

The Effect of Leadership, Motivation, and Work Environment on Employee Performance with Job Satisfaction as an Intervening Variable at the Center for Teachers and Education Personnel (BBGTK) of North Sumatra

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Abstract

This study aims to analyze the effects of leadership, work motivation, and work environment on employee performance, with job satisfaction serving as an intervening variable at the Center for Teachers and Education Personnel (BBGTK) of North Sumatra. The study involved 77 Civil Servants (ASN) selected using a saturated sampling technique. A quantitative approach was employed, and the data were analyzed using Structural Equation Modeling based on Partial Least Squares (PLS-SEM) with SmartPLS 4.0. The results revealed that leadership, work motivation, and work environment had positive and significant effects on employee performance, with path coefficients of 0.358, 0.265, and 0.267, respectively. Leadership, work motivation, and work environment also positively influenced job satisfaction, while job satisfaction had a positive and significant effect on employee performance ($\beta = 0.171$; $p = 0.005$). Leadership emerged as the strongest predictor of both employee performance and job satisfaction. The mediation analysis further indicated that job satisfaction transmitted the effects of leadership, work motivation, and work environment on employee performance. The structural model explained 67.9% of the variance in job satisfaction and 92.9% of the variance in employee performance. Overall, the findings highlight that improving employee performance at BBGTK North Sumatra requires an integrated approach centered on effective leadership, supported by strong work motivation, a conducive work environment, and increased job satisfaction.

Keywords: *Leadership; Work Motivation; Work Environment; Job Satisfaction; Employee Performance.*

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Introduction

Human resources constitute a fundamental element in every organization, including public educational institutions such as the Center for Teachers and Education Personnel (BBGTK) of North Sumatra. The achievement of organizational objectives depends substantially on the quality and performance of its employees. Employees are expected to carry out their duties effectively, responsibly, and consistently to support the delivery of quality public services. Therefore, organizations need to manage their human resources appropriately to ensure that employees are capable of achieving the expected performance standards [1].

Employee performance reflects the results achieved by employees in carrying out their duties based on predetermined responsibilities and organizational targets. However, employee performance is influenced by various organizational and individual factors. Leadership is one of the important factors because effective leaders can provide direction, support, and encouragement for employees to achieve organizational objectives [2]. Previous research also indicates that appropriate leadership practices can encourage positive employee behavior and contribute to improved employee performance [3].

In addition to leadership, work motivation plays an essential role in encouraging employees to perform optimally. Employees with strong motivation tend to demonstrate greater enthusiasm, responsibility, and persistence in completing their duties. Previous research has demonstrated that work motivation contributes to improving employee performance by encouraging employees to exert greater effort in achieving organizational objectives [4]. The work environment is equally important because employees require comfortable physical working conditions, adequate facilities, and harmonious relationships with supervisors and colleagues. A conducive workplace environment can support employees in performing their duties effectively and achieving better performance outcomes [5].

Job satisfaction is another important factor that may explain how leadership, motivation, and the work environment influence employee performance. Employees who receive appropriate leadership support are more likely to develop positive attitudes and satisfaction toward their work [6]. Strong work motivation can also contribute to higher levels of employee job satisfaction [7]. Furthermore, a conducive work environment can create comfort and positive working experiences that strengthen employees' job satisfaction [8]. Employees with higher job satisfaction are subsequently more likely to demonstrate positive work behavior and improved performance [9]. Therefore, job satisfaction may serve as an important intervening mechanism through which leadership, motivation, and the work environment contribute to employee performance.

Within the operational context of BBGTK North Sumatra, employee performance is generally considered positive; however, several issues indicate that performance has not yet been fully optimized. Preliminary observations show that employee performance achievements remain inconsistent, particularly regarding administrative discipline and the completion of annual Employee Performance Target (SKP) evaluations. In addition, differences in leadership effectiveness, employee motivation, workplace conditions, and levels of job satisfaction may contribute to variations in employee performance. These conditions demonstrate that improving employee performance requires attention not only to individual capabilities but also to organizational factors that shape employees' experiences and attitudes toward their work.

Consequently, this study aims to systematically examine the effects of leadership, motivation, and work environment on employee performance at BBGTK North Sumatra. Furthermore, this study investigates the role of job satisfaction as an intervening variable in the relationships between leadership, motivation, and work environment and employee performance. By examining these relationships simultaneously, this study is expected to provide empirical evidence regarding the organizational factors that contribute to improving employee performance within a public educational institution.

Literature Review

2.1 Leadership

Leadership is the process of influencing and directing employees toward the achievement of organizational objectives. Effective leadership provides clear direction, strengthens communication, and encourages employees to perform their responsibilities effectively [1]. Leadership is reflected through decision-making ability, motivational ability, communication ability, employee control, responsibility, and emotional control [2]. In this study, leadership is expected to influence employee performance directly and indirectly by creating positive work experiences that strengthen job satisfaction.

2.2 Work Motivation

Work motivation represents the internal and external forces that stimulate employees to exert effort and persist in achieving organizational goals [3]. Highly motivated employees tend to demonstrate greater enthusiasm, responsibility, and achievement orientation. Work motivation can be reflected through the need for achievement, affiliation, and power [4]. Therefore, motivation is expected to strengthen employee performance directly and through increased job satisfaction.

2.3 Work Environment

The work environment encompasses physical and non-physical conditions surrounding employees that may affect their comfort and ability to perform their duties [5]. A conducive workplace provides adequate physical conditions, appropriate facilities, and supportive interpersonal relationships. In this study, the work environment is measured through five dimensions: lighting, temperature and air circulation, noise level, workspace and work facilities, and working relationships [6]. Favorable working conditions are expected to increase employee comfort and job satisfaction, thereby supporting higher employee performance.

