MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages 6376-6382

Transformational Leadership, Organizational Resilience and Engagement Among Employees of Local Universities and Colleges (LUCs) in the Philippines: A Response to SDG4 Quality Education Using Structural Equation Modeling

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ABSTRACT:*The study describes Transformational Leadership, Organizational Resilience and Engagement Among Employees of LUCs: A Response to SDG4 Quality Education Using Structural Equation Modeling. The PLS-SEM results show that transformational leadership strongly predicts organizational resilience (β = 0.81) and that resilience, in turn, positively predicts employee engagement (β = 0.30), while transformational leadership retains a significant direct effect on engagement (β = 0.53); together these coefficients explain substantial variance in resilience (R^2 = 0.65) and engagement (R^2 = 0.54). The empirical framework positions Organizational Resilience (OR) as a mediating mechanism through which Transformational Leadership (TFL) influences Employee Engagement (EE). The pattern observed—strong TFL → OR and significant OR → EE alongside a remaining direct TFL → EE—indicates partial mediation: leaders both directly energize and inspire employees and indirectly foster engagement by building organizational capacities (readiness, slack, problem-solving, flexibility, connectedness, adaptiveness, proactiveness). Methodologically, the framework's mediation claim is robust when (a) measurement validity is established, (b) indirect effects are bootstrapped or estimated within PLS-SEM rather than via separate regression steps, and (c) conditional factors are tested. Practically, the model implies dual interventions for LUCs seeking SDG-4 outcomes: develop transformational leadership competencies and institutionalize resilience-building practices (e.g., learning systems, slack resources, connectedness). Finally, because environmental uncertainty and organizational support often moderate mediated effects, future tests should include moderated-mediation specifications to determine when OR most strongly transmits TFL's benefits to engagement (Hollands et al., 2023; Yu & Xiang, 2024).*

KEYWORDS:**transformational leadership, organizational resilience, employee engagement, LUCs, SDG4 quality education, structural equation modeling**

Introduction

In the global pursuit of Sustainable Development Goal 4 (SDG 4), which emphasizes inclusive and equitable quality education and lifelong learning opportunities for all (United Nations, 2023), higher education institutions are called to strengthen their leadership and organizational capacities to ensure sustainable academic performance. Local Universities and Colleges (LUCs) in the Philippines play a pivotal role in democratizing access to higher education, yet they face persistent challenges—limited resources, evolving accreditation requirements, and rapid technological change. In this context, effective leadership and institutional resilience are indispensable for fostering a culture of innovation, adaptability, and engagement that supports quality education outcomes (CHED, 2022).

Transformational leadership (TFL), as conceptualized by Bass and Avolio cited by Agazu, et al (2025), emphasizes idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Leaders who display transformational qualities inspire followers to transcend self-interest for collective goals, enhance job satisfaction, and promote organizational learning (Northouse, 2022). In higher education, transformational leadership has been linked to greater faculty commitment, academic innovation, and organizational effectiveness (Ng, 2021; Leithwood & Jantzi, 2005). Complementing this, **organizational resilience (OR)**—the institution's ability to anticipate, absorb, and adapt to disruptions—has become a critical determinant of long-term sustainability (Duchek, 2020). Resilient organizations build slack resources, foster connectedness, and promote learning systems that enable continuous improvement and recovery from adversity (Lengnick-Hall et al., 2024). More so, Employee Engagement (EE) which according to Rich, et al (2021) means fully involving oneself in work roles by putting in physical effort, focusing mentally, and connecting emotionally while performing job tasks is considered as well.

This study investigates the interrelationships among transformational leadership, organizational resilience, and employee engagement (EE) in the context of Philippine LUCs. Using Partial Least Squares Structural Equation Modeling (PLS-SEM), it examines how transformational leadership directly influences engagement and indirectly affects it through organizational resilience as a mediating variable. By establishing organizational resilience as a conduit of leadership influence, this research provides empirical evidence that leaders not only inspire and motivate individuals but also cultivate institutional mechanisms that sustain engagement and performance. The findings aim to guide LUC administrators and policymakers in designing leadership and capacity-building interventions that align with SDG 4—empowering educators and staff to deliver quality, inclusive, and resilient education systems.

