Transformational Leadership and Teacher Professional Services: Sequential Mediation by Culture and Engagement

Sidiq Nulhaq[1], R. Madhakomala[1], Masduki[1]

1Postgraduate Program of Educational Management, Universitas Negeri Jakarta, Jakarta, Indonesia

sidiqnulhaq@institutpendidikan.ac.id.

madhakomala@live.com.

masdukiahmad@gmail.com.

HOW TO CITE:
Sidiq Nulhaq, R. Madhakomala, Masduki (2026). Transformational Leadership and Teacher Professional Services: Sequential Mediation by Culture and Engagement International Journal of Special Education, 41(19s),1120 - 1136

ABSTARCT

Transformational leadership is widely assumed to improve teacher professional services directly, but the empirical evidence for this direct path is inconsistent. This study tests a novel explanation for that inconsistency, not previously tested for teacher professional services: that leadership's influence operates sequentially, through organizational culture and then employee engagement, rather than directly. A quantitative explanatory survey of 321 certified senior high school teachers across four regencies of Banten Province, Indonesia, was analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM), comparing two specifications on the same dataset: a baseline model treating leadership and culture as parallel, competing predictors, and a sequential model repositioning leadership as culture's antecedent. In the baseline model, neither leadership ($\beta = 0.022$, $p = .721$) nor culture ($\beta = 0.135$, $p = .224$) predicted professional services directly; only engagement did ($\beta = 0.541$, $p < .001$). In the sequential model, leadership strongly predicted culture ($\beta = 0.790$), culture predicted engagement ($\beta = 0.720$), and engagement predicted professional services ($\beta = 0.652$), yielding a significant indirect effect of leadership on professional services through the full chain ($\beta = 0.371$, $p < .001$). These results indicate that transformational leadership's influence on teacher professional services is better explained as channelled through culture and engagement than as absent. Leadership development should therefore be evaluated as culture-building work, with engagement treated as a prerequisite investment rather than a by-product.

Keywords: Transformational leadership, Organizational culture

Employee engagement, Teacher professional services, Sequential mediation, PLS-SEM

1. INTRODUCTION

Teacher quality is widely regarded as the single most consequential school-level determinant of student learning [1]. In Indonesia this question has taken on new urgency: by the 2024/2025 academic year, more than 97% of teachers had met the minimum academic qualification [2], yet Indonesia's 2022 PISA results remained far below the international average, with only 18.35% of students reaching minimum mathematics competency compared with 68.91% across OECD countries [3]. The binding constraint on Indonesian education therefore appears to be not teacher credentialing, but whether schools can convert qualified teachers into consistently high-quality professional service.

This pattern recurs at senior high school level: Indonesia's Rapor Pendidikan 2025 shows schools rated "good" on classroom management rising from 11.9% to 38.2% between 2022 and 2024, even as the share of schools reporting good teacher psychological well-being fell from 61.0% to 23.7% over the same period [4], a domestic echo of multinational evidence that organizational conditions, not leadership behaviour alone, carry teacher well-being [5], [6]. Banten Province, this study's setting, illustrates the underlying vulnerability concretely: 74.6% of its senior high school teachers hold non-civil-servant status and only 35.4% are certified [7], conditions that historically under-targeted continuous professional development programmes have failed to offset [8]. Improving instructional technique while these organizational conditions deteriorate suggests that teacher professional services cannot be strengthened through training-based reform alone.

Transformational leadership is the most commonly proposed answer to this organizational half of the problem, but the evidence for its effect is inconsistent in a way that motivates this study's central research gap. Principals who articulate a compelling vision, model idealized influence, and attend to individual teachers' needs are assumed to lift teacher motivation and performance directly [9], [10], yet the empirical record supporting this direct leadership-to-performance path is far from settled: several studies find that once organizational culture and employee engagement enter the model as competing predictors, the direct path from transformational leadership to teacher performance shrinks toward non-significance [12]. This inconsistency is not confined to Indonesia. A meta-analysis of 22 studies published between 2015 and 2025 found that both organizational culture ($r = 0.448$) and transformational leadership ($r = 0.441$) correlate positively with teacher performance, but with very high heterogeneity in culture's effect ($I^2 = 80.18\%$) [13], and a study of Cypriot schools likewise found transformational and transactional leadership behaviours predicted teacher self-efficacy inconsistently across contexts [14]. A different picture emerges once leadership's influence is modelled as passing through an explicit mediating chain rather than competing directly: a dual-mediation model found transformational leadership's effect on teacher professional development operates mainly indirectly, through self-efficacy and organizational culture [15], and a study of corporate settings during a crisis period found organizational culture's effect on performance passed through a serial mediation of leadership and work engagement in sequence [16] - the same structural logic tested here for teacher professional services. The stakes are practical: if school systems invest in leadership training assuming it translates directly into better teaching, and that assumption is wrong because the true effect operates through a longer causal chain, the investment will appear to fail even where leadership genuinely matters. This is the gap this study addresses: whether transformational leadership's apparent irrelevance in conventional parallel-predictor models reflects a genuine absence of effect, or a mis-specification that obscures an indirect effect operating sequentially through organizational culture and employee engagement.

In this study, teacher professional services is conceptualized following Indonesia's Rapor Pendidikan framework as a composite of continuous professional development [17], mastery of professional knowledge [18], and professional teaching practice [19]. Organizational culture is the pattern of shared basic assumptions a group learns while solving problems of external adaptation and internal integration [20], theorized in schools to support high-level teacher performance when organized around collaboration and continuous learning [21]. Employee engagement is a persistent, positive work-related state of vigour, dedication and absorption [22], theorized to translate into stronger development, knowledge and practice [23] and consistently identified as one of the most proximal predictors of performance across occupational settings [24], [25]; transformational leadership has also been found to reduce teachers' role stress through the dual mediation of affective commitment and job satisfaction [26], suggesting engagement operates alongside other affective states through which leadership reaches daily practice.

Both transformational leadership and organizational culture are theorized to shape professional services indirectly, through employee engagement: leaders elevate engagement by satisfying followers' psychological needs for meaning and safety [27], and a collaborative culture supplies the same psychological conditions [23]. Recent evidence reinforces this channel - culture mediates the relationship between transformational leadership and teaching performance in public schools [28], and both culture and leadership shape organizational citizenship behaviour and commitment through employee engagement among higher-education staff [29] - and established mediation logic [30], [31] suggests that a construct's influence may be fully channelled through engagement rather than absent altogether when its direct effect fails to materialize.

