

COLLABORATIVE LEADERSHIP AND COMPETENCE AS PREDICTORS OF COLLABORATIVE BEHAVIOR AND PERFORMANCE AMONG EDUCATIONAL STAFF IN HIGHER EDUCATION: EVIDENCE FROM AN INDONESIAN PUBLIC UNIVERSITY

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Abstract

This study investigates the impact of collaborative leadership and competence on employee performance, focusing on the mediating role of collaborative behavior among administrative civil servants at the Rectorate of Universitas Mulawarman, Indonesia. This study employs a quantitative explanatory design utilizing Partial Least Squares Structural Equation Modeling (SEM-PLS) with SmartPLS 4. Data were gathered from 168 respondents using a validated questionnaire assessing leadership, competence, collaboration, and performance indicators. The findings indicate that both collaborative leadership and competence exert significant positive effects on collaborative behavior, which, in turn, significantly enhances employee performance. Although collaborative leadership does not directly affect performance, it indirectly affects it through collaborative behavior, suggesting a full mediation pattern. Competence has both direct and indirect effects on performance, affirming that technical, digital, interpersonal, analytical, and adaptive competencies improve performance outcomes when manifested in collaborative action. This study contributes to the theoretical understanding by refining social exchange theory and competency-based human resource management within a behavioral collaboration framework. It identifies collaborative behavior as a central mechanism linking managerial capability and professional competence to institutional performance. The results offer practical implications for higher education governance, highlighting the importance of participatory decision-making, transparent information systems, and integrated competency development programs that promote interunit collaboration and enhance service quality.

Keywords: *collaborative leadership, competence, collaborative behavior, employee performance, higher education administration*

INTRODUCTION

Higher education institutions worldwide are undergoing profound transformations driven by globalization, digitalization, and heightened accountability demands. Universities are now assessed not only on their academic outputs but also on their internal governance, administrative efficiency, and collaborative culture that underpins institutional performance. In this context, administrative staff, often referred to as educational personnel or non-academic civil servants, play a vital yet frequently overlooked role in ensuring operational excellence and achieving institutional objectives. The Merdeka Belajar–Kampus Merdeka (MBKM) policy in Indonesia has intensified the need for adaptive, efficient, and collaborative governance within universities. Nevertheless, national data from the Ministry of Education (2023) indicate that less than half of Indonesia's 190,000 educational staff consistently engage in professional development. This discrepancy underscores the misalignment between the increasing complexity of job roles and the current competencies of the staff. The efficacy of administrative services, which are crucial for supporting academic functions, is significantly influenced by the quality of leadership, personnel competence, and collaborative behavior among employees.

Mulawarman University (UNMUL), one of the largest public universities in Eastern Indonesia, provides a significant context for this study. Rectorate staff are integral to administrative coordination across faculties and units, facilitating research, education, and community engagement. Despite their strategic importance, internal evaluations at UNMUL reveal ongoing challenges, including hierarchical leadership styles, varying competency levels, and limited cross-unit collaborations. These issues hinder the service quality and overall performance outcomes. Recent scholarship underscores the significance of collaborative leadership, a participatory and empowering management approach in contemporary organizations. Research within higher education corroborates that this form of leadership promotes innovation, inclusion, and shared accountability (Abudu & Quansah, 2025; Granados-Magaña et al. 2024). It facilitates trust and knowledge exchange, both of which are essential for institutional agility. Nonetheless, this leadership style remains underdeveloped in Indonesia's public universities, where bureaucratic norms frequently impede participatory decision-making.

In addition to leadership, competence is a crucial determinant of performance. Empirical evidence indicates that digital, interpersonal, and adaptive competencies significantly enhance job performance and foster organizational innovation (De Carvalho et al., 2023; Kurniawan & Puspitaningtyas, 2024). However, research has revealed that employees frequently exhibit uneven digital literacy and limited collaboration skills, particularly in geographically dispersed institutions such as UNMUL (Mulawarman University). In this context, understanding the interaction between leadership and competence in shaping collaborative behavior and performance is both theoretically significant and urgent. Preliminary survey data collected from 27 administrative staff members at UNMUL indicate that while self-assessment scores for performance and collaborative behavior are relatively high, perceptions of collaborative leadership are significantly lower than expected. This finding suggests strong individual motivation but a lack of systemic support for participatory collaboration. Similar patterns have been observed at the national level, where hierarchical cultures inhibit bottom-up communication (BKN, 2023). Such organizational dynamics impede knowledge sharing and slow collective problem solving, ultimately constraining institutional effectiveness.

Empirical evidence from public-sector organizations substantiates this concern. Research conducted by Reyes (2024) and Yu et al. (2025) affirm that leadership practices that prioritize distributed power and shared accountability enhance employee satisfaction and performance, albeit often indirectly through mediators such as collaboration or commitment. Similarly, Liu and Sun (2025) demonstrated that a collaborative environment fosters innovative behavior among university employees through the mediating role of knowledge sharing. However, the majority of existing research predominantly focuses on faculty members rather than administrative staff, leaving a conceptual and empirical gap in understanding the collaborative dynamics among non-academic personnel. This study aims to address existing research gaps by integrating collaborative leadership, competence, collaborative behavior, and performance into a unified, structural model. It examines both direct and indirect effects, focusing on the mediating role of collaborative behavior in connecting leadership and competence to employee performance. This integrative approach is uncommon in the context of public higher education, especially in developing countries, where administrative functions are crucial for institutional quality assurance. By focusing on Indonesia's higher education sector, this study contributes to the global discourse on leadership and collaboration within complex public organizations. It offers theoretical insights into how participatory leadership and competence enhance collective performance while providing practical guidance for university leaders aiming to strengthen administrative capacity through collaboration-based strategies. The findings are anticipated to advance both the theory and practice of human resource management in higher education systems undergoing digital and organizational transformations.

