

The Effect of Digital Transformation on Employee Performance at Perumda Tirtanadi of North Sumatra Province

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Abstract

This study aims to examine the effect of Digital Transformation on Employee Performance at Perumda Tirtanadi of North Sumatra Province, Indonesia. In the context of public sector governance, improving employee performance is essential to support the successful implementation of digital transformation and enhance overall organizational effectiveness. Employee performance reflects employees' ability in terms of work quality, timeliness, responsibility, and consistency, which are crucial in adapting to digital changes within the organization. A quantitative approach was employed using survey data collected from 54 respondents through a structured questionnaire. The validity and reliability of the research instrument were tested using Pearson's correlation and Cronbach's Alpha, confirming that all items were valid and reliable. Descriptive statistical analysis indicated that both Digital Transformation and Employee Performance were perceived at a moderate level, with mean scores of 20.1852 and 20.4074, respectively, and relatively consistent responses among participants. Furthermore, simple linear regression analysis and a t-test were conducted to test the research hypothesis. The results revealed that Employee Performance has a positive and statistically significant effect on Digital Transformation, with a significance value of 0.000 and a regression coefficient of 1.033. The coefficient of determination ($R^2 = 0.951$) indicates that 95.1% of the variance in Employee Performance can be explained by Digital Transformation. In addition, the high t-value (31.613 and 73.553) confirms a very strong relationship between the variables. These findings highlight the importance of improving digital transformation as a strategic approach to supporting and accelerating employee performance within the organization.

Keywords: Employee Performance; Digital Transformation; Human Resource Management

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Introduction

In the era of digital transformation and public sector modernization, improving employee performance has become a strategic priority for organizations, particularly for regionally owned enterprises (BUMDs) that are directly responsible for delivering public services. Organizations are increasingly required to optimize their human resources in order to enhance efficiency, effectiveness, and service quality in response to growing public expectations. In this context, employee performance serves as a key indicator in determining the success of organizational management and the achievement of institutional objectives (1); (2).

Perumda Tirtanadi of North Sumatra Province, as a public utility company responsible for providing clean water services, plays a crucial role in supporting community welfare and regional development. The effectiveness of its service delivery is highly dependent on the performance of its employees. Therefore, improving employee performance within the organization is essential to ensure sustainable service quality and organizational competitiveness in an increasingly dynamic environment (3).

Employee performance is influenced by various factors, including technological, organizational, and psychological aspects. One of the most significant factors in recent years is digital transformation. Digital transformation refers to the integration of digital technologies into organizational processes, which leads to fundamental changes in how work is performed, how services are delivered, and how organizations create value (4); (5). The implementation of digital systems, automation, and data-driven decision-making is expected to enhance operational efficiency, accuracy, and service quality.

Furthermore, digital transformation has been widely recognized as an important driver of organizational performance. Organizations that successfully adopt digital technologies tend to achieve higher levels of productivity, innovation, and service effectiveness (6). Employees who are able to utilize digital systems effectively are more likely to complete their tasks efficiently, reduce errors, and improve overall work outcomes. Therefore, digital transformation is considered a key factor in enhancing employee performance in modern organizations (7).

In the public sector, the importance of digital transformation is even more pronounced due to the increasing demand for transparency, accountability, and efficiency in public service delivery. Public organizations are required not only to adopt digital technologies but also to ensure that employees are capable of adapting to technological changes and utilizing digital tools effectively in their daily tasks (8). Consequently, the success of digital transformation initiatives depends largely on the readiness, competence, and adaptability of employees.

Despite its potential benefits, the implementation of digital transformation does not always produce optimal results in practice. In many organizations, the adoption of digital systems is often accompanied by various challenges, such as limited employee competence, resistance to change, and inadequate training programs (9). These challenges may hinder the effective utilization of digital technologies and, consequently, limit their impact on employee performance.

To obtain an initial empirical understanding of this issue, a preliminary survey was conducted among employees of Perumda Tirtanadi of North Sumatra Province, particularly in the General Affairs and Management Systems Division. The survey aimed to assess key indicators related to digital transformation and employee performance, including ease of use of digital systems, availability of training, timeliness of task completion, and quality of work outcomes.