2.4 Job Satisfaction

Job satisfaction refers to employees' positive evaluations and emotional responses toward their jobs and working experiences [7]. It reflects how employees perceive important aspects of their work, including the work itself, compensation, promotion opportunities, supervision, and relationships with coworkers [8]. In this study, job satisfaction serves as an intervening variable that explains how leadership, motivation, and the work environment can translate into improved employee performance.

2.5 Employee Performance

Employee performance represents the results achieved by employees in fulfilling their duties and responsibilities according to established organizational standards [9]. Performance can be reflected through work quality, work quantity, timeliness, effectiveness, and independence [10]. As the primary outcome variable in this study, employee performance is expected to improve when employees experience effective leadership, strong work motivation, a conducive work environment, and higher job satisfaction.

The theoretical relationships among these variables indicate that employee performance is not determined solely by individual effort but also by organizational conditions that shape employees' attitudes and work experiences. Accordingly, this study integrates leadership, work motivation, and work environment as antecedents of employee performance, with job satisfaction positioned as an intervening mechanism that may strengthen these relationships.

2.6 Conceptual Framework

Drawing upon the theoretical foundations discussed earlier, this study posits that leadership, work motivation, and work environment exert both direct and indirect influences on employee performance, wherein job satisfaction functions as an intervening variable.

Leadership, work motivation, and work environment are also expected to influence job satisfaction, which subsequently contributes to employee performance. The conceptual interconnections among these constructs are illustrated in the following framework.

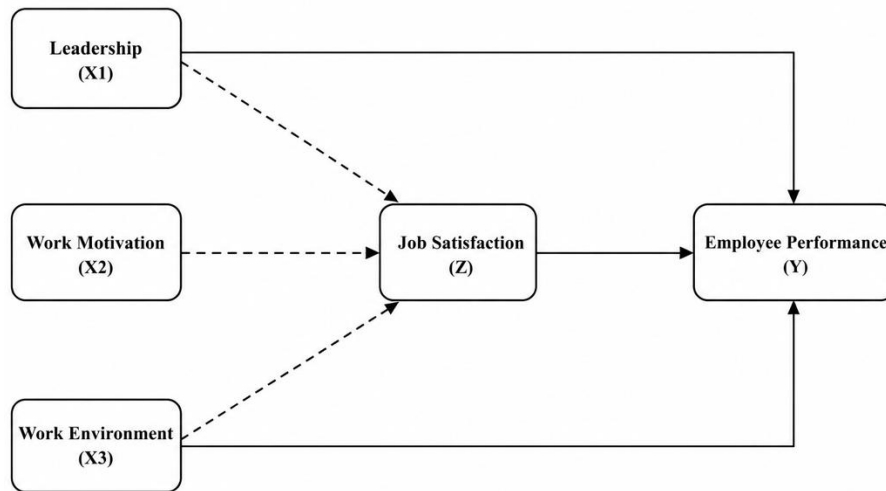


Figure 1. Conceptual Framework

2.7 Hypotheses

In research, hypotheses are formulated based on the identified problems, theoretical foundations, conceptual framework, and objectives of the study. They function as tentative statements that explain the expected relationships among variables and provide a basis for empirical testing. As noted by [11], a hypothesis serves as a provisional answer to the research problem that must be empirically examined and verified.

Accordingly, based on the theoretical framework and relationships among the variables examined in this study, the following hypotheses are proposed:

- H1 :** Leadership is proposed to have a positive and significant effect on employee performance.
- H2 :** Work motivation is proposed to have a positive and significant effect on employee performance.
- H3 :** Work environment is proposed to have a positive and significant effect on employee performance.
- H4 :** Leadership is proposed to have a positive and significant effect on job satisfaction.
- H5 :** Work motivation is proposed to have a positive and significant effect on job satisfaction.
- H6 :** Work environment is proposed to have a positive and significant effect on job satisfaction.
- H7 :** Job satisfaction is proposed to have a positive and significant effect on employee performance.
- H8 :** Leadership is proposed to have a positive and significant effect on employee performance through job satisfaction.
- H9 :** Work motivation is proposed to have a positive and significant effect on employee performance through job satisfaction.
- H10 :** Work environment is proposed to have a positive and significant effect on employee performance through job satisfaction.

Research Methodology

3.1 Type of Research

This study adopts a quantitative associative approach designed to examine the causal relationships among the variables investigated. Quantitative research is based on the positivist paradigm and employs research instruments and statistical analysis to objectively test predetermined hypotheses [12]. In this study, leadership (X1), work motivation (X2), and work environment (X3) serve as exogenous variables, employee performance (Y) serves as the endogenous variable, while job satisfaction (Z) functions as an intervening variable that explains the indirect relationships between the exogenous variables and employee performance.

3.2 Research Location and Duration

The research was conducted at the Center for Teachers and Education Personnel (BBGTK) of North Sumatra, located at Jl. Kenanga Raya No. 64, Tanjung Sari, Medan Selayang District, Medan City, North Sumatra, Indonesia. The research was carried out over a three-month period, from October to December 2025, covering the employees of BBGTK North Sumatra.

3.3 Population and Sample

A population refers to the entire group of subjects or objects possessing specific characteristics determined by the researcher for investigation and subsequent conclusion drawing [12]. The population of this study comprises all 77 Civil Servants (ASN) working at BBGTK North Sumatra. Given the relatively limited population size, this study employed a saturated sampling technique, in which all members of the population were selected as research respondents. Therefore, the total sample consisted of 77 respondents, representing the entire ASN employee population at BBGTK North Sumatra.

