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Transformational Leadership and Innovative Work Behavior: Mediating Roles of Organizational Culture, Self-Efficacy, and Work Engagement in West Kalimantan State Polytechnics

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Abstract: Transformational Leadership and Innovative Work Behavior: Mediating Roles of Organizational Culture, Self-Efficacy, and Work Engagement in West Kalimantan State Polytechnics. **Objective**: This research explores the impact of transformational leadership (TL) on fostering innovative work behavior (IWB) among teaching staff at State Polytechnics in West Kalimantan. The study delves deeper by examining the mediating roles of organizational culture (OC), self-efficacy (SE), and work engagement (WE) in this dynamic relationship. **Methods**: Utilizing a quantitative research design, data were collected through surveys from 220 respondents across various State Polytechnics in West Kalimantan. The analysis was conducted using the Structural Equation Modeling Partial Least Squares (SEM PLS) method, allowing for the testing of complex relationships among TL, OC, SE, WE, and IWB. **Findings**: The findings reveal that TL positively and significantly influences IWB. Furthermore, OC, SE, and WE were identified as critical mediators in the TL-IWB relationship. Notably, WE emerged as the most influential mediator, emphasizing its critical role in bridging the gap between transformational leadership and innovative behavior in educational environments. **Conclusion**: This study underscores the pivotal role of transformational leadership in cultivating an innovative work culture among teaching staff. For polytechnic leaders, the findings suggest that fostering a supportive OC, enhancing SE, and actively engaging staff in their work are vital strategies to encourage innovation. These insights contribute to the broader literature on leadership and innovation and point to the need for further exploration in diverse educational contexts.

Keywords: transformational leadership, innovative work behavior, organizational culture, self-efficacy, work engagement.

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INTRODUCTION

IWB is crucial for organizational success, significantly influencing job performance, sustainability, productivity, and adaptability (Contreras et al., 2020; Stankevièiûtë et al., 2020). Understanding the factors that drive this behavior is essential for organizations seeking a competitive edge (Mubarak et al., 2021). IWB involves generating, promoting, and realizing new ideas, which foster growth and adaptability adaptability (Janssen, 2000). Therefore, studying the determinants of IWB in the workplace is imperative.

Despite these measures, state polytechnics in West Kalimantan have shown limited innovative developments, raising concerns about the effectiveness of TL within these institutions. Unlike traditional academic institutions, polytechnics

focus on practical skills and technical knowledge directly applicable to various industries, emphasizing hands-on training and industry-oriented programs. Polytechnic education and training have long been regarded as a critical solution to addressing skill gaps among unemployed youth (Yusop et al., 2022; Zahari Ismail & Zamberi Ahmad, 2013). Understanding the dynamics influencing IWB among polytechnic teaching staff is crucial for addressing this lag and ensuring these institutions contribute to Indonesia's growth.

Encouraging IWB in educational institutions involves several phases, such as modernization, fostering creativity, and utilizing progressive achievements (Steare et al., 2023). Promoting this behavior among students and faculty enhances creativity and problem-solving abilities and nurtures a culture of innovation. TL, defined by idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Riggio, 2006), is essential for driving innovation and improving polytechnic performance (Sehgal et al., 2021). Transformational leaders motivate employees to prioritize the organization's goals over personal interests (Udin, 2023), cultivating an environment where employees feel valued and empowered (Lambriex-Schmitz et al., 2020). This leadership approach is widely acknowledged as a catalyst for IWB (Grošelj et al., 2021; Lin, 2023).

Leaders in polytechnic institutions play a vital role in shaping the IWB of their teaching staff. TL has been shown to enhance teaching staff's motivation, performance, and innovative abilities by fostering a shared vision, encouraging intellectual engagement, and offering individualized support (Grošelj et al., 2021; Lin, 2023). This leadership style is widely recognized as a catalyst for IWB, crucial for adapting to changes and achieving sustainable growth (Lin, 2023; Sarwar et al., 2020). The current study addresses a significant research gap by exploring how TL, OC, SE, and engagement influence IWB in the polytechnic sector.