LITERATURE REVIEW

2. Literature Review and Hypotheses Development

2.1 Collaborative Leadership and Collaborative Behavior

Collaborative leadership serves as a mechanism that facilitates participatory engagement, open communication, and shared decision-making, collectively fostering effective coordination across organizational units. This concept is grounded in distributed leadership theory, which posits that the distribution of power and responsibility among members enhances individual commitment to collective goals (Northouse, 2025). Contemporary literature corroborates that participative leadership bolsters trust, transparency, and communication, thereby promoting knowledge sharing, cross-unit coordination, and mutual support, which are essential components of collaborative behavior (Yukl and Gardner, 2020). Recent empirical investigations have substantiated these theoretical propositions. Research conducted in Mexican public universities has demonstrated that distributed leadership enhances collaborative intelligence among staff, thereby promoting continuous improvement processes

(Granados-Magaña *et al.*, 2024). In the context of China, Fan and Chu (2025) identified that distributed leadership exerts a positive influence on job satisfaction through collaboration, underscoring the critical role of participatory leadership in fostering collective work behaviors. Similarly, Liu and Sun (2025) illustrated that a collaborative climate augments knowledge-sharing practices, which in turn drives teamwork and collective efficiency. Collectively, these studies affirm that collaborative leadership is a significant predictor of collaborative behavior within educational organizations.

Hypothesis 1 (H1): Collaborative leadership positively influences collaborative behavior.

2.2 Competence and Collaborative Behavior

Competence encompasses a combination of knowledge, skills, and attitudes that are essential for effective job performance. Employees who demonstrate competence are better equipped to adapt, communicate, and collaborate with colleagues in complex institutional settings. Scholars such as Dubois and Rothwell (2004) regard competence as the foundation of behavioral consistency, which facilitates collaboration and problem-solving. Empirical evidence supports this perspective. De Carvalho *et al.* (2023) demonstrated that digital competence among university employees enhances innovative work behavior through collaboration. Similarly, Wahyuningtyas *et al.* (2023) identified that interpersonal competence facilitates team synergy and commitment in education settings. These findings suggest that competence functions not only as an individual attribute but also as a social resource that reinforces collaborative behavior.

Hypothesis 2 (H2): Competence positively influences collaborative behavior.

2.3 Competence and Performance

Performance is commonly defined as the result of individual or collective efforts aimed at effectively achieving an organization's objectives (Campbell, 1990). The competency-based human resource management framework (Dubois & Rothwell, 2004) posits that competence enhances high performance through superior technical, interpersonal and adaptive skills. In the context of higher education, the performance of administrative staff is contingent on their proficiency in digital processes, coordination capabilities, and service orientation. The empirical findings align with these assumptions. Kurniawan and Puspitaningtyas (2024) found that competence significantly influences the performance of educational staff at Indonesian universities. Muhajirin *et al.* (2024) further demonstrated that competence, in conjunction with work discipline and motivation, enhances work performance. This evidence substantiates the assertion that competence directly determines the effectiveness with which employees execute their administrative and strategic roles.

Hypothesis 3 (H3): Competence positively influences employee performance.

2.4 Collaborative Leadership and Performance

Collaborative leadership promotes empowerment, mutual accountability, and a shared vision, which indirectly enhances performance outcomes. As noted by El-Sayed *et al.* (2024), collaborative leadership enhances productivity by influencing innovative behavior and motivation. However, research indicates that the direct relationship between leadership and performance may be weak unless it is mediated by behavioral or contextual variables, such as collaboration, trust, or commitment (Yu *et al.*, 2025). Research conducted by Shohib *et al.* (2024) established that organizational commitment serves as a mediating factor in the relationship between collaborative leadership and teacher performance in Indonesia. This finding implies that leadership is executed more effectively through behavioral mechanisms rather than direct hierarchical control.

Hypothesis 4 (H4): Collaborative leadership positively influences employee performance.

2.5 Collaborative Behavior and Performance

Collaborative behavior refers to the extent to which employees participate in cooperative activities, engage in joint problem-solving, and offer mutual support. According to team effectiveness theory (Robbins & Judge, 2023), high-performing organizations rely on collaboration as a fundamental element for achieving shared goals. Effective coordination among employees, along with the exchange of expertise and provision of mutual feedback, enhances their collective performance. Empirical evidence supports this relationship. Chang and Chen (2023) demonstrated that collaborative behavior mediates the association between adaptability and job performance. Annan-Prah *et al.* (2023) similarly found that collaborative learning enhances the performance of administrative staff in universities. These findings underscore that collaboration serves both as a behavioral outcome of leadership and competence and as a direct determinant of organizational effectiveness.

Hypothesis 5 (H5): Collaborative behavior positively influences employee performance.