3.4 Data Sources and Collection Technique

This study primarily utilized primary data obtained directly from respondents through a structured questionnaire. The questionnaire was distributed to 77 ASN employees at BBGTK North Sumatra and contained statements representing leadership, work motivation, work environment, job satisfaction, and employee performance. Respondents' perceptions were measured using a five-point Likert scale ranging from strongly disagree to strongly agree. Supporting data were also obtained through relevant institutional documentation required to strengthen the description of the research object.

3.5 Data Analysis Technique

The research data were analyzed using Structural Equation Modeling based on Partial Least Squares (PLS-SEM) with SmartPLS version 4.0. PLS-SEM was employed to simultaneously examine the relationships among leadership, work motivation, work environment, job satisfaction, and employee performance. The analysis consisted of two main stages: evaluation of the measurement model (outer model) and evaluation of the structural model (inner model) [13].

The outer model was evaluated through convergent validity and construct reliability. Convergent validity was assessed using outer loading and Average Variance Extracted (AVE), while construct reliability was evaluated using Cronbach's Alpha and Composite Reliability. The inner model was subsequently assessed using the coefficient of determination (R^2), effect size (f^2), and collinearity statistics (VIF). Hypothesis testing was performed through the bootstrapping procedure by examining the path coefficients, t-statistics, and p-values. A relationship was considered statistically significant when the p-value was below 0.05.

Furthermore, the analysis examined both direct and indirect effects. The direct effects included the relationships of leadership, work motivation, and work environment with employee performance; the relationships of leadership, work motivation, and work environment with job satisfaction; and the relationship between job satisfaction and employee performance. The indirect-effect analysis was conducted to determine whether job satisfaction serves as an intervening variable in the relationships between leadership, work motivation, and work environment and employee performance.

3.6 Feasibility Testing

The testing procedures conducted in this study include:

- 1) Outer Model Evaluation, to assess construct validity and reliability using outer loading, Composite Reliability, Cronbach's Alpha, and Average Variance Extracted (AVE) [13].

- 2) Inner Model Evaluation, to assess the structural relationships using the coefficient of determination (R^2), effect size (f^2), and Variance Inflation Factor (VIF) [14].
- 3) Model Fit Evaluation, to assess the overall fit of the proposed model using the Standardized Root Mean Square Residual (SRMR) criterion [15].
- 4) Hypothesis Testing, conducted through bootstrapping in SmartPLS 4.0 to examine direct and indirect effects. A relationship is considered significant when the t-statistic > 1.96 and p-value < 0.05 [16].

Results

4.1 Outer Model Analysis

The outer model testing in this study was conducted using the PLS Algorithm analysis in SmartPLS version 4.0. This procedure aimed to evaluate the validity and reliability of the indicators used to measure leadership, work motivation, work environment, job satisfaction, and employee performance.

1) The Result of Convergent Validity

Convergent validity in a reflective measurement model is evaluated by examining the outer loading value of each indicator on its respective construct. An indicator is considered to meet the convergent validity criterion when its outer loading value is greater than 0.70 [15]. Based on the outer loading analysis, all indicators in this study obtained values above 0.70. Therefore, all indicators were declared valid and retained for further analysis. The detailed results are presented in Table 1.

Table 1. Outer Loading

Leadership (X1)		
Indicators	Outer Loading	Description
K_1	0.906	Valid
K_2	0.911	Valid
K_3	0.886	Valid
K_4	0.872	Valid
K_5	0.916	Valid
K_6	0.913	Valid
K_7	0.880	Valid
K_8	0.902	Valid
K_9	0.937	Valid
K_10	0.895	Valid
K_11	0.923	Valid
Work Motivation (X2)		
Indicators	Outer Loading	Description
MK_1	0.918	Valid
MK_2	0.913	Valid
MK_3	0.943	Valid
MK_4	0.921	Valid
MK_5	0.946	Valid
MK_6	0.910	Valid
MK_7	0.912	Valid
MK_8	0.898	Valid
MK_9	0.930	Valid
MK_10	0.931	Valid
Work Environment (X3)		
Indicators	Outer Loading	Description
LK_1	0.888	Valid
LK_2	0.907	Valid

LK_3	0.804	Valid
LK_4	0.907	Valid
LK_5	0.859	Valid
LK_6	0.864	Valid
LK_7	0.899	Valid
LK_8	0.897	Valid
LK_9	0.892	Valid
LK_10	0.891	Valid
Job Satisfaction (Z)		
Indicators	Outer Loading	Description
KK2_1	0.934	Valid
KK2_2	0.900	Valid
KK2_3	0.933	Valid
KK2_4	0.925	Valid
KK2_5	0.901	Valid
KK2_6	0.928	Valid
KK2_7	0.907	Valid
KK2_8	0.933	Valid
Employee Performance (Y)		
Indicators	Outer Loading	Description
KK1_1	0.905	Valid
KK1_2	0.922	Valid
KK1_3	0.895	Valid
KK1_4	0.892	Valid
KK1_5	0.919	Valid
KK1_6	0.936	Valid
KK1_7	0.862	Valid
KK1_8	0.919	Valid

Source: SmartPLS 4.0 Output, 2026

Based on the results presented in Table 1, all indicators demonstrate outer loading values above 0.70, confirming that the measurement model meets the convergent validity criterion [10]. The loading values obtained indicate that each indicator has a strong relationship with its respective latent construct.