Despite the established importance of TL, OC, SE, and WE in fostering IWB, more research should be done in polytechnics' context. Existing studies have overlooked mainly educational institutions' unique challenges and dynamics, particularly polytechnics. This research aims to fill this gap by examining how TL, OC, SE, and WE influence IWB in the polytechnic sector.

Key factors influencing IWB include (Lee & Kim, 2024), SE (Uppathampracha & Liu, 2022; Wan et al., 2022), and WE (Ali et al., 2022), all of which have significantly impacted employees' willingness to engage in innovative activities. These factors serve as vital components in the broader framework of organizational dynamics that shape IWB.

TL stimulates intellectual growth and innovation among organization members (Bass & Riggio, 2006; Shivers-Blackwell, 2004). Transformational leaders create a culture of continuous improvement by fostering a sense of responsibility, encouraging new ways of addressing problems, and promoting learning (Certo & Certo, 2012). Research shows that organizations with high levels of innovative behavior adapt better to changes and achieve sustained growth (Asurakkody & Shin, 2018; Bibi et al., 2020; Sarwar et al., 2020; Stanescu et al., 2021). Therefore, TL is critical to the success of innovation initiatives in educational institutions (Kareem et al., 2023).

OC encompasses bureaucratic, innovative, and supportive cultures (Wallach, 1983) and is defined as shared values, beliefs, and norms that significantly influence organizational behavior (George & Jones, 2012; Schein, 2009). Transformational leaders are instrumental in creating environments that foster risk-taking,

experimentation, and collaboration, all essential for innovation (Afsar et al., 2015). Studies have shown that OC mediates the relationship between TL and IWB (Erhan et al., 2022; Estherita et al., 2023; Sattayaraksa & Boon-itt, 2018).

Belief in one's ability to succeed, known as SE (Bandura, 1977; Guarnaccia et al., 2018), mediates TL's impact on IWB. According to Bandura (1977), SE differs among individuals based on three dimensions: magnitude (the level of task difficulty an individual believes they can handle), strength (the firm belief in capabilities), and generality (confidence across various behaviors). Transformational leaders boost SE by offering support, encouraging intellectual stimulation, and establishing challenging goals (Alwahhabi et al., 2023; Li et al., 2019; Uppathampracha & Liu, 2022). Consistent research findings indicate that SE mediates the link between TL and IWB (Dvir et al., 2002; Pieterse et al., 2010), underscoring its role in promoting innovation (Mohammed & Al-Abrrow, 2024; Stanescu et al., 2021).

WE, which includes vigor, dedication, and absorption (Schaufeli, 2017; Schaufeli & Bakker, 2003), is critical in the connection between TL and IWB. Vigor involves high levels of energy and mental resilience, dedication entails strong engagement and feelings of significance and enthusiasm, and absorption is characterized by deep focus and difficulty detaching from work. Transformational leaders establish environments that promote risk-taking, intellectual stimulation, and psychological safety, which enhances WE (Alwahhabi et al., 2023; Karimi et al., 2023; Li et al., 2019). Research indicates that TL positively impacts IWB through improved WE (Alwahhabi et al., 2023; Karimi et al., 2023; Li et al., 2019; Uppathampracha & Liu, 2022).

From the proposed hypotheses, the conceptual framework is designed to illustrate the patterns of how each independent variable affects the dependent variable, as depicted in Figure 1.

