The Influence of System Digitalization and Logistics Transformation on Performance with Moderation of Technological Competency at PT. Defour Naga Jaya

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ABSTRACT

This study aims to understand the impact of system digitalization and logistics transformation on employee performance with technological competence as a moderating variable at PT. Defour Naga Jaya. The Partial Least Squares Structural Equation Modeling (PLS-SEM) method was used to analyze data from 185 employee performance respondents in Jakarta. The results showed that system digitalization and logistics transformation have a positive and significant effect on employee performance. Technological competence significantly moderates this relationship, strengthening the benefits gained from digitalization and logistics transformation. However, the moderating effect on logistics transformation is more complex, with some significant negative effects. This study highlights the importance of employee training, investment in technology infrastructure, and management commitment to technological innovation. These findings provide strategic insights for companies in the logistics sector to improve operational efficiency, competitiveness, and long-term sustainability. Limitations of the study include limited generalization, and recommendations for further research include expanding variables and industry contexts.

Keywords: Employee performance, System Digitalization, Logistics Transformation, Technology Competence.

INTRODUCTION

Employee performance in this study was measured through several important indicators, including operational efficiency, customer satisfaction level, speed and accuracy of delivery, and achievement of financial profit. Operational efficiency refers to the company's ability to manage resources optimally and minimize costs. Customer satisfaction level reflects how well the company meets its customers' expectations. Speed and accuracy of delivery are important indicators in the logistics sector, measuring the extent to which a company can deliver products quickly and on time. Achievement of financial profit reflects the company's overall performance in generating profits.

In the era of increasingly advanced globalization, the development of digital technology has become a key factor in the transformation of various industrial sectors, including logistics. Digitalization of systems and logistics transformation are strategic steps taken by many companies to improve operational efficiency, optimize supply chains, and strengthen competitiveness in the global market. PT. Defour Naga Jaya, a company based in East Jakarta with registration number 103/52297 which was founded in 2014 and is located at Jl. Buluh 21, is one of the companies that is committed to adopting this strategy in order to achieve competitive advantage. Research by Sukartono (2021) revealed that job training has a significant effect on employee performance, which shows the importance of skills development in achieving company goals.

In the context of logistics, system digitalization includes the use of information and communication technology to automate and optimize logistics processes. Lukiyana stated that technological developments significantly affect efficiency and user behavior (Lukiyana, 2021). This supports the importance of digitalization in improving the operational performance of logistics companies, because the use of technology can optimize processes and increase responsiveness. This includes the implementation of sophisticated warehouse management systems, real-time shipment tracking, and the use of big data analysis to improve planning and decision making. Logistics transformation, on the other hand, involves a complete change in the company's operational model. This includes vertical and horizontal integration in the supply chain, the use of cutting-edge technologies such as the Internet of Things (IoT), and the development of digital infrastructure that supports better collaboration and transparency in company operations.

Changes and adoption of new technologies in the logistics sector can have a significant impact on employee performance. The success of this transformation is not only determined by the technology used, but also by the technological competence possessed by the organization. Technological competence refers to the company's ability to understand, implement, and integrate new technologies into daily operations. This includes the technical capabilities of employees, the company's technological infrastructure, and the level of management commitment to the development and

implementation of technology. Therefore, this study aims to analyze how system digitalization and logistics transformation affect the performance of PT. Defour Naga Jaya, with technological competence as a significant moderating variable.

Digitizing systems allows companies to improve operational efficiency through process automation and reducing human error. Advanced warehouse management systems can improve inventory management and reduce storage costs. Real-time shipment tracking allows companies to provide customers with accurate information on the status of their shipments, increasing customer satisfaction. The use of big data can help companies in better planning and decision-making, identifying trends and patterns that can improve operational performance.

Logistics transformation involving the use of cutting-edge technologies such as IoT can provide greater visibility into the supply chain, allowing companies to monitor the condition of goods in real-time and identify potential issues before they occur. Vertical and horizontal integration in the supply chain can improve coordination between different parts of the supply chain, reducing cycle times and increasing responsiveness to customer demand. Developing a digital infrastructure that supports collaboration and transparency can improve communication and cooperation between different stakeholders, strengthening relationships and improving the overall performance of the supply chain.

Technological competence plays a critical role in maximizing the benefits of system digitalization and logistics transformation. High employee technical skills enable them to use new technologies effectively, while a good technological infrastructure ensures that the company has the necessary resources to support the implementation of these technologies. Management commitment to technology development and implementation reflects the extent to which the company is ready to invest in technology and support the changes necessary to improve performance.