The findings indicate that a significant proportion of employees still experience difficulties in using digital systems, and training programs have not yet been implemented evenly or continuously. In addition, employee performance remains suboptimal, particularly in terms of timeliness and quality of work results. These findings suggest that digital transformation initiatives within the organization have not yet fully contributed to improving employee performance.

This situation highlights the existence of a gap between the theoretical expectations and the empirical reality. Theoretically, effective digital transformation should lead to improved efficiency, enhanced employee capability, and better performance outcomes. However, the actual conditions at Perumda Tirtanadi indicate that the implementation of digital transformation has not yet achieved its expected impact on employee performance (7).

Previous studies have emphasized the important role of digital transformation in improving employee performance across various organizational contexts (10). However, empirical research focusing specifically on digital transformation and employee performance in regionally owned enterprises, particularly in the water utility sector, remains relatively limited. Considering the strategic role of Perumda Tirtanadi in providing essential public services, it is important to examine how digital transformation influences employee performance within this organization.

Therefore, this study aims to analyze the effect of digital transformation on employee performance at Perumda Tirtanadi of North Sumatra Province. The findings of this study are expected to provide empirical evidence regarding the role of digital transformation in enhancing employee performance and to offer practical recommendations for strengthening digitalization strategies and human resource management in public sector organizations.

Literature Review Digital Transformation

Digital transformation refers to the process of integrating digital technologies into all aspects of an organization, resulting in fundamental changes in how the organization operates and delivers value to its stakeholders. It not only involves the adoption of information technology but also encompasses changes in work processes, organizational culture, and employees' mindsets in responding to technological advancements (11)

In the context of public sector organizations and regionally owned enterprises, digital transformation plays a crucial role in enhancing administrative efficiency, transparency, data accuracy, and the quality of public services. The implementation of management information systems, document digitalization, and technology-based applications is expected to support employee performance more effectively. However, the success of digital transformation is highly dependent on human resource readiness and employees' ability to adopt and utilize the implemented technologies (10)

Indicators of Digital Transformation

The indicators of digital transformation in this study are adapted from (11) which include:

1. The utilization of digital technologies in work processes
2. The ease of use of digital systems
3. The availability of information technology infrastructure
4. Management support for digitalization
5. Training and development of employees' digital competencies

Employee Performance

Employee performance refers to the level of achievement of work results accomplished by employees in carrying out the duties and responsibilities assigned to them in accordance with organizational standards and objectives. Performance reflects an individual's contribution to the overall achievement of organizational goals, including aspects such as the quality, quantity, and timeliness of task completion (12).

In the context of public sector organizations, employee performance is not only measured by work output but also by accountability, compliance with regulations, and the ability to deliver high-quality public services. (13) emphasize that employee performance is a function of ability, motivation, and the opportunities provided by the organization.

Indicators of Employee Performance

According to (12) the indicators of employee performance include:

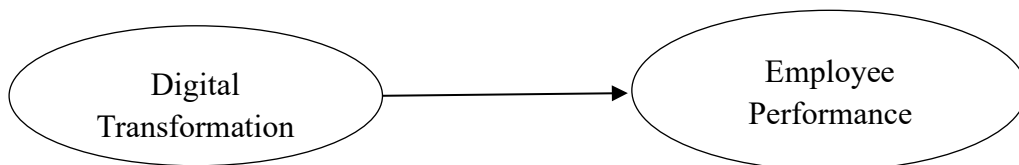
1. Quality of work results
2. Timeliness in completing tasks
3. Work responsibility
4. Consistency of performance
5. Ability to apply competencies in work tasks

Conceptual Framework and Hypothesis

This study conceptualizes Digital Transformation as independent variables. And employee performance acts as the dependent variable.

The conceptual framework assumes that higher Digital Transformation will improve employee performance. Increased employee performance is expected to contribute positively to their work performance.

Based on this framework, the hypotheses of this study are formulated as follows:



The hypothesis is:

H_a : Digital Transformation has a positive and significant effect on Employee Performance at Perumda Tirtanadi of North Sumatra Province

H_o : Digital Transformation does not have positive and significant effect on Employee performance at Perumda Tirtanadi of North Sumatra Province

Research Methodology

This study employed a quantitative associative research design, which aims to examine the relationship between two or more variables (14); (15). The quantitative approach was selected to statistically test the hypothesized relationships among the research variables. However, in the present study, the primary focus is on analyzing the influence of Digital Transformation on Employee performance .