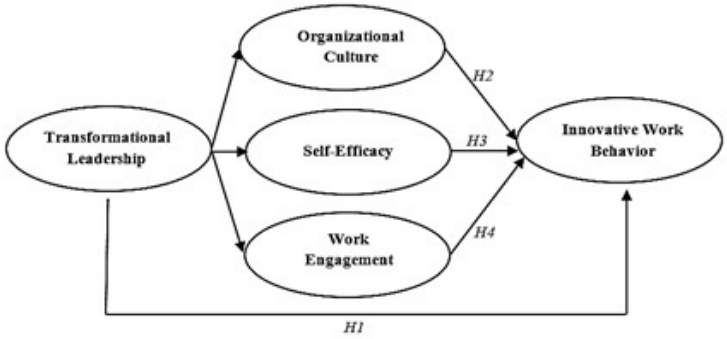

Figure 1. The conceptual framework

This research investigates how TL influences the development of IWB in polytechnics by considering the impact of OC, SE, and WE. The study intends to shed light on how polytechnic leaders can effectively encourage a culture of innovation among their teaching staff. Additionally, this research contributes to the existing body of knowledge by offering a detailed understanding of the relationship between TL, OC, SE, and WE in polytechnics. It provides valuable insight into how leadership can stimulate innovation, enhancing the theoretical and practical comprehension of promoting IWB in educational institutions. Based on the literature review and identified gaps, the following hypotheses are proposed:

H1: TL positively influences IWB
H2: OC mediates the relationship between TL and IWB
H3: SE mediates the relationship between TL and IWB
H4: WE mediates the relationship between TL and IWB

METHOD

Participants

The study was conducted across three West Kalimantan, Indonesia state polytechnics: Politap, Poltesa, and Polnep. Two hundred twenty respondents were selected using Slovin's formula with a 5% margin of error from a population of 367 teaching staff. The respondents were distributed as follows: 30 from Politap, 38 from Poltesa, and 152 from Polnep. The sample included 141 male and 79 female participants, ensuring a representative sample across these institutions. A stratified random sampling technique was employed to ensure a proportional representation of participants from each polytechnic, enhancing the study's generalizability.

Research Design and Procedures

This research employed a quantitative, cross-sectional survey design, enabling examining relationships between variables at a specific time. The study was conducted over six months, allowing sufficient time for data collection, analysis, and interpretation. The research process involved multiple stages: developing and adapting research instruments, pilot testing, and the primary data collection phase. The instruments were initially adapted from validated scales and underwent pilot testing with a small sample to assess their validity and reliability. Based on feedback, the instruments were refined to improve their quality. Data collection involved administering questionnaires online via Google Forms and direct polytechnic visits, ensuring a comprehensive and high response rate.

Instruments

The study utilized several adapted and validated instruments, translated into Indonesian and modified to suit the local context. Each of these constructs was assessed using a Likert scale ranging from 1 to 5, where 1 indicated "strongly disagree," and 5 indicated "strongly agree." Items marked with an asterisk (*) were reversed to control for response biases.

TL was measured using the Transformational Leadership Scale developed by Bass and Riggio (2006), which consists of 24 items across four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. For example, an item for idealized influence is "*My supervisor possesses a character of integrity*." IWB was assessed using Janssen's (2000) scale, comprising 18 items across three dimensions: idea generation, idea promotion, and idea implementation, with a sample item for idea generation, as "*I often generate new ideas to solve problems*." OC was assessed using Wallach's (1983) Organizational Culture Index, which includes 18 items divided into three dimensions: bureaucratic culture, innovative culture, and supportive culture. An example of an innovative culture is "*At this campus, lecturers who think independently in carrying out their duties are valued*." SE was measured using Bandura's (1977) scale, which includes 16 items grouped into three dimensions: magnitude, strength, and generality. An example of an item measuring strength is "*I have the perseverance to complete my tasks well*." WE was measured using UWES developed by Schaufeli and Bakker (2003), which includes 18 items divided into three dimensions: vigor, dedication, and absorption. For example, an item for absorption is " As a lecturer, I feel happy in carrying out my duties."

The validity and reliability of the instruments were thoroughly tested. Statistical validity (Pearson Product-Moment Correlation) was used

to verify construct validity, while reliability was assessed using Cronbach's Alpha, with values ranging from 0.822 to 0.957, indicating high reliability. The instruments' robustness was further confirmed through iterative refinement during the pilot phase.