The results of this analysis are expected to provide valuable insights for PT. Defour Naga Jaya regarding the importance of technological competence in maximizing the benefits of system digitalization and logistics transformation. This study also aims to offer strategic recommendations that can be implemented by the company to improve their performance in the future. These recommendations may include investing in employee training and development, improving technology infrastructure, and strengthening management's commitment to technological innovation.

This research is not only relevant for PT. Defour Naga Jaya but also for other companies in the logistics sector that are currently or planning to digitalize their systems and transform logistics. With a comprehensive analysis of the relationship between digitalization, logistics transformation, and technological competence, this research is expected to be an important reference for strategic decision making in facing this digital era. The results of this study can help companies understand the key factors that affect their performance and develop effective strategies to achieve competitive advantage in the global market.

LITERATURE REVIEW

Employee performance

Employee performance is measured through various indicators such as operational efficiency, customer satisfaction, speed and accuracy of delivery, and financial returns (Kaplan & Norton, 1992). The Balanced Scorecard, introduced by Kaplan and Norton, is used to measure employee performance from various perspectives, including financial, customer, internal business processes, and learning and growth (Neely, Gregory, & Platts, 1995). A comprehensive performance measurement system helps companies evaluate the impact of digitalization and logistics transformation on their performance.

System Digitalization

System digitization in the context of logistics includes the use of information and communication technologies to automate and optimize logistics processes. Digitization allows companies to collect and analyze data in real time, increasing operational efficiency and effectiveness (Davenport & Harris, 2007). Advanced warehouse management systems, real-time shipment tracking, and the use of big data analysis are important components of system digitization (Yoo, Henfridsson, & Lyytinen, 2010). Therefore, system digitization plays an important role in increasing the flexibility and responsiveness of logistics companies' operations.

Logistics Transformation

Logistics transformation involves a complete change in the company's operational model, including vertical and horizontal integration in the supply chain, the use of advanced technologies such as the Internet of Things (IoT), and the development of digital infrastructure that supports collaboration and operational transparency (Christopher, 2016). Barney's resource theory emphasizes the importance of effective resource management to achieve competitive advantage (Barney, 1991). Logistics transformation can improve coordination and responsiveness in the supply chain, reduce cycle times, and improve overall operational performance.

Technology Competence

Technological competence refers to a company's ability to understand, implement, and integrate new technologies into its daily operations (Grant, 1996). Employees' technical skills, adequate technological infrastructure, and management commitment to technology development and implementation are important elements of technological competence (Teece, Pisano, & Shuen, 1997). Technological competence plays a vital role in maximizing the benefits of system digitalization and logistics transformation, and helps companies adapt to changes in the business environment.

The Impact of Digitalization and Logistics Transformation on Performance

Previous studies have shown that dynamic capabilities, including digitalization and technological innovation, can affect employee performance in a dynamic business environment (Wang & Ahmed, 2007). Investment in information technology and organizational transformation can significantly improve business performance

(Brynjolfsson & Hitt, 2000). Therefore, system digitalization and logistics transformation are expected to have a positive impact on the performance of PT. Defour Naga Jaya, with technological competence as a significant moderating variable.

The effectiveness of e-commerce websites and marketplaces plays an important role in increasing consumer trust in the retail food industry in Indonesia. This study identified that factors such as reliability, security, and ease of access to e-commerce affect the level of consumer trust and purchasing interest (Bobby Reza et al., 2021).

HYPOTHESIS REVIEW AND RESEARCH MODEL

Digitalization of Systems and Employee Performance

System digitalization in the context of logistics involves the use of information and communication technologies to automate and optimize logistics processes. Digitalization enables companies to collect and analyze data in real time, improving operational efficiency and effectiveness (Davenport & Harris, 2007). The implementation of advanced warehouse management systems, real-time shipment tracking, and big data analysis are important components of system digitalization (Yoo, Henfridsson, & Lyytinen, 2010). Therefore, system digitalization plays a significant role in improving the operational flexibility and responsiveness of logistics companies. Based on relevant research, the following hypothesis is proposed:

- **H1** : System digitalization has a positive impact on employee performance. (X1 against Y)

