“Transformational leadership, perceived organizational support, and self-reported lecturer performance: Mediation by interpersonal collaboration skills”

AUTHORS	Eliagus Telaumbanua Prihatin Lumbanraja Yeni Absah Beby Karina Fawzeea Sembiring

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Eliagus Telaumbanua (Indonesia), **Prihatin Lumbanraja** (Indonesia),
Yeni Absah (Indonesia), **Beby Karina Fawzeea Sembiring** (Indonesia)

TRANSFORMATIONAL LEADERSHIP, PERCEIVED ORGANIZATIONAL SUPPORT, AND SELF-REPORTED LECTURER PERFORMANCE: MEDIATION BY INTERPERSONAL COLLABORATION SKILLS

Abstract

Lecturer performance in geographically dispersed higher education institutions depends on more than individual expertise; it also requires the coordinated use of academic knowledge. This study aims to examine how transformational leadership and perceived organizational support explain self-reported lecturer performance and whether interpersonal collaboration skills mediate these relationships in higher education institutions in the Nias Archipelago. Survey data from 217 permanent lecturers were analyzed using partial least squares structural equation modeling. Transformational leadership was positively associated with interpersonal collaboration skills ($\beta = .340$, $p = .003$) and self-reported lecturer performance ($\beta = .226$, $p = .010$). Perceived organizational support was positively associated with collaboration skills ($\beta = .387$, $p < .001$) and performance ($\beta = .267$, $p = .003$). Interpersonal collaboration skills had the strongest direct association with performance ($\beta = .401$, $p < .001$). The indirect effects of transformational leadership ($\beta = .136$, 95% CI [.039, .263]) and perceived organizational support ($\beta = .156$, 95% CI [.077, .244]) were significant, indicating complementary partial mediation. The model explained 46.6% of the variance in collaboration skills and 62.8% in self-reported lecturer performance. The findings show that leadership and organizational support contribute to perceived academic accomplishment partly by enabling lecturers to communicate, coordinate responsibilities, build trust, manage disagreement constructively, make joint decisions, and collaborate across units.

Keywords leadership, organizational support, collaboration, lecturer performance, higher education, knowledge exchange

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Eliagus Telaumbanua, Doctoral Student, Faculty of Economics and Business, Department of Management, Universitas Sumatera Utara [University of North Sumatra], Indonesia. (Corresponding author)

Prihatin Lumbanraja, Ph.D., Professor, Faculty of Economics and Business, Department of Management, Universitas Sumatera Utara [University of North Sumatra], Indonesia.

Yeni Absah, Ph.D., Professor, Faculty of Economics and Business, Department of Management, Universitas Sumatera Utara [University of North Sumatra], Indonesia.

Beby Karina Fawzeea Sembiring, Ph.D., Lecturer, Faculty of Economics and Business, Department of Management, Universitas Sumatera Utara [University of North Sumatra], Indonesia.

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INTRODUCTION

Higher education institutions in geographically dispersed regions must coordinate teaching, research, community engagement, and professional development despite uneven access to academic networks and specialized resources. In an archipelagic environment, physical separation increases the time and effort required to exchange information, align academic tasks, and develop joint outputs. Lecturer performance is therefore not solely an individual matter. It is also an organizational problem concerning how knowledge, support, and collegial relationships are converted into academic work.

Universities are knowledge-producing organizations in which performance depends on creating, exchanging, integrating, and applying expertise (Grant, 1996; Nonaka, 1994). Individual lecturers may possess

substantial disciplinary knowledge, yet that knowledge does not automatically become institutional value. Curriculum improvement requires shared pedagogical judgments; research productivity often depends on access to complementary expertise; and community service requires coordination with colleagues and external partners.

Evidence from higher education likewise indicates that knowledge management and knowledge sharing are associated with academic and organizational performance (Ahmed, 2025; Iqbal et al., 2019; Tjahjadi et al., 2019). The unresolved issue is how managerial and organizational conditions help lecturers transform distributed knowledge into coordinated output.

Transformational leadership and perceived organizational support offer two plausible explanations. Transformational leadership can create collective direction, challenge established routines, and attend to lecturers' developmental needs. Perceived organizational support reflects whether lecturers believe that their institution values their contribution, provides useful resources, and cares about their work-related welfare. Both constructs have been linked to performance, but a direct-effect explanation is incomplete. Leadership messages and institutional assistance only become productive when lecturers can communicate, coordinate responsibilities, resolve disagreements, and trust one another sufficiently to combine their expertise.

1. LITERATURE REVIEW AND HYPOTHESES

The literature review connects performance theory, transformational leadership theory, organizational support theory, social exchange theory, and research on teamwork and knowledge sharing. The central argument is that leadership and support are upstream resources, whereas interpersonal collaboration skills constitute the behavioral capability through which academic knowledge is combined and applied.

1.1. Self-reported lecturer performance as a knowledge-based outcome

Performance refers to behaviors and accomplishments that contribute to organizational objectives (Campbell, 1990). Task performance captures core responsibilities, whereas contextual performance includes actions that sustain the social and psychological environment in which work occurs (Borman & Motowidlo, 1993). In higher education, the principal task domains are teaching, research, and community service, accompanied by professional development and institutional duties. These domains are interdependent: teaching draws on disciplinary and pedagogical knowledge, research requires the creation and validation of new knowledge, and community service applies academic knowledge to external problems.

Academic performance is consequently embedded in knowledge processes rather than produced through isolated effort. A knowledge-based view treats organizations as mechanisms for integrating specialized expertise (Grant, 1996). Nonaka (1994) further explains that organizational knowledge emerges through interaction between tacit and explicit forms of knowing. In a university, lecturers' expertise becomes institutionally useful when it is articulated, exchanged, combined, and applied. Empirical studies in higher education support this logic. Iqbal et al. (2019) found that knowledge management contributes to organizational performance through innovation and intellectual capital, while Tjahjadi et al. (2019) showed that intellectual capital matters in the relationship between performance management systems and higher-education performance. More recently, Ahmed (2025) reported a strong association between faculty knowledge sharing and faculty performance.

The present outcome is self-reported rather than objective performance. Self-reports are useful for capturing activities that may not be uniformly recorded across institutions, including informal mentoring, collaborative preparation, and the perceived accomplishment of multiple academic roles. They also permit respondents to assess the same reference period. However, they are vulnerable to consistency motives, social desirability, and common-source inflation (Podsakoff et al., 2003;

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Spector, 2006). The interpretation must therefore remain at the level of perceived academic accomplishment. Objective publication counts, student outcomes, grant records, and verified community-service outputs would represent related but distinct criteria.

1.2. Transformational leadership, collaboration, and performance

Transformational leadership explains how leaders mobilize followers around purposes that exceed immediate self-interest. Its main behaviors are idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Avolio & Bass, 2004; Bass, 1985; Bass & Riggio, 2006; Burns, 1978). Idealized influence establishes behavioral credibility; inspirational motivation gives work a shared direction; intellectual stimulation legitimizes questioning and experimentation; and individualized consideration supports professional development. These behaviors are relevant to academic work because lecturers possess considerable autonomy and respond more readily to meaning, professional respect, and intellectual challenge than to close task control.

Meta-analytic evidence consistently links transformational leadership with performance and favorable work attitudes (Banks et al., 2016; Hoch et al., 2018; Judge & Piccolo, 2004). The relationship is not purely motivational. Transformational leaders can influence the relational architecture of work by developing trust, clarifying shared objectives, and encouraging information exchange (Podsakoff et al., 1990). In higher education, Bryman (2007) identified direction, credibility, communication, and collegiality as recurring features of effective leadership. Nelly et al. (2024) subsequently showed that competency mediates the effect of transformational leadership on lecturer performance, indicating that leadership becomes consequential partly through capabilities developed by academic staff.

Transformational leadership should strengthen interpersonal collaboration skills because collaborative academic work requires a legitimate shared agenda. Intellectual stimulation encourages lecturers to expose unfinished ideas to scrutiny, while individualized consideration reduces the interpersonal risk of asking for help. Inspirational motivation can align separate units around collective outcomes, and idealized influence can establish norms of reciprocity and integrity. Where institutional geography makes spontaneous interaction less likely, these leadership behaviors can compensate by creating purposeful opportunities for coordination.