2.6 The Mediating Role of Collaborative Behavior

The interplay between collaborative leadership, competence, and performance is intricate and complex. Leadership and competence influence individual interactions, knowledge sharing, and alignment with collective objectives, whereas collaborative behavior converts these elements into measurable outcomes. Liu and Sun (2025) assert that collaboration serves as a behavioral conduit linking leadership to innovation outcomes. Similarly, Wahyuningtyas et al. (2023) demonstrated that commitment mediates the impact of interpersonal competence on performance, thereby underscoring the mediating function of social behavior in organizational processes. In higher education administration, collaborative behavior is anticipated to mediate the relationship between leadership and competence and employee performance.

Hypothesis 6 (H6): Collaborative behavior mediates the relationship between collaborative leadership and employee performance.

Hypothesis 7 (H7): Collaborative behavior mediates the relationship between competence and CWB.

METHOD

3.1 Research Design

This study employed a quantitative explanatory design to investigate the causal relationships among collaborative leadership, competence, collaborative behavior, and performance. This explanatory approach facilitates the examination of both direct and indirect effects within a comprehensive structural model. The chosen method offers a rigorous framework for analyzing the theoretical connections between leadership, competence, and the behavioral mechanisms that underpin employee performance in higher education administration. Partial Least Squares Structural Equation Modeling (PLS-SEM) was utilized through SmartPLS version 4. This approach is particularly suitable for complex models that involve multiple constructs and mediating relationships, especially when the data do not adhere to normal distribution patterns (Hair et al. 2022). The design is consistent with the framework proposed by Creswell and Creswell (2018), which emphasizes construct validity and predictive accuracy.

3.2 Population and Sample

The study population comprised all 179 civil servant educational staff members at the Rectorate of Mulawarman University in Indonesia. Owing to the relatively manageable size of the population, a census sampling technique was employed. This method ensured the inclusion of every staff member directly involved in administrative and service functions, thereby enhancing representativeness and statistical reliability. The respondents were distributed across functional divisions, including academic services, human resources, finance, planning, and quality assurance. These units serve as the central coordination hubs linking academic and managerial processes at the university level. Demographic characteristics (gender, age, years of service, and educational level) were analyzed descriptively to contextualize the data.

3.3 Data Collection Procedure

Data were collected using a structured questionnaire, which was disseminated in both physical and electronic forms between February and March 2025. The instrument was pre-tested with a sample of ten respondents to evaluate its clarity and consistency. Ethical considerations were rigorously observed, ensuring voluntary participation, confidentiality of responses, and elimination of coercion or bias. Participants provided informed consent prior to their involvement, and the data collection process adhered to the institutional ethical standards. The questionnaire comprised two sections: demographic information and statements designed to measure latent constructs, utilizing a five-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree").

3.4 Measurement of Constructs

Each construct within the model was operationalized utilizing established scales adapted from prior research: Collaborative Leadership (X_1) was assessed using six indicators adapted from Yukl and Gardner (2020) and Chrislip and Larson (1994), encompassing shared vision, participative decision-making, empowerment, trust, communication openness, and mutual accountability. Competence (X_2) was evaluated using five indicators from Dubois and Rothwell (2004) and Armstrong and Taylor (2023), representing knowledge mastery, technical skill, interpersonal skill, adaptability, and digital literacy. Collaborative Behavior (Y) was measured using six items from McShane and

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Von Glinow (2021) and Barker Scott (2024), including teamwork, coordination, information sharing, mutual assistance, openness to feedback, and problem-solving. Performance (Z) was assessed using five indicators derived from Armstrong (2022) and Aguinis (2019), representing service quality, efficiency, innovation, reliability, and achievement of work targets. All measurement items were adapted to the administrative context of Indonesian higher education and translated into Bahasa Indonesia through a double-back translation process to ensure conceptual equivalence.

3.5 Data Analysis Technique

The analysis was executed in two distinct phases: the evaluation of the measurement model and the assessment of the structural model. **Measurement Model:** This phase involved the evaluation of indicator reliability (outer loadings), internal consistency (Cronbach's alpha and composite reliability), and convergent validity (average variance extracted [AVE]). Discriminant validity was assessed using the Fornell–Larcker criterion and HTMT ratio. It was anticipated that all constructs would satisfy the established thresholds (loading ≥ 0.7 , CR ≥ 0.7 , and AVE ≥ 0.5). **Structural Model:** This phase was examined using path coefficients, t-values, and p-values, which were derived via bootstrapping with 5,000 resamples. The predictive capability of the model was evaluated using R^2 and Q^2 values, and the overall model fit was determined using the Standardized Root Mean Square Residual (SRMR). The mediation effects of collaborative behavior were analyzed using indirect effect analysis, as recommended by Hair et al. (2022). To ensure robustness, potential issues of multicollinearity were checked using Variance Inflation Factor (VIF) values, which should remain below 3. The results were interpreted statistically and theoretically, focusing on the practical implications for organizational development within public universities.

3.6 Validity and Reliability

Construct validity was affirmed through expert evaluation by three senior academics with expertise in management and human resource development. Reliability was statistically confirmed using Cronbach's alpha (>0.7) and Composite Reliability (>0.8). Both convergent and discriminant validity met the established thresholds, verifying that the constructs accurately represented their intended theoretical dimensions. The instrument's consistency and accuracy enhance its appropriateness for assessing the interrelationships among leadership, competence, collaboration, and performance within public higher-education institutions.

RESULTS AND DISCUSSION

4.1 Demographic Profile

This study involved 179 administrative civil servants (Tenaga Kependidikan PNS) working at the Rectorate of Universitas Mulawarman. The demographic characteristics of the respondents are presented to provide a contextual overview of their distribution by gender, age, educational attainment, and work unit. These characteristics help explain the behavioral tendencies and organizational dynamics relevant to the study variables, particularly collaboration and performance.