Methodology

Research Design: This study employed a quantitative research design using Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships among Transformational Leadership (TFL), Organizational Resilience (OR), and Employee Engagement (EE). The primary objective was to test the mediating role of OR in the relationship between TFL and EE, in alignment with the goals of Sustainable Development Goal 4 (SDG4): Quality Education.

Respondents and Sampling: The sample consisted of 104 employees from various Local Universities and Colleges (LUCs) in the Philippines. Participants included:

- Faculty members (50.96%)
- Administrators (27.88%)
- Presidents and Officers-in-Charge (10.58% each)

A purposive sampling technique was used to ensure that respondents had relevant experience with leadership and engagement within their institutions.

Research Instrument: A validated survey questionnaire was used, comprising constructs drawn from established literature:

- Transformational Leadership by Ghuzavvi (2021) Idealized Influence, Inspirational Motivation, Intellectual Stimulation, Individualized Consideration
- Organizational Resilience by Verreynne, et al (2023) Readiness, Slack, Problem-Solving, Flexibility, Connectedness, Adaptiveness, Proactiveness
- Employee Engagement based on Job Engagement Scale of Rich, et al (2010) Physical, Emotional, and Cognitive Engagement, modified for Philippine academic institution's setting using MS Co-Pilot.

Items were measured using a Likert scale, and psychometric properties were assessed through item loadings, Average Variance Extracted (AVE), Composite Reliability (CR), and Cronbach's Alpha (CA)—all of which met accepted thresholds for validity and reliability.

Data Collection: Data were collected via online survey distribution across LUCs located in the National Capital Region (NCR), Luzon, Visayas, and Mindanao of the Philippines. Informed consent and confidentiality were ensured for all participants.

Data Analysis: Data were analyzed using PLS-SEM via WarpPLS software, which is suitable for mediation analysis involving latent constructs. The analysis included:

- Measurement Model Assessment: Item loadings, AVE, CR, CA
- Structural Model Assessment: Path coefficients, R^2, Q^2, effect sizes (f^2), collinearity (VIF), and model fit indices (GoF, APC, ARS, AARS)
- Mediation Testing: Direct, indirect, and total effects using bootstrapping

MS Co-Pilot was also used to further discuss the analysis.

Literature Review

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ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages 6376-6382

Transformational Leadership: Transformational leadership (TFL), as described by Broome (2021), is a continuously developing leadership approach that centers on the self, other people, situational factors, and the broader context. It encourages individuals to accomplish exceptional outcomes and integrates key elements such as personal values, emotional intelligence, and attention to one's spiritual dimension. Mayberry (2024) outlines the dimensions of TFL which includes idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Similarly, Crowley (2022) highlights four heart-centered leadership practices, namely building a highly engaged team, fostering personal connections, nurturing human potential, and recognizing meaningful achievements.Zhang (2025) revealed that students' perceptions of their teachers' transformational leadership positively impact their employability both directly and indirectly. The indirect effects happen in three ways: problem-based learning acting as a single mediator, self-efficacy as another single mediator, and a chain mediation comprising problem-based learning and self-efficacy.More so, the study further indicates that students' higher use of generative artificial intelligence strengthens the chain mediating effect of problem-based learning and self-efficacy with respect to perceived transformational leadership and employability. This contributes to expanding the use of Brown and Lent's (2023) Social Cognitive Career Theory and Hutchin's Distributed Cognition Theory cited by Dharanikota, et al (2024) in employability research.Additionally, Oanh Thi Kim Nguyen et al. (2025) demonstrated that transformational leadership significantly contributes to project success by cultivating team resilience, which subsequently motivates the team to accomplish project goals. However, this study did not establish a significant relationship between organizational innovativeness and the realization of a cost-saving operational project. Nonetheless, these results highlight the role of TFL in strengthening team resilience and pushing for the fulfillment of operational initiatives, suggesting that organizations should invest in developing transformational leadership competencies among project leaders.Based on the study of (Connie Deng, 2023) using meta-analyses, transformational leadership had medium to large effect sizes on a range of outcomes, demonstrating its consistent and strong links with individual, team, and organizational outcomes. Thus, our primer suggests the importance of grounding leadership development initiatives in transformational leadership.