Transformational leadership should also have a direct association with self-reported lecturer performance. Leaders influence priorities, provide feedback, recognize effort, and connect individual academic work to institutional goals. Studies of educators and lecturers have reported positive relationships between transformational leadership, interpersonal communication, competency, and performance (Melianah et al., 2021; Nelly et al., 2024). Nevertheless, the direct association is expected to coexist with an indirect route because academic outcomes require lecturers to enact leadership expectations through their own collaborative behavior.

1.3. Perceived organizational support, collaboration, and performance

Perceived organizational support is the general belief that an organization values employees' contributions and cares about their well-being (Eisenberger et al., 1986; Rhoades & Eisenberger, 2002). Organizational support theory argues that favorable treatment from the organization is interpreted as evidence of institutional commitment, particularly when the treatment appears discretionary. Social exchange theory then explains why supported employees reciprocate through stronger effort and organization-benefiting behavior (Blau, 1964; Wayne et al., 1997). A meta-analysis by Kurtessis et al. (2017) confirms that fairness, supervisor support, human-resource practices, and working conditions are important antecedents of POS and that POS is associated with performance-related outcomes.

In higher education, support has both socio-emotional and instrumental content. Recognition signals that academic contributions are valued, while facilities, workload arrangements, development opportunities, and administrative assistance determine whether lecturers can act on their exper-

tise. Fiernaningsih et al. (2023) found that organizational support contributed to engagement, proactive behavior, and performance among vocational lecturers. Nguyen et al. (2025) likewise demonstrated that POS and transformational leadership are relevant to informal coaching and job performance in higher education. These findings imply that support is not merely an attitude-enhancing resource; it can reduce the practical costs of knowledge exchange.

POS should foster interpersonal collaboration skills because lecturers are more willing to share information and depend on colleagues when the institution provides psychological and material security. People-management practices can facilitate knowledge sharing by shaping motivation, opportunity, and trust (E. Cabrera & A. Cabrera, 2005). Support for joint projects, access to communication facilities, transparent recognition, and fair workload allocation can make collaboration feasible rather than optional. In contrast, insufficient support can encourage lecturers to protect scarce resources and prioritize individual tasks.

POS should also predict self-reported lecturer performance directly. Resources and recognition enable teaching preparation, research implementation, community engagement, and professional development. The reciprocity norm further suggests that lecturers who feel valued will be more willing to invest effort in institutional goals. Evidence from educational and broader organizational settings supports positive relationships between POS, engagement, and job performance (Kurtessis et al., 2017; Prabowo & Muafi, 2021). In resource-constrained institutions, this direct route may be especially visible because basic enabling conditions cannot be substituted by motivation alone.

1.4. Interpersonal collaboration skills as a mediating capability

Interpersonal collaboration skills are defined here as the capability to communicate academic information, coordinate interdependent tasks, manage disagreement constructively, develop trust, participate in joint decisions, and work across organizational boundaries. The construct integrates interpersonal and teamwork competencies because university work frequently crosses disciplinary, departmental, and institutional lines. Research on teams identifies communication, coordination, trust, conflict management, and shared cognition as core conditions of effectiveness (Mathieu et al., 2017; Salas et al., 2008, 2018). Psychological safety also supports learning behavior by allowing members to admit uncertainty and seek feedback without excessive interpersonal risk (Edmondson, 1999).

Collaboration is not equivalent to interpersonal harmony. Task disagreement can improve the examination of ideas when it is managed constructively, whereas relationship conflict tends to impair satisfaction and performance (De Dreu & Weingart, 2003). Effective collaborators are therefore able to keep intellectual disagreement focused on the work, coordinate contributions, and convert diverse knowledge into decisions. Teamwork instruments in higher education similarly emphasize communication, shared responsibility, execution, and regulation (de Prada et al., 2022; Hebles et al., 2022). Campbell et al. (2025) further demonstrate that transferable teamwork competencies can be deliberately developed rather than treated as fixed personality attributes.

For lecturers, collaboration skills should predict performance because teaching, research, and community service are increasingly interdependent. Coordinated course development reduces duplication; peer feedback improves research design and manuscripts; joint decision making supports coherent academic programs; and cross-unit collaboration expands access to expertise and external partners. Wang and Noe (2010) describe knowledge sharing as a process shaped by individual, relational, and organizational conditions. Interpersonal collaboration skills provide the behavioral means through which such sharing is translated into academic work.

The mediating argument follows from the distinction between resources and deployment. Transformational leadership supplies direction and relational cues, while POS supplies recognition and enabling conditions. Neither produces academic outcomes without lecturers' action. Collaboration skills are the deployable capability that connects these resources to performance by enabling knowledge integration. This logic ex-

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tends findings that competency, engagement, and job satisfaction mediate leadership or knowledge-sharing effects (Ahmed, 2025; Fiernaningsih et al., 2023; Nelly et al., 2024). It also offers a mechanism closely aligned with knowledge and performance management: leadership and support improve performance partly because they help lecturers exchange and apply knowledge more effectively.

1.5. Research gap, aim, and hypotheses

Prior research demonstrates that transformational leadership and POS are related to work outcomes, but three gaps remain. First, lecturer performance is often discussed without distinguishing self-reported accomplishment from objective records. Second, studies commonly examine psychological mediators such as engagement, satisfaction, or broad competency, leaving the knowledge-integration mechanism underdeveloped. Third, evidence from geographically dispersed higher education is limited, even though collaboration may be especially consequential where access to expertise and infrastructure is uneven. These gaps justify a model in which interpersonal collaboration skills mediate the effects of leadership and organizational support on self-reported lecturer performance.

This study aims to examine how transformational leadership and perceived organizational support explain self-reported lecturer performance and whether interpersonal collaboration skills mediate these relationships in higher education institutions in the Nias Archipelago.

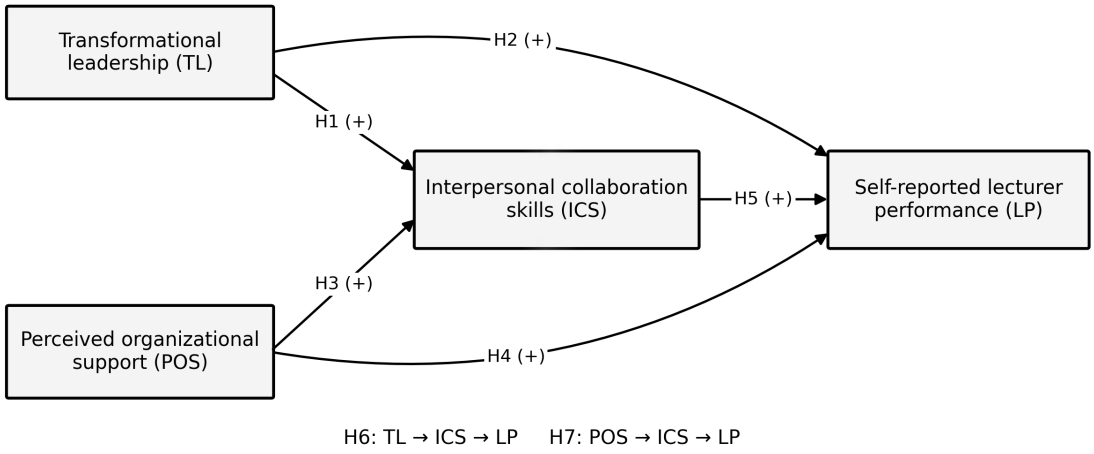
The hypotheses were formulated by integrating three bases of justification: relevant theory, previous empirical findings, and the observed research problem in geographically dispersed higher education institutions. Transformational leadership theory, organizational support theory, social exchange theory, and the knowledge-based view provide the theoretical mechanisms; previous studies support the expected relationships among leadership, POS, collaboration, knowledge sharing, and performance; and the local research problem highlights the need to explain how lecturers convert limited and distributed resources into perceived academic accomplishment.