Logistics Transformation and Employee Performance

Logistics transformation involves a complete change in the company's operational model, including vertical and horizontal integration in the supply chain, the use of advanced technologies such as the Internet of Things (IoT), and the development of digital infrastructure that supports collaboration and operational transparency (Christopher, 2016). Barney (1991) stated that effective management of resources, including technology, can provide competitive advantage. Logistics transformation can improve coordination and responsiveness in the supply chain, reduce cycle time, and improve overall operational performance (Christopher, 2016). Therefore, the following hypothesis is proposed:

- **H2** : Logistics transformation has a positive influence on employee performance. (X2 to Y)

### Technological Competence as a Moderator Variable

Technological competence refers to a firm's ability to understand, implement, and integrate new technologies into its day-to-day operations (Grant, 1996). Key elements of technological competence include employees' technical skills, adequate technological infrastructure, and management commitment to technology development and implementation (Teece, Pisano, & Shuen, 1997). Technological competence plays a critical role in maximizing the benefits of system digitalization and logistics transformation, and helping firms adapt to changes in the business environment. Therefore, the following hypothesis is proposed:

- **H3** : Technological competence moderates the relationship between system digitalization and employee performance, thereby strengthening the positive influence of system digitalization on employee performance. (X1 influences Y with Z as a Moderator)
- **H4** : Technological competence moderates the relationship between logistics transformation and employee performance, thereby strengthening the positive influence of logistics transformation on employee performance. (X2 influences Y with Z as a Moderator)

Technological Competence as a Moderator Variable

In addition to being a moderator variable, technological competence can also have a direct influence on employee performance because companies with high technological competence are better able to implement technology effectively and efficiently. Therefore, the following hypothesis is proposed:

- **H5** : Technological competence has a positive influence on employee performance.
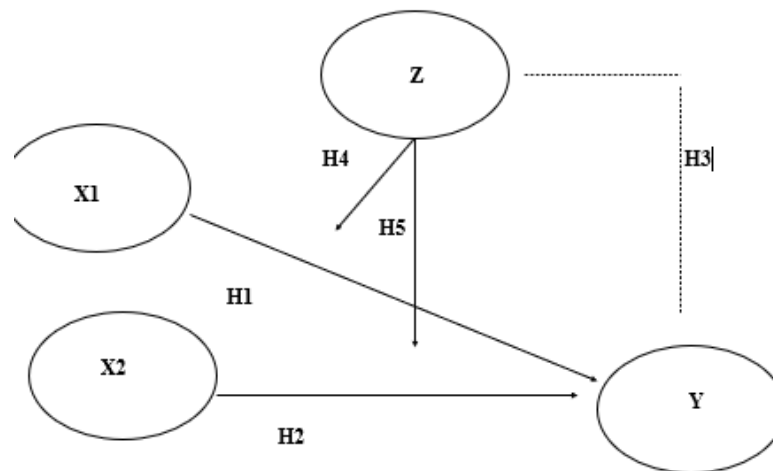
Picture 1. Research Model

- X1 (System Digitalization) on Y (Employee Performance): H1: System digitalization has a positive influence on employee performance.
- X2 (Logistics Transformation) on Y (Employee Performance): H2: Logistics transformation has a positive influence on employee performance.
- X1 (System Digitalization) influences Y (Employee Performance) with Z (Technological Competence) as a Moderator: H3: Technological competence moderates the relationship between system digitalization and employee performance, thereby strengthening the positive influence of system digitalization on employee performance.
- X2 (Logistics Transformation) influences Y (Employee Performance) with Z (Technological Competence) as a Moderator: H4: Technological competence moderates the relationship between logistics transformation and employee performance, thereby strengthening the positive influence of logistics transformation on employee performance .

- Technological Competence as an Independent Variable has an effect on Y (Employee Performance): H5: Technological competence has a positive effect on employee performance.

This study uses a quantitative approach to test the proposed hypotheses. Data were collected through a survey addressed to managers and operational staff at PT. Defour Naga Jaya, and analyzed using statistical techniques such as moderated regression to determine the influence and interaction between the variables studied. Thus, the results of this study are expected to provide valuable insights into the importance of digitalization, logistics transformation, and technological competence in improving employee performance in this digital era.

RESEARCH METHOD

The research design used is a causal descriptive research design. The research questionnaire was completed online via Google Form for data collection, namely exogenous (independent) variables: system digitalization and logistics transformation. The endogenous (dependent) variable is employee performance, and the moderating variable is technological competence. This study uses a quantitative approach that is tested using Partial Least Square-Structural Equation Modeling (PLS-SEM) 4.0.