For the Leadership (X1) construct, the outer loading values range from 0.872 to 0.937, indicating that all 11 indicators adequately represent leadership. Work Motivation (X2) records loading values between 0.898 and 0.946, demonstrating a strong contribution of all 10 indicators in measuring employee motivation.

The Work Environment (X3) construct shows outer loading values ranging from 0.804 to 0.907. Although LK_3 has the lowest loading value of 0.804, it remains above the required threshold and is therefore retained as a valid indicator. Job Satisfaction (Z) records loading values between 0.900 and 0.934, while Employee Performance (Y) ranges from 0.862 to 0.936, confirming that all indicators consistently represent their respective constructs.

Overall, all 47 indicators satisfy the convergent validity requirement, with outer loading values ranging from 0.804 to 0.946. Therefore, no indicators were eliminated, and the entire measurement model is considered suitable for further validity, reliability, and structural model analysis. The outer model results are illustrated in the following structural model diagram.

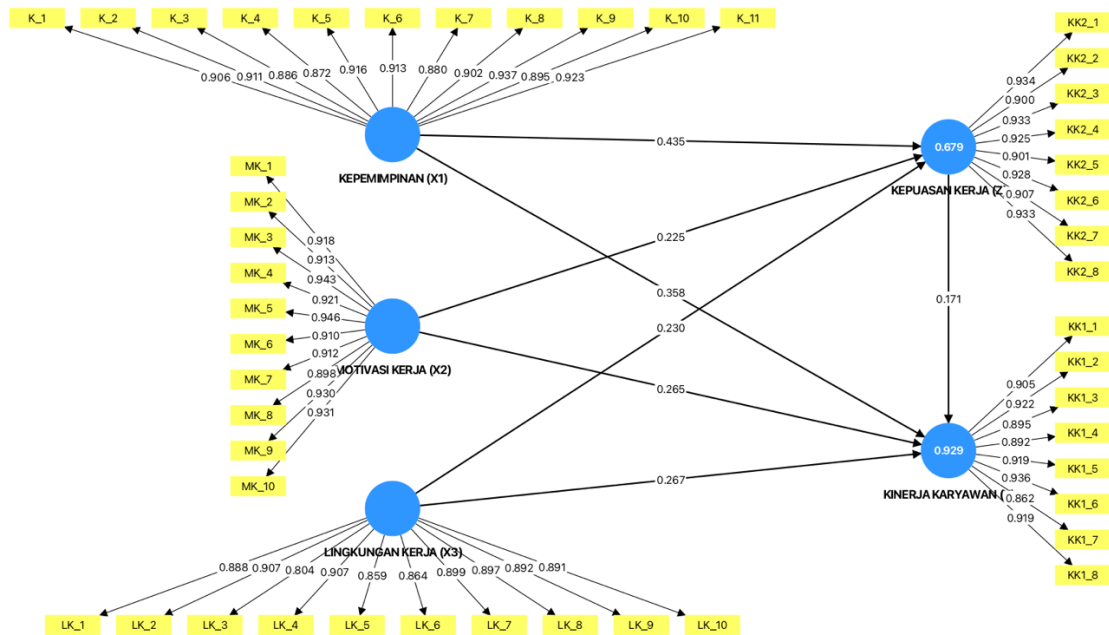


Figure 2. Outer Model and Structural Model Estimation Results

2) The Results of Discriminant Validity Testing

The next stage is discriminant validity testing, which aims to determine whether each construct in the model is empirically distinct from the other constructs. Discriminant validity confirms that leadership, work motivation, work environment, job satisfaction, and employee performance measure different concepts within the research model. A construct is considered to meet the discriminant validity criterion when it demonstrates adequate distinction from the other constructs [16]. The results of the discriminant validity testing are presented in Table 2.

Table 2. The Results of Discriminant Validity Testing

Leadership (X1)					
Indicators	Leadership (X1)	Work Motivation (X2)	Work Environment (X3)	Job Satisfaction (Z)	Employee Performance (Y)
K_1	0.906	0.700	0.768	0.733	0.841
K_2	0.911	0.715	0.753	0.718	0.842
K_3	0.886	0.704	0.794	0.727	0.862
K_4	0.872	0.712	0.692	0.715	0.791
K_5	0.916	0.772	0.743	0.706	0.855
K_6	0.913	0.759	0.745	0.758	0.840
K_7	0.880	0.643	0.660	0.648	0.775
K_8	0.902	0.657	0.755	0.734	0.840
K_9	0.937	0.727	0.735	0.733	0.842
K_10	0.895	0.722	0.756	0.714	0.833
K_11	0.923	0.669	0.771	0.764	0.840
Work Motivation (X2)					
Indicators	Leadership (X1)	Work Motivation (X2)	Work Environment (X3)	Job Satisfaction (Z)	Employee Performance (Y)
MK_1	0.725	0.918	0.611	0.605	0.773
MK_2	0.680	0.913	0.554	0.659	0.763
MK_3	0.761	0.943	0.672	0.699	0.831
MK_4	0.757	0.921	0.605	0.683	0.783

