantity, and timeliness in completing work..

The authors suggest testing two independent variables: digital competence and leadership. The dependent variable is employee performance.

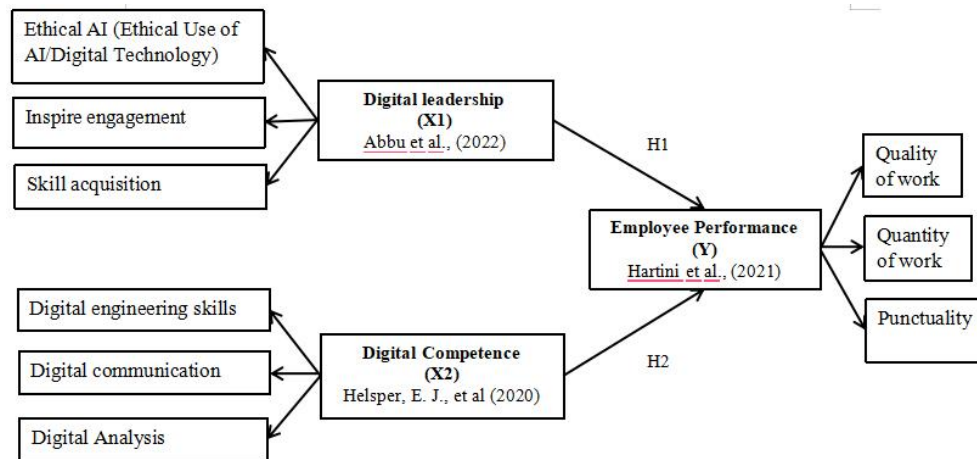


Fig 2. Frame of Mind (Abbu et al., 2022; Helsper, E.J., et al., 2020; Hartini et al., 2021)

Research Hypothesis

H1: It is suspected that digital leadership has a positive effect on employee performance.

H2: It is suspected that digital competence has a positive effect on employee performance.

H3: It is Suspected that Digital Leadership and Digital Competence Simultaneously Have a Significant Effect on Employee Performance

3. Research Methods

This research used a quantitative, cross-sectional design. The portion of the population chosen to represent the whole is called the research sample. With a population of 107 people, the Slovin formula was used to determine the sample size; 103 people responded, with a 2% margin of error. The data collection method involves collecting data from digital printer employees through observations and online and offline questionnaires. The study began in October 2025 and continued through January 2026, and has a Likert scale from 1 to 5, indicating a value of "Very Poor". This study was analyzed using Modeling Equation Structural Partial Least Squares (SEM PLS), which is powered by SmartPLS 4.

Below are the operations of the research variables by subject and the method used in the research:

Table 1 Variable Operations

Digital Leadership (DL)			Kompetensi Digital (KD)		
Dimensions	Indicator	Source	Dimensions	Indicator	Source
<i>Ethical AI</i> (Ethics of Using AI/Digital Technology)	Transparent leaders, responsible leaders	Abbu et al., (2022)	Digital engineering skills	Ability to operate devices, mastery of digital applications	Helsper, E.J., et al (2020)
<i>Inspire engagement</i>	Motivation, employee engagement		Digital communication	Digital discussions, digital negotiations	
<i>Skill acquisition</i>	Technology training, technology utilization		Digital Analysis	Analyzing digital technologies, technology usage	
Employee Performance (KK)					
Dimensions	Indicator	Source			
Quality of work	Precision., standard conformity	Hartini et al., (2021)			
Working quantity	The number of tasks completed, the volume of work handled.				
Punctuality	Accuracy, deadline completion				

4. Research Results and Discussion

4.1 Company Profile

Ayuprint, a digital printing and offset company established in 2006 in Karawang, is one of the places where studies are conducted. Although the year of its establishment is not available, DexPrint offers general printing services at competitive prices. CG Digital Print offers digital printing, including banners and posters. High-quality printing products are available at Centro Digital Printing Karawang, but there is no information on the year of establishment. Invitations and brochures can be printed through two digital printing presses. Adiva Digital Printing focuses on digital printing and marketing. High-quality digital printing is available at Central Print Karawang. Niaga Printing Karawang, part of the Sofasco Group (established around 2009), provides a wide range of printing services. Printing special stickers and t-shirts can be done at the KAU Store Digital Printing Karawang. Digital printing and offset services are available at Cipta Grafika Printing. They can also print digital goods. The focus of the 8e Sticker & Digital Printing Concept is sticker printing.