A recurring difficulty with the conventional parallel-predictor specification is that transformational leadership and organizational culture are conceptually adjacent: both describe features of the shared organizational environment and have historically been treated as adjacent strands within the educational leadership and management literature [11]; empirical studies, including the present one (Section 3.1), frequently report high inter-construct correlations between them. When two conceptually adjacent constructs compete as independent predictors of the same outcome, the construct measured with less discriminant separation from the outcome's true intervening mechanism can appear artificially weak - not because it lacks influence, but because its influence has nowhere independent left to register once its conceptual neighbour is already in the model [32], [33]. A more theoretically faithful specification follows the original account of transformational leadership as an influence that operates chiefly by shifting shared values and meaning within an organization, not by giving direct behavioural instruction to individual teachers [9]. Under this account, leadership's primary channel is the organizational culture the teacher works within, not the individual teacher directly [20], [34]; culture, in turn, shapes engagement; and engagement shapes professional practice - the sequential mediation this study tests directly.

This study tests two structural specifications of the same relationships within a single dataset. The baseline model estimates transformational leadership and organizational culture as parallel, competing predictors of employee engagement and teacher professional services, testing the following hypotheses:

1. H1. Transformational leadership has a significant positive direct effect on teacher professional services.
2. H2. Organizational culture has a significant positive direct effect on teacher professional services.

3. H3. Employee engagement has a significant positive direct effect on teacher professional services.
4. H4. Transformational leadership has a significant positive indirect effect on teacher professional services through employee engagement.
5. H5. Organizational culture has a significant positive indirect effect on teacher professional services through employee engagement.
6. H6. Transformational leadership and organizational culture jointly influence teacher professional services through employee engagement.
7. H7. Transformational leadership has a significant positive indirect effect on teacher professional services through the sequential mediation of organizational culture and employee engagement.

Sections 3.2 and 3.3 report both specifications side by side so this question can be judged directly against the data.

2. METHOD

This study used a quantitative, non-experimental explanatory survey design [35], [36]. Data were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS, an approach suited to testing complex models with multiple latent constructs and to comparing competing structural specifications of the same constructs [37]. The research was conducted among certified senior high school teachers in four regencies of Banten Province, Indonesia (Kabupaten Tangerang, Serang, Pandeglang and Lebak), a locus selected for its documented structural vulnerabilities in teacher professional conditions [7].

The target population comprised 2,238 certified senior high school teachers across the four regencies (2023 provincial certification records). Sample size was determined using the Krejcie and Morgan table [38], and proportionate stratified random sampling was applied across regencies. Sampling was conducted at the individual teacher level, directly from the 2023 certified-teacher roster maintained jointly by the Ministry of Education's Dapodik database and the Banten Provincial Education Office, rather than through a two-stage school-cluster design; teachers were not sampled indirectly via school selection. Within each regency, the proportionate share of the 321-teacher sample was drawn at random from that regency's roster (127 of 898 certified teachers in Kabupaten Tangerang, 73 of 516 in Serang, 59 of 408 in Pandeglang, and 62 of 416 in Lebak, summing to the reported final sample of 321). Because the sampling frame was restricted to teachers already certified as of 2023, non-certified teachers and those certified after 2023 were not eligible for selection; the sample is therefore representative of the certified senior high school teacher population in these four regencies, and generalization to non-certified teachers or to other regencies of Banten should be made cautiously. The final analytic sample comprised 321 teachers with complete, valid responses. Respondents' perceptions of all four constructs were, on average, favourable: transformational leadership ($M = 3.49$, $SD = 0.61$), organizational culture ($M = 3.52$, $SD = 0.57$), employee engagement ($M = 3.50$, $SD = 0.58$) and teacher professional services ($M = 3.54$, $SD = 0.56$), each on a four-point scale.

All four constructs were measured with structured questionnaires using a four-point Likert-type scale (1 = never/strongly disagree to 4 = always/strongly agree), modelled as reflective measures. Transformational leadership was operationalized following a four-dimension framework (idealized influence, inspirational motivation, intellectual stimulation, individualized consideration) [9], with 12 items. Organizational culture followed a three-level framework (artefacts, espoused values, basic assumptions) [20], with 14 items. Employee engagement was measured with 32 items adapted from the Utrecht Work Engagement Scale across its three dimensions (vigour, dedication, absorption) [22]. Teacher professional services was measured with 29 items across continuous

professional development, professional knowledge, and professional teaching practice [19], [18], [39]. Representative indicators included, for transformational leadership, items on whether the principal "acts as a role model who earns staff trust and respect" (idealized influence) and "gives individualized attention to each teacher's professional development needs" (individualized consideration); for organizational culture, items on the school's "customary work practices and shared traditions" (artefacts) and the "shared belief that learning is a meaningful process requiring active participation from everyone" (basic assumptions); for employee engagement, items on teachers' "energy and resilience at work" (vigour) and feeling "challenged by the demands of the job" (dedication); and for teacher professional services, items on "designing and implementing innovative learning that encourages critical thinking" and "using assessment results to improve subsequent instruction." All items underwent expert judgement for content and face validity, followed by a pilot test assessing preliminary convergent validity, composite reliability and Cronbach's alpha, consistent with guidance that composite reliability and alpha above 0.60 are acceptable for exploratory instrument development [37]. Procedural safeguards against common method bias were applied during design and administration, including psychological separation of predictor and criterion items and respondent anonymity [40]. A statistical check for common method bias (e.g., Harman's single-factor test or a marker-variable analysis) was not conducted in this study; this is acknowledged as a limitation, and future replications should report such a test alongside procedural safeguards. As reported in Section 3.1, the average variance extracted for three of the four constructs fell below the conventional 0.50 threshold in the final sample despite acceptable pilot-stage estimates; this measurement limitation and its implications for the structural results are discussed in Sections 3.1 and 4.