MK_5	0.753	0.946	0.660	0.699	0.802
MK_6	0.643	0.910	0.550	0.629	0.719
MK_7	0.685	0.912	0.603	0.620	0.773
MK_8	0.733	0.898	0.614	0.685	0.787
MK_9	0.764	0.930	0.595	0.688	0.781
MK_10	0.708	0.931	0.636	0.643	0.773
Work Environment (X3)					
Indicators	Leadership (X1)	Work Motivation (X2)	Work Environment (X3)	Job Satisfaction (Z)	Employee Performance (Y)
LK_1	0.703	0.556	0.888	0.593	0.728
LK_2	0.743	0.643	0.907	0.693	0.789
LK_3	0.671	0.519	0.804	0.622	0.669
LK_4	0.726	0.608	0.907	0.642	0.781
LK_5	0.681	0.589	0.859	0.644	0.738
LK_6	0.776	0.563	0.864	0.668	0.777
LK_7	0.743	0.589	0.899	0.622	0.779
LK_8	0.741	0.586	0.897	0.657	0.783
LK_9	0.731	0.604	0.892	0.663	0.774
LK_10	0.732	0.574	0.891	0.685	0.780
Job Satisfaction (Z)					
Indicators	Leadership (X1)	Work Motivation (X2)	Work Environment (X3)	Job Satisfaction (Z)	Employee Performance (Y)
KK2_1	0.768	0.710	0.656	0.934	0.795
KK2_2	0.732	0.675	0.679	0.900	0.794
KK2_3	0.750	0.671	0.695	0.933	0.797
KK2_4	0.758	0.699	0.643	0.925	0.780
KK2_5	0.684	0.594	0.648	0.901	0.745
KK2_6	0.684	0.625	0.651	0.928	0.739
KK2_7	0.763	0.638	0.717	0.907	0.779
KK2_8	0.745	0.663	0.731	0.933	0.780
Employee Performance (Y)					
Indicators	Leadership (X1)	Work Motivation (X2)	Work Environment (X3)	Job Satisfaction (Z)	Employee Performance (Y)
KK1_1	0.837	0.762	0.793	0.822	0.905
KK1_2	0.836	0.824	0.785	0.771	0.922
KK1_3	0.816	0.771	0.749	0.801	0.895
KK1_4	0.818	0.736	0.788	0.717	0.892
KK1_5	0.849	0.764	0.808	0.734	0.919
KK1_6	0.866	0.805	0.821	0.775	0.936
KK1_7	0.809	0.702	0.748	0.701	0.862
KK1_8	0.855	0.757	0.766	0.800	0.919

Source: SmartPLS 4.0 Output, 2026

Based on Table 2, each indicator demonstrates a higher cross-loading value on its respective construct than on the other constructs, indicating that the measurement model satisfies the discriminant validity criterion.

The Leadership (X1) indicators record cross-loading values ranging from 0.872 to 0.937, while the Work Motivation (X2) indicators range from 0.898 to 0.946. In each case, the

indicators load more strongly on their intended constructs than on the other variables, confirming their ability to distinctly represent leadership and work motivation.

Similarly, the Work Environment (X3) indicators show cross-loading values between 0.804 and 0.907. Although LK_3 records the lowest value of 0.804, its loading remains higher on the work environment construct than on the other constructs. Job Satisfaction (Z) also demonstrates strong discriminant validity, with cross-loading values ranging from 0.900 to 0.934, confirming that its indicators distinctly capture employees' satisfaction with their jobs.

Finally, the Employee Performance (Y) indicators record cross-loading values between 0.862 and 0.936. All indicators exhibit their highest correlations with employee performance, demonstrating that they accurately represent the performance construct despite relatively strong correlations with several organizational variables.

Overall, the cross-loading results confirm that leadership, work motivation, work environment, job satisfaction, and employee performance are empirically distinguishable constructs. Therefore, all 47 indicators meet the discriminant validity criterion and can be retained for subsequent reliability and structural model analysis.

3) The Result of Composite reliability Test

The next stage evaluates the reliability and convergent validity of the constructs. Construct reliability is assessed using Cronbach's Alpha and Composite Reliability, where values above 0.70 indicate adequate internal consistency [13]. Convergent validity is further evaluated using the Average Variance Extracted (AVE), with values above 0.50 indicating that the construct adequately explains the variance of its indicators [15]. The results are presented in Table 3.

Table 3. Construct Reliability and Validity

Variables	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	(AVE)
Leadership (X1)	0.978	0.978	0.980	0.817
Work Motivation (X2)	0.980	0.981	0.983	0.851
Work Environment (X3)	0.968	0.969	0.972	0.777
Job Satisfaction (Z)	0.974	0.974	0.978	0.846
Employee Performance (Y)	0.969	0.969	0.974	0.822

Source: SmartPLS 4.0 Output, 2026

Based on Table 3, all constructs demonstrate strong reliability, with Cronbach's Alpha values ranging from 0.968 to 0.980 and Composite Reliability (rho_c) values ranging from 0.972 to 0.983, exceeding the recommended threshold of 0.70. Work Motivation (X2) records the highest reliability, while Work Environment (X3), despite having the lowest reliability values, still demonstrates very strong internal consistency.

Furthermore, the AVE values range from 0.777 to 0.851, substantially exceeding the minimum criterion of 0.50. Work Motivation (X2) records the highest AVE at 0.851, while Work Environment (X3) records the lowest at 0.777. These results confirm that leadership, work motivation, work environment, job satisfaction, and employee performance satisfy both construct reliability and convergent validity requirements. Therefore, all constructs are considered reliable and valid for subsequent structural model analysis.

4.2 Structural Model Evaluation (Inner Model)

The structural model evaluation is conducted to assess the predictive strength and relationships among the latent variables in the proposed research model. This analysis focuses

on examining how leadership, work motivation, and work environment explain job satisfaction and employee performance, as well as the role of job satisfaction in influencing employee performance.

1) Coefficient of Determination (R^2) Test

The coefficient of determination (R^2) is used to assess the explanatory power of the structural model by showing the proportion of variance in the endogenous constructs explained by their predictor variables. Higher R^2 values indicate a stronger ability of the proposed model to explain the dependent constructs.