H1: *Transformational leadership has a positive effect on interpersonal collaboration skills.*

H2: *Transformational leadership has a positive effect on self-reported lecturer performance.*

H3: *Perceived organizational support has a positive effect on interpersonal collaboration skills.*

H4: *Perceived organizational support has a positive effect on self-reported lecturer performance.*



Note: TL = transformational leadership; *POS* = perceived organizational support*; ICS* = interpersonal collaboration skills; *LP* = self-reported lecturer performance.

Figure 1. Proposed research model

H5: Interpersonal collaboration skills have a positive effect on self-reported lecturer performance.

H6: Interpersonal collaboration skills mediate the effect of transformational leadership on self-reported lecturer performance.

H7: Interpersonal collaboration skills mediate the effect of perceived organizational support on self-reported lecturer performance.

2. METHODOLOGY

2.1. Research design and participants

The study used a quantitative, cross-sectional explanatory design. Data were collected from October 2025 to January 2026 from permanent lecturers employed by higher education institutions in the Nias Archipelago. Eligible respondents held permanent academic appointments and carried out teaching, research, and community-service duties. The questionnaire was administered online through Google Forms (G-Form), and the survey link was distributed through institutional academic contacts. After eligibility and completeness screening, 217 responses were retained for analysis.

The target population comprised all eligible permanent lecturers employed by the participating higher education institutions. The total population across *k* institutions is defined as follows:

$$N = \sum_{i=1}^{k} N_i, \quad (1)$$

where N_i denotes the number of eligible permanent lecturers in institution *i*, and *N* denotes the total target population. The retained distribution records did not preserve a fully verifiable invitation denominator; therefore, an unsupported response rate is not reported. This limitation is explicitly acknowledged because response-rate information is important for interpreting survey representativeness. The final analytical sample consisted of 217 permanent lecturers.

Sample-size adequacy for PLS-SEM was evaluated with the inverse square root method proposed by Kock and Hadaya (2018). For a directional test at $\alpha = .05$ and statistical power of .80, the minimum sample size is:

$$n_{\min} = \left(\frac{2.486}{|\beta_{\min}|} \right)^2, \quad (2)$$

where $|\beta_{min}|$ is the smallest path coefficient that the study is designed to detect, and the calculated result is rounded upward to the next integer. Assuming $|\beta_{min}| = .20$, $n_{min} = (2.486 / .20)^2 = 154.5$, which yields a minimum of 155 cases. The 217 valid responses therefore exceeded the minimum requirement for estimating the proposed model.

Respondents were distributed across the two participating institutions, with 106 lecturers from Universitas Nias (48.8%) and 111 from Universitas Nias Raya (51.2%). This relatively balanced distribution indicates that the pooled sample was not dominated by one institution. Men represented 71.0% of respondents, and the largest age group was 35-44 years (46.1%), followed by lecturers aged 34 years or younger (32.3%). Most respondents held a master's degree (93.1%). Regarding academic rank, 46.5% were lecturers, 32.3% were assistant lecturers, 20.7% had no academic rank, and 0.5% were senior lecturers. The largest tenure category was 6-10 years (31.3%). The faculty distribution was also reported to improve the transparency of the respondent profile. However, the analytical file did not retain verified research-productivity indicators, and the study therefore does not test differences based on objective publication, grant, or community-service records.

Institutional affiliation was retained as a respondent-characteristic variable to document sample composition. The present analysis estimates a pooled structural model; therefore, the results should not be interpreted as evidence that institution-specific structural effects are identical across the two universities.

2.2. Measures

The questionnaire used a five-point response scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items were adapted to the academic-work context and organized into four constructs. The complete English rendering of the administered items is reported in Appendix A, including items

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Table 1. Respondent characteristics (N = 217)

Characteristic	Category	n	%
Institutional affiliation	Universitas Nias	106	48.8
	Universitas Nias Raya	111	51.2
Gender	Men	154	71.0
	Women	63	29.0
Age	≤ 34 years	70	32.3
	35-44 years	100	46.1
	45-54 years	30	13.8
	55-64 years	17	7.8
Highest education	Master's degree	202	93.1
	Doctoral degree	15	6.9
Academic rank	No academic rank	45	20.7
	Assistant Lecturer	70	32.3
	Lecturer	101	46.5
	Senior Lecturer	1	0.5
Faculty / school	Economics and Business	58	26.7
	Teacher Training and Education	105	48.4
	Science and Technology	40	18.4
	Law	14	6.5
Institutional tenure	< 3 years	52	24.0
	3-5 years	38	17.5
	6-10 years	68	31.3
	11-15 years	45	20.7
	> 15 years	14	6.5

Note: Percentages are calculated from 217 valid cases. No missing demographic values were reported in the retained dataset.

removed during measurement-model refinement. The instrument was designed to cover conceptually necessary domains while avoiding repetitive wording that could increase respondent fatigue.

Transformational leadership was modeled as a higher-order construct represented by idealized influence, individualized consideration, inspirational motivation, and intellectual stimulation (Avolio & Bass, 2004). Perceived organizational support was represented by organizational care, recognition and reward, and work support and facilities, consistent with organizational support theory (Eisenberger et al., 1986; Kurtessis et al., 2017). Interpersonal collaboration skills were represented by collaborative communication, coordination and shared responsibility, conflict management, collaborative trust, joint decision making and problem solving, and cross-boundary collaboration, drawing on teamwork and knowledge-sharing research (Hebles et al., 2022; Salas et al., 2018; Wang & Noe, 2010).

Self-reported lecturer performance covered teaching, research, community service, supporting duties, and professional development. The construct captures respondents' perceptions of their own accomplishment during the reference period. It should not be interpreted as objective productivity because the study did not link survey responses to student evaluations, publication databases, grant records, workload files, or verified community-service documentation. This wording is used consistently in the title, abstract, analysis, discussion, and conclusion.

2.3. Data collection, ethics, and common method safeguards

Participation was voluntary. Before completing the questionnaire, lecturers received information about the academic purpose of the study, the voluntary nature of participation, anonymity, and the use of aggregated results. No names were included in the analytical file. Data collection followed the permission procedures of the participating institutions. Because no formal ethics-committee approval number was available in the study records, the manuscript does not claim approval that cannot be documented.

Procedural and statistical safeguards were used because the predictors and outcome came from

the same respondents. The questionnaire separated construct blocks, used neutral wording, assured anonymity, and emphasized that there were no correct or incorrect responses. Statistically, common method bias was examined through the variance explained by the first unrotated factor and full-collinearity variance inflation factors (VIFs), following Podsakoff et al. (2003) and Kock (2015). These diagnostics can indicate whether a dominant common factor is plausible, but they cannot eliminate all common-source bias (Conway & Lance, 2010; Spector, 2006).

2.4. Data analysis

Descriptive statistics were produced in IBM SPSS Statistics 31. The measurement and structural models were estimated in SmartPLS 4.1.1.6 (Ringle et al., 2024). Partial least squares structural equation modeling (PLS-SEM) was selected because the model is prediction-oriented, includes higher-order constructs, and tests simultaneous direct and indirect relationships (Hair et al., 2019, 2022). A two-stage approach was used to estimate the higher-order constructs, consistent with recommendations for hierarchical component models (Becker et al., 2012; Sarstedt et al., 2019).

The measurement model was evaluated using indicator loadings, indicator VIF, Cronbach's alpha, rho_A, composite reliability, average variance extracted (AVE), and the heterotrait-monotrait ratio (HTMT). Reliability coefficients of at least .70 and AVE of at least .50 were used as general criteria; HTMT values below .90 supported discriminant validity (Hair et al., 2022; Henseler et al., 2015). Structural relationships were evaluated using standardized path coefficients, bootstrapped t-statistics, p-values, 95% confidence intervals, effect sizes (f^2), and coefficients of determination (R^2). The bootstrapping procedure used 5,000 resamples. Mediation was assessed from the significance and direction of direct, indirect, and total effects, together with the variance accounted for (VAF).