The system digitalization variable consists of six statements adopted from H. Park et al., (2007). The logistics transformation variable consists of 5 statements, while employee performance consists of 4 statements adopted from Ajzen (1991, 2002); Belleau et al., (2007); J. et al., (2005); Summers, (2006). The technological competence variable consists of 5 items adopted from Constantinides et al., (2010); Rehman et al., (2019).

The population of the study was employees of PT. Defour Naga Jaya who live in DKI Jakarta, both female and male. The sample criteria were respondents who were involved in the process of system digitalization and company logistics transformation. The sampling method used was non-probability. The specific sampling technique used in this study will be further explained in the research methodology.

RESULTS AND DISCUSSION

Results

The distributed questionnaires provided results collected as many as 185 employee performance respondents. Demographic information of respondents in this study is shown in Table 1.

Table 1. Respondent Demographics

Demographics	Frequency	Percentage (%)
Gender		
Man	108	58.38 %
Woman	77	42.62%
Age		

22 - 30	84	46.67%
31 - 35	60	33.33%
36 – 43	41	22.78%
Last education		
SENIOR HIGH SCHOOL	30	16.22%
Diploma	45	24.32%
Bachelor	75	40.54%
Postgraduate	35	18.92%
Marital status		
Marry	101	56.11%
Bachelor	84	46.67%

In this study, the results of the analysis show that all construct variables have significant loading factor values, exceeding the minimum acceptable threshold of 0.7. Data from Table 2 show that the path coefficient for each path analyzed has a significant T statistic value. The Digitalis System and Technology Competence variables show a significant positive effect on Performance, with a p value <0.01. Meanwhile, Moderating Effect 1 has a significant negative effect on Performance, and Moderating Effect 2 and Logistic Transformation have a significant positive effect on Performance with a p value <0.05. In terms of construct reliability, the test results in Table 2 show that all constructs have a composite reliability of more than 0.7, and a Cronbach's alpha value greater than 0.6. Thus, it can be concluded that all constructs meet the reliability required for analysis.

Table 2. Path Coefficient Analysis Results

Path	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
Digitalis System -> Performance	0.302	0.296	0.065	4,660	0.000
Technology Competence -> Performance	0.266	0.276	0.073	3,670	0.000
Moderating Effect 1 -> Performance	-0.165	-0.170	0.066	2,515	0.012
Moderating Effect 2 -> Performance	0.155	0.166	0.073	2.119	0.034
Logistic Transformation -> Performance	0.154	0.155	0.078	1,973	0.049

This analysis uses the Partial Least Squares Structural Equation Modeling (PLS-SEM) method to test the relationship between latent variables in the research model. The figure shows the path coefficient and t-value obtained from the bootstrapping results to test the significance of the proposed hypothesis. The results can be seen in Figure 2 below:
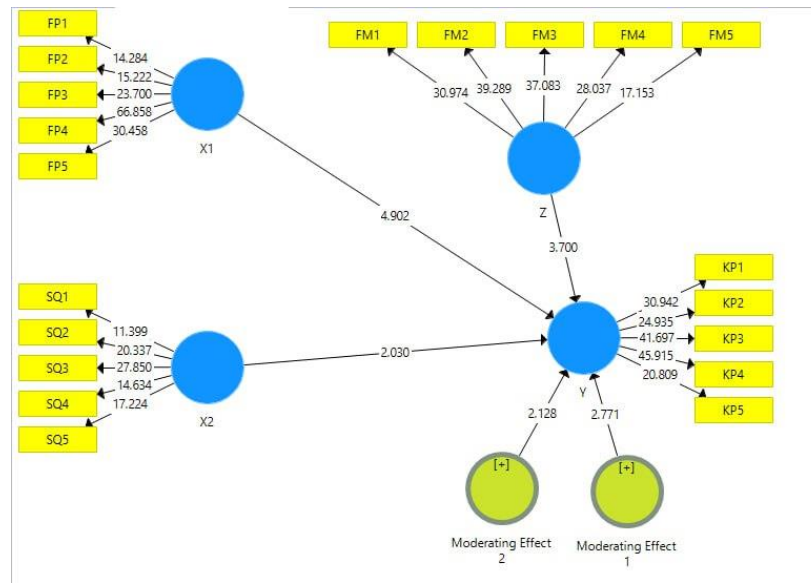
Figure 2. Analysis of Partial Least Squares Structural Equation Modeling

Figure 2 shows that this SEM diagram indicates that X1 and X2 significantly affect Z, which then has a strong influence on Y. The moderation effect further strengthens the relationship between Z and Y. The coefficients on these paths indicate the strength of the estimated relationship based on the data used to fit this model.