Data Analysis

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM). The analysis began with the evaluation of the measurement model to ensure construct validity, including tests for Composite Reliability (CR > 0.7), Average Variance Extracted (AVE > 0.5), and Discriminant Validity (HTMT ratio < 0.85). The structural model was then assessed through path coefficients and R-squared values (moderate > 0.5). Model fit was evaluated using the Standardized Root Mean Square Residual (SRMR < 0.08). All analysis procedures adhered to the guidelines provided by Hair et al. (2011)to ensure the accuracy and validity of the results.

RESULT AND DISCUSSION

Model Evaluation

The evaluation of the model began with assessing the measurement model, which ensured reliability and validity before moving to the structural model. The results of each hypothesis were then discussed.

Measurement Model

This study's measurement model was evaluated using three criteria: convergent validity, discriminant validity, and reliability. Convergent reliability is assessed using the outer loading and the Average Variance Extracted (AVE) values. The desired condition is for the outer loading and AVE values to exceed 0.5. Tables 2 and 3 present the results of the outer loading assessment and Average Variance Extracted (AVE).

Table 2. Outer loading

Indicators	IWB	OC	SE	TL	WE
IWB1	0.753	-	-	-	-
IWB2	0.702	-	-	-	-
IWB3	0.707	-	-	-	-
OC1	-	0.773	-	-	-
OC2	-	0.827	-	-	-
OC3	-	0.832	-	-	-
SE1	-	-	0.886	-	-
SE2	-	-	0.838	-	-
SE3	-	-	0.873	-	-
TL1	-	-	-	0.751	-
TL2	-	-	-	0.810	-
TL3	-	-	-	0.774	-
TL4	-	-	-	0.737	-
WE1	-	-	-	-	0.847
WE2	-	-	-	-	0.809
WE3	-	-	-	-	0.759

All indicators load above the commonly accepted threshold of 0.7, indicating strong reliability and construct validity. It means the indicators consistently measure their respective constructs across samples and contexts. The high loadings all constructs suggest the measurement model is robust, with indicators representing the latent well. It supports the validity of using these constructs in further analyses or research.

Table 3. Average variance extracted (AVE)

Variables	AVE
IWB	0.520
OC	0.658
SE	0.750
TL	0.590
WE	0.649

The obtained AVE values confirm the robustness of the constructs used in the study, indicating a well-constructed measurement model. All constructs exhibit AVE values above the commonly accepted threshold of 0.5, affirming satisfactory convergent validity. This demonstrates that their indicators effectively capture the constructs, encompassing significant variance relative to measurement error. The AVE values strongly support the robustness of the measurement model, indicating that their respective indicators reliably and validly measure the constructs. Constructs with higher AVE values, such as SE, are mainly well-defined by their indicators.

Discriminant validity ensures that each construct in the model is distinct and not overly correlated with others. It was assessed by probing cross-loadings, which involves comparing the outer loading scores of an indicator across its intended variable and other variables. The output cross-loadings are shown in Table 4.

Table 4. Cross loading

Indicators	IWB	OC	SE	TL	WE
IWB1	**0.753**	0.270	0.280	0.287	0.323
IWB2	**0.702**	0.271	0.305	0.214	0.303
IWB3	**0.707**	0.337	0.313	0.264	0.248
OC1	0.251	**0.773**	0.266	0.284	0.309
OC2	0.317	**0.827**	0.428	0.239	0.298
OC3	0.406	**0.832**	0.475	0.226	0.276
SE1	0.352	0.439	**0.886**	0.157	0.317
SE2	0.332	0.427	**0.838**	0.195	0.299
SE3	0.389	0.405	**0.873**	0.239	0.339
TL1	0.206	0.259	0.139	**0.751**	0.240
TL2	0.222	0.167	0.071	**0.810**	0.179
TL3	0.247	0.220	0.168	**0.774**	0.226
TL4	0.362	0.260	0.268	**0.737**	0.274
WE1	0.328	0.350	0.382	0.300	**0.847**
WE2	0.373	0.266	0.288	0.260	**0.809**
WE3	0.257	0.247	0.195	0.166	**0.759**

Overall, the cross-loading table confirms the robustness of the measurement model by representing that every construct is well-defined and distinct from the others. Each indicator has its highest loading on its corresponding construct, with significantly lower loadings on other constructs. It indicates good discriminant validity, meaning the constructs are distinct. The high loadings on the intended constructs suggest that the indicators are reliable measures of their respective constructs.