Table 4. R-Square Results

Variables	R-Square	Adjusted R-Square
Job Satisfaction (Z)	0.679	0.666
Employee Performance (Y)	0.929	0.925

Source: SmartPLS 4.0 Output, 2026

Based on Table 4, the R^2 value for Job Satisfaction (Z) is 0.679, indicating that leadership, work motivation, and work environment collectively explain 67.9% of the variation in job satisfaction, while the remaining 32.1% is attributable to factors outside the research model. The adjusted R^2 value of 0.666 further indicates substantial explanatory power after considering the number of predictors included in the model.

Employee Performance (Y) records an R^2 value of 0.929, demonstrating that leadership, work motivation, work environment, and job satisfaction collectively explain 92.9% of the variation in employee performance. Only 7.1% is explained by other factors not examined in this study. The adjusted R^2 value of 0.925 confirms that the model maintains very strong explanatory power.

Overall, these results indicate that the proposed structural model is particularly strong in explaining employee performance at BBGTK North Sumatra. The findings also demonstrate that leadership, work motivation, and work environment provide substantial explanatory power for job satisfaction, while their integration with job satisfaction produces a highly explanatory model of employee performance [5].

2) The Results of Model Fit Evaluation

Model fit evaluation was conducted to assess the overall correspondence between the proposed PLS-SEM model and the empirical data. The evaluation primarily considers the Standardized Root Mean Square Residual (SRMR), where a value below 0.08 indicates an acceptable model fit. Other indices, including NFI, d_ULS, and d_G, provide additional information regarding the overall model fit.

Table 5. Model Fit Results

Model Fit Criteria	Saturated Model	Estimated Model
SRMR	0.038	0.038
d_ULS	1.622	1.622
d_G	4.665	4.665
Chi-Square	1387.524	1387.524
NFI	0.779	0.779

Source: SmartPLS 4.0 Output, 2026

Based on Table 5, the SRMR value of 0.038 is well below the recommended threshold of 0.08, indicating a strong correspondence between the proposed model and the observed data. Moreover, the identical SRMR values for the saturated and estimated models indicate that the specified structural relationships do not introduce additional model discrepancy.

The NFI value of 0.779 indicates that the model achieves a reasonable level of incremental fit, although it does not approach the ideal value of 1. Therefore, the strongest evidence of model fit in this study is provided by the low SRMR value rather than by the NFI

alone [15]. Overall, the model demonstrates an acceptable fit and provides an adequate empirical foundation for examining the proposed relationships among leadership, work motivation, work environment, job satisfaction, and employee performance at BBGTK North Sumatra.

4.3 Hypothesis Testing Results

After evaluating the structural model, hypothesis testing was conducted to determine the direct and indirect relationships among leadership, work motivation, work environment, job satisfaction, and employee performance. The decision was based on the bootstrapping results generated by SmartPLS 4.0, with statistical significance determined at a p-value below 0.05. The direct-effect results are presented in Table 6.

Table 6. Path Coefficients (Direct Effects)

Relationship	Original Sample (O)	Sample Mean (M)	STDEV	T-Statistics	P-Values	Decision
Leadership (X1) → Employee Performance (Y)	0.358	0.362	0.085	4.189	0.000	Accepted
Work Motivation (X2) → Employee Performance (Y)	0.265	0.263	0.057	4.620	0.000	Accepted
Work Environment (X3) → Employee Performance (Y)	0.267	0.266	0.066	4.071	0.000	Accepted
Leadership (X1) → Job Satisfaction (Z)	0.435	0.429	0.135	3.222	0.001	Accepted
Work Motivation (X2) → Job Satisfaction (Z)	0.225	0.227	0.113	1.989	0.047	Accepted
Work Environment (X3) → Job Satisfaction (Z)	0.230	0.235	0.124	1.850	0.001	Accepted
Job Satisfaction (Z) → Employee Performance (Y)	0.171	0.169	0.061	2.808	0.005	Accepted

Source: SmartPLS 4.0 Output, 2026

Based on Table 6, leadership has a positive and significant effect on employee performance ($\beta = 0.358$; $t = 4.189$; $p = 0.000$). Among the three exogenous variables, leadership produces the strongest direct effect on performance. This result indicates that employee performance at BBGTK North Sumatra is particularly responsive to how leaders provide direction, communicate expectations, make decisions, and coordinate employees in carrying out institutional responsibilities [22]. Thus, strengthening leadership practices is likely to produce the most substantial direct improvement in employee performance. This finding is consistent with previous evidence showing that leadership is an important organizational mechanism for strengthening employee performance [3].

Work motivation also has a positive and significant effect on employee performance ($\beta = 0.265$; $t = 4.620$; $p = 0.000$). This result indicates that employees who possess stronger achievement orientation, persistence, and willingness to perform their responsibilities are more likely to achieve higher performance. In the BBGTK context, motivation becomes particularly relevant because the effectiveness of educational public services depends not only on formal job assignments but also on employees' willingness to complete their responsibilities consistently [18]. Therefore, H2 is accepted. This result is in line with previous research emphasizing the contribution of employee motivation to performance outcomes [7].

The results further show that work environment positively and significantly affects employee performance ($\beta = 0.267$; $t = 4.071$; $p = 0.000$). Its coefficient is slightly higher than that of work motivation, indicating that workplace conditions constitute an important performance driver at BBGTK North Sumatra. Adequate facilities, comfortable physical conditions, and supportive working relationships enable employees to perform their duties with fewer workplace constraints. This result supports previous research demonstrating that favorable workplace conditions contribute to stronger employee performance [1].