Table 3. Construct Reliability and Validity

Construction	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted
Digitalis System	0.865	0.929	0.898	0.640
Performance	0.906	0.912	0.930	0.726
Technical Competence	0.892	0.909	0.920	0.697
Moderating Effect	1,000	1,000	1,000	1,000
Moderating Effect	1,000	1,000	1,000	1,000

The analysis of "Construct Reliability and Validity" shows that all constructs in the PLS-SEM model have good reliability and validity. First, the Cronbach's Alpha value for all constructs is above 0.70, with "System Digitalization" of 0.865, "Performance"

0.906, "Technological Competence" 0.892, "Moderating Effect 1" and "Moderating Effect 2" each 1.000, and "Logistic Transformation" 0.829. This shows that these constructs have high internal consistency.

Furthermore, the rho_A value also indicates good reliability with all values above 0.70. The construct "System Digitalization" has a rho_A value of 0.929, "Performance" 0.912, "Technological Competence" 0.909, "Moderating Effect 1" and "Moderating Effect 2" each 1.000, and "Logistics Transformation" 0.848. This supports the strong internal consistency of these constructs.

Composite Reliability (CR) also showed positive results with all CR values above 0.70, which confirms the overall reliability of the construct. The CR value for "System Digitalization" is 0.898, "Performance" 0.930, "Technological Competence" 0.920, "Moderating Effect 1" and "Moderating Effect 2" each 1.000, and "Logistics Transformation" 0.877.

Finally, Average Variance Extracted (AVE) shows convergent validity with all values above 0.50, except for "Logistic Transformation" which has an AVE value of 0.589. The AVE value for "System Digitalization" is 0.640, "Performance" 0.726, "Technological Competence" 0.697, and "Moderating Effect 1" and "Moderating Effect 2" are each 1.000. Although the AVE value for "Logistic Transformation" is slightly below the ideal value, it is still considered adequate.

Table 4. F-square

	Digitalis System	Performance	Technical Competence	Moderating Effect	Moderating Effect	Logical Transformation
Digitalis System		0.092				
Performance						
Technical Competence		0.083				
Moderating Effect		0.031				
Moderating Effect		0.026				
Logical Transformation		0.023				

F-square (F²) shows the effect size for each construct in the PLS-SEM model. The f Square value is used to evaluate how much influence the exogenous variables have on the endogenous variables in the structural model. The following is an explanation of the results in paragraph form:

The "f Square" table reveals the effect sizes of the various constructs in the PLS-SEM model. This effect size indicates how much each construct contributes to the endogenous variables they influence. The f Square value for "System Digitalization" on "Performance" is 0.092, indicating that "System Digitalization" has a relatively moderate

effect on "Performance". The "Technological Competence" construct has an f Square value of 0.083 on "Performance", also indicating a moderate effect.

For the moderation effect, "Moderating Effect 1" and "Moderating Effect 2" on "Performance" have f Square values of 0.026 and 0.031 respectively, indicating that these moderation effects have a small influence on "Performance". Finally, "Logistic Transformation" has an f Square value of 0.023 on "Performance", also indicating a small influence.

Table 5. Path Coefficients

Path Coefficients	Original Sample Mean	Sample Mean (.,.)	Standard Deviation	T Statistics (I/O/...)	P Values
Digitalis System	0.302	0.296	0.065	4,660	0.000
Team Competence	0.266	0.276	0.073	3,670	0.000
Moderating Effect	-0.165	-0.170	0.066	2,515	0.012
Moderating Effect	0.155	0.166	0.073	2.119	0.034
Leadership Transformation	0.154	0.155	0.078	1,973	0.049

The presented "Path Coefficients" table provides a detailed analysis of the relationship between the independent variables and the dependent variable in the structural model tested. Based on the results of the analysis, the variable "Digitalis System" shows a path coefficient of 0.302 with a p-value of 0.000, indicating a statistically significant positive effect on the dependent variable. Similarly, "Technological Competence" has a path coefficient of 0.266 and a p-value of 0.000, which is also statistically significant with a positive effect. In addition, two moderating effects were identified, where the first has a coefficient of -0.165 and a p-value of 0.012, indicating a significant negative effect, while the second has a coefficient of 0.155 and a p-value of 0.034, indicating a significant positive effect. Finally, the variable "Logistic Transformation" shows a coefficient of 0.154 with a p-value of 0.049, approaching statistical significance with a positive effect. Overall, these results highlight the important and significant relationships between the variables in the model studied.