3. RESULTS

3.1. Data screening and common method diagnostics

All 217 retained questionnaires contained complete values for the variables used in the analysis. The first unrotated factor explained 32.4% of item variance, below the 50% diagnostic threshold. Full-collinearity VIF values ranged from 2.305 to 2.836, below 3.3. These results do not indicate a dominant common method factor, although they do not rule out all bias associated with self-report and common-source data.

3.2. Measurement model

The measurement model met the specified quality criteria. Higher-order dimension loadings ranged from .750 to .915, and indicator VIF values were below the conventional collinearity threshold. Cronbach's alpha ranged from .788 to .888, composite reliability from .862 to .926, and AVE from .606 to .806. Thus, all constructs demonstrated internal consistency and convergent validity. Two performance dimensions with comparatively lower loadings were retained because they represent theoretically required domains of lecturer work and the construct-level reliability and AVE remained satisfactory.

The HTMT coefficients ranged from .716 to .861. Every value was below .90, supporting empirical distinctiveness among transformational leadership, POS, interpersonal collaboration skills, and

Table 2. Common method bias diagnostics

Diagnostic	Result	Guideline	Assessment
Unrotated first factor	32.4% of item variance	< 50%	No dominant single factor
Full-collinearity VIF: ICS	2.305	< 3.3	Acceptable
Full-collinearity VIF: LP	2.688	< 3.3	Acceptable
Full-collinearity VIF: POS	2.836	< 3.3	Acceptable
Full-collinearity VIF: TL	2.718	< 3.3	Acceptable

Note: The first-factor percentage is based on the unrotated solution. Full-collinearity VIF values below 3.3 are treated as evidence against severe common method bias (Kock, 2015).

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Table 3. Measurement model reliability, convergent validity, and collinearity

Construct	Dimension	Loading	VIF	α	rho_A	CR	AVE
TL	Idealized influence	.864	2.363	.888	.893	.923	.749
	Individualized consideration	.819	1.974				
	Inspirational motivation	.880	2.639				
	Intellectual stimulation	.897	2.753				
POS	Organizational care	.875	2.091	.880	.881	.926	.806
	Recognition and reward	.903	2.712				
	Work support and facilities	.915	2.793				
ICS	Collaborative communication	.765	1.887	.870	.872	.902	.606
	Conflict management	.762	1.750				
	Coordination and information sharing	.810	2.052				
	Cross-boundary collaboration	.764	1.694				
	Joint decision making	.765	1.766				
	Trust and respect	.803	2.101				
LP	Community service performance	.799	1.660	.788	.794	.862	.610
	Research performance	.806	1.572				
	Supporting duties and professional development	.750	1.516				
	Teaching performance	.769	1.565				

Note: α = Cronbach's alpha; rho_A = Dijkstra–Henseler reliability; CR = composite reliability; AVE = average variance extracted. Construct-level reliability statistics appear in the first row for each construct.

self-reported lecturer performance. The largest coefficient was between POS and transformational leadership (.861), indicating close but non-redundant perceptions of institutional and leadership resources.

Table 4. Heterotrait-monotrait ratios

Construct	LP	ICS	POS	TL
LP				
ICS	.858			
POS	.829	.729		
TL	.812	.716	.861	

Note: All HTMT values are below .90.

3.3. Direct effects and explanatory power

All five direct-effect hypotheses were supported. Transformational leadership predicted interpersonal collaboration skills (β = .340, p = .003) and self-reported lecturer performance (β = .226, p = .010). POS predicted interpersonal collaboration skills (β = .387, p < .001) and self-reported lecturer performance (β = .267, p = .003). Interpersonal collaboration skills had the largest direct coefficient for performance (β = .401, p < .001). The corresponding confidence intervals excluded zero. Effect sizes were small for the two direct antecedent-performance paths, small-to-moderate for the antecedent-collaboration paths, and moderate for the collaboration-performance path.

3.4. Indirect effects

Both hypothesized indirect effects were significant. The indirect effect of transformational leadership through interpersonal collaboration skills was .136 (p = .017, 95% CI [.039, .263]). The direct effect remained significant and had the same sign, producing complementary partial mediation; the VAF was 37.7%. The indirect effect of POS through collaboration skills was .156 (p < .001, 95% CI

Table 5. Direct effects and hypothesis tests

Hypothesis	Path	β	t	p	95% CI	f^2	Decision
H1	TL → ICS	.340	3.008	.003	[.105, .549]	.092	Supported
H2	TL → LP	.226	2.582	.010	[.057, .396]	.053	Supported
H3	POS → ICS	.387	4.514	< .001	[.227, .564]	.119	Supported
H4	POS → LP	.267	2.979	.003	[.080, .436]	.072	Supported
H5	ICS → LP	.401	4.740	< .001	[.232, .562]	.231	Supported

Note: Bootstrap results are based on 5,000 resamples. CI = confidence interval.

Table 6. Direct, indirect, and total effects

Hypothesis	Indirect path	Direct β (p)	Indirect β (p)	Total β (p)	Indirect 95% CI	VAF	Mediation type	Decision
H6	TL → ICS → LP	.226 (.010)	.136 (.017)	.362 (< .001)	[.039, .263]	37.7%	Complementary partial	Supported
H7	POS → ICS → LP	.267 (.003)	.156 (< .001)	.422 (< .001)	[.077, .244]	36.8%	Complementary partial	Supported

Note: VAF = variance accounted for, calculated as indirect effect divided by total effect. Complementary partial mediation occurs when direct and indirect effects are significant and point in the same direction.

[.077, .244]). Its direct effect also remained significant and positive, with a VAF of 36.8%. Thus, collaboration skills transmitted a substantial, but not complete, share of each antecedent's association with self-reported lecturer performance.

3.5. Model explanatory power and fit

Transformational leadership and POS explained 46.6% of the variance in interpersonal collaboration skills (adjusted R^2 = .461). Transformational leadership, POS, and collaboration skills jointly explained 62.8% of the variance in self-reported lecturer performance (adjusted R^2 = .623). The standardized root mean square residual was .064, while the normed fit index was .847. These statistics are reported as descriptive model diagnostics and do not replace the evaluation of path estimates, measurement quality, and predictive relevance. Figure 2 summarizes the supported structural relationships, explained variance, and significant indirect effects.

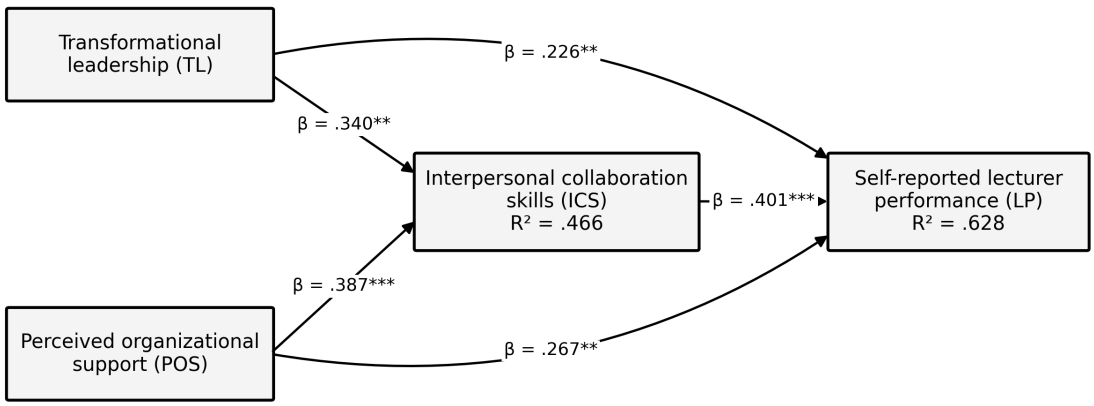
4. DISCUSSION

The findings show that self-reported lecturer performance is associated with a configuration of leadership, organizational support, and interpersonal collaboration rather than with a single managerial input. All direct paths were positive, and collaboration skills produced the largest di-

Table 7. Explanatory power and model diagnostics

Outcome / diagnostic	R^2	Adjusted R^2	Value
Interpersonal collaboration skills	.466	.461	–
Self-reported lecturer performance	.628	.623	–
SRMR	–	–	.064
NFI	–	–	.847

Note: R2 values refer to endogenous constructs. SRMR and NFI are model-level diagnostics.