4.2 Respondent Profile

Gender, age, and amount of time spent working in Karawang digital printing were the elements that formed the profile of respondents in the study sample.

Table 2 *Respondent Profile*

Features	Frequency	Percentage %	Features	Frequency	Percentage %
Gender			Age		
Male	0,71	69%	17-20	0,20	20%
Women	0,32	31%	21-30	0,48	46%
			30-40	0,35	34%
Total	100	100%	Total	100	100%
Features	Frequency	Percentage %			
Length of work in Digital Printing					
< 1 Year	0,17	16%			
1-2 Years	0,33	32%			
>2 Years	0,54	52%			
Total	100	100%			

69% of digital printer employees are male; 46% are aged 21–30, and 52% have more than 2 years of service.

4.3 Descriptive Analysis

Descriptive analysis, as stated by Ghazali (2017), provides an overview of a dataset's characteristics without making general conclusions. Using descriptive statistics, this study analyzed respondents' responses to each questionnaire item. Based on the results of the calculation of the mean score, the interpretation of the assessment is divided into five categories; scores in the range of 1.00–1.80 are included in the Very Bad (STB) category, scores in the range of 1.81–2.60 are included in the Not Good (TB) category, scores in the range of 2.61–3.40 are included in the Fairly Good (CB) category, scores in the range of 3.41–4.20 are included in the Good category (B).

Table 3 *Descriptive Analysis*

Digital Leadership (DL)	Total score	Ket.	Kompetensi Digital (KD)	Total score	Ket.
Transparent leader (DL1)	384	Good	Ability to operate digital devices (KD1)	358	Good
Responsible leader (DL2)	374	Good	Ability to operate supporting devices (KD2)	373	Good
Motivation (DL3)	364	Good	Digital application mastery (KD3)	363	Good
Employee engagement (DL4)	366	Good	Communication application mastery (KD4)	371	Good
Technology training (DL5)	382	Good	Diskusi digital (KD5)	368	Pretty Good
Technology utilization (DL6)	357	Pretty Good	Digital negotiation (KD6)	354	Good
Knowledge sharing (DL7)	357	Pretty Good	Analyzing technology (KD7)	372	Pretty Good
Mode	-	Good	Mode	-	Good
Employee Performance (KK)	Total score	Ket.			
Ketelitian (KK1)	366	Good			
Ability to minimize errors (KK2)	371	Good			
Standard conformity (KK3)	378	Good			
Ability to implement company SOP (KK4)	381	Good			
Number of tasks completed (KK5)	358	Pretty Good			
Volume of work handled (KK6)	368	Good			
Precision (KK7)	357	Pretty Good			
Deadline Completion (KK8)	369	Good			
Mode	-	Good			

The majority of respondents assessed printing performance, digital competence, and digital leadership well, as shown by Table 3 of the descriptive analysis results. Digital leadership indicators, such as the DL1 transparent leader (score: 384) and the DL5 technology training (score: 382), also showed positive results. The operability of the KD2 device (score of 373) and the performance of employees with the KK4 standard conformity indicator (score of 381). Overall, digital leaders and digital skills go a long way in improving the performance of printing employees.

4.4 Verifiable Analysis

4.4.1 Convergent Validity Analysis

According to Ghozali (Setiabudhi et al., 2025), the minimum loading factor value is 0.70. If the value exceeds that number, the indicator is considered valid. If the value is below 0.70, the indicator is removed from the model. Table 4 shows the results of the Smart-PLS 4 test.