The measurement model was assessed for indicator reliability, internal consistency reliability (Cronbach's alpha, composite reliability), convergent validity (average variance extracted, AVE), discriminant validity (Heterotrait-Monotrait ratio, HTMT, and the Fornell-Larcker criterion) [32], [33], and collinearity diagnostics (variance inflation factor, VIF). Two structural models were then estimated from the identical dataset: the baseline model (H1-H6) and the sequential model (H7), the latter estimated independently with its own bootstrapping run. The sequential specification was not an ad hoc alternative fitted after the fact; it was motivated a priori by the discriminant-validity diagnostics reported in Section 3.1, where the comparatively high HTMT ratio between transformational leadership and organizational culture (Table 2) indicated substantial conceptual and empirical overlap between the two constructs, consistent with theoretical accounts of transformational leadership as an influence that operates chiefly by shifting shared organizational values rather than by direct behavioural instruction to individual teachers [9], [20], [34]. The two specifications were therefore compared not to select a single best-fitting model by fit indices alone, but to test whether transformational leadership's apparent irrelevance under a parallel-predictor specification reflects a genuine absence of effect or a longer causal chain obscured by construct overlap; the fit and predictive-relevance statistics reported for each model in Sections 3.2 and 3.3 support this comparison. Both models were assessed for explanatory power (R^2 and adjusted R^2), predictive relevance (Q^2, via blindfolding), effect size (f^2), and model fit (SRMR). Significance of all path coefficients and indirect effects was evaluated through bootstrapping with 5,000 subsamples, a two-tailed test, $\alpha = .05$, and percentile-based confidence intervals [37], [41].

3. RESULTS AND DISCUSSION

3.1. Measurement model assessment

Indicator reliability was assessed via outer loadings; the complete set of indicator loadings is reported in the Supplementary Material. All 12

indicators of transformational leadership loaded above the recommended 0.70 threshold (range 0.702-0.792). Loadings for the other three constructs were more heterogeneous: organizational culture ranged from 0.591 to 0.799, with several of its indicators below 0.70; employee engagement ranged from 0.482 to 0.727, with the great majority of its 32 indicators below 0.70; and teacher professional services ranged from 0.589 to 0.750, with most of its indicators below 0.70. These lower-loading items were retained because their removal did not meaningfully improve composite reliability, and because organizational culture, employee engagement and teacher professional services are each conceptually broad, multidimensional constructs (three sub-dimensions apiece) for which some loading heterogeneity is expected when the construct is modelled as a single first-order reflective factor [37]. Internal consistency reliability was nonetheless strong across all constructs, with Cronbach's alpha ranging from 0.914 to 0.953 and composite reliability (ϱc) ranging from 0.927 to 0.957 (Table 1), comfortably above the 0.70 threshold. Convergent validity (AVE) was adequate only for transformational leadership (0.546); organizational culture (0.496) and teacher professional services (0.474) fell modestly below the conventional 0.50 threshold, while employee engagement (0.386) fell substantially below it and should not be read as a marginal shortfall. Because AVE is the average of squared loadings, a low AVE alongside high composite reliability (the pattern observed here) is the numerical signature of a construct whose indicators are individually noisy but collectively consistent, consistent with organizational culture, employee engagement and teacher professional services each being modelled as a single first-order factor over what are, substantively, multidimensional constructs (culture's artefacts/values/assumptions; engagement's vigour/dedication/absorption; professional services' three practice domains). This is treated as a genuine measurement limitation rather than an acceptable marginal deviation: low AVE indicates that a meaningful share of indicator variance is not explained by the intended latent construct, which weakens - without invalidating, given the VIF and HTMT evidence reported below - the precision of the structural estimates that follow. A higher-order (second-order) specification of these three constructs, modelling each sub-dimension as a first-order construct and the overall construct as a second-order composite, would likely improve AVE and is recommended as a priority for re-estimation in future work; the model was not re-specified as higher-order here because doing so changes the structural paths tested against H1-H7 and requires a fresh bootstrapping run; this is noted explicitly as a direction for revision, beyond the scope of the present analysis.

Table 1. Reliability and convergent validity

Construct	**Cronbach's α**	**Composite reliability (ϱc)**	**AVE**
Transformational leadership (KT)	0.924	0.935	0.546
Organizational culture (BO)	0.914	0.927	0.496
Employee engagement (EG)	0.948	0.952	0.386
Teacher professional services (LP)	0.953	0.957	0.474

Discriminant validity was assessed via HTMT (Table 2) and the Fornell-Larcker criterion (Table 3). All HTMT values fell below the conservative 0.90 threshold, although the ratio between

organizational culture and transformational leadership was comparatively high (HTMT = 0.851). The Fornell-Larcker criterion was not satisfied for two of the four constructs: the square root of AVE for organizational culture (0.704) is lower than its correlation with transformational leadership (0.789) and with employee engagement (0.720; Table 3), and the square root of AVE for employee engagement (0.621) is lower than its correlations with organizational culture (0.720), transformational leadership (0.623) and teacher professional services (0.653). Only transformational leadership and teacher professional services satisfy the Fornell-Larcker criterion against every other construct. The Fornell-Larcker criterion is therefore not treated as met for the full model; discriminant validity is instead assessed via HTMT - now generally recommended over Fornell-Larcker as the more reliable discriminant-validity criterion in variance-based SEM [33] - which places every construct pair below the conservative 0.90 threshold, albeit with the organizational culture-leadership pair close to the more conservative 0.85 benchmark. Collinearity diagnostics indicate this conceptual overlap did not reach the point of statistical redundancy: indicator-level VIF ranged from 1.648 to 2.932, and construct-level VIF reached a maximum of 3.423, both below the conservative threshold of 5. Taken together, the HTMT and VIF evidence support treating the four constructs as empirically distinguishable, while the Fornell-Larcker shortfall for organizational culture and employee engagement is a genuine limitation of the measurement model rather than a marginal or discretionary judgement call; a full resolution would require bootstrapped HTMT confidence intervals rather than point estimates alone; these were not computed here and are noted as a priority for re-analysis before the structural findings below are treated as final. The elevated overlap between organizational culture and transformational leadership motivates the sequential specification tested in Section 3.3.