Cronbach's Alpha and Composite Reliability tests were conducted to ensure the consistency and reliability of our measurement model. Cronbach's Alpha evaluates the internal consistency of the indicators within each construct, while Composite Reliability offers a more comprehensive assessment by considering the actual loadings of the indicators. Table 5 presents the results of Cronbach's Alpha and Composite Reliability testing.

Table 5. Cronbach's alpha and composite reliability

Variables	Cronbach's Alpha	Composite Reliability
IWB	0.538	0.764
OC	0.749	0.852
SE	0.841	0.900
TL	0.781	0.852
WE	0.753	0.847

The table above displays the reliability metrics for the constructs used in the study, including values for Cronbach's Alpha and Composite Reliability. All constructs exhibit Composite Reliability values above 0.7, indicating good internal consistency. The Cronbach's Alpha values are generally above the acceptable threshold of 0.7, except IWB, which has a value of 0.538. However, despite being slightly lower, it still has a satisfactory Composite Reliability value.

Structural Model

The coefficient of determination (R^2) and predictive relevance (Q^2) were used to assess the effectiveness of the structural model. The R^2 value indicates the proportion of variance explained by the independent variables for each dependent construct, reflecting the model's explanatory power. Predictive relevance (Q^2) measures the model's ability to predict data points accurately. These metrics provide insights into the model's strength and predictive capability. The coefficient of the determination and structure model are presented in Table 6 and Figure 2.

The model accounts for 30.8% of the variance in IWB. It indicates a moderate explanatory power, suggesting that TL, OC, SE, and WE are significant predictors of IWB. The remaining 69.2% of the variance is due to other factors not included in the model, pointing to the potential for further exploration of additional influences. The model explains 9.3% of the variance in OC, a relatively low explanatory power. While TL shapes OC, other variables not included in the current model may play a more substantial role. With an R^2 value of 5.3%, the model suggests that TL has a minimal direct effect on SE. It indicates the need for further investigation into other potential influences on SE, such as personal development opportunities or individual psychological traits. The model accounts for 9.6% of the variance in WE. It suggests that while TL plays a role, other significant factors might be more prominent.