Table 1. Demographic Characteristics of Respondents

Category	Number of Employees	Percentage (%)
Gender		
Male	127	70.95
Female	52	29.05
Total	179	100.00
Age		
< 30 years	6	3.35
30–40 years	13	7.26
41–50 years	70	39.11
> 50 years	90	50.28
Total	179	100.00
Educational Level		
Junior High School	3	1.68
Senior High School	32	17.88
Diploma (D3)	12	6.70

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Category	Number of Employees	Percentage (%)
Bachelor's Degree (S1)	72	40.22
Master's Degree (S2)	51	28.49
Total	179	100.00
Work Unit		
Bureau of General Affairs and Finance	37	20.67
Bureau of Academic and Student Affairs	57	31.84
Bureau of Planning, Cooperation, and Public Relations	34	18.99
Other Units (UPA, LP2M, LP3M)	51	28.49
Total	179	100.00

Source: Processed Data, 2025

The demographic distribution shows that the majority of respondents are male employees (70.95%), predominantly within the 41–50 and above-50 age groups, indicating a workforce characterized by mature professional experience. In terms of education, most respondents held bachelor's and master's degrees (68.71%), suggesting a relatively high academic background that supports analytical and administrative competencies. The largest proportion of respondents worked in the Bureau of Academic and Student Affairs, followed by the Bureau of General Affairs and Finance, reflecting the concentration of administrative functions that directly influence institutional operations and service delivery. These demographic characteristics suggest that the rectorate workforce is composed of experienced and well-educated employees whose professional maturity and educational attainment are conducive to a collaborative work culture and performance improvement.

4.2 Measurement Model

4.2.1 Convergent Validity

Convergent validity refers to the extent to which indicators of a latent construct are correlated and measure the same underlying concepts. This ensures that all indicators within a construct are internally consistent and theoretically aligned. In this study, convergent validity was assessed using three parameters: outer loading, Average Variance Extracted (AVE), and Composite Reliability (CR). A construct is deemed to have achieved convergent validity when each indicator exhibits an outer loading value greater than 0.70, the AVE exceeds 0.50 (indicating that more than 50 percent of the variance of the indicators is captured by the construct), and the CR is above 0.70, confirming internal consistency. The results, presented in Table 2, indicate that all indicators of the four constructs satisfy the recommended thresholds. This suggests that the measurement model attained convergent validity, thereby confirming that the indicators within each construct accurately represented the theoretical concepts being measured.

Table 2. Convergent Validity Results (Outer Loading, AVE, and CR)

Variable / Indicator	Outer Loading	Cronbach's Alpha (CA)	Composite Reliability (CR)	Average Variance Extracted (AVE)
Employee Performance (Z)		0.877	0.879	0.674
Z1. Work quality: accuracy and precision of results	0.757			
Z2. Timeliness: completion of tasks within the target period	0.848			
Z3. Cross-unit collaboration: teamwork across departments	0.799			
Z4. Service orientation: responsiveness and satisfaction in service delivery	0.816			
Z5. Problem solving: accuracy in overcoming work obstacles	0.937			
Collaborative Behavior (Y)		0.822	0.862	0.603
Y1. Information sharing: activeness in communicating work progress	0.898			

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Y2. Task coordination: workflow alignment between units	0.859			
Y3. Mutual support: willingness to assist coworkers	0.841			
Y4. Decision participation: involvement in policy formulation	0.962			
Y5. Conflict management: constructive resolution of differences	0.740			
Collaborative Leadership (X1)		0.932	0.932	0.788
X11. Joint decision-making: staff participation in decision processes	0.979			
X12. Information transparency: openness in communication	0.979			
X13. Empowerment: delegation of responsibility according to staff capacity	0.797			
X14. Coordination facilitation: ability to guide collaboration and meetings	0.901			
X15. Network orchestration: building internal and external cooperation	0.732			
Competence (X2)		0.911	0.914	0.740
X21. Technical competence: mastery of work procedures and regulations	0.937			
X22. Digital competence: proficiency in using applications and managing data	0.764			
X23. Interpersonal competence: communication and relationship management skills	0.811			
X24. Analytical competence: problem analysis and solution capability	0.801			
X25. Adaptability: ability to adjust to procedural and technological changes	0.861			

Source: Processed Data, 2025

The results demonstrated that all outer loading values exceeded 0.70, indicating a strong correlation between each indicator and its respective construct. Additionally, the Composite Reliability (CR) and Average Variance Extracted (AVE) values satisfied the required thresholds (CR > 0.70, AVE > 0.50), thereby confirming internal consistency and adequate shared variance among indicators within each construct. Consequently, the convergent validity test affirms that all constructs within the model—collaborative leadership, competence, collaborative behavior, and employee performance—are conceptually sound and empirically valid.

4.2.2 Discriminant Validity (Fornell–Larcker Criterion)

Discriminant validity assesses the degree to which a latent construct is empirically distinct from other constructs in a model. In essence, it ensures that each construct measures a unique concept that is not captured redundantly by another. The Fornell–Larcker criterion is one of the most widely employed methods for evaluating discriminant validity in structural equation modeling. According to Fornell and Larcker (1981), discriminant validity is established when the square root of the Average Variance Extracted (AVE) for each construct exceeds its correlations with other constructs. The diagonal values in the matrix represent the square roots of the AVE, while

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the off-diagonal values represent the correlations between the constructs. A higher diagonal value indicates that a construct shares more variance with its indicators than with any other construct in the model.