Table 2. Discriminant validity - Heterotrait-Monotrait ratio (HTMT)

Construct pair	**HTMT**
BO - EG	0.763
BO - KT	0.851
EG - KT	0.655
BO - LP	0.575
EG - LP	0.683
KT - LP	0.490

Table 3. Discriminant validity - Fornell-Larcker criterion

	BO	**EG**	**KT**	**LP**
BO	0.704			
EG	0.720	0.621		
KT	0.789	0.623	0.739	

	BO	EG	KT	LP
LP	0.544	0.653	0.467	0.688

3.2. Baseline model: transformational leadership and organizational culture as parallel predictors

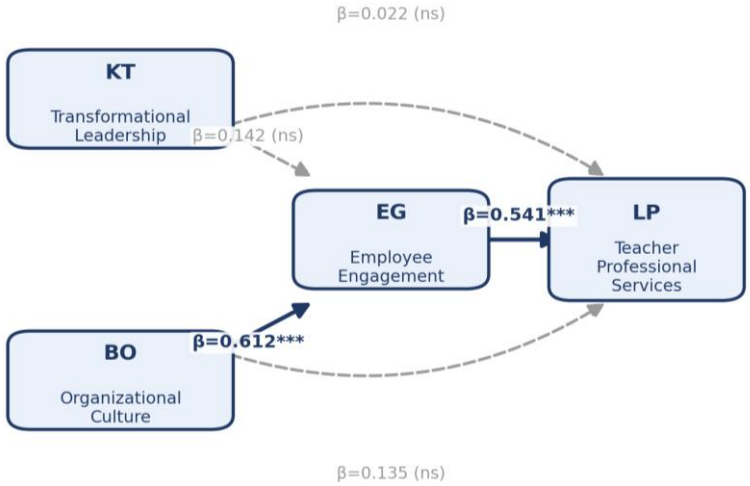

Figure 1. Baseline model: transformational leadership and organizational culture as parallel predictors of employee engagement and teacher professional services

As shown in Figure 1, the baseline structural model explained a moderate-to-strong share of variance in the endogenous constructs. Transformational leadership and organizational culture jointly explained 52.6% of the variance in employee engagement (R^2 = 0.526), while all three predictors together explained 43.8% of the variance in teacher professional services (R^2 = 0.438). Predictive relevance (Q^2) was strong for employee engagement (0.522) and moderate for teacher professional services (0.276); model fit was acceptable (SRMR = 0.064).

Bootstrapped hypothesis testing (Table 4) showed employee engagement was the only construct with a significant direct effect on teacher professional services (β = 0.541, t = 6.036, p < .001), supporting H3. Neither transformational leadership (β = 0.022, t = 0.357, p = .721) nor organizational culture (β = 0.135, t = 1.217, p = .224) had a significant direct effect, so H1 and H2 were not supported. The indirect effect of transformational leadership through engagement was non-significant (β = 0.077, t = 1.694, p = .090; H4 not supported), while organizational culture exerted a strong, significant indirect effect through engagement (β = 0.331, t = 4.669, p < .001), supporting H5 and indicating full mediation. Effect sizes corroborated this pattern: organizational culture showed a moderate-to-large effect on engagement (f^2 = 0.291) but a negligible direct effect on professional services (f^2 = 0.010), while transformational leadership showed negligible effects throughout ($f^2 \leq 0.017$). H6 as stated asks whether transformational leadership and organizational culture jointly influence professional services through engagement; R^2(EG) = 0.526 describes how much variance the two predictors jointly explain in engagement itself, not a test of a joint indirect effect on professional services, and it is not evidence for or against H6. Judged instead against the two specific indirect effects that actually bear on the hypothesis, the picture is mixed: organizational culture's specific indirect effect through engagement was significant (β = 0.331, p < .001) while transformational leadership's was not (β = 0.077, p = .090). This is not treated as a valid basis for concluding partial support for a joint

hypothesis, because no omnibus test of the two paths' combined indirect effect was estimated. H6 is therefore reported as inconclusive under the baseline specification, and future re-analyses are recommended to either drop H6 or replace it with an explicitly defined omnibus indirect-effect test, such as a joint significance test or a combined bootstrapped confidence interval for the sum of the two specific indirect effects.

A supplementary bootstrap analysis, estimating organizational culture's and transformational leadership's total effects on professional services with employee engagement removed from the causal path entirely (a total-effect check preceding mediator inclusion), corroborates this mediation pattern: organizational culture's total effect on professional services was significant and substantial ($\beta = 0.476$, $t = 5.920$, $p < .001$), while transformational leadership's total effect remained non-significant ($\beta = 0.088$, $t = 1.166$, $p = .244$). Comparing organizational culture's total effect (0.476) against its direct effect once engagement is included in the model (0.135, n.s.) is textbook evidence of full mediation: culture's effect on professional services operates almost entirely through engagement. Transformational leadership's effect, by contrast, was non-significant whether or not employee engagement was included as a mediator in this parallel-predictor specification, reinforcing that leadership's effect surfaces only once organizational culture, not engagement alone, is positioned as its proximal channel (Section 3.3).

Table 4. Baseline model: direct, indirect and total effects

Hyp.	Path	β	t	p	Decision
H1	KT→LP (direct)	0.022	0.357	.721	Not supported
H2	BO→LP (direct)	0.135	1.217	.224	Not supported
H3	EG→LP (direct)	0.541	6.036	<.001	Supported
H4	KT→EG→LP (indirect)	0.077	1.694	.090	Not supported
H5	BO→EG→LP (indirect)	0.331	4.669	<.001	Supported (full mediation)
H6	KT & BO (joint)→LP via EG	R^2(EG)=0.526	-	-	Inconclusive

3.3 Sequential model: transformational leadership as an antecedent of organizational culture

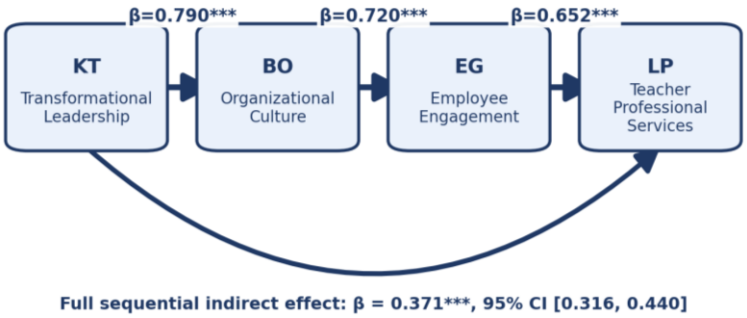

Figure 2. Sequential model: transformational leadership as an antecedent of organizational culture, culture as an antecedent of engagement, and engagement as the proximal predictor of teacher professional services

Figure 2 illustrates the sequential model, which, motivated by the elevated HTMT ratio in Section 3.1, repositioned transformational leadership as organizational culture's antecedent, testing the chain leadership → culture → engagement → professional services, estimated independently with its own bootstrapping run.