Indirect effects: TL → ICS → LP = .136*; POS → ICS → LP = .156***

Note: TL = transformational leadership; *POS* = perceived organizational support; *ICS* = interpersonal collaboration skills; *LP* = self-reported lecturer performance; * *p* < .05; ** *p* < .01; *** *p* < .001.

Figure 2. Structural model results

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rect coefficient for performance. The two significant indirect effects further indicate that leadership and support are translated into academic accomplishment partly through lecturers' ability to exchange and integrate knowledge. This pattern is especially meaningful in geographically dispersed higher education, where coordination failures can consume scarce time and resources.

The interpretation of these results follows the same logic used to formulate the hypotheses: each finding is discussed in relation to relevant theory, prior empirical evidence, and scientific reasoning about the research problem. Because the outcome was measured by self-report, the term performance in this section refers to lecturers' perceived academic accomplishment rather than objectively verified teaching quality, publication output, grant income, or documented community-service impact.

Transformational leadership had a positive effect on interpersonal collaboration skills. The result supports the argument that transformational behavior shapes how academic staff relate to one another, not merely how motivated they feel. Idealized influence can establish credible norms for reciprocity; inspirational motivation can connect separate tasks to a shared academic purpose; intellectual stimulation can legitimize the open discussion of uncertain ideas; and individualized consideration can make lecturers more willing to seek help and offer expertise. This interpretation is consistent with Podsakoff et al. (1990), who linked transformational behavior with trust, and with meta-analytic evidence showing robust associations between transformational leadership and work outcomes (Banks et al., 2016; Hoch et al., 2018; Judge & Piccolo, 2004). It also extends Nelly et al. (2024): whereas their mediator was general competency, the present study identifies a specific relational capability that directly enables knowledge-intensive work.

Transformational leadership also predicted self-reported performance, but its direct coefficient (.226) was smaller than the coefficient of collaboration skills (.401). This difference suggests that leadership direction is insufficient unless lecturers can enact it through coordinated behavior. Academic leaders can encourage research, teaching improvement, and community engagement, but they do not personally integrate the specialized knowledge required for every output. The result refines a simple leader-performance claim: leadership remains consequential, yet a notable share of its association with performance is behavioral and relational. The indirect effect (.136) accounted for 37.7% of the total effect, showing that collaboration is not a peripheral explanation.

POS positively predicted both collaboration skills and self-reported performance. The effect on collaboration indicates that institutional treatment shapes whether lecturers are willing and able to depend on one another. Recognition reduces the perceived risk that collaborative contributions will be ignored; fair policies make reciprocal effort more credible; and facilities or administrative support lower the transaction costs of joint work. This explanation accords with organizational support theory and the reciprocity mechanism proposed by Blau (1964), Eisenberger et al. (1986), and Kurtessis et al. (2017). It also corresponds with evidence from Indonesian vocational higher education, where organizational support was related to engagement, proactive behavior, and performance (Fiernaningsih et al., 2023), and with Nguyen et al. (2025), who showed that support is relevant to coaching and performance in higher education.

The direct POS-performance coefficient (.267) confirms that some effects of support do not require a collaborative route. Access to resources, development opportunities, recognition, and workable policies can immediately facilitate academic tasks. This direct contribution is plausible in institutions where scarce facilities or administrative delays can constrain the execution of teaching, research, and service. At the same time, the indirect effect through collaboration (.156) represented 36.8% of the total POS effect. Organizational support therefore appears to work in two ways: it enables individual academic activity and creates conditions in which lecturers can combine their knowledge with that of colleagues.

Interpersonal collaboration skills were the strongest direct predictor of self-reported performance. This result reinforces the view that academic performance is socially embedded. Collaborative communication allows complex information to be interpreted; coordination clarifies interdepen-

dence; constructive conflict management protects task debate from becoming personal; trust lowers monitoring costs; joint decision making combines perspectives; and cross-boundary collaboration widens access to expertise. The result is consistent with the science of teamwork (Mathieu et al., 2017; Salas et al., 2008, 2018) and with higher-education studies that conceptualize teamwork as a developable competency (Campbell et al., 2025; de Prada et al., 2022; Hebles et al., 2022). It also complements Ahmed's (2025) finding that faculty knowledge sharing is strongly related to performance. The present model specifies the interpersonal competencies through which such sharing can be organized.

The mediation results provide the article's main theoretical contribution. Leadership and POS are commonly treated as independent predictors of performance. The present evidence shows that their effects are partly transmitted through a common knowledge-integration capability. This is compatible with the knowledge-based view: organizations benefit from specialized knowledge when they possess mechanisms for integration (Grant, 1996). In this model, interpersonal collaboration skills are a micro-level integration mechanism. They explain how a shared direction and supportive institutional environment lead to communication, coordination, and joint problem solving, which in turn are associated with academic accomplishment.

The partial character of the mediation is also theoretically informative. Collaboration did not absorb the entire effect of leadership or support. Leadership may influence performance through goal clarity, confidence, feedback, or professional identification, while support may operate through access to resources, affective commitment, or reduced strain. The results therefore do not claim that collaboration is the only mechanism. Instead, they establish it as a distinct and quantitatively meaningful pathway. This interpretation is more defensible than treating a significant indirect effect as a full causal explanation, particularly in a cross-sectional design.

The study contributes to the scope of Knowledge and Performance Management by connecting human-resource conditions with knowledge exchange in universities. Transformational leadership and POS are upstream organizational resources. Interpersonal collaboration skills are the capability that makes distributed academic knowledge usable. Self-reported performance is the perceived outcome of that deployment. The framework therefore shifts attention from whether universities possess knowledgeable employees to whether their management systems enable employees to combine and apply knowledge. This emphasis is consistent with research showing that knowledge management, intellectual capital, and knowledge sharing are linked to higher-education performance (Ahmed, 2025; Iqbal et al., 2019; Tjahjadi et al., 2019).

The practical implication is not simply to provide more leadership training or more resources. Institutions should design routines that connect these investments to collaborative execution. Academic leaders can establish cross-unit research forums, structured peer review, co-teaching arrangements, and joint planning sessions for community engagement. Work allocation and recognition systems should make collaborative contributions visible, rather than rewarding only individual outputs. Institutions can also develop clear protocols for resolving task conflict, create small interdisciplinary project grants, provide shared digital workspaces, and schedule time for collaborative academic work. These practices target the behavioral capability that showed the strongest association with performance. These recommendations should be interpreted as strategies for strengthening lecturers' perceived academic accomplishment and knowledge-based collaboration; objective performance effects should be verified in future studies using institutional records.

The findings should be interpreted within several limitations. First, all focal variables were reported by the same respondents at one time, so causal direction cannot be established and common-source inflation remains possible despite the diagnostic checks. Second, performance was self-reported and should not be equated with verified teaching quality, publication productivity, grant success, or documented community impact. Third, although institutional affiliation is now reported and the two participating universities are represented almost equally, the retained records did not preserve a fully verifiable invitation denominator. The response

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rate therefore cannot be calculated accurately and remains a limitation for survey representativeness. Because institutional affiliation was not specified as a moderator or grouping variable in the final structural model, the study does not make claims about university-specific path differences.

Fourth, the available dataset did not retain verified research-productivity indicators that would allow the analysis to compare self-reported accomplishment with objective publication, grant, or documented community-service records. Fifth, the setting is geographically specific. The contextual relevance of distance and resource constraints may differ in metropolitan or public-university systems. Future studies should use time-separated or longitudinal designs, collect supervisor or institutional performance records, retain invitation and subgroup records more completely, and test whether institutional affiliation, faculty, digital infrastructure, or knowledge-sharing climate changes the strength of the identified mechanisms.

CONCLUSION

This study aims to examine how transformational leadership and perceived organizational support explain self-reported lecturer performance and whether interpersonal collaboration skills mediate these relationships in higher education institutions in the Nias Archipelago.