Table 3. Discriminant Validity Test (Fornell–Larcker Criterion)

Construct	X1. Collaborative Leadership	X2. Competence	Y. Collaborative Behavior	Z. Employee Performance
X1. Collaborative Leadership	0.888			
X2. Competence	0.789	0.860		
Y. Collaborative Behavior	0.688	0.771	0.777	
Z. Employee Performance	0.662	0.723	0.756	0.821

Source: Processed Data, 2025

The findings presented in Table 3 demonstrate that all diagonal values, representing the square roots of the Average Variance Extracted (AVE), exceed their corresponding inter-construct correlations. For example, the square root of the AVE for Collaborative Leadership (0.888) surpassed its correlations with competence (0.789), Collaborative Behavior (0.688), and Employee Performance (0.662). This pattern was consistently observed across all constructs, thereby satisfying the Fornell–Larcker criterion. These results affirm that each construct within the model exhibits sufficient discriminant validity, indicating that Collaborative Leadership, Competence, Collaborative Behavior, and Employee Performance are empirically distinct and measure separate theoretical dimensions.

4.2.3 Reliability

Reliability testing was conducted to assess the internal consistency and stability of each latent construct within the model. Reliability indicates the extent to which the indicators consistently measure their respective constructs across various observations. In this study, reliability was evaluated using three primary statistical indicators: Cronbach’s alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE). According to Hair et al. (2022), a construct is deemed reliable if the values of Cronbach’s Alpha and Composite Reliability exceed 0.70, signifying adequate internal consistency, and if the AVE values are above 0.50, indicating that more than half of the variance of the indicators is accounted for by the latent construct. The reliability results for all the constructs are presented in Table 4.

Table 4. Reliability

Construct	Cronbach’s Alpha	Composite Reliability (pa)	Composite Reliability (pc)	Average Variance Extracted (AVE)
X1. Collaborative Leadership	0.932	0.932	0.949	0.788
X2. Competence	0.911	0.914	0.934	0.740
Y. Collaborative Behavior	0.822	0.862	0.879	0.603
Z. Employee Performance	0.877	0.879	0.911	0.674

Source: Processed Data, 2025

All constructs exhibited Cronbach’s Alpha and Composite Reliability values exceeding 0.80, thereby confirming high internal consistency and reliability. Similarly, the Average Variance Extracted (AVE) values for all variables surpassed 0.50, indicating that each latent construct accounted for more than 50 percent of the variance in its observed indicators. Among the constructs, Collaborative Leadership demonstrated the highest reliability (CA = 0.932, CR = 0.949, AVE = 0.788), suggesting very strong internal coherence among its indicators. This finding implies that respondents consistently perceive behaviors associated with shared decision-making, transparency, empowerment, and coordination as integral to collaborative leadership. Likewise, Competence exhibited high reliability (CA = 0.911, CR = 0.934, AVE = 0.740), indicating that indicators related to technical, digital,

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interpersonal, analytical, and adaptive skills were consistently recognized as reflective of employees' competencies. The reliability of Collaborative Behavior (CA = 0.822, CR = 0.879, AVE = 0.603) and Employee Performance (CA = 0.877, CR = 0.911, AVE = 0.674) also met the established criteria, demonstrating that both constructs were internally consistent and conceptually sound. Consequently, the results confirm that all constructs in the measurement model are reliable and suitable for further analysis in the structural model. The strong reliability across all variables enhances the model's overall validity and ensures that the indicators consistently represent the theoretical dimensions of collaborative leadership, competence, collaborative behavior, and employee performance.

4.3 Structural Model

4.3.1 Significance and Path Coefficient

The evaluation of the structural model was undertaken to assess the hypothesized causal relationships among constructs, employing the bootstrapping procedure in SmartPLS 4. This approach estimates the model's stability by generating standard errors and t-statistics through resampling (5,000 iterations). A relationship is deemed statistically significant if the t-statistic exceeds 1.96 (at the 5 percent significance level) and the p-value is below 0.05. The path coefficient results indicate both direct and indirect effects among the variables. The visual representation of the path diagram produced by SmartPLS 4 (Figure 1) illustrates that the pathways from competence to collaborative behavior and performance are the most prominent.