The results reversed the baseline picture (Table 5). Transformational leadership exerted a very strong effect on organizational culture (β = 0.790, t = 26.465, p < .001); culture exerted a strong effect on engagement (β = 0.720, t = 18.649, p < .001); and engagement exerted a strong effect on professional services (β = 0.652, t = 14.877, p < .001). The specific indirect effect of culture on professional services through engagement was substantial (β = 0.469, t = 12.693, p < .001), as was the specific indirect effect of leadership on engagement through culture (β = 0.569, t = 13.849, p < .001). Most importantly, the full sequential indirect effect of transformational leadership on teacher professional services was significant and substantial (β = 0.371, t = 11.734, p < .001, 95% CI [0.316, 0.440]), supporting H7. Because this sequential specification did not include a direct leadership-to-professional-services path, this coefficient should be read as the significant indirect effect that a sequential specification recovers, not as evidence that it exceeds the baseline model's direct-effect estimate by some multiple: the two figures come from differently specified models estimated with different sets of paths and are not directly comparable as a ratio.

Table 5. Sequential model: path coefficients and indirect effects

Path	**β**	**t**	**p**	**95% CI**
KT→BO	0.790	26.465	<.001	[0.729, 0.847]
BO→EG	0.720	18.649	<.001	[0.641, 0.793]
EG→LP	0.652	14.877	<.001	[0.573, 0.743]
BO→EG→LP (indirect)	0.469	12.693	<.001	[0.403, 0.548]
KT→BO→EG (indirect)	0.569	13.849	<.001	[0.491, 0.650]
KT→BO→EG→LP (H7, full chain)	0.371	11.734	<.001	[0.316, 0.440]

Because no direct path from leadership to professional services was estimated in this model, this specification cannot itself distinguish full mediation (no remaining direct effect once culture and engagement are accounted for) from partial mediation (a genuine but smaller remaining direct effect). What the sequential model does show is that transformational leadership's influence is recoverable, significant, and substantial once modelled as operating through culture and engagement in sequence, in contrast to the non-significant, near-zero coefficient obtained when leadership and culture compete as parallel predictors of professional services directly. Establishing whether this mediation is full or partial requires re-estimating the sequential chain with the direct leadership-to-professional-services path included, so that direct, specific indirect, total indirect, and total effects can be compared within one specification; the model was not re-estimated this way here; this is noted as the priority follow-up analysis before the mediation type is characterised definitively.

3.4. Discussion

Across both specifications, the seven hypotheses resolve as follows. H1 (leadership→services, direct) and H2 (culture→services, direct) were

not supported; H3 (engagement→services, direct) was supported. H4 (leadership→services via engagement) was not supported, while H5 (culture→services via engagement) was supported. H6 (a joint leadership-and-culture effect via engagement) is treated as inconclusive under the baseline specification, for the reasons given in Section 3.2. H7 (leadership→services via the sequential chain of culture then engagement) was supported, although, as noted in Section 3.3, whether this represents full or partial mediation of leadership's effect could not be established without a directly comparable model that includes the direct path.

The central empirical puzzle this study set out to explain is why transformational leadership's coefficient behaves so differently across the two specifications: statistically indistinguishable from zero ($\beta = 0.022$, $p = .721$) when leadership and organizational culture compete as parallel predictors of professional services, yet the source of a substantial, significant indirect effect ($\beta = 0.371$, $p < .001$) once leadership is repositioned as culture's antecedent. Two explanations compete for this pattern, and the evidence in Section 3.1 favours one over the other. A measurement-artefact explanation would attribute the parallel-model coefficient to instrument unreliability; this is not well supported here, because transformational leadership was the best-measured of the four constructs (AVE = 0.546, all 12 indicators loading above 0.70) and its collinearity with organizational culture, while elevated, remained below conventional thresholds (VIF ≤ 3.423; HTMT = 0.851, below 0.90). A conceptual-overlap explanation is better supported: organizational culture and transformational leadership are the only construct pair for which the Fornell-Larcker square-root-of-AVE value is exceeded by their mutual correlation (0.704 versus 0.789; Table 3), and their HTMT ratio is the highest of the six pairs tested. When two constructs this closely related compete as independent predictors of the same outcome, established mediation logic [30], [31] suggests that the one positioned conceptually upstream - here, leadership, which Bass and Riggio [9] and Schein [20] both describe as operating chiefly by shaping shared values and meaning rather than by direct behavioural instruction - will appear to lose its effect not because the effect is absent, but because its conceptual neighbour has already absorbed the variance a parallel model attributes to a direct path. This reading is consistent with Hallinger's long-standing argument that school leadership's effects on teaching operate mainly indirectly, through the organizational capacities leaders build, rather than through direct behavioural influence on individual teachers [47]. On this view the two models are not competing explanations to be adjudicated by fit alone, but diagnostic of each other: the baseline model's null direct effect is the symptom, and the sequential model's substantial indirect effect is the diagnosis. Transformational leadership's influence on teacher professional services in this sample appears real, but not additively separable from the organizational culture through which it operates.

Employee engagement's position as the only construct with a significant direct effect on professional services in both specifications is consistent with Job Demands-Resources theory [46], which treats engagement as the proximal psychological state through which job and organizational resources - here, a leadership-shaped organizational culture - are converted into work behaviour. Under this reading, organizational culture does not act on teacher professional services directly because its influence is not yet behavioural: culture supplies resources such as voice in decisions, collegial support, and alignment between personal and organizational values that raise engagement, and it is engagement, not culture per se, that teachers translate into the specific behaviours - lesson design, instructional practice, continuous professional development - that the professional-services construct measures. This mirrors evidence from outside education: a study of Slovak firms during a crisis period found organizational culture's effect on work performance passed through a serial mediation of

leadership and work engagement in sequence, structurally the same chain tested here [16], while a meta-analysis of 22 education studies found organizational culture's correlation with teacher performance ($r = 0.448$) accompanied by very high cross-study heterogeneity ($I^2 = 80.18\%$) [13], a pattern consistent with culture's effect depending on whether a proximal mechanism such as engagement is included in the model, as it is not in many of the studies pooled into that estimate.