The results support all seven hypotheses. Transformational leadership and POS were positively associated with collaboration skills and self-reported performance, while collaboration skills showed the strongest direct association with performance. The indirect effects were significant and complementary: collaboration accounted for 37.7% of the total transformational-leadership effect and 36.8% of the total POS effect. The model explained 62.8% of the variance in self-reported lecturer performance.

The principal conclusion is that leadership and organizational support are more strongly associated with perceived academic accomplishment when they are converted into a capability for knowledge exchange and coordinated academic action. Transformational leadership provides direction and relational cues; POS provides recognition and enabling conditions; collaboration skills allow lecturers to combine these resources in teaching, research, community service, and supporting duties. For management practice, this means that leadership development and support policies should be paired with structures for joint planning, peer feedback, cross-unit projects, and constructive conflict management, while recognizing that the present evidence concerns self-reported performance.

The conclusion remains bounded by the measurement design. The study explains lecturers' perceived accomplishment, not objectively verified performance. Future research should link survey constructs with publication records, student learning indicators, grants, verified service outputs, and longitudinal changes. Comparative studies across island, rural, and metropolitan institutions would also clarify whether collaboration has greater explanatory value where knowledge and resources are spatially dispersed.

DECLARATION OF GENERATIVE AI IN THE WRITING PROCESS

In preparing this manuscript, the authors used OpenAI's ChatGPT for language refinement, structural consistency checking, and formatting support. After use, the authors reviewed and edited the text and bear full responsibility for the content of the publication.

AUTHOR CONTRIBUTIONS

Conceptualization: Eliagus Telaumbanua, Prihatin Lumbanraja, Yeni Absah, Beby Karina Fawzeea Sembiring.
Data curation: Eliagus Telaumbanua.

Formal analysis: Eliagus Telaumbanua.
Investigation: Eliagus Telaumbanua, Yeni Absah.
Methodology: Eliagus Telaumbanua, Prihatin Lumbanraja, Beby Karina Fawzeea Sembiring.
Project administration: Eliagus Telaumbanua, Yeni Absah.
Resources: Eliagus Telaumbanua, Yeni Absah.
Software: Eliagus Telaumbanua.
Supervision: Prihatin Lumbanraja, Beby Karina Fawzeea Sembiring.
Validation: Prihatin Lumbanraja, Yeni Absah, Beby Karina Fawzeea Sembiring.
Visualization: Eliagus Telaumbanua, Yeni Absah.
Writing – original draft: Eliagus Telaumbanua.
Writing – review & editing: Eliagus Telaumbanua, Prihatin Lumbanraja, Yeni Absah, Beby Karina Fawzeea Sembiring.

ETHICS STATEMENT

Participation was voluntary. Respondents were informed about the purpose of the study, anonymity, and the use of aggregated results. No personally identifying information was included in the analytical dataset. Data collection followed the institutional permission procedures applicable at the research sites.

DATA AVAILABILITY STATEMENT

A de-identified dataset may be made available by the corresponding author upon reasonable request, subject to institutional confidentiality requirements. The questionnaire items are reported in Appendix A.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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APPENDIX A. Questionnaire items

The tables present the English rendering of all administered items. Statements marked as removed were included in data collection but excluded during measurement-model refinement. The questionnaire used a five-point agreement scale from 1 (strongly disagree) to 5 (strongly agree).

Table A1. Transformational leadership items

Code	Dimension	Item statement
TL1	Idealized influence	The academic leader acts consistently with the values expected from lecturers.
TL2	Idealized influence	The academic leader earns lecturers' respect through ethical conduct.
TL3	Idealized influence	The academic leader places collective academic interests above personal interests.
TL4	Inspirational motivation	The academic leader communicates a clear direction for academic work.
TL5	Inspirational motivation	The academic leader encourages lecturers to pursue demanding academic targets.
TL6	Inspirational motivation	The academic leader expresses confidence that the academic unit can achieve its goals.
TL7	Intellectual stimulation	The academic leader encourages lecturers to question established work routines.
TL8	Intellectual stimulation	The academic leader invites new approaches to teaching, research, and community service.
TL9	Intellectual stimulation	The academic leader treats academic problems as opportunities for learning.
TL10	Individualized consideration	The academic leader recognizes differences in lecturers' needs and capabilities.
TL11	Individualized consideration	The academic leader provides individual guidance when it is needed.
TL12	Individualized consideration	The academic leader supports lecturers' professional development.

Note: Item wording is reported for transparency; construct scores were estimated from the retained indicators in the final measurement model.

Table A2. Perceived organizational support items

Code	Dimension	Item statement
POS1	Organizational care	The institution shows concern for my well-being as a lecturer.
POS2	Organizational care	The institution considers my interests when decisions affect my work.
POS3	Organizational care	The institution provides help when I face difficulties in carrying out academic duties.
POS4	Organizational care	The institution cares about my satisfaction with my work.
POS5	Recognition and reward	The institution values my contribution to academic activities.
POS6	Recognition and reward	Good academic work is acknowledged by the institution.
POS7	Recognition and reward	The institution appreciates extra effort devoted to academic responsibilities.
POS8	Recognition and reward	Recognition is provided fairly for lecturers' achievements.
POS9	Work support and facilities	The institution provides facilities needed for teaching.
POS10	Work support and facilities	The institution supports access to resources needed for research.
POS11	Work support and facilities	Administrative support helps me complete academic duties.
POS12	Work support and facilities	The institution facilitates opportunities for professional development.

Note: Item wording is reported for transparency; construct scores were estimated from the retained indicators in the final measurement model.

Table A3. Interpersonal collaboration skills items

Code	Dimension	Item statement
ICS1	Collaborative communication	I communicate academic information clearly to colleagues.
ICS2	Collaborative communication	I listen carefully to colleagues' views before responding.
ICS3	Collaborative communication	I provide timely feedback during joint academic work.
ICS4	Trust and respect	I can rely on colleagues to fulfill agreed responsibilities.
ICS5	Trust and respect	I respect colleagues' expertise and professional differences.
ICS6	Trust and respect	I share academic ideas without excessive concern that colleagues will misuse them.
ICS7	Coordination and information sharing	I coordinate my tasks with colleagues when our academic responsibilities are connected.
ICS8	Coordination and information sharing	I share information that colleagues need to complete joint work.
ICS9	Coordination and information sharing	I clarify roles and deadlines before collaborative activities begin.
ICS10	Conflict management	I discuss disagreement without attacking the person involved.

Table A3 (cont.). Interpersonal collaboration skills items

Code	Dimension	Item statement
ICS11	Conflict management	I help colleagues identify workable solutions when academic priorities conflict.
ICS12	Conflict management	I address collaboration problems before they disrupt academic work.
ICS13	Joint decision making	I participate actively in decisions concerning joint academic tasks.
ICS14	Joint decision making	I consider evidence and colleagues' input when making group decisions.
ICS15	Joint decision making	I support decisions that have been agreed upon collectively.
ICS16	Cross-boundary collaboration	I collaborate with lecturers outside my immediate academic unit.
ICS17	Cross-boundary collaboration	I connect colleagues with expertise or resources from other units.
ICS18	Cross-boundary collaboration	I contribute to academic activities that require cooperation across organizational boundaries.

Note: Item wording is reported for transparency; construct scores were estimated from the retained indicators in the final measurement model.

Table A4. Self-reported lecturer performance items

Code	Dimension	Item statement
LP1	Teaching performance	I completed planned teaching activities according to the academic schedule.
LP2	Teaching performance	I consistently achieved the intended learning outcomes in the courses I taught. [Removed from the final measurement model]
LP3	Teaching performance	I improved teaching materials or methods based on student and peer feedback.
LP4	Research performance	I made measurable progress on research activities during the most recent academic year.
LP5	Research performance	I contributed to the preparation or completion of scholarly outputs.
LP6	Research performance	I participated actively in research collaboration or dissemination.
LP7	Community service performance	I contributed to community service activities relevant to my expertise.
LP8	Community service performance	I completed the responsibilities assigned to me in community service projects.
LP9	Community service performance	I helped translate academic knowledge into benefits for community partners.
LP10	Supporting duties and professional development	I completed supporting academic or administrative duties responsibly.
LP11	Supporting duties and professional development	I participated in professional-development activities relevant to my role.
LP12	Supporting duties and professional development	I applied learning from professional-development activities to my academic work.