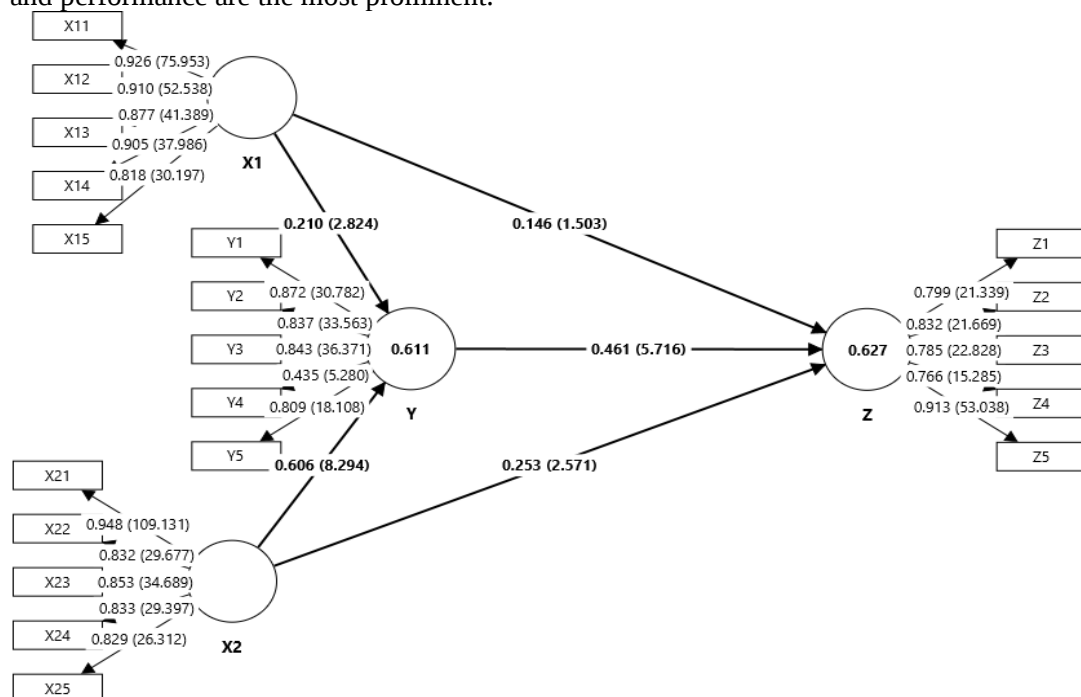


Figure 1. Output SmartPLS 4

4.3.2 Coefficient of Determination (R^2)

The R-squared value serves as a measure of the model's explanatory power, indicating the proportion of variance in the dependent variables that can be accounted for by the independent variables. Higher R^2 values indicated a stronger predictive capability of the model. As illustrated in Table 5, the R-squared value for Collaborative Behavior is 0.611, signifying that 61.1 percent of its variance is explained by Collaborative Leadership and competence. The R-squared value for Employee Performance is 0.627, indicating that 62.7 percent of the variance in performance can be attributed to the combined influence of Collaborative Leadership, Competence, and Collaborative Behavior. These values suggest that the model possesses substantial explanatory power, reflecting a robust predictive relationship between exogenous and endogenous constructs.

Table 5. Coefficient of Determination (R^2)

Variable	R-square	Adjusted R-square
Y. Collaborative Behavior	0.611	0.607
Z. Employee Performance	0.627	0.621

Source: Processed Data, 2025

4.3.3 Effect Size (f^2)

The F-square test evaluates the effect size of each exogenous construct on the endogenous construct. According to Cohen (1988), effect sizes of 0.02, 0.15, and 0.35 correspond to small, medium, and large effects, respectively, in this study. As illustrated in Table 6, competence exerts a large effect ($f^2 = 0.357$) on Collaborative Behavior, indicating that enhancements in employee competence significantly augment their collaborative tendencies. Conversely, Collaborative Behavior exerts a moderate effect ($f^2 = 0.221$) on Employee Performance. The remaining relationships exhibited small to moderate effects, suggesting that while Collaborative Leadership contributes positively, its impact is comparatively smaller than that of competence.

Table 6. Effect Size (f^2)

Path Relationship	f-square
X1. Collaborative Leadership - Y. Collaborative Behavior	0.043
X1. Collaborative Leadership - Z. Employee Performance	0.021
X2. Competence - Y. Collaborative Behavior	0.357
X2. Competence - Z. Employee Performance	0.048
Y. Collaborative Behavior - Z. Employee Performance	0.221

Source: Processed Data, 2025

4.3.4 Multicollinearity Test (Variance Inflation Factor – VIF)

Multicollinearity testing was employed to ensure the absence of significant correlations among exogenous variables that influence the same endogenous construct. This assessment utilized the Variance Inflation Factor (VIF), with a value below 5 indicating no multicollinearity issues (Hair et al., 2022). As evidenced by the results presented in Table 7, all VIF values fall below 5, ranging from 2.574–3.592. This finding indicates that each construct within the model provides distinct explanatory information with no evidence of redundancy among the predictors.

Table 7. Multicollinearity (VIF)

Path Relationship	VIF
X1. Collaborative Leadership - Y. Collaborative Behavior	2.648
X1. Collaborative Leadership - Z. Employee Performance	2.761
X2. Competence - Y. Collaborative Behavior	2.648
X2. Competence - Z. Employee Performance	3.592
Y. Collaborative Behavior - Z. Employee Performance	2.574

Source: Processed Data, 2025

4.3.5 Model Fit Analysis

Model fit analysis is crucial for evaluating the correspondence between the proposed structural model and empirical data. In Partial Least Squares Structural Equation Modeling (PLS-SEM), fit indices such as the Standardized Root Mean Square Residual (SRMR), d_{ULS} , d_G , Chi-square, and Normed Fit Index (NFI) are employed to assess model adequacy. According to Henseler et al. (2015), an SRMR value below 0.08 signifies a good model fit, while higher NFI values approaching 1 indicate superior overall fit quality. As shown in Table 8, the SRMR value of 0.060 satisfies the recommended threshold, thereby confirming that the model exhibits a good fit. The NFI value of 0.830 further suggests that the empirical data were well aligned with the proposed theoretical structure.