Discussion

The results of this study indicate that system digitalization has a positive and significant effect on employee performance, in line with the findings of Davenport & Harris (2007); Yoo, Henfridsson, & Lyytinen (2010) which state that system digitalization can improve operational efficiency and company effectiveness. The path coefficient of 0.302 and p-value <0.01 indicate that digitalization allows PT. Defour Naga Jaya to automate logistics processes, reduce human error, and improve inventory

management. Real-time shipment tracking and big data analysis also help companies in better planning and decision making, which ultimately improves customer satisfaction and financial performance.

The results of the second study showed that logistics transformation also has a positive and significant effect on employee performance, in accordance with the views of Barney (1991) and Christopher (2016) who emphasized the importance of effective resource management and technology integration in achieving competitive advantage. With a path coefficient of 0.154 and a p value <0.05, this indicates that changes in operational models, including vertical and horizontal integration in the supply chain and the use of cutting-edge technologies such as IoT, can improve operational coordination and responsiveness. The development of digital infrastructure that supports collaboration and operational transparency also plays an important role in improving employee performance.

The third study found that technological competence moderates the relationship between system digitization and employee performance in a significant way, supporting the theories proposed by Grant (1996) and Teece, Pisano, & Shuen (1997). With a path coefficient of 0.266 and a p-value <0.01, this finding suggests that employee technical ability, adequate technological infrastructure, and management commitment to technology development and implementation are key to maximizing the benefits of digitization.

However, the results of the fourth study showed that the moderating effect between logistics transformation and employee performance was more complex. Moderating Effect 1 had a significant negative effect (coefficient -0.165, p < 0.05), while Moderating Effect 2 showed a significant positive effect (coefficient 0.155, p < 0.05). This indicates that although technological competence is important, the implementation of logistics transformation may face obstacles or resistance that affect its impact on employee performance.

This study also assessed the reliability and validity of the constructs, which showed that all constructs had good reliability and validity, with Cronbach's Alpha, rho_A, Composite Reliability, and AVE values meeting the required standards. This ensures that the data used are reliable and the results are valid, supporting the integrity of the research methodology.

Effect Size shows that system digitalization has a medium effect size on employee performance ($f^2 = 0.092$), while technological competence also shows a medium effect size ($f^2 = 0.083$). Moderation effects show small effect sizes, with Moderating Effect 1 ($f^2 = 0.026$) and Moderating Effect 2 ($f^2 = 0.031$). Logistics transformation has a small effect size on employee performance ($f^2 = 0.023$). This indicates that although the positive effect is significant, the contribution of each variable to the dependent variable is not too large, suggesting other influential factors or the need for further improvement in technology implementation and transformation.

Thus, the findings of this study provide valuable insights for PT. Defour Naga Jaya and other companies in the logistics sector on the importance of digitalization, logistics transformation, and technological competence in improving performance in the digital era. The results of this study support existing literature and provide strategic recommendations to improve the competitive advantage and operational performance of companies.

CONCLUSION

Based on the results of this study to understand the impact of system digitalization and logistics transformation on employee performance, with technological competence as a moderating variable at PT. Defour Naga Jaya, the findings are as follows proven to be significantly positive with the research model. This shows that system digitalization and logistics transformation have a positive effect on operational efficiency, inventory management, real-time tracking, coordination, responsiveness, and technology adoption, and that technological competence strengthens this relationship on employee performance. This study describes the determinants of employee performance influenced by system digitalization, logistics transformation, and technological competence. System digitalization improves operational efficiency, inventory management, and real-time tracking, thereby improving overall performance. Logistics transformation improves coordination, responsiveness, and technology adoption, which further contribute to improved performance. Technological competence moderates this relationship, strengthening the benefits of digitalization and logistics transformation on performance.

In detail, system digitization improves operational efficiency, inventory management, and real-time tracking, thereby improving overall performance. Logistics transformation improves coordination, responsiveness, and technology adoption, which further contribute to improved performance. Technology competency strengthens the relationship between system digitization and logistics transformation and employee performance, thereby enhancing the benefits derived from digitalization and logistics transformation.

In this case, companies must maximize the benefits of system digitalization and logistics transformation by developing better technological competencies. This will allow companies to integrate system digitalization and logistics transformation well, benefiting from operational efficiency, inventory management, real-time tracking, coordination, responsiveness, and better technology adoption. In addition, companies must also monitor other variables that can affect employee performance, such as company policies, business environment, and other factors.

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