Note: Item wording is reported for transparency; construct scores were estimated from the retained indicators in the final measurement model.

APPENDIX B. Distribution of respondents by institution

The supplementary material reports respondent distribution, institutional cross-tabulations, item-level descriptive statistics, and selected SmartPLS outputs. Institutional affiliation is coded in column H of the original dataset as 1 = Universitas Nias (UNIAS) and 2 = Universitas Nias Raya (UNIRAYA).

Table B1. Institutional distribution of respondents

Institution	n	%
Universitas Nias (UNIAS)	106	48.8
Universitas Nias Raya (UNIRAYA)	111	51.2
Total	217	100.0

The two participating universities were almost equally represented, and neither institution dominated the pooled analytical sample.

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APPENDIX C. Cross-tabulation of respondent characteristics by institution

Table C1. Institutional affiliation by gender

Gender	UNIAS	UNIRAYA	Total
Men	77	77	154
Women	29	34	63

Table C2. Institutional affiliation by age

Age	UNIAS	UNIRAYA	Total
≤ 34 years	39	31	70
35-44 years	44	56	100
45-54 years	18	12	30
55-64 years	5	12	17

Table C3. Institutional affiliation by education

Education	UNIAS	UNIRAYA	Total
Master's degree	98	104	202
Doctoral degree	8	7	15

Table C4. Institutional affiliation by academic rank

Academic rank	UNIAS	UNIRAYA	Total
No academic rank	25	20	45
Assistant Lecturer (Asisten Ahli)	44	26	70
Lecturer (Lektor)	37	64	101
Senior Lecturer (Lektor Kepala)	0	1	1

Table C5. Institutional affiliation by faculty / school

Faculty / school	UNIAS	UNIRAYA	Total
Economics and Business	30	28	58
Teacher Training and Education	53	52	105
Science and Technology	23	17	40
Law	0	14	14

Table C6. Institutional affiliation by institutional tenure

Institutional tenure	UNIAS	UNIRAYA	Total
< 3 years	28	24	52
3-5 years	24	14	38
6-10 years	34	34	68
11-15 years	10	35	45
> 15 years	10	4	14

APPENDIX D. Item-level descriptive statistics by institution

Means and standard deviations are based on the five-point response scale. These tables document the distribution of responses to the measurement items across the two institutions; they are descriptive and are not interpreted as tests of structural-path differences.

Table D1. Transformational leadership (TL) items by institution

Item	UNIAS Mean	UNIAS SD	UNIRAYA Mean	UNIRAYA SD	Overall Mean	Overall SD
TL1	4.255	0.648	4.477	0.520	4.369	0.595
TL2	4.283	0.629	4.432	0.550	4.359	0.593
TL3	4.274	0.610	4.486	0.502	4.382	0.566
TL4	4.245	0.614	4.378	0.557	4.313	0.588
TL5	4.292	0.568	4.387	0.525	4.341	0.548
TL6	4.198	0.576	4.505	0.520	4.355	0.568
TL7	4.255	0.603	4.477	0.537	4.369	0.579
TL8	4.198	0.653	4.495	0.520	4.350	0.606
TL9	4.151	0.644	4.532	0.536	4.346	0.620
TL10	4.217	0.743	4.396	0.544	4.309	0.654
TL11	4.160	0.678	4.441	0.499	4.304	0.608
TL12	4.217	0.602	4.423	0.549	4.323	0.583

Table D2. Perceived organizational support (POS) items by institution

Item	UNIAS Mean	UNIAS SD	UNIRAYA Mean	UNIRAYA SD	Overall Mean	Overall SD
POS1	4.160	0.571	4.396	0.527	4.281	0.560
POS2	4.179	0.614	4.477	0.520	4.332	0.586
POS3	4.208	0.597	4.414	0.547	4.313	0.580
POS4	4.075	0.713	4.378	0.523	4.230	0.640
POS5	4.038	0.646	4.441	0.567	4.244	0.638
POS6	3.925	0.739	4.405	0.562	4.171	0.696
POS7	4.123	0.581	4.423	0.565	4.276	0.591
POS8	4.160	0.649	4.405	0.546	4.286	0.610
POS9	4.047	0.608	4.360	0.519	4.207	0.584
POS10	4.094	0.625	4.387	0.559	4.244	0.609
POS11	3.991	0.640	4.423	0.514	4.212	0.617
POS12	4.170	0.525	4.432	0.582	4.304	0.569

Table D3. Interpersonal collaboration skills (ICS) items by institution

Item	UNIAS Mean	UNIAS SD	UNIRAYA Mean	UNIRAYA SD	Overall Mean	Overall SD
ICS1	4.255	0.499	4.396	0.544	4.327	0.526
ICS2	4.283	0.512	4.423	0.549	4.355	0.534
ICS3	4.387	0.508	4.423	0.514	4.406	0.511
ICS4	4.255	0.618	4.505	0.537	4.382	0.590
ICS5	4.302	0.520	4.423	0.565	4.364	0.545
ICS6	4.321	0.526	4.396	0.561	4.359	0.544
ICS7	4.311	0.523	4.486	0.537	4.401	0.536
ICS8	4.255	0.570	4.477	0.537	4.369	0.563
ICS9	4.245	0.549	4.459	0.536	4.355	0.551
ICS10	4.226	0.540	4.441	0.517	4.336	0.538
ICS11	4.330	0.511	4.405	0.529	4.369	0.520
ICS12	4.217	0.458	4.468	0.553	4.346	0.523
ICS13	4.217	0.569	4.387	0.542	4.304	0.561
ICS14	4.075	0.613	4.441	0.534	4.263	0.601
ICS15	4.208	0.547	4.423	0.532	4.318	0.549
ICS16	4.104	0.689	4.450	0.568	4.281	0.652
ICS17	4.142	0.560	4.360	0.501	4.253	0.540
ICS18	4.113	0.540	4.468	0.519	4.295	0.557

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Table D4. Self-reported lecturer performance (LP) items by institution

Item	UNIAS Mean	UNIAS SD	UNIRAYA Mean	UNIRAYA SD	Overall Mean	Overall SD
LP1	4.368	0.522	4.414	0.513	4.392	0.517
LP2	4.396	0.564	4.342	0.495	4.369	0.529
LP3	4.255	0.499	4.432	0.566	4.346	0.540
LP4	4.311	0.607	4.432	0.566	4.373	0.588
LP5	4.113	0.681	4.495	0.616	4.309	0.675
LP6	4.075	0.658	4.459	0.569	4.272	0.642
LP7	4.236	0.544	4.459	0.536	4.350	0.550
LP8	4.217	0.498	4.441	0.517	4.332	0.519
LP9	4.236	0.508	4.514	0.586	4.378	0.565
LP10	4.311	0.505	4.423	0.565	4.369	0.538
LP11	4.208	0.564	4.432	0.550	4.323	0.567
LP12	4.245	0.659	4.387	0.559	4.318	0.613

APPENDIX E. Selected SmartPLS outputs

The figures below are included as supporting documentation. The numerical results reported in the manuscript tables remain the primary basis for interpretation.