Table 8. Model Fit Evaluation

Fit Measure	Saturated Model	Estimated Model
SRMR	0.060	0.060
d_{ULS}	0.746	0.746
d_G	0.567	0.567
Chi-square	528.449	528.449
NFI	0.830	0.830

Source: Processed Data, 2025

4.3.6 Hypothesis Testing Results

The results of the hypothesis testing were obtained from the path coefficient table in SmartPLS 4. A hypothesis is considered supported when the t-statistic value is greater than or equal to 1.96 and the p-value is less than or equal to 0.05. As presented in Table 9, six of the seven hypotheses are statistically significant, whereas one hypothesis, specifically the direct effect of Collaborative Leadership on Employee Performance, is not. Notably, Competence and Collaborative Behavior exhibited strong positive effects on Employee Performance, and Collaborative Behavior served as a mediator in the relationship between both Competence and Leadership with performance outcomes.

Table 9. Hypothesis Testing Results (PLS-SEM)

No	Hypothesis	Path Coefficient	t-Statistic	p-Value	Decision
1	X1. Collaborative Leadership - Y. Collaborative Behavior	0.164	2.640	0.008	Significant
2	X1. Collaborative Leadership - Z. Employee Performance	0.131	1.595	0.111	Not Significant
3	X2. Competence - Y. Collaborative Behavior	0.679	10.869	0.000	Significant
4	X2. Competence - Z. Employee Performance	0.292	3.063	0.002	Significant
5	Y. Collaborative Behavior - Z. Employee Performance	0.415	4.399	0.000	Significant
6	X1. Collaborative Leadership - Y. Collaborative Behavior - Z. Employee Performance	0.068	2.111	0.035	Significant (Mediation)
7	X2. Competence - Y. Collaborative Behavior - Z. Employee Performance	0.282	4.023	0.000	Significant (Mediation)

Source: Processed Data, 2025

The results demonstrate that competence is the most significant predictor of both collaborative behavior and employee performance. Although collaborative leadership does not directly impact performance, its effect is mediated by collaborative behavior. This finding underscores the mediating role of collaboration as a behavioral mechanism that connects leadership and competence to enhance performance. The results of the mediation analyses substantiate both hypotheses 6 and 7. The mediation effects reveal that Collaborative Behavior functions as a behavioral conduit linking leadership and competence with employee performance. While Collaborative Leadership impacts performance solely through indirect means, competence exerts both direct and mediated effects, underscoring the necessity for skill and capability enhancement to be accompanied by a collaborative environment to yield significant organizational outcomes. Within the realm of higher education administration, these findings imply that leadership and competence initiatives achieve optimal effectiveness when integrated with programs that foster teamwork, communication, and participatory problem-solving. Institutions that prioritize these behavioral enablers are likely to witness improvements in service quality, cross-unit coordination and organizational agility. Consequently, Collaborative acts not only as a mediator but also as a crucial behavioral mechanism that converts leadership intentions and employee capabilities into sustainable performance enhancements.

5. Discussion

5.1 Overview of Empirical Findings

This study investigated the structural relationships among collaborative leadership, competence, collaborative behavior, and employee performance in a public higher education setting. Utilizing SEM-PLS, the findings indicate that both collaborative leadership and competence exert a positive influence on collaborative behavior, which, in turn, significantly enhances performance. Notably, collaborative leadership does not directly affect performance; rather, its impact is mediated by collaborative behavior. These results underscore the role of collaborative behavior as a crucial intermediary linking managerial attributes and professional capabilities to institutional performance outcomes.

5.2 Collaborative Leadership as a Behavioral Catalyst

The significant correlation between collaborative leadership and collaborative behavior substantiates the argument that participatory and transparent leadership styles foster teamwork and trust among teachers. The most prominent indicators, joint decision-making and information transparency, underscore the importance of inclusive communication to enhance engagement. This finding is consistent with Reyes (2024), who demonstrated that participative leadership augments innovation and team synergy in higher education institutions. The relatively weaker indicator of network orchestration suggests limited inter-bureau coordination. This observation aligns with Barker Scott (2024), who emphasized that the ability to manage cross-unit networks characterizes mature, collaborative organizations. In bureaucratic structures, such as university rectorates, leadership effectiveness is more reliant on facilitation and shared governance than on hierarchical authority.

5.3 Competence as a Structural Enabler of Collaboration

Competence is a significant predictor of collaborative behavior, with technical competence being the most influential dimension. This suggests that mastery of procedures and regulations fosters trust and consistency among employees. This finding aligns with that of Abbas et al. (2023), who identified technical expertise as a key driver of innovative work behavior. Digital and interpersonal competencies enhance communication and coordination, corroborating the findings of Zulkifli et al. (2024) and Oktarina et al. (2023), respectively. Furthermore, analytical and adaptive competencies enable employees to manage policy changes and problem-solving more effectively, as Chang and Chen (2023) observed. These findings indicate that competence functions not only as an individual capability but also as social capital that reinforces interunit integration and organizational collaboration.

5.4 Collaborative Behavior and Performance Synergy

Collaborative behavior is crucial for enhancing performance. When employees engage in active information sharing, coordinate workflows, and participate in decision-making processes, their collective outcomes become more efficient and responsive. The most significant indicators, namely decision participation and information sharing, demonstrate the shared ownership of organizational processes, as supported by Reyes (2024) and Liu and Sun (2025). Furthermore, collaboration alleviates communication barriers, improves service quality, and expedites problem solving. However, the relatively lower score in analytical problem-solving suggests that collaboration should be complemented by the development of analytical capacity to maintain adaptive performance within complex administrative systems.