Table 6. Coefficient of determination

Construct	R Square
IWB	0.277
OC	0.094
SE	0.053
WE	0.096

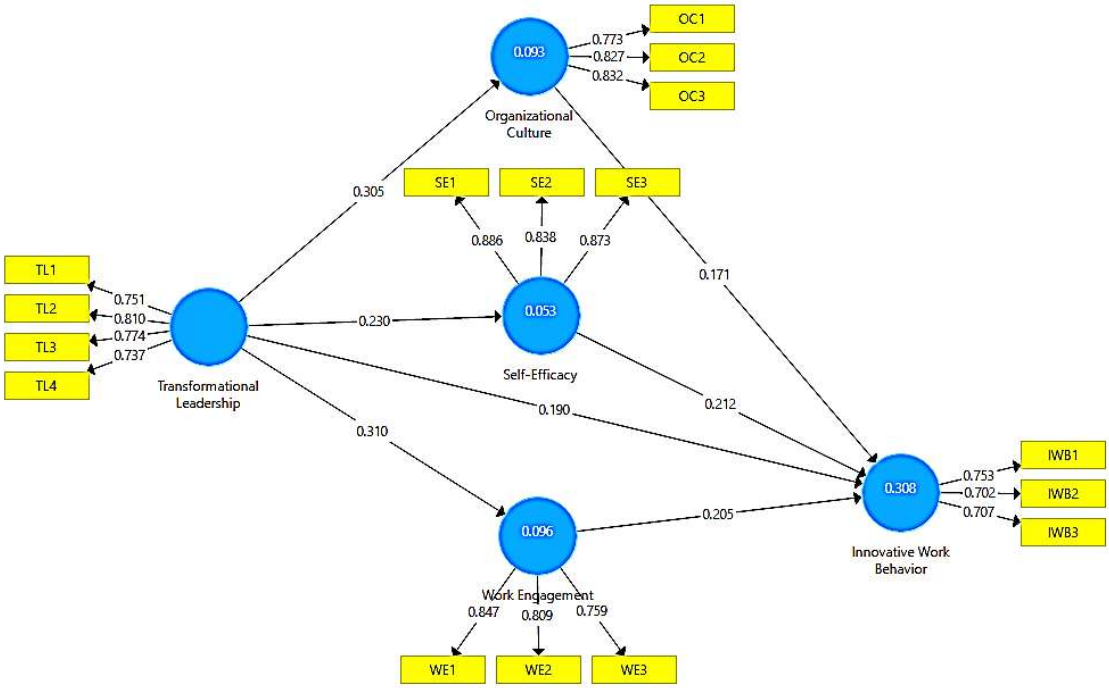

Figure 2. Research structure model

Table 7. Predictive relevance (Q^2)

Construct	SSO	SSE	Q^2
IWB	660.0	563.8	0.146
OC	660.0	620.3	0.060
SE	660.0	635.8	0.037
TL	880.0	880.0	
WE	660.0	623.1	0.056

The Q^2 values are calculated as Q^2 (=1-SSE/SSO) and indicate the predictive relevance of the model for each construct. A Q^2 value greater than zero indicates the model has predictive relevance for the construct. The predictive relevance of the model was assessed using Q^2 values, summarized in Table 7. The Q^2 values indicate the model's ability to predict outcomes for each construct. Notably, IWB demonstrated a Q^2 of 0.146, suggesting moderate predictive relevance, while other constructs exhibited smaller Q^2 values, indicating varying degrees of predictive capability.

The Direct and Indirect Effects

The direct effect test evaluates the immediate impact of one variable on another within the structural model. Examining the path

coefficients can determine the strength and significance of these direct relationships, providing insights into how TL directly influences IWB. The structural model results, including path coefficients and significance levels, are outlined in Table 8. The findings indicated TL's positive and statistically significant effect on IWB (5ØýÞ = 0.35, 5ØaÜ = 6.42, 5Ø]Ü < 0.01).

Table 8. Direct effects

Variable	Coefficient	T Statistics	P Values
TL > IWB	0.355	6.427	0.000

Besides, the indirect effects analysis also investigated the mediating roles of OC, SE, and WE in the link between TL and IWB. Understanding these pathways helps to elucidate how these factors facilitate the influence of TL on innovation within the workplace, as depicted in Table 9.

Table 9. Indirect effects

Variables	Coefficient	T Statistics	P Values
TL > OC > IWB	0.052	2.079	0.038
TL > SE > IWB	0.049	2.335	0.020
TL > WE > IWB	0.063	3.022	0.003

Hypothesis Evaluation

H1: Transformational leadership (TL) positively influences innovative work behavior (IWB)

The results supported the first hypothesis (H1), showing that TL has a positive and significant effect on IWB (5ØýÞ = 0.355, 5ØaÜ = 6.427, 5Ø]Ü < 0.01) (see Table 8). The direct effects of TL on innovative work behavior underscore the critical role leaders play in fostering an innovative culture within organizations. Transformational leaders inspire and intellectually stimulate their staff, encouraging them to think creatively and solve problems, aligning with existing literature emphasizing leadership's impact on innovation (Bass & Riggio, 2006). These findings are consistent with research indicating that TL positively influences IWB across various sectors (Afsar & Masood, 2018; Afsar & Umrani, 2020; Futri et al., 2023; Khan et al., 2019; Li et al., 2019). Such leaders motivate employees to embrace change and think innovatively (Surtiani et al., 2023). In educational contexts, the results underscore the importance of TL in driving innovation among teaching staff.