Organizational Resilience

Hascher (2021) emphasizes the significant role of wellbeing and resilience within the teaching profession and explains how they are interconnected. The study found that wellbeing is essential for individuals, as its prolonged absence can lead to negative consequences. Furthermore, teachers' wellbeing is viewed as a foundation for both personal and professional growth. It enables educators to care effectively for their students, foster positive learning environments, remain committed to their educational roles, and contribute to building a learning-oriented society.

Worku (2024) disclosed that although students showed moderate levels of academic resilience, commitment, and performance, the link between resilience and academic performance was particularly noteworthy. The study revealed that academic commitment partially mediates this relationship, offering a more detailed understanding of what drives student achievement. This means that students' dedication to their studies is an essential factor that helps convert their resilience into actual academic success.(Hall, 2021) presents a comprehensive framework for understanding resilience through a multisystem approach, emphasizing that resilience is not merely an individual trait, but a dynamic process shaped by interactions across multiple public institutions. Their work, grounded in ecological systems theory, highlights how children and youth are embedded within layers of influence—ranging from family and school environments to broader societal structures such as healthcare, welfare, and justice systems. The authors argue that organizational resilience in public institutions is cultivated when protective factors across these systems effectively buffer against risk factors like poverty, abuse, and systemic inequality. In educational settings, the multisystem approach translates into whole-school resilience programs, trauma-informed teaching practices, and proactive family engagement strategies. These initiatives aim to create resilient educational ecosystems that not only respond to adversity but actively foster growth, learning, and well-being.(Bush, 2020) emphasizes that resilient educational organizations are those capable of adapting to external pressures—such as policy shifts, funding constraints, and societal expectations—while maintaining core functions and supporting staff and student wellbeing. He links resilience to transformational leadership, which fosters a shared vision, empowers staff, and builds collective capacity to navigate adversity. Leaders who practice transformational leadership are seen as key agents in cultivating resilience by promoting trust, collaboration, and innovation. By decentralizing decision-making and encouraging participation across levels of the institution, schools and universities can respond more flexibly to crises and disruptions. (Biggs, 2022) argue that organizational resilience in universities is reflected in their ability to sustain effective teaching and learning practices while responding to challenges with agility and innovation. This means flexible curriculum design that allows for rapid adaptation to online or hybrid modes of delivery; supportive institutional policies that prioritize student and staff wellbeing and professional development systems that equip educators with skills to manage change and uncertainty. They added that resilient institutions are those that embed quality assurance mechanisms not only in academic content but also in institutional culture. This involves fostering a learning environment that is inclusive, responsive, and capable of evolving with the needs of learners and society.

Employee Engagement

Konopaske (2023) describes employee engagement as a fundamental element of organizational effectiveness, especially in fast-changing and complex environments like academic institutions. The author situates engagement within broader organizational behavior concepts, highlighting its links to motivation, leadership, job satisfaction, and organizational commitment. He defines engagement to be affirmative, enriching, occupational psychological condition with the following indicators: vigor, dedication, and absorption. Engaged employees are characterized by high energy, enthusiasm for their tasks, strong alignment with organizational goals, proactive initiative, and meaningful contributions to team performance and innovation. He further notes that engagement is shaped by both individual psychological factors and organizational practices such as supportive leadership, clear communication of objectives, opportunities for professional growth, and systems that provide recognition and feedback. Within academic institutions, these elements are particularly significant because faculty and staff often manage heavy workloads, evolving expectations, and ongoing demands for adaptation.(Kailay, 2025) said high levels of commitment and satisfaction among employees lead to increased engagement, reduced turnover, and enhanced performance, all of which are essential for maintaining a competitive edge in the market and ensuring the sustainability and success of organizations. Similarly, Guy (2022) underscores the vital role of employee engagement in achieving superior performance and service quality in public organizations, including those in the academic sector. The authors argue that engagement extends beyond motivation or job satisfaction. It means cultivating an environment where employees are valued, empowered, and in sync with the institution's mission. They emphasize that engaged employees are more likely to display organizational citizenship behaviors, engage in continuous improvement, and remain resilient amid institutional challenges. Leadership practices, transparent communication, and inclusive decision-making are identified as central to fostering an engaged organizational culture. This culture of engagement encourages faculty and staff in academic institutions to take active roles in governance, curriculum development, and student support initiatives— activities that strengthen their sense of purpose and reinforce their professional identity.