5.5 Indirect Effects through Collaborative Behavior

Mediation analyses confirmed that collaborative behavior functions as an intermediary mechanism linking leadership and competence to performance outcomes. Collaborative leadership indirectly influences performance through collaboration, corroborating the findings of Liu and Sun (2025) and Wahab et al. (2024), who demonstrated that inclusive leadership primarily affects outcomes through teamwork and shared knowledge. Similarly, competence impacts performance both directly and indirectly via collaborative behavior, aligning with the studies of Shohib et al. (2024) and Granados-Magaña et al. (2024). This dual mediation pattern underscores that collaborative behavior constitutes the behavioral infrastructure that translates managerial intent and professional skills into measurable performance results.

5.6 Theoretical Implications

This study makes significant contributions to the theoretical advancement of organizational and leadership research in three ways. First, it refines the social exchange framework by identifying collaborative behavior as a behavioral mechanism through which participatory leadership fosters reciprocal engagement and enhances performance. Second, it extends competency-based human resource management by conceptualizing competence as a form of social capital that facilitates effective coordination across organizational units. Third, it advances the literature on higher education administration by focusing on non-academic civil servants, a workforce group that is seldom studied despite its crucial role in institutional performance and governance.

5.7 Managerial and Policy Implications

The findings indicate that leadership, competence development, and collaboration should be integrated into cohesive management strategies. Institutions are encouraged to formalize participatory decision-making forums and information-sharing systems to ensure transparency and accountability. Human resource development programs

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should be designed to enhance technical, digital, and interpersonal competencies that directly facilitate team coordination. Routine collaborative practices, such as knowledge-sharing sessions, interdepartmental rotations, and structured conflict resolution mechanisms should be established as standard organizational procedures. Leadership programs must incorporate training in analytical thinking and problem-solving to complement collaboration with other cognitive capabilities. Digital tools should be optimized to enhance collaboration across units and to mitigate administrative fragmentation. Implementing these findings within the rectorate necessitates the establishment of specific, measurable actions. It is recommended to establish regular inter-unit coordination councils to enhance administrative communication. Additionally, the development of a collaboration playbook is advised, which should include guidelines for workflow integration, escalation procedures, and participatory decision-making. Furthermore, the introduction of a competency passport for each employee is proposed to document assessed skills, collaboration experiences, and contributions to institutional outcomes. The implementation of quarterly knowledge exchange forums is also suggested to facilitate the sharing of innovative outcomes and process improvements. Finally, it is essential to monitor collaboration-based performance indicators such as participation frequency, inter-unit response times, and collaborative project completion rates. The findings corroborate that collaborative leadership and competence serve as complementary catalysts that enhance administrative performance through the mediation of collaborative behavior. These results provide theoretical insights and practical guidance for leaders in higher education who aim to establish participatory governance systems that convert individual capacity into collective performance. Future research could extend these insights by investigating the longitudinal effects of collaboration-based management practices on organizational resilience and digital transformation within higher education institutions.

CONCLUSION

This study presents empirical evidence demonstrating that collaborative leadership and competence are essential organizational capabilities that enhance performance through collaboration. The findings underscore that leadership practices rooted in participation and transparency foster an environment conducive to collaboration. Similarly, competence, which encompasses technical, digital, interpersonal, analytical, and adaptive dimensions, not only bolsters individual capability but also promotes behavioral integration across organizational units. The findings affirm that collaborative behavior functions as a behavioral mechanism that translates managerial capacity and individual competence into measurable institutional performances. These results enhance our understanding of how behavioral collaboration acts as a structural link between leadership and performance in higher education administration. Furthermore, this study contributes to the theoretical advancement of social exchange theory and competency-based human resource management by incorporating them into a behavioral collaboration framework. At a practical level, the findings offer guidance to higher-education leaders in enhancing participatory governance systems, aligning human resource development with collaborative competencies, and integrating behavioral collaboration into routine administrative practices. These initiatives have the potential to enhance service quality, improve coordination efficiency, and increase organizational adaptability within public university rectorates.

7. Limitations

This study has several limitations. First, the study's scope is confined to administrative staff within a single public university, limiting the generalizability of the findings to other institutional or cultural contexts. The second limitation involves the cross-sectional nature of the data collection, which constrains the ability to capture the temporal dynamics of collaboration, competence, and leadership effects. The third limitation concerns the reliance on self-reported measures, which may introduce perceptual bias, despite the robustness of the structural model. Notwithstanding these constraints, this study upholds strong methodological rigor and theoretical alignment, offering a replicable model for future organizational behavior research in higher education.

8. Future Research Directions

Future research initiatives could extend this study in several ways. Utilizing longitudinal designs would allow scholars to investigate the progression of collaborative behavior over time and evaluate how enduring leadership practices affect performance. Comparative analyses across universities and countries could illuminate the contextual differences in the functioning of collaboration mechanisms under varying governance systems. Additionally, incorporating qualitative inquiry could deepen our understanding of the intricate cultural and interpersonal processes underpinning collaboration. Researchers might also explore the moderating roles of organizational culture, digital readiness, and generational diversity to achieve a more comprehensive understanding

of behavioral dynamics within academic administrations. By synthesizing behavioral, technological, and cultural perspectives, future studies can provide more nuanced explanations of how collaborative leadership and competence collectively sustain organizational performance in higher-education institutions.

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