The research was conducted at at Perumda Tirtanadi of North Sumatra Province, located at Jl. Sei Agul. 32, North Sumatera. The study was carried out over a three-month period, from March 2026 to June 2026.

The population of this study consisted of all employees working at at Perumda Tirtanadi of North Sumatra Province. According to (16); (17), a population refers to the entire group of subjects or objects that possess specific characteristics relevant to the research problem and serve as the basis for data collection and generalization of findings. In this study, the total population comprised 55 employees, all of whom were civil servants (ASN).

Given the relatively small size of the population, this research applied a saturated sampling technique (census sampling), in which all members of the population were included as research respondents. As defined by (17), a sample represents a subset of the population selected to reflect the characteristics of the entire population. However, since the population in this study was limited to 54 employees, all individuals were involved as respondents. Therefore, the total sample size was 54 employees.

The study relied on primary data collected through a structured questionnaire distributed to all respondents. The questionnaire items were developed based on established theoretical

indicators of Digital transformation and employee performance. Responses were measured using a five-point Likert scale ranging from strongly disagree to strongly agree. In addition, secondary data were obtained from institutional documents, official reports, and relevant administrative records to complement and support the primary data.

The collected data were analyzed using quantitative statistical methods with the assistance of SPSS version 26.0. The analysis was conducted in several stages. First, a validity test was performed to assess whether each questionnaire item accurately measured the intended variable (18). An item was considered valid if the calculated correlation coefficient (r-count) exceeded the r-table value. Second, a reliability test was conducted using Cronbach's Alpha, where a coefficient greater than 0.70 indicated that the instrument was reliable.

The regression model applied in this study is formulated as follows: $Y = a + bX$, Where:

Y = Employee performance

X = Digital transformation a

= Constant

b = Regression Coefficient

The t-test is used to determine whether Digital transformation has a significant effect on employee performance. The hypothesis is accepted if the t-count value is greater than the ttable value or if the significance level (p-value) is less than 0.05. Additionally, the coefficient of determination (R^2) is calculated to measure the proportion of variance in employee performance explained by Digital transformation. The R^2 value ranges from 0 to 1, with values closer to 1 indicating a stronger influence of the independent variable.

Results Validity and Reliability Tests

Validity was assessed using Pearson's correlation coefficient (r-value) by correlating each individual item score with the total composite score of its respective variable. With a sample size of $N = 50$ and a significance level of 5% (two-tailed), the critical r-table value was 0,2017. An item was considered valid if its r-value exceeded the r-table value.

Based on the results of the validity test using Pearson Correlation, the correlation coefficients obtained were 0.958, 0.985, 0.894, 0.977, and 0.977 with a significance value (Sig. 2-tailed) of 0.000 for all indicators of Digital transformation variable.

Since all correlation coefficients are very high and the significance values are below 0.05, it can be concluded that all indicators are statistically significant and valid in measuring the Digital transformation.

The results of the validity test using Pearson Correlation of Employee performance variable, obtained were 0.989, 0.989, 0.999, 0.999 and 0.999 with a significance value (Sig. 2tailed) of 0.000 for all indicators of the Employee performance variable.

According to (15) since all correlation coefficients are above the commonly accepted minimum threshold ($r > 0.30$) and fall within the moderate to very strong correlation range, and because the significance values are below 0.05, it can be concluded that all indicators are statistically significant and valid in measuring the Employee performance variable.

Reliability was evaluated using Cronbach's Alpha to measure the internal consistency of each variable. A research instrument is generally considered reliable if its Cronbach's Alpha value exceeds 0.60 (19).

Table 1. Reliability Results

Variable	Cronbach's Alpha	Benchmark	Result
Digital transformation	0.978	> 0.60	Reliable
Employee performance	0.997	> 0.60	Reliable

The Digital transformation variable achieved a Cronbach's Alpha value of 0.978, while the Employee performance variable obtained a value of 0.997. Both values were well above

the 0.60 benchmark, indicating strong internal consistency. These findings confirmed that the measurement instruments were both valid and reliable.

Descriptive Analysis

The first step in the descriptive analysis was to examine the summary statistics of the two main variables (Digital transformation and Employee performance). The analysis was conducted to provide an overview of respondents' perceptions based on the composite scores obtained from the questionnaire items. Each variable score represents the total accumulation of responses across its respective indicators.