The finding that a direct transformational-leadership effect can appear, disappear, or reverse depending on model specification is not unique to this sample. A study of Indonesian teachers found transformational leadership, culture and job satisfaction all predicted performance when entered as parallel predictors [12], a specification equivalent to this study's baseline model; the present results suggest that re-estimating such models sequentially, with leadership positioned as culture's antecedent rather than its competitor, is a useful robustness check before concluding that leadership does not matter. Other PLS-SEM studies of transformational leadership in comparable populations reinforce this study's substantive conclusion without testing the same sequential structure: one analysis of staff performance found transformational leadership's effect operated largely through organizational commitment and motivation rather than as a direct behavioural lever [42]; a study of a South Jakarta school found the principal's transformational leadership influenced teacher commitment only through motivation as an intervening variable, with a negligible direct path [43]; and a study of Omani primary school teachers found transformational leadership's relationship with organizational commitment ran through an innovation-oriented organizational culture [44]. Each of these studies, like the present one, locates transformational leadership's effect downstream of an intervening organizational or psychological state rather than in a direct path to the outcome of interest. Cross-cultural evidence nonetheless cautions against generalising this chain unmodified: a study of Cypriot schools found transformational and transactional leadership behaviours predicted teacher self-efficacy inconsistently across contexts [14], suggesting that the strength, and possibly the ordering, of the leadership-culture-engagement chain identified here may not transfer without modification to education systems with different governance, certification, or employment structures than Indonesia's.

For school leadership practice, these results imply that leadership-development programmes intended to raise teacher professional services should be designed and evaluated as culture-building interventions rather than as direct behavioural coaching. Concretely, principal-development curricula should give as much weight to facilitating participatory decision-making, sustaining professional learning communities, and aligning staff and organizational values [21] as they currently give to instructional-supervision skills, since it is through the former that this study's data suggest leadership reaches classroom practice. Because employee engagement is the single mechanism through which both leadership and culture reach professional services, school systems should treat engagement as a leading indicator to be measured and invested in proactively - through workload management, recognition and career-progression systems, and structured opportunities for teacher voice - rather than as a lagging outcome inferred only from professional-service quality after the fact. School-quality evaluation frameworks that currently score leadership, culture, and engagement as independent dashboard indicators should instead track them as sequential stages of one causal process, since an intervention that raises leadership scores without also raising engagement would not, on this model, be expected to improve professional services.

These interpretations are conditioned on the measurement and design limitations discussed in Sections 3.1 and 4. In particular, the discriminant-validity shortfall between organizational culture and transformational leadership means that the conceptual-overlap explanation offered above,

while the best-supported reading of the present data, should be treated as provisional pending re-estimation with bootstrapped HTMT confidence intervals and, ideally, a higher-order measurement model.

4. CONCLUSION

This study tested whether transformational leadership improves teacher professional services directly, or through organizational culture and employee engagement. Under the baseline specification, neither transformational leadership nor organizational culture showed a significant direct effect; only employee engagement did. Under the sequential specification, leadership predicted culture, culture predicted engagement, and engagement predicted professional services, producing a significant and substantial indirect effect of leadership on professional services through this chain ($\beta = 0.371$, $p < .001$). Because the sequential model did not include a direct leadership-to-professional-services path, this study establishes that leadership's influence is recoverable and substantial once channelled through culture and engagement, rather than establishing that this mediation is complete; confirming full versus partial mediation requires re-estimating the chain with the direct path included, which is identified as a priority for follow-up analysis.

This study's contribution can be summarised along three lines. Theoretically, it demonstrates that transformational leadership's apparent irrelevance to teacher professional services in a conventional parallel-predictor model is better explained by a longer causal chain than by a genuine absence of effect: leadership's influence on professional services is substantially channelled through organizational culture and, in turn, through employee engagement, with engagement acting as the constant, most proximal mechanism across both specifications. Practically, the findings reframe leadership development away from a direct lever on teacher performance and toward culture-building work, and reposition engagement as a prerequisite investment that school systems should plan and measure for, rather than a downstream by-product assessed only after the fact; school-quality evaluation systems should accordingly track leadership, culture, and engagement together as sequential stages of one process rather than as independently scored indicators. For future research, the priorities are to re-estimate the sequential model with the direct leadership path included so that full and partial mediation can be distinguished within a single specification, to test the same chain longitudinally so that the assumed causal ordering can be evaluated rather than assumed, and to extend the sample beyond certified senior high school teachers in a single Indonesian province using externally rated rather than exclusively self-reported measures of culture and engagement.

These contributions should be read alongside the study's limitations. The cross-sectional design cannot establish the temporal ordering the sequential model assumes; all four constructs were measured through teacher self-report, which raises the possibility of common method bias despite the procedural safeguards applied during instrument design and the caveats noted in Section 2; the sample was confined to certified public senior high school teachers in four regencies of one Indonesian province, which limits generalisability to other educational levels, employment statuses, and regions; and the measurement model carries the limitations documented in Section 3.1, most notably average variance extracted below the conventional threshold for three of the four constructs and a Fornell-Larcker shortfall for organizational culture and employee engagement, which future studies should address through higher-order construct specification and bootstrapped HTMT confidence intervals.

ACKNOWLEDGMENTS

Not applicable.

FUNDING INFORMATION

Authors state no funding involved. This study was conducted as part of the corresponding author's doctoral dissertation research at

Universitas Negeri Jakarta, undertaken jointly with his co-author promotors.

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

Written informed consent was obtained from all participants prior to data collection. Respondents were informed of the study's purpose, the voluntary nature of their participation, and their right to withdraw at any stage without consequence, before completing the questionnaire.

ETHICAL APPROVAL

The research involving human participants complied with all relevant national regulations and institutional policies, in accordance with the tenets of the Helsinki Declaration. Ethical clearance was granted by Universitas Negeri Jakarta as part of the corresponding author's doctoral dissertation review process, and separate research permission to survey teachers in public senior high schools was granted by the Provincial Education Office (Dinas Pendidikan Provinsi Banten), given respondents' administrative status as teachers under its authority.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author upon reasonable request.

REFERENCES

E. A. Hanushek and S. G. Rivkin, "Generalizations about using value-added measures of teacher quality," Am. Econ. Rev., vol. 100, no. 2, pp. 267-271, 2010, doi: 10.1257/aer.100.2.267.