Table 4 Output Result For Outer Loading

Digital Leadership (DL)	Outer Loading	Kompetensi Digital (KD)	Outer Loading
Transparent leader (DL1)	0.827	Ability to operate digital devices (KD1)	0.865
Responsible leader (DL2)	0.791	Ability to operate supporting devices (KD2)	0.797
Motivation (DL3)	0.858	Digital application mastery (KD3)	0.772
Employee engagement (DL4)	0.862	Communication application mastery (KD4)	0.719
Technology training (DL5)	0.850	Diskusi digital (KD5)	0.741
Technology utilization (DL6)	0.792	Digital negotiation (KD6)	0.792
Knowledge sharing (DL7)	0.825	Analyzing technology (KD7)	0.782
Employee Performance (KK)	Outer Loading		
Ketelitian (KK1)	0.812		
Ability to minimize errors (KK2)	0.817		
Standard conformity (KK3)	0.868		
Ability to implement company SOP (KK4)	0.820		
Number of tasks completed (KK5)	0.842		
Volume of work handled (KK6)	0.843		
Precision (KK7)	0.811		
Deadline Completion (KK8)	0.835		

Table 4 shows that all indicators for the variable have external loadings above 0.70, indicating that each indicator is valid for its construct.

According to Hair et al. (2019), reliability is considered good if the test value is greater than 0.7 or nearly 1.

Table 5 Nilai Composite Reliability, Cronbach's Alpha, and Average Variance Extracted

	Cronbach's alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
Digital Leadership	0.925	0.935	0.939	0.688
Digital Competence	0.896	0.934	0.917	0.612
Employee Performance	0.938	0.955	0.947	0.691

According to Table 5, each variable in this study had a Cronbach's alpha value above 0.70 (nearly 1) and an Average Variance Extracted (AVE) above 0.50, indicating that the structure was reliable.

4.4.2 Discriminatory Validity

The heterotrait-monotrait ratio (HTMT) value is an important metric for evaluating discriminant validity. According to Hair et al. (2022), the HTMT value should not exceed 0.90, indicating weak validity and a lack of discriminant validity. Table 5 shows the HTMT values.

Table 6 HTMT values & Fornell-Larcker criterion

Digital Leadership (DL)	Digital Competence (KD)	Employee Performance (KK)
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Digital Leadership

Digital Competence 0.606

Employee Performance 0.444 0.657

Fornell-Larcker criterion

Digital Leadership 0.830

Digital Competence 0.545 0.782

Employee Performance 0.432 0.684 0.831

Table 6 shows the HTMT value between (DL) and (KD) of 0.611 indicating a moderate relationship, the HTMT value between (DL) and (KK) of 0.444 indicates a lower but still significant relationship, and the HTMT value between (KD) and (KK) of 0.632 indicates a moderate relationship indicating the influence of digital competence on employee performance. The results of the Fornell-Larcker Criterion calculation show that each construct in this research model has good discriminant validity.

4.4.3 Structural Model Evaluation

To ensure that the relationships between constructs in a theoretical model can be understood and statistically tested, structural model evaluation uses statistical techniques such as structural equation modeling (SEM).