Regarding job satisfaction, leadership produces the strongest effect ($\beta = 0.435$; $t = 3.222$; $p = 0.001$). This coefficient is considerably higher than the effects of work motivation and work environment on job satisfaction. The finding indicates that employees' satisfaction at BBGTK North Sumatra is strongly shaped by their experience of leadership. Employees are more likely to develop positive evaluations of their jobs when leadership provides appropriate direction, support, communication, and recognition. Thus, leadership at BBGTK does not merely function as a direct performance driver but also shapes the psychological conditions under which employees experience their work.

Work motivation has a positive and significant effect on job satisfaction ($\beta = 0.225$; $t = 1.989$; $p = 0.047$). Although the effect is weaker than that of leadership, motivated employees tend to perceive their work more positively because they have stronger internal reasons to pursue achievement and fulfill their responsibilities. This finding indicates that strengthening employee motivation can simultaneously contribute to better performance and greater satisfaction [20].

The coefficient for work environment toward job satisfaction is positive at 0.230. Based on the reported p-value of 0.001, the relationship is significant, suggesting that improvements in physical working conditions, facilities, and interpersonal relationships can strengthen employees' satisfaction with their working experience. This pattern is consistent with studies emphasizing the importance of workplace conditions in shaping employees' psychological and performance outcomes [1].

Finally, job satisfaction has a positive and significant effect on employee performance ($\beta = 0.171$; $t = 2.808$; $p = 0.005$). Although its direct effect is smaller than those of leadership, motivation, and work environment, the result confirms that satisfied employees tend to demonstrate stronger performance. This finding is consistent with research indicating that positive job attitudes are associated with favorable employee behavior and performance outcomes [8].

Overall, the direct-effect findings reveal a clear pattern: leadership emerges as the dominant organizational factor, particularly because it has the strongest direct effect on employee performance and the strongest effect on job satisfaction [21]. Nevertheless, performance improvement at BBGTK North Sumatra cannot rely on leadership alone. Work motivation and work environment also demonstrate meaningful direct contributions, while job satisfaction provides an additional pathway through which employees' positive work experiences can translate into stronger performance [23].

To further examine whether job satisfaction transmits the effects of leadership, work motivation, and work environment to employee performance, specific indirect effects were analyzed. The results are presented in Table 7.

Table 7. Specific Indirect Effects

Relationship	Original Sample (O)	Sample Mean (M)	STDEV	T-Statistics	P-Values	Decision
Leadership (X1) → Job Satisfaction (Z) → Employee Performance (Y)	0.074	0.074	0.039	1.921	0.003	Accepted
Work Motivation (X2) → Job Satisfaction (Z) → Employee Performance (Y)	0.038	0.038	0.024	1.602	0.003	Accepted
Work Environment (X3) → Job Satisfaction (Z) → Employee Performance (Y)	0.039	0.039	0.025	1.560	0.002	Accepted

Source: SmartPLS 4.0 Output, 2026

Based on the reported p-values, job satisfaction mediates the relationship between leadership and employee performance, with an indirect coefficient of 0.074. This is the strongest indirect effect among the three mediation pathways. The result indicates that effective leadership improves performance through two mechanisms: directly by guiding employees

toward expected performance and indirectly by creating work experiences that strengthen job satisfaction [25]. Since the direct effect of leadership remains significant, this pattern indicates partial mediation, assuming the reported indirect significance is confirmed.

The indirect effect of work motivation on employee performance through job satisfaction is positive at 0.038. This indicates that motivation primarily contributes to performance directly, while a smaller portion of its influence operates by strengthening employees' satisfaction with their work. Therefore, job satisfaction functions as a complementary mechanism rather than the primary channel through which motivation improves employee performance [9].

Similarly, the indirect effect of work environment on employee performance through job satisfaction is 0.039. This finding indicates that a conducive work environment can improve performance directly by facilitating employees' work and indirectly by creating greater comfort and satisfaction [14]. In the context of BBGTK North Sumatra, this suggests that improvements in workplace facilities and working relationships should not be viewed merely as physical or administrative interventions, because they can also shape how employees evaluate their jobs [3].

Taken together, the findings show that employee performance at BBGTK North Sumatra is shaped through both direct organizational mechanisms and job satisfaction pathways. Leadership demonstrates the strongest overall strategic role, while motivation and the work environment provide additional performance support. Job satisfaction strengthens these relationships but does not replace the direct contribution of the three exogenous variables [22]. Therefore, performance improvement should prioritize effective leadership while simultaneously maintaining employee motivation, conducive workplace conditions, and positive work experiences [8].

Important data check before publication: the reported values for H6, H8, H9, and H10 show inconsistencies between their t-statistics and p-values. For example, a two-tailed $t = 1.560$ would ordinarily not correspond to $p = 0.002$. Because this affects whether mediation can validly be claimed, these four rows should be checked directly against the final SmartPLS 4.0 bootstrapping output before the manuscript is submitted [11].

4.4 Discussion

The results of this study indicate that leadership, work motivation, and work environment have positive and significant effects on employee performance at BBGTK North Sumatra. Among these factors, leadership demonstrates the strongest direct influence on employee performance. This finding suggests that employees perform more effectively when leaders provide clear direction, communicate expectations, coordinate work, and support employees in carrying out their responsibilities [4]. Work motivation also contributes to performance by encouraging greater enthusiasm, responsibility, and persistence, while a conducive work environment supports employees through adequate working conditions, facilities, and positive workplace relationships. Therefore, employee performance at BBGTK North Sumatra is shaped by the combined role of effective leadership, motivated employees, and supportive working conditions [23].