H2: Organizational Culture (OC) mediates the relationship between TL and IWB

The second hypothesis (H2) was supported, with OC significantly mediating the relationship between TL and IWB (5ØýÞ = 0.052, 5ØaÜ = 2.079, 5Ø]Ü < 0.05) (see Table 9). This suggests that a supportive organizational culture is essential for translating transformational leadership into innovative behaviors. The relationship between TL and IWB is significantly mediated by OC, suggesting that a supportive culture is essential for fostering innovation. Transformational leaders cultivate environments where shared values and norms prioritize creativity and risk-taking, facilitating innovative thinking (Schein, 2009). This underscores OC's critical role in translating TL practices into IWB. Research emphasizes that the influence of TL on

IWB is profoundly affected by OC, necessitating the alignment of leadership practices with cultural values (El Awar, 2022; Ferdinan & Lindawati, 2021). When integrated into OC, leadership initiatives enhance IWB by promoting environments conducive to creativity (Sueb & Sopiah, 2023).

The interplay between TL, OC, and IWB is examined across various contexts, including educational and public service organizations (Yusup & Maulani, 2023). These studies illustrate the intricate relationship between leadership styles and OC, emphasizing a holistic approach considering synergistic effects on performance. Key elements such as organizational support, innovation orientation, and meaningful work mediate this relationship (Sueb & Sopiah, 2023). Additionally, research indicates that OC mediates the relationship between authentic leadership and IWB, highlighting the importance of a conducive culture in fostering innovation (Indrayanti & Ulfia, 2022). Transformational leaders develop cultures encouraging knowledge sharing and creativity and enhancing IWB (Li et al., 2019; Surtiani et al., 2023). Thus, OC is a vital mediator between TL and IWB, enhancing creativity and innovation by aligning leadership with cultural values.

H3: Self-efficacy (SE) mediates the relationship between TL and IWB

The study found that SE was revealed to mediate the impact of TL on IWB (5ØýÞ = 0.049, 5ØaÜ = 2.335, 5Ø]Ü < 0.05) (see Table 9), confirming H3 and highlighting how transformational leaders can enhance employees' SE, leading to increased innovative behaviors. The impact of TL on IWB is significantly mediated by SE, underscoring the critical role of self-belief in driving innovation (Bandura, 1977). When employees are under the guidance of transformational leaders, their confidence in their abilities increases, resulting in a higher incidence of innovative behaviors. By nurturing SE, leaders encourage employees to participate in creative endeavors, thereby fostering a culture of innovation. SE refers to an individual's belief in their capacity to accomplish tasks and plays a pivotal role in translating TL into innovative behavior (Afsar & Masood, 2018; Hassan & Ali, 2021; Iddris et al., 2023; Uppathampracha & Liu, 2022). Studies show that SE positively mediates the effects of empowering and TL on IWB (Hassan & Ali, 2021; Iddris et al., 2023).

In various contexts, such as nursing informatics and entrepreneurial leadership, creative SE plays a vital mediator between TL and innovative behavior (Afsar & Masood, 2018; Indrayanti & Ulfia, 2022; Jing et al., 2021). Furthermore, SE influences the relationship between TL and innovativeness, with highly self-efficacious employees demonstrating more significant innovation under transformational leaders (Iddris et al., 2023). Research indicates that SE boosts confidence, motivation, and productivity, impacting innovative behavior (Sudarmo et al., 2022). Moreover, SE has been recognized as a sequential mediator, along with WE, in the connection between ethical leadership and innovative behavior (Uppathampracha & Liu, 2022), highlighting the multifaceted role of SE in cultivating an environment conducive to innovation. SE is crucial in mediating and moderating the connection between TL and innovative conduct. Encouraging employees to have confidence in their abilities promotes originality and stimulates innovation, emphasizing the importance of leaders nurturing SE within their teams.