Table 2. Descriptive Statistics

Variable	Mean	Std. Deviation	N
Digital transformation	20.1852	3.73699	54
Employee performance	20.4074	3.52628	54

As shown in Table 3, the mean score for Digital Transformation is 20.1852, with a standard deviation of 3.73699, based on 54 respondents. This result indicates that, on average, respondents perceived the implementation of digital transformation within the organization to be at a moderate level. The standard deviation, which is relatively smaller than the mean, suggests that the responses are fairly consistent among respondents. This implies that employees tend to share similar perceptions regarding the implementation of digital transformation, including aspects such as the use of digital systems, availability of infrastructure, and organizational support, although some variation still exists.

Meanwhile, the mean score for Employee Performance is 20.4074, with a standard deviation of 3.52628, also based on 54 respondents. This finding indicates that the overall level of employee performance is perceived to be in the moderate to relatively good category. The relatively lower standard deviation compared to the mean shows that respondents' assessments of employee performance are quite consistent. In other words, most employees tend to evaluate performance similarly in terms of work quality, timeliness, responsibility, and consistency.

Overall, the descriptive statistics indicate that both Digital Transformation and Employee Performance are perceived at a moderate level, with relatively consistent responses among participants. These findings provide an initial indication that digital transformation may play a role in influencing employee performance. Therefore, further inferential analysis is required to examine the relationship and the extent of the effect of digital transformation on employee performance within the organization (6).

These findings are consistent with previous studies (6), which indicate that digital transformation has a significant relationship with employee performance. The results highlight that digital transformation contributes positively to improving employee performance.

Regression Analysis Simple Linear Regression

A simple linear regression analysis was conducted to examine the effect of Digital transformation on Employee performance at Perumda Tirtanadi of North Sumatra Province. The analysis used composite scores derived from the three indicators of each variable based on the questionnaire data from 54 respondents.

Table 3. Regression Results

Model	B	Std. Error	Beta	t	Sig. (p)
(Constant)	-.900	.677		-1.330	.189
Employee performance	1.033	.033	.975	31.613	.000

a. Dependent Variable: Digital transformation

A simple linear regression analysis was conducted to examine the effect of Digital Transformation on Employee Performance. The analysis was based on questionnaire data collected from 54 respondents, with Employee Performance as the dependent variable and Digital Transformation as the independent variable.

Based on the regression output presented in Table 4, the regression equation can be formulated as:

$$Y = -0.900 + 1.033X$$

The constant value ($B = -0.900$) indicates that when the value of Digital Transformation is assumed to be zero, the predicted score of Employee Performance would be -0.900 . Although this value has limited practical interpretation in real organizational contexts, it serves as a baseline in the regression model.

The regression coefficient ($B = 1.033$) indicates that for every one-unit increase in Digital Transformation, the Employee Performance score is predicted to increase by 1.033 units, assuming other factors remain constant. This positive coefficient suggests that higher levels of digital transformation are associated with higher levels of employee performance within the organization.

The significance value ($p = 0.000$) is lower than the significance level of 0.05, indicating that Digital Transformation has a statistically significant effect on Employee Performance. Furthermore, the standardized beta coefficient ($Beta = 0.975$) shows a very strong positive relationship between the two variables.

The t-value of 31.613, which is much higher than the critical t-table value (approximately 2.006 for $df = 52$, $\alpha = 0.05$), further confirms that the effect of Digital Transformation on Employee Performance is statistically significant.

These findings indicate that higher levels of digital transformation are strongly associated with increased employee performance within the organization(20). Therefore, the research hypothesis stating that Digital Transformation has a positive and significant effect on Employee Performance is accepted.

Coefficient of Determination (R^2)

The coefficient of determination (R^2) was calculated ;to measure the proportion of variance in Digital transformation that could be explained by Employee performance at at Perumda Tirtanadi of North Sumatra Province.

Table 4. Coefficient of Determination

<u>Model</u>	<u>R</u>	<u>R²</u>	<u>Adjusted R²</u>
1	.975a	.951	.950

Based on Table 5, the results of the analysis show that the coefficient of determination (R^2) is 0.991. This indicates that 99.1% of the variance in Employee Performance can be explained by Digital transformation. In other words, the independent variable included in this regression model has a very strong explanatory power in predicting changes in Digital transformation. The remaining 0.9% of the variance is influenced by other factors not included in this research model, such as leadership style, organizational culture, work environment, training systems, or other managerial aspects within the organization.