GoodStats Data, "Potret kualitas guru Indonesia 2024/2025: Lebih dari 96% sudah penuhi kualifikasi," GoodStats, Jakarta, Indonesia, 2025. [Online]. Available: https://data.goodstats.id/statistic/potret-kualitas-guru-indonesia-20242025-lebih-dari-96-sudah-penuhi-kualifikasi-rzJL3

OECD, PISA 2022 Results (Volume I): The State of Learning and Equity in Education. Paris, France: OECD Publishing, 2023, doi: 10.1787/53f23881-en.

F. Krisna and L. Martak, Rapor Pendidikan Indonesia 2025. Jakarta, Indonesia: Kementerian Pendidikan Dasar dan Menengah Republik Indonesia, 2025.

T. Fidan, "Organizational predictors of teachers' subjective well-being: Multinational evidence from PISA 2022 data," SAGE Open, vol. 15, no. 3, 2025, doi: 10.1177/21582440251362956.

S. Üztemur, A. Gökalp, A. İlğan, and E. Dinç, "Leadership, autonomy, and organizational trust as predictors of teacher wellbeing and job satisfaction: A cross-cultural study based on PISA 2022 data," Front. Psychol., vol. 16, art. 1703458, 2026, doi: 10.3389/fpsyg.2025.1703458.

Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia, Neraca Pendidikan Daerah Provinsi Banten 2023. Jakarta, Indonesia: Kemendikbudristek, 2023.

S. Revina, R. P. Pramana, R. Fillaili, and D. Suryadarma, "Systemic constraints facing teacher professional development in a middle-income country: Indonesia's experience over four decades," RISE Working Paper Series, no. 20/054, 2020, doi: 10.35489/BSG-RISE-WP_2020/054.

B. M. Bass and R. E. Riggio, Transformational Leadership, 2nd ed. Mahwah, NJ, USA: Lawrence Erlbaum Associates, 2006, doi: 10.4324/9781410617095.

K. Leithwood and D. Jantzi, "Transformational school leadership effects: A replication," Sch. Eff. Sch. Improv., vol. 10, no. 4, pp. 451-479, 1999, doi: 10.1076/sesi.10.4.451.3495.

P. Hallinger and J. Kovačević, "Mapping the intellectual lineage of educational management, administration and leadership, 1972-2020," Educ. Manag. Adm. Leadersh., vol. 50, no. 2, pp. 192-216, 2022, doi: 10.1177/17411432211006093.

A. Purwanto, M. Asbari, and P. B. Santoso, "Influence of transformational leadership, organizational culture, and job satisfaction on teacher performance," Int. J. Soc. Manag. Stud., vol. 1, no. 1, pp. 1-12, 2020.

Surwiti, W. Widodo, S. Sumaryoto, and H. Prasetyono, "A meta-analysis of organizational culture and transformational leadership effects on teacher performance," Bull. Couns. Psychother., vol. 7, no. 3, 2025, doi: 10.51214/002025071638000.

E. Lefteri and M. E. Menon, "Transformational and transactional school leadership as predictors of teacher self-efficacy," Stud. Educ. Eval., vol. 86, art. 101476, 2025, doi: 10.1016/j.stueduc.2025.101476.

Y. Long and Y. Xia, "Leveraging transformational and instructional leadership for teacher professional development: A dual-mediation model of teacher self-efficacy and organisational culture," Teach. Teach. Educ., vol. 164, art. 105087, 2025, doi: 10.1016/j.tate.2025.105087.

J. Michulek, E. Gajanova, A. Krizanova, and M. Nadanyiova, "Determinants of improving the relationship between corporate culture and work performance: Illusion or reality of serial mediation of leadership and work engagement in a crisis period?," Front. Psychol., vol. 14, art. 1135199, 2023, doi: 10.3389/fpsyg.2023.1135199.

L. M. Desimone, "Improving impact studies of teachers' professional development: Toward better conceptualizations and measures," Educ. Res., vol. 38, no. 3, pp. 181-199, 2009, doi: 10.3102/0013189X08331140.

C. Danielson, Enhancing Professional Practice: A Framework for Teaching, 2nd ed. Alexandria, VA, USA: ASCD, 2007.

C. Danielson, Enhancing Student Achievement: A Framework for School Improvement. Alexandria, VA, USA: ASCD, 2002.

E. H. Schein, Organizational Culture and Leadership, 4th ed. San Francisco, CA, USA: Jossey-Bass, 2010.

K. Leithwood and J. Sun, "Academic culture: A promising mediator of school leaders' influence on student learning," J. Educ. Adm., vol. 56, no. 3, pp. 350-363, 2018, doi: 10.1108/JEA-01-2017-0009.

W. B. Schaufeli and A. B. Bakker, UWES: Utrecht Work Engagement Scale, Preliminary Manual. Utrecht, Netherlands: Occupational Health Psychology Unit, Utrecht Univ., 2004.

W. A. Kahn, "Psychological conditions of personal engagement and disengagement at work," Acad. Manag. J., vol. 33, no. 4, pp. 692-724, 1990, doi: 10.5465/256287.

J. K. Harter, F. L. Schmidt, and T. L. Hayes, "Business-unit-level relationship between employee satisfaction, employee engagement, and business outcomes: A meta-analysis," J. Appl. Psychol., vol. 87, no. 2, pp. 268-279, 2002, doi: 10.1037/0021-9010.87.2.268.

B. L. Rich, J. A. Lepine, and E. R. Crawford, "Job engagement: Antecedents and effects on job performance," Acad. Manag. J., vol. 53, no. 3, pp. 617-635, 2010, doi: 10.5465/AMJ.2010.51468988.

P. Yong and J. Zhang, "How transformational leadership reduces teachers' role stress: Dual mediation of affective commitment and job satisfaction," Front. Psychol., vol. 16, art. 1634303, 2025, doi: 10.3389/fpsyg.2025.1634303.

F. O. Walumbwa, J. J. Lawler, B. J. Avolio, P. Wang, and K. Shi, "Transformational leadership and work-related attitudes: The moderating effects of collective and self-efficacy across cultures," J. Leadersh. Organ. Stud., vol. 11, no. 3, pp. 2-16, 2005, doi: 10.1177/107179190501100301.

M. Alzoraiki, A. R. Ahmad, O. A. Ateeq, and A. B. Milhem, "The role of transformational leadership in enhancing school culture and teaching performance in Yemeni public schools," Front. Educ., vol. 9, art. 1413607, 2024, doi: 10.3389/feduc.2024.1413607.