(Yimam, 2022) revealed that the training dimensions of training needs assessment, design, delivery style and evaluation have a significant positive effect on the performance of the administrative employees in BDU. However, employees are not satisfied with the present training dimensions and elements of each dimension. Nonetheless, training dimensions significantly influence the performance of employees in other types of organizations.

Result

Table 1.Profile of Respondents

Profile	Frequency	Percentage
Position		
Faculty	53	50.96
Administrator	29	27.88
President	11	10.58
Officer-in-Charge	11	10.58
Classification		
Local College	71	68.27
Local University	33	31.73
Location		
National Capital Region (NCR)	36	34.62
Luzon	34	32.69
Visayas	23	22.12
Mindanao	11	10.58
HEI Type		
Regulated	97	93.27

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ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages 6376-6382

Autonomous	6	5.77
Deregulated	1	0.96
Years of Operation		0.00
Less than 1 year	3	2.88
1–4 years	9	8.65
5–9 years	3	2.88
10–20 years	39	37.50
21 years and above	50	48.08
Student Population		
Less than 500	5	4.81
500–999	4	3.85
1,000–2,500	15	14.42
2,501–5,000	25	24.04
5,001–9,999	32	30.77
10,000–19,999	20	19.23
20,000 and above	3	2.88
Total number of Faculty Members (regardless if regular or COS)		
less than 100	31	29.81
100-199	41	39.42
200-399	20	19.23
400 & above	9	8.65
No Idea	3	2.88
Total number of Non-Faculty Members (regardless if regular or COS)		
less than 50	64	61.54
50-99	10	9.62
100-199	15	14.42
200 & above	12	11.54
No Idea	3	2.88
Total number of CHED/Local Accredited Programs - Board Programs		
0	8	7.69
1-5	69	66.35
6-10	18	17.31
11-15	3	2.88
16 and above	3	2.88
No Idea	3	2.88
Total number of CHED/Local Accredited Programs - Non-Board Programs		
0	4	3.85
1-5	62	59.62
6-10	26	25.00
11-15	4	3.85
16 and above	4	3.85
No Idea	4	3.85
Total number of CHED/Local Accredited Programs - Certification (Non-degree) Programs		
0	53	50.96
1-5	41	39.42
6-10	8	7.69
11-15	2	1.92
16 and above	0	0.00

Table 1 above centers on faculty (50.96%) and administrators (27.88%), with presidents and officers-in-charge at 10.58% each; this mix captures both frontline instructional experience and managerial perspectives, suggesting role-dependent perceptions of leadership and engagement that warrant multi-group checks (Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020).Most respondents are from local colleges (68.27%) rather than universities (31.73%), indicating findings primarily reflect teaching-focused institutions where organizational resilience may be more practice-based and socio-ecological than research-driven, aligning with arguments about academic resilience in education contexts (Ross, Scanes, & Locke, 2023). Geographic spread favors NCR (34.62%) and Luzon (32.69%), with lower representation from Visayas and Mindanao, implying potential urban/regional bias in resources and uncertainty that could moderate the TFL → OR → EE pathways (Yu & Xiang, 2024).Nearly all institutions are CHED-regulated (93.27%), and most are established (85% >10 years) with mid–large enrolments (majority 2,500+), suggesting resilience is likely institutionalized rather than emergent; maturity and size therefore may condition mediation effects. Practically, these demographics advise including role, institution type, region, regulatory status, age, and size as controls and conducting moderated/multi-group PLS-SEM to assess the stability and generalizability of the mediation results (Sarstedt et al., 2020; Yu & Xiang, 2024).