Furthermore, the correlation coefficient ($R = 0.996$) indicates a very strong positive relationship between Digital transformation and Employee Performance. This suggests that higher levels of employee performance are strongly associated with higher levels of Digital transformation within the organization.

The Adjusted R^2 value of 0.991 also demonstrates that the regression model remains highly reliable even after adjustment. This indicates that the model has excellent predictive capability and provides a robust explanation of the relationship between the variables.

Overall, these findings confirm that Digital transformation makes a substantial contribution to explaining variations in Employee Performance, while only a very small proportion is influenced by other factors beyond the scope of this study (21).

Hypothesis Testing (t-Test)

Hypothesis testing was conducted using a t-test to determine whether the independent variable, Digital transformation, had a positive and significant effect on Employee performance

Table 5. t- Test Result

Model	B	Std. Error Beta	t	Sig. (p)
(Constant)	-.374	.286	-1.309	.197
Employee performance	1.014	.014	.996	.000

a. Dependent Variable: Digital transformation

Based on the results presented in Table 5, the constant value is -0.374 with a standard error of 0.286 and a t-value of -1.309 , with a significance value of 0.197 . This value represents the baseline level of Digital Transformation when Employee Performance is assumed to be zero. However, since the significance value is greater than 0.05 , the constant is not statistically significant.

Meanwhile, the regression coefficient for Employee Performance is 1.014 with a standard error of 0.014 and a standardized beta coefficient of 0.996 . The t-value of 73.553 , which is far greater than the t-table value (approximately 2.006 for $\alpha = 0.05$), indicates that Digital Transformation has a very strong and statistically significant effect on Employee Performance. The significance value ($p = 0.000$) is also lower than 0.05 , further confirming the significance of the effect.

The positive regression coefficient shows that higher levels of digital transformation are associated with higher levels of employee performance within the organization. This suggests that improvements in employee performance are likely to support and accelerate the implementation of digital transformation initiatives.

Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted. This means that Digital Transformation has a positive and significant effect on Employee Performance.

Overall, the results indicate that digital transformation is a key factor influencing the success of Employee Performance within the organization, with a very strong magnitude of effect (22).

Conclusion

Based on the results of the descriptive and inferential statistical analyses, several conclusions can be drawn from this study regarding the relationship between Employee Performance and Digital Transformation at Perumda Tirtanadi of North Sumatra Province.

First, the descriptive analysis shows that respondents generally provided moderately positive assessments of both variables. The mean score of Digital Transformation was 20.1852 with a standard deviation of 3.73699 , while the mean score of Employee Performance was 20.4074 with a standard deviation of 3.52628 . These results indicate that both digital transformation and employee performance are perceived to be at a moderate level within the organization. The relatively small standard deviation values suggest that respondents' perceptions were fairly consistent.

Second, the simple linear regression analysis indicates that Digital Transformation has a positive effect on Employee Performance. The regression equation obtained was $Y = -0.900 + 1.033X$, which means that every one-unit increase in employee performance is predicted to increase digital transformation by 1.033 units. The significance value of 0.000 (< 0.05) indicates that this effect is statistically significant.

Third, the coefficient of determination (R^2) shows a value of 0.951, meaning that 95.1% of the variation in Employee Performance can be explained by Digital Transformation, while the remaining 4.9% is influenced by other variables not included in this study. In addition, the correlation coefficient ($R = 0.975$) indicates a very strong positive relationship between the two variables.

Fourth, the t-test results further confirm the significance of this relationship. The calculated t-value of 31.613 (from regression) and 73.553 (from hypothesis testing output) are both far greater than the t-table value (approximately 2.006), with a significance value of 0.000, indicating that the independent variable has a very strong and statistically significant influence on the dependent variable. Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_a) is accepted.

Overall, the findings of this study demonstrate that Digital Transformation plays a highly significant role in influencing Employee Performance at Perumda Tirtanadi of North Sumatra Province. Higher levels of Digital Transformation are strongly associated with better implementation of Employee Performance within the organization. These results suggest that improving employee performance through effective performance management, continuous training, and organizational support can significantly contribute to strengthening digital transformation and enhancing overall organizational effectiveness.

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