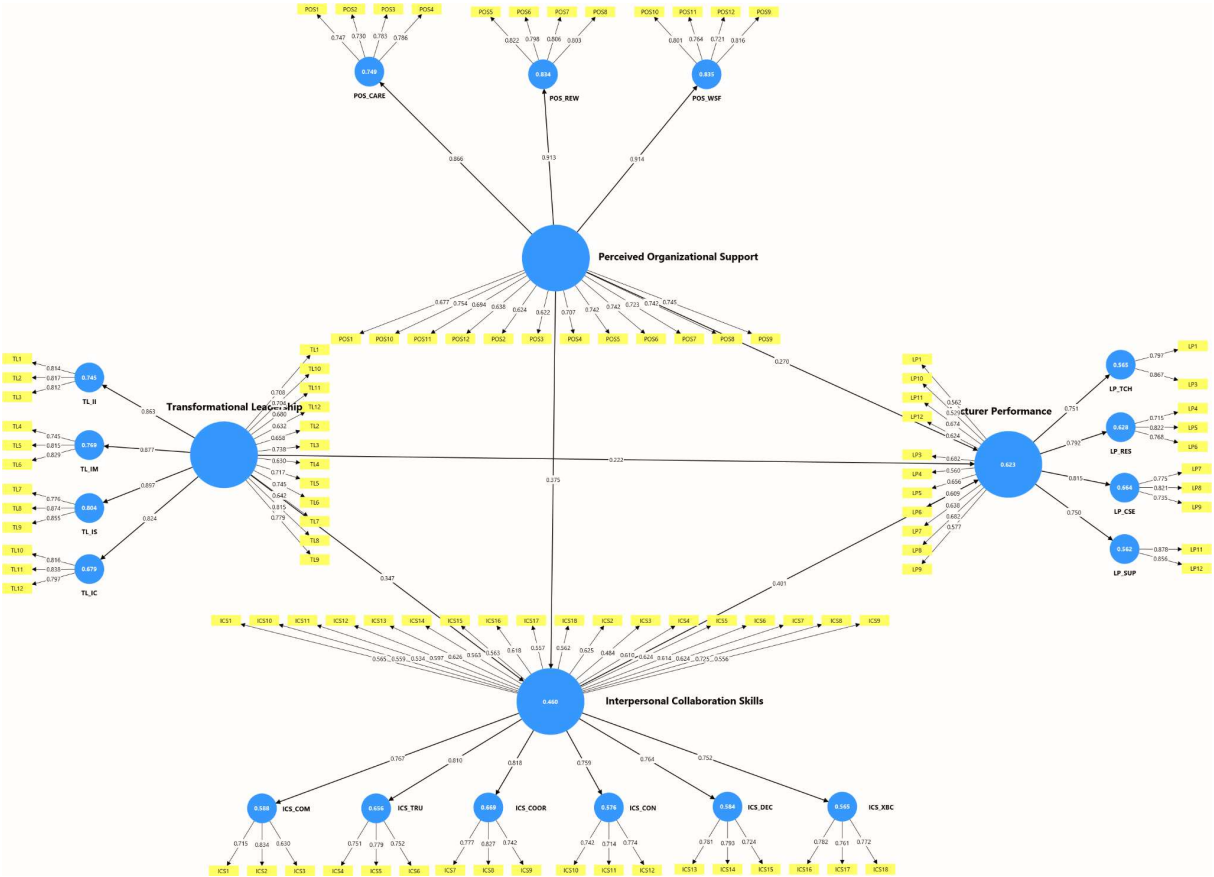

Figure E1. PLS-SEM algorithm output for the four-construct hierarchical model

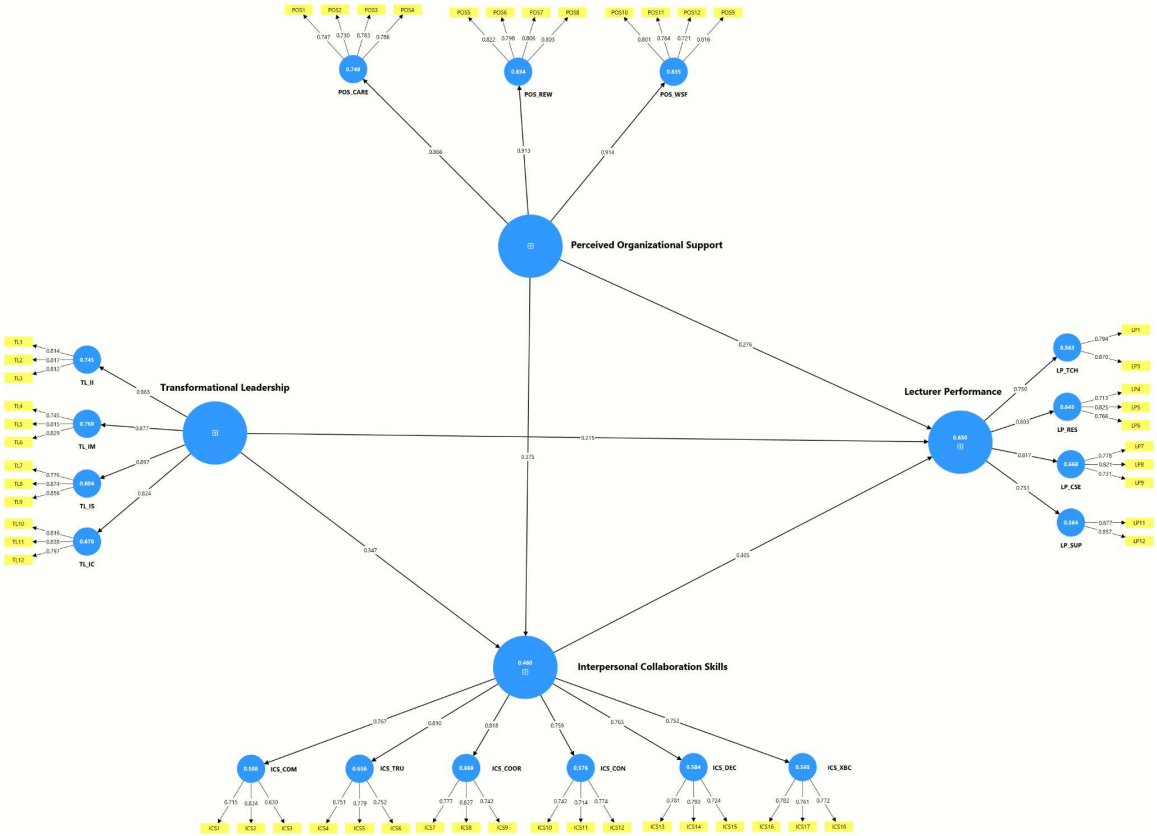

Figure E2. Final structural-model display with higher-order dimensions

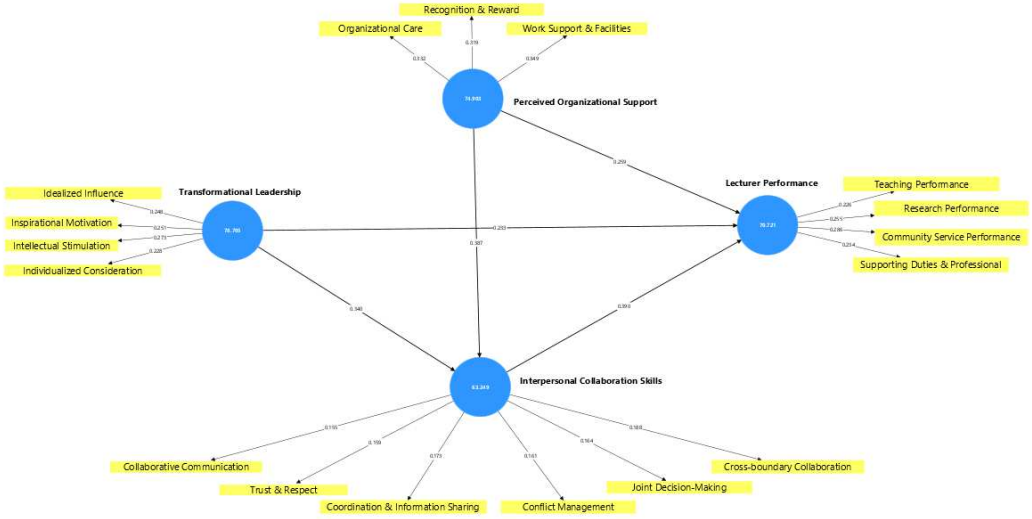

Figure E3. Importance–performance map analysis (IPMA) output

The IPMA output indicates that interpersonal collaboration skills have comparatively lower performance than transformational leadership and perceived organizational support, while the structural results identify collaboration skills as the strongest direct predictor of self-reported lecturer performance. Accordingly, collaborative capability is a practical improvement priority. This interpretation concerns perceived academic accomplishment rather than objectively verified performance.

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