C. Hidayat, A. Hermawan, and D. O. Berliyanti, "The influence of organizational culture, transformational leadership on organizational citizenship behaviors, and organizational commitment through employee engagement," Indones. J. Educ. Soc. Sci., vol. 3, no. 2, pp. 100-120, 2024, doi: 10.56916/ijess.v3i2.635.

[R. M. Baron and D. A. Kenny, "The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations," J. Pers. Soc. Psychol., vol. 51, no. 6, pp. 1173-1182, 1986, doi: 10.1037/0022-3514.51.6.1173.

[X. Zhao, J. G. Lynch Jr., and Q. Chen, "Reconsidering Baron and Kenny: Myths and truths about mediation analysis," J. Consum. Res., vol. 37, no. 2, pp. 197-206, 2010, doi: 10.1086/651257.

C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," J. Mark. Res., vol. 18, no. 1, pp. 39-50, 1981, doi: 10.2307/3151312.

J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," J. Acad. Mark. Sci., vol. 43, no. 1, pp. 115-135, 2015, doi: 10.1007/s11747-014-0403-8.

D. R. Denison, "Organizational culture: Can it be a key lever for driving organizational change?," in The Handbook of Organizational Culture, S. Cartwright and C. L. Cooper, Eds. Chichester, U.K.: John Wiley & Sons, 2000.

J. W. Creswell, Research Design: Qualitative, Quantitative, and Mixed Methods Approaches, 4th ed. Thousand Oaks, CA, USA: Sage, 2014.

J. R. Fraenkel, N. E. Wallen, and H. H. Hyun, How to Design and Evaluate Research in Education, 8th ed. New York, NY, USA: McGraw-Hill, 2012.

J. F. Hair, G. T. M. Hult, C. M. Ringle, and M. Sarstedt, A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), 3rd ed. Thousand Oaks, CA, USA: Sage, 2022.

R. V. Krejcie and D. W. Morgan, "Determining sample size for research activities," Educ. Psychol. Meas., vol. 30, no. 3, pp. 607-610, 1970, doi: 10.1177/001316447003000308.

L. Darling-Hammond, "Teacher quality and student achievement: A review of state policy evidence," Educ. Policy Anal. Arch., vol. 8, p. 1, 2000, doi: 10.14507/epaa.v8n1.2000.

P. M. Podsakoff, S. B. MacKenzie, J. Y. Lee, and N. P. Podsakoff, "Common method biases in behavioral research: A critical review of the literature and recommended remedies," J. Appl. Psychol., vol. 88, no. 5, pp. 879-903, 2003, doi: 10.1037/0021-9010.88.5.879.

S. Streukens and S. Leroi-Werelds, "Bootstrapping and PLS-SEM: A step-by-step guide to get more out of your bootstrap results," Eur. Manag. J., vol. 34, no. 6, pp. 618-632, 2016, doi: 10.1016/j.emj.2016.06.003.

Soim, "Transforming education: The impact of transformational leadership on staff performance," Al-Tanzim J. Manaj. Pendidik. Islam, vol. 8, no. 4, 2024, doi: 10.33650/al-tanzim.v8i4.9684.

R. V. Sitompul and K. Y. Tung, "The effect of transformational leadership of school principal and learning organization on teacher commitment at South Jakarta SIS School with motivation as an intervening variable," J. Din. Pendidik., vol. 16, no. 1, pp. 85-93, 2023, doi: 10.51212/jdp.v16i1.170.

S. R. Ali Alshuhumi, D. A. M. Y. Al-Hidabi, and A. I. Akinbode, "Transformational leadership, innovation-oriented organizational culture, and organizational commitment among primary school teachers in Oman: A PLS-SEM analysis," Front. Educ., vol. 11, art. 1856804, 2026, doi: 10.3389/feduc.2026.1856804.

N. Bloom, R. Lemos, R. Sadun, and J. Van Reenen, "Does management matter in schools?" Econ. J., vol. 125, no. 584, pp. 647-674, 2015, doi: 10.1111/ecoj.12267.

A. B. Bakker and E. Demerouti, "The Job Demands-Resources model: State of the art," J. Manag. Psychol., vol. 22, no. 3, pp. 309-328, 2007, doi: 10.1108/02683940710733115.

P. Hallinger, "Leading educational change: Reflections on the practice of instructional and transformational leadership," Camb. J. Educ., vol. 33, no. 3, pp. 329-352, 2003, doi: 10.1080/0305764032000122005.

BIOGRAPHIES OF AUTHORS

Sidiq Nulhaq holds a bachelor's and master's degree in physics education from Universitas Pendidikan Indonesia and is currently a doctoral candidate in Educational Management at Universitas Negeri Jakarta. He is a national practitioner, and consultant in Monitoring, Evaluation, Learning, and Research (MELR), with over 14 years of experience designing monitoring and evaluation systems, Theory of Change frameworks, and indicator frameworks for government programmes and international development agencies, including Indonesia's Ministry of Education, Culture, Research, and Technology, Bappenas, UNICEF, the World Bank, Save the Children Indonesia, Tanoto Foundation, and the Clinton Health Access Initiative. He received the 2023 Nugra Jasa Dharma Pustaloka award from Indonesia's National Library for his contribution to community literacy. He can be contacted at email: sidiqnulhaq@institutpendidikan.ac.id.

R. Madhakomala is a Professor of Educational Management at Universitas Negeri Jakarta (UNJ), where he has served as a lecturer and researcher since 1986. He completed his bachelor's and master's degrees in educational technology at IKIP Jakarta (now UNJ) and his doctorate in Educational Management at UNJ. His research interests include educational management, human resource development, leadership, and educational policy evaluation, and he has supervised numerous graduate and doctoral students. He received the Satyalancana Karya Satya award from the President of Indonesia in recognition of his service as an academic. He can be contacted at email: madhakomala@live.com.

Masduki is a Professor at the Department of Educational Management, Faculty of Education, Universitas Negeri Jakarta (UNJ). He holds a bachelor's degree in law from Universitas Islam Indonesia, a master's degree in human resource management, and a doctorate in Educational Management from UNJ. His expertise spans educational management, quality management, organizational behaviour, and educational policy, and he teaches and supervises research at the undergraduate, master's, and doctoral levels. He has authored several textbooks, including Manajemen Mutu Terpadu (Total Quality Management) and Pembiayaan Pendidikan (Education Financing). He can be contacted at email: masdukiahmad@gmail.com.