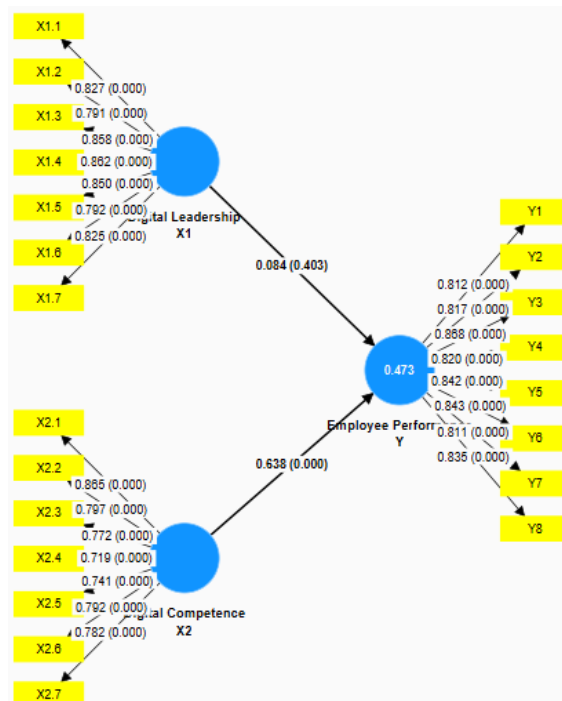


Fig 3 Output Result Bootstrapping Modeling

Overall, the model in Figure 2 shows that digital leadership and digital competence have a significant positive effect on employee performance (0.566, $p < 0.001$) and a significant positive relationship with employee performance (0.320, $p < 0.001$). However, there was a weak and insignificant relationship between digital leadership and digital competence (0.084, $p < 0.424$).

4.4.4 Coefficient of Determination (R-Square)

Riyasni (2023) states that the R-Square value can be used to indicate the extent to which endogenous latent variables influence exogenous latent variables. A value of 0.75 generally indicates a strong influence, 0.50 a moderate influence, and 0.25 a weak influence.

Table 7 R-Square

	R-Square
Employee Performance	0.473

Table 7 shows that digital leadership and digital competence can explain employee performance, with an R-squared value of 0.473. This suggests that the model can explain employee performance in a moderating role.

4.5 Uji Hypothesis

To assess the direct relationships between independent and bound variables, hypothesis tests were conducted using the Structural Equation Modeling Partial Least Squares (SEM-PLS) method. The Bootstrapping method is also used. According to Purwanto et al. (2021), the relationship is considered significant if the p-value < 0.050. In contrast, the relationship is considered insignificant if the p-value > 0.05. If the t-statistic value < 2.010 and the p-value < 0.05, Ho is accepted; conversely, if the t-statistic value > 2.010 and the p-value < 0.05, Ho is not accepted.

Table 8 Results of Bootstrapping Calculation of Research Data

	Original sample (O)	Sample mean (M)	Standar deviation (STDEV)	T statistics (O/STDEV)	P values
Digital Leadership → Employee Performance	0.084	0.084	0.100	0.835	0.403
Digital Competence → Employee Performance	0.638	0.649	0.079	8.056	0.000

The results of the hypothesis test showed that the digital leadership variable on employee performance had a P value of 0.403, which is greater than 0.05, and a T-statistic of 0.835 in the t-table of 2.010, indicating that there was no significant relationship. The digital variable of competency to employee performance had a P value of 0.000, which is greater than 0.05, and a T-statistic of 8.056 in t-table 2.010 indicates a significant relationship.

4.5.1 Effect Size (F-Square) and Predictive Relevance (Q-Square)

According to the theory of Hair et al. (2018), the influence measure (f^2) can be used to assess the strength of each variable's influence. A Q-squared value of less than 0 indicates low predictive ability, while a value above 0.50 indicates high predictive power.

Table 9 F-Square Value

	F-Square	Ket
Digital Leadership → Employee Performance	0.009	Small effects
Digital Competence → Employee Performance	0.543	Huge effect
Q-Square Value		
Employee Performance	0.289	

Table 9 shows the F-Square value, indicating that digital leadership on employee performance has a small influence (less than 0.35) and that digital competence on employee performance has a large influence (more than 0.50). The Q-Square value for employee performance is 0.289, indicating that the employee's ability is moderate to high.

4.5.2 Model Eligibility

To assess how accurately the research model's specifications can display empirical data, model feasibility testing (model fit) is performed. In this study, the global fit index commonly used in SEM-PLS was employed, as shown in Table 10.

Table 10 Goodness Of Fit Model

	Saturated Model	Estimated Model
SRMR	0.107	0.107
d_ULS	2.896	2.896
d_G	2.362	2.362
Chi-square	1158.724	1158.724
NFI	0.604	0.604

Table 10 shows the model's conformity results. The values of d_{ULS} (2.896) and d_G (2.362) are higher than those of the saturated model, indicating a decrease in incompatibility. The SRMR value is 0.107, above 0.10. Nevertheless, the NFI of 0.629 remains below 0.90, suggesting that the model can still be used for further analysis but needs improvement.