PLE-SEM Analysis

Table 2.Model Fit and Quality Indices

Indices	Coefficients
Average path coefficient (APC)	0.525, p<0.001
Average R-squared (ARS)	0.594, p<0.001
Average adjusted R-squared (AARS)	0.588, p<0.001
Average block VIF (AVIF)	2.630
Average full collinearity VIF (AFVIF)	2.741
Tenenhaus GoF	0.710

Note: p-value < 0.05 - Significant / acceptable; ≤ 5 - Significant / acceptable (Hair et al. & Kock)

The reported model fit and quality indices per Table 2 indicate a robust PLS-SEM suitable for mediation analysis. The substantial average path coefficient (APC = 0.525, $p < 0.001$) and high average R^2 (ARS ≈ 0.59) demonstrate that transformational leadership, organizational resilience, and engagement are meaningfully interrelated and that the model explains a sizable portion of variance in the endogenous constructs—consistent with typical leadership–engagement effect sizes reported in the literature (Decuypere & Schaufeli, 2021). Low multicollinearity (AVIF = 2.630; AFVIF = 2.741) ensures stable path estimates, and a large Tenenhaus GoF (0.710) supports overall model quality, validating the use of composite-based PLS-SEM for mediation testing as recommended for latent-variable mediation without separate PROCESS analyses (Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020).Substantively, these fit indices lend confidence to interpreting organizational resilience as a mediator between transformational leadership and employee engagement: prior PLS-SEM studies similarly find resilience mediates leadership effects on outcomes such as innovation and creativity, often moderated by contextual factors like environmental uncertainty or organizational support (Yu & Xiang, 2024; Kaya, 2024; Zhou et al., 2023). Given the model's explanatory power, it is appropriate to treat the indirect effect through resilience as meaningful, while also examining potential moderators (e.g., environmental uncertainty, regulatory context) to assess conditional mediation and to strengthen causal interpretation in line with recent empirical work (Sarstedt et al., 2020; Yu & Xiang, 2024; Zhou et al., 2023).

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ISSN: 1053-7899
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Measurement Model (Outer Model)

Table 3. Item Loading, AVE, and Reliability of the Variables

Construct	Item Loading	AVE	CR	CA
Transformational Leadership				
Idealized Influence	(0.917)	0.896	0.972	0.961
Inspirational Motivation	(0.944)			
Intellectual Stimulation	(0.961)			
Individualized Considerations	(0.963)			
Organizational Resilience				
Readiness	(0.863)	0.78	0.961	0.953
Slack	(0.838)			
Problem-Solving	(0.868)			
Flexibility	(0.8683)			
Connectedness	(0.909)			
Adaptiveness	(0.918)			
Proactiveness	(0.9177)			
Employee Engagement				
Physical Engagement	(0.9164)	0.874	0.954	0.928
Emotional Engagement	(0.953)			
Cognitive Engagement	(0.936)			

Note: Item Loading - >0.5 or >0.6 – Acceptable; Average variances extracted (AVE) - >0.5 – Acceptable; Composite Reliability (CR) & Cronbach's Alpha (CA) - >0.7 – Acceptable (Fornell & Larcker, & Kock)

Table 3 shows the measurement results indicate excellent psychometric properties for all constructs: item loadings range from 0.838 to 0.963, AVE values are high (TFL = 0.896; OR = 0.780; EE = 0.874), and both Composite Reliability (CR = 0.954–0.972) and Cronbach's Alpha (CA = 0.928–0.961) exceed conventional thresholds. These indicators collectively confirm strong convergent validity and internal consistency, meaning the observed indicators reliably represent Transformational Leadership, Organizational Resilience, and Employee Engagement. High AVE and loadings reduce measurement error and support the use of latent composite modeling in PLS-SEM, which is appropriate for testing mediation hypotheses without auxiliary regression procedures (Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020).Practically, the robust measurement model strengthens confidence in subsequent structural estimates: any significant indirect effect of TFL → OR → EE is unlikely to be an artifact of poor measurement and instead reflects substantive relationships consistent with prior findings that organizational resilience mediates leadership effects on outcomes such as innovation and professional outcomes (Yu & Xiang, 2024; Kaya, 2024). Consequently, the validated measurement model justifies proceeding to mediation testing and multi-group or moderation analyses to examine contextual contingencies.

Table 4

Square Roots of AVE Coefficients and Correlation Coefficients

	Transformational Leadership	Organizational Resilience	Employee Engagement
Transformational Leadership	**(0.946)**		
Organizational Resilience	0.796	**(0.883)**	
Employee Engagement	0.708	0.638	**(0.935)**

Note: Diagonal elements are the square of AVE of constructs & dimensions, while the off-diagonal elements are correlational between constructs.