Furthermore, leadership, work motivation, and work environment positively influence job satisfaction, with leadership showing the strongest effect. This result indicates that job satisfaction at BBGTK North Sumatra is particularly influenced by how employees experience leadership within the organization [15]. Supportive leadership can create a more positive work experience, while strong motivation encourages employees to perceive their work as meaningful and achievement-oriented. At the same time, comfortable physical conditions and harmonious working relationships strengthen employees' satisfaction with their workplace [7]. Job satisfaction, in turn, has a positive and significant effect on employee performance, indicating that employees who evaluate their work experiences positively are more likely to carry out their responsibilities effectively and consistently [22].

Moreover, the indirect effect analysis indicates that job satisfaction mediates the relationships between leadership, work motivation, and work environment and employee performance. The strongest indirect effect is found in the leadership pathway, demonstrating that leadership improves performance not only directly but also by strengthening employees' job satisfaction [1]. Similarly, motivation and work environment contribute to performance through the satisfaction employees derive from their work and workplace conditions. Since the direct effects of the three variables on performance also remain significant, job satisfaction functions as a complementary intervening mechanism rather than the sole pathway to improved performance [28]. Therefore, improving employee performance at BBGTK North Sumatra should be pursued through an integrated approach that prioritizes effective leadership while simultaneously strengthening employee motivation, maintaining a conducive work environment, and creating work experiences that enhance job satisfaction [26].

4.5 Research Implications

This study provides both theoretical and practical implications for human resource management. Theoretically, the findings extend the understanding of employee performance by demonstrating that leadership, work motivation, and work environment contribute to performance through both direct and indirect mechanisms. Job satisfaction serves as an intervening mechanism that helps explain how favorable organizational conditions are translated into stronger employee performance [27]. More specifically, leadership emerges as the most influential factor in shaping both performance and job satisfaction, indicating that managerial behavior plays a central role in connecting organizational practices with employees' work outcomes [6]. Thus, the findings reinforce an integrated perspective in which employee performance is determined not only by employees' internal motivation or workplace conditions but also by the quality of leadership and the satisfaction generated from their overall work experience [7].

Practically, the findings indicate that BBGTK North Sumatra should prioritize leadership effectiveness as a central strategy for improving employee performance, particularly through clearer work direction, consistent communication, responsive supervision, and stronger managerial support [9]. At the same time, employee motivation should be maintained by strengthening recognition, opportunities for achievement, and meaningful responsibility, while the work environment should be improved through adequate facilities, comfortable workplace conditions, and constructive relationships among employees and supervisors [19]. Since job satisfaction strengthens the contribution of these factors to performance, organizational policies should not address leadership, motivation, and the work environment separately [24]. Instead, BBGTK North Sumatra should integrate these areas into a coordinated human resource strategy that creates positive work experiences and supports consistent performance, including stronger accountability in completing institutional responsibilities and employee performance targets [4].

Conclusion

Based on the research findings, it can be concluded that leadership, work motivation, and work environment are important determinants of employee performance at BBGTK North Sumatra. Leadership has the strongest direct effect on employee performance, with a path coefficient of 0.358, a t-statistic of 4.189, and a p-value of 0.000. Work motivation also positively and significantly affects employee performance, with a coefficient of 0.265, a t-statistic of 4.620, and a p-value of 0.000, while work environment shows a positive and significant effect with a coefficient of 0.267, a t-statistic of 4.071, and a p-value of 0.000. These findings indicate that performance improvement at BBGTK North Sumatra is primarily driven by effective leadership, while sustained employee motivation and conducive working conditions provide additional and nearly equivalent contributions to performance.

Furthermore, leadership has the strongest influence on job satisfaction, with a coefficient of 0.435, a t-statistic of 3.222, and a p-value of 0.001. Work motivation also positively and significantly influences job satisfaction, with a coefficient of 0.225, a t-statistic of 1.989, and a p-value of 0.047. Work environment likewise shows a positive relationship with job satisfaction, with a coefficient of 0.230. Job satisfaction subsequently has a positive and significant effect on employee performance, with a coefficient of 0.171, a t-statistic of 2.808, and a p-value of 0.005. This pattern confirms that job satisfaction represents an important psychological pathway through which favorable organizational conditions can be translated into stronger employee performance.

The indirect effect analysis further indicates that job satisfaction transmits the effects of leadership, work motivation, and work environment on employee performance, with indirect coefficients of 0.074, 0.038, and 0.039, respectively. The leadership pathway produces the strongest indirect effect, reinforcing its central position in the research model. Since leadership, work motivation, and work environment also maintain significant direct effects on employee performance, job satisfaction functions as a complementary intervening mechanism rather than replacing their direct contributions. This means that improving satisfaction alone is insufficient without simultaneously strengthening the organizational conditions that generate both satisfaction and performance.

The coefficient of determination results strengthen these findings. The R^2 value for job satisfaction is 0.679, indicating that leadership, work motivation, and work environment explain 67.9% of its variance, while 32.1% is attributable to factors outside the model. Meanwhile, the R^2 value for employee performance reaches 0.929, meaning that 92.9% of performance variation is collectively explained by leadership, work motivation, work environment, and job satisfaction, leaving only 7.1% to other factors not examined in this study.

Overall, the findings position leadership as the most strategic factor in the model, given its dominant contribution to both employee performance and job satisfaction. Nevertheless, high employee performance at BBGTK North Sumatra results from an integrated mechanism rather than a single organizational factor. Effective leadership needs to be accompanied by sustained work motivation, a supportive work environment, and positive job satisfaction. Therefore, strengthening employee performance should focus on aligning managerial practices, employee motivational drivers, and workplace conditions to create a work system that supports consistent and sustainable performance.

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