4.6 Research Discussion

4.6.1 Descriptive Analysis and Verification Analysis

The Influence of Digital Leadership on Employee Performance

With a T-statistic of 0.835 and a P-value of 0.403 (> 0.05), the results showed that digital leaders had no significant effect on employee performance; the H1 hypothesis was rejected. Although all digital leadership indicators have strong outer loadings (above 0.70), their effect on improving employee performance has not been directly observed. The indicator with the highest outer loading value is employee involvement, indicating that the element of employee involvement in the digital environment has not been fully realized, thereby failing to encourage employees to improve their performance. These results align with research by Yulianti & Maharani (2024), which found that digital leaders do not directly affect employee performance. The hypothesis that digital leadership has a positive influence is rejected because the statistical results indicate it is not strong enough to affect employee performance.

The Influence of Digital Competencies on Employee Performance

The study's results show that digital competence has a positive, significant effect on employee performance. This is indicated by a T-statistic of 8.056 and a P-value of 0.000 (< 0.05), which supports the H2 hypothesis. The ability to operate digital devices is an indicator of digital competence, with the highest external load value, suggesting that mastery of digital devices is a major factor in supporting employee performance. In addition, indicators of the ability to operate digital devices and negotiate with the highest external load values can improve practical skills in using technology, and digital communication is essential to improve employee performance. According to research by Ulum & Wulansari (2025), digital competencies are an important component in improving employee performance. The study found that employees with digital competencies can complete tasks faster, more precisely, and in accordance with company standards, thereby improving their performance.

The Influence of Digital Leadership and Digital Competence on Employee Performance

Digital leadership and digital competence simultaneously have a significant explanatory effect on changes in employee performance, as indicated by the R-Square (R^2) test. The value of the employee performance variable is 0.473. In other words, the R^2 value indicates that the model has moderate explanatory power for describing employee performance in this study; the combination of these two variables explains about 47.3% of the variation in employee performance. Nursiva, H. et al. (2024) found that effective digital leaders can improve digital competencies, suggesting that employees at logistics companies like JNE are better equipped to do so.

5. Conclusion & Implications

The results showed that digital leaders and digital competencies did not significantly affect employee performance, but they contributed a moderate amount to the variation in employee performance, with $R^2 = 0.473$. The implication in the study, in the digital leadership variable, is "responsible leader" (DL2) with a value of 0.791, which indicates that the aspect of leadership responsibility in the implementation of digital leadership needs to be improved, especially in terms of consistency and exemplary in the use of digital technology, so that digital leadership can be felt more clearly by employees. In the digital competency variable, the indicator with the lowest outer loading value was "communication application mastery" (KD4), with a value of 0.719, indicating a need to improve employees' ability to use digital communication applications effectively to support work coordination and collaboration. Meanwhile, in the employee performance variable, the indicator with the lowest outer loading value was "accuracy" (KK7) of 0.811, which implies that the company needs to strengthen work system support and the use of digital technology so that employees can complete work more precisely and accurately, in accordance with the set targets.

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Conflict of Interest

The author declares that there are no conflicts of interest related to the publication of this paper.

Author's Contribution

The authors confirm their contributions to this paper as follows: **conception and design of the research:** Imel Lia Putri, Uus Mohammad Darul Fadli, and Ery Rosmawati; **data collection:** Imel Lia Putri, Uus Mohammad Darul Fadli, and Ery Rosmawati; **analysis and interpretation of results:** Imel Lia Putri, Uus Mohammad Darul Fadli, and Ery Rosmawati; **preparation of manuscript drafts:** Imel Lia Putri, Uus Mohammad Darul Fadli, and Ery Rosmawati. Imel Lia Putri, Uus Mohammad Darul Fadli, and Ery Rosmawati reviewed the results and approved the final version of the manuscript.

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