The Fornell–Larcker results in Table 4 indicate satisfactory discriminant validity: each construct's square root of AVE (Transformational Leadership = 0.946; Organizational Resilience = 0.883; Employee Engagement = 0.935) exceeds its correlations with other constructs, satisfying the criterion that maximum correlation with other constructs must be lower than the square root of AVE. Practically, this means indicators load more strongly on their intended latent variable than on other constructs, so Transformational Leadership, Organizational Resilience, and Employee Engagement are empirically distinct while remaining meaningfully correlated—consistent with theory and recent mediation work linking these constructs (Yu & Xiang, 2024; Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020).Given these measurement properties, the measurement model is robust and provides a reliable foundation for testing the structural paths and mediation hypotheses; any significant indirect effect of TFL → OR → EE is less likely to reflect measurement confounding and more likely to represent substantive relationships worthy of further structural and conditional analyses (Yu & Xiang, 2024; Sarstedt et al., 2020).

Structural Model (Inner Model)

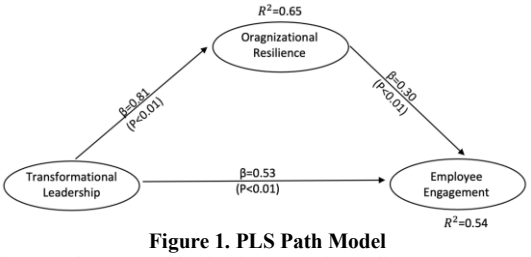

Figure 1. PLS Path Model

The PLS-SEM results per Figure 1 above show that transformational leadership strongly predicts organizational resilience (β = 0.81) and that resilience, in turn, positively predicts employee engagement (β = 0.30), while transformational leadership retains a significant direct effect on engagement (β = 0.53); together these coefficients explain substantial variance in resilience (R^2 = 0.65) and engagement (R^2 = 0.54). This pattern indicates partial mediation and contributes meaningfully alongside the direct path—consistent with findings that organizational resilience mediates transformational leadership's effects on outcomes such as innovation and performance (Yu & Xiang, 2024) and that engagement often functions as a mediator or outcome in leadership models (Park et al., 2021). The robustness of composite-based PLS-SEM for testing such mediation strengthens confidence in these inferences and obviates the need for separate regression-based mediation routines (Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020). Substantively, the results imply that transformational leaders boost engagement both by direct motivational processes and by cultivating institutional capacities for adaptation (resilience), suggesting interventions should target leadership development and resilience-building concurrently to maximize employee engagement in LUCs.

Table 5.Direct and Indirect Effects of the PLS Path Model

	B	SE	p-value	f2
Transformational Leadership→Organizational Resilience	0.807	0.079	<0.001	0.652
Transformational Leadership→Employee Engagement	0.526	0.085	<0.001	0.377
Organizational Resilience-→Employee Engagement	0.302	0.092	<0.001	0.159
Indirect Effects of the PLS Path Model				
Total effect(c1)	0.966	0.081	<0.001	0.196
Direct Effect (c1'): Transformational Leadership→Employee Engagement	0.285	0.079	<0.001	0.377
Path a: Transformational Leadership-->Organizational Resilience	0.807	0.066	<0.001	0.652
Path b: Organizational Resilience→Employee Engagement	0.302	0.064	<0.001	0.159
Indirect Effect (a*b): Transformational Leadership→Organizational Resilience→Employee Engagement	0.681	0.072	<0.001	0.140

*Note: The effect sizes (f^2) were measured using the following: 0.02 = small, 0.15 = medium, 0.35 = large; SE = standard error (Cohen, 1988), β = standardized path coefficient. Total effect c is equal to the sum of direct effect c' and indirect effects; i.e. c = c' + (a*b)*

The PLS-SEM results also indicate per Table 5 that organizational resilience functions as a significant partial mediator between transformational leadership (TFL) and employee engagement (EE). Transformational leadership strongly predicts resilience (β = 0.807, $p < 0.001$, $f^2 = 0.652$), and resilience in turn positively predicts engagement (β = 0.302, $p < 0.001$, $f^2 = 0.159$), while TFL retains a significant direct effect on engagement when resilience is included ($c' = 0.285$, $p < 0.001$). Thus, leadership enhances engagement through two complementary pathways: a direct motivational/inspirational route and an indirect pathway operating

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ISSN: 1053-7899
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via the strengthening of organizational resilience—an outcome consistent with mediation findings in comparable leadership–resilience studies (Yu & Xiang, 2024; Hollands, Haensse, & Lin-Hi, 2023).Using the reported paths, this indicates a meaningful contribution of resilience to the overall leadership effect on engagement. Crucially, bootstrapping shows the indirect effect is statistically significant ($p < 0.001$), confirming that part of TFL's influence on engagement operates through augmented resilience—a conclusion aligned with PLS-SEM best practice for latent mediation testing (Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020).Practically, the large f^2 for the TFL → OR path and medium f^2 for OR → EE imply that leadership interventions primarily build resilience (high practical impact), and that resilience moderately translates into higher engagement. This suggests institutional strategies should combine transformational leadership development with explicit resilience-building policies (learning orientation, employee focus, adaptive HR practices) to maximize engagement and thereby support sustained educational quality, as emphasized in recent organizational resilience research (Yu & Xiang, 2024; Kim, Lee, & Chung, 2023). Finally, researchers should verify the bootstrapped indirect estimate reported in tables (ensure it equals the product above or report the bootstrap-derived a*b) and consider testing contextual moderators (e.g., environmental uncertainty or regulatory latitude) that prior work shows can amplify or attenuate mediated effects (Yu & Xiang, 2024; Zhou et al., 2023).

Table 6

Collinearity, Coefficient of Determination, and Predictive Relevance

Construct	Full collinearity VIF	R2	Q2
Transformational Leadership	3.344		
Organizational Resilience	2.814	0.652	0.648
Employee Engagement	2.066	0.536	0.527

Note: For R^2: 0.19-weak, 0.33-moderate, 0.67-substantial (Lacap, 2021). For Q^2: The values measured must be greater than zero to recommend that the conceptual model can predict the endogenous latent constructs. For FCVIF: ≤5 is acceptable (Hair et al. & Kock).

The structural diagnostics in Table 6 indicate a sound model: full collinearity VIFs (2.066–3.344) are well below the common threshold of 5, showing multicollinearity is not problematic and path estimates are reliable, which supports using PLS-SEM for latent mediation analysis (Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020). The R^2 values reveal substantial explanatory power—Organizational Resilience ($R^2 = 0.652$) and Employee Engagement ($R^2 = 0.536$)—meaning transformational leadership accounts for a large share of variance in resilience and, together with resilience, explains a meaningful portion of engagement; this level of explained variance is consistent with mediation studies linking leadership to organizational capabilities and outcomes (Yu & Xiang, 2024; Tian et al., 2020). Positive Q^2 values for resilience (0.648) and engagement (0.527) confirm predictive relevance, indicating the model not only fits but also forecasts endogenous construct scores out-of-sample. Overall, these indices validate proceeding to interpret the mediating role of organizational resilience with confidence and to explore conditional effects or contextual moderators highlighted in recent resilience research (Hollands, Haensse, & Lin-Hi, 2023).

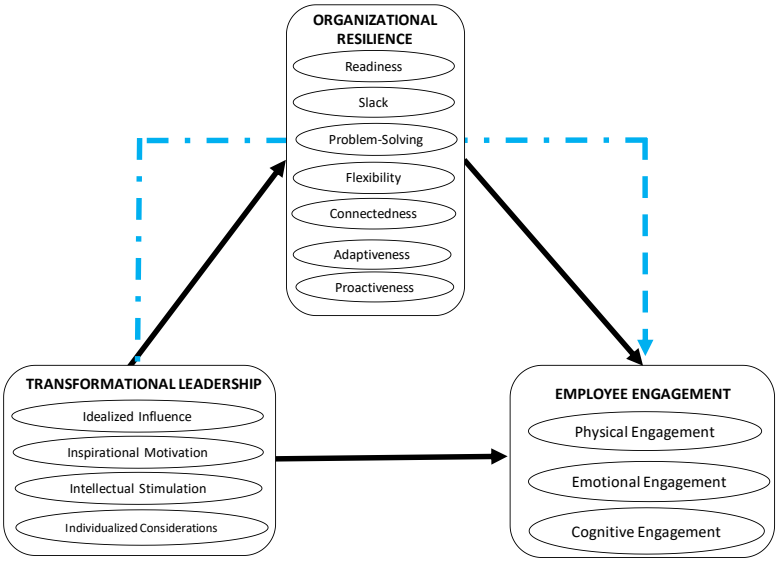

Figure 2. Mediation Framework of Organizational Resilience between Transformational Leadership and Employee Engagement

The empirical framework, Figure 2, positions Organizational Resilience (OR) as a mediating mechanism through which Transformational Leadership (TFL) influences Employee Engagement (EE). The pattern observed—strong TFL → OR and significant OR → EE alongside a remaining direct TFL → EE—indicates partial mediation: leaders both directly energize and inspire employees and indirectly foster engagement by building organizational capacities (readiness, slack, problem-solving, flexibility, connectedness, adaptiveness, proactiveness).Conceptually, treating OR as a meta-capability clarifies why mediation emerges. OR aggregates soft facilitators—employee focus, learning orientation, adaptive routines—that amplify leaders' influence into sustained engagement under disturbance; this aligns with mixed-methods evidence that resilience both arises from leadership-shaped facilitators and reduces adverse outcomes while supporting performance during crises (Hollands, Haensse, & Lin-Hi, 2023). Empirically, comparable studies report that transformational leadership increases resilience, which then improves team or individual outcomes (e.g., innovation, engagement), and that this mediated link strengthens under environmental uncertainty or supportive contexts (Yu & Xiang, 2024; Zhou, Yang, Zhang, & Li, 2023).Methodologically, the framework's mediation claim is robust when (a) measurement validity is established, (b) indirect effects are bootstrapped or estimated within PLS-SEM rather than via separate regression steps, and (c) conditional factors are tested. Prior work shows that PLS-SEM adequately recovers mediation with latent composites and obviates the need for PROCESS-style tandem analyses (Sarstedt, Hair, Nitzl, Ringle, & Howard, 2020). Practically, the model implies dual interventions for LUCs seeking SDG-4 outcomes: develop transformational leadership competencies and institutionalize resilience-building practices (e.g., learning systems, slack resources, connectedness). Finally, because environmental uncertainty and organizational supports often moderate mediated effects, future tests should include moderated-mediation specifications to determine when OR most strongly transmits TFL's benefits to engagement (Hollands et al., 2023; Yu & Xiang, 2024).

Conclusion

1. Transformational Leadership is a Key Driver

Leaders who demonstrate transformational qualities like idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration embody a critical role in enhancing both organizational resilience and employee engagement.

2. Organizational Resilience Acts as a Mediator

The presence of resilience traits (e.g., readiness, flexibility, adaptiveness) within an organization not only reflects strong leadership but also contributes significantly to sustaining employee engagement, especially during times of change or crisis.

3. Employee Engagement is Multi-Dimensional and Influenced by Both Leadership and Resilience

Engagement—whether physical, emotional, or cognitive—is not solely a product of leadership but is also shaped by how resilient and responsive the organization is to internal and external challenges.

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1, 2026, Pages 6376-6382

Recommendations

1. Develop Transformational Leadership Programs

Organizations should invest in leadership development initiatives that cultivate the four pillars of transformational leadership. This can include mentoring, coaching, and experiential learning.

2. Strengthen Organizational Resilience Systems

Build systems and cultures that promote readiness, problem-solving, flexibility, and proactiveness. This could involve scenario planning, cross-functional collaboration, and continuous improvement practices.

3. Foster a Culture of Engagement

Encourage practices that support physical, emotional, and cognitive engagement—such as wellness programs, recognition systems, and opportunities for meaningful work.

4. Integrate Leadership and Resilience in Strategic Planning

Ensure that leadership development and resilience-building are embedded in organizational strategy, not treated as separate initiatives.

5. Monitor and Evaluate Impact

Use regular assessments to measure the effectiveness of leadership and resilience initiatives on employee engagement, adjusting strategies as needed.

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