H4: Work engagement (WE) mediates the relationship between TL and IWB

The study also found that WE had the most significant mediating effect (5ØýÞ = 0.063, 5ØaÜ = 3.022, 5Ø]Ü < 0.01) (see Table 9), supporting H4 and indicating that TL greatly enhances WE, resulting in higher levels of IWB. WE mediates

the connection between TL and IWB, which links leadership and increased innovation. This study provides a comprehensive understanding of the influence of TL and WE on innovative behavior. WE acts as a critical mediator, amplifying the effect of leadership on innovation. Engaged employees, who are motivated and deeply immersed in their tasks, are willing to innovate, underscoring the significance of promoting engagement to stimulate innovation (Schaufeli & Bakker, 2003). Studies have shown that TL and high WE can significantly boost innovation (Ariyani & Hidayati, 2018). Ariyani and Hidayati (2018) pointed out the substantial positive influence of TL and WE on innovative behavior, with engagement further amplifying this impact (Afsar & Umrani, 2020). Similarly, Li et al. (2019) underscored that engagement fosters innovation due to TL, indicating a favorable correlation between leadership, engagement, and innovation (Anom & Gustomo, 2023; Ariyani & Hidayati, 2018; Futri et al., 2023; Khan et al., 2019). This finding indicates that engaged employees are deeply involved in their work and are more willing to contribute to innovative efforts, making WE a crucial mediator in the TL-IWB relationship.

While this study contributes valuable insights into the role of transformational leadership and its mediating factors in fostering innovation, several avenues for future research remain. First, the cross-sectional design limits the ability to infer causality. Future studies should adopt longitudinal approaches to better understand the dynamics of leadership and innovation over time. Additionally, exploring other potential mediators, such as psychological empowerment or job autonomy, could provide a more comprehensive understanding of the mechanisms through which TL influences IWB. Finally, extending this research to other sectors and organizational settings would help to generalize the findings across different contexts.

■ CONCLUSION

In conclusion, this study emphasizes the critical role of transformational leadership (TL) in enhancing innovative work behavior (IWB) among teaching staff at state polytechnics. The findings demonstrate that TL influences IWB directly and indirectly through organizational culture, self-efficacy, and work engagement. These mediating factors provide a more comprehensive understanding of how leadership fosters innovation within educational settings.

The results suggest that institutions should integrate TL principles into leadership development programs, promote a supportive organizational culture, and boost employee engagement and self-efficacy to cultivate innovation. However, the study's cross-sectional design limits the ability to infer causality, and future research should consider longitudinal approaches to deepen the understanding of these dynamics.

Overall, this research contributes significantly to the existing literature on leadership and innovation, offering practical insights for educational institutions aiming to foster a culture of innovation. Future studies should continue to explore these relationships in diverse contexts and consider additional factors that may influence the effectiveness of TL in driving innovation.

■ REFERENCES

Afsar, B., Badir, Y., & Khan, M. M. (2015). Person–job fit, person–organization fit and innovative work behavior: The mediating role of innovation trust. *The Journal of High Technology Management Research*, *26*(2), 105–116. https://doi.org/10.1016/j.hitech.2015.09.001

Afsar, B., & Masood, M. (2018). Transformational leadership, creative self-efficacy, trust in supervisor, uncertainty avoidance, and innovative work behavior of nurses. *Journal of Applied Behavioral*

Science, *54*(1). https://doi.org/10.1177/0021886317711891

Afsar, B., & Umrani, W. A. (2020). Transformational leadership and innovative work behavior: The role of motivation to learn, task complexity and innovation climate. *European Journal of Innovation Management*, *23*(3). https://doi.org/10.1108/EJIM-12-2018-0257

Ali, H., Li, M., & Qiu, X. (2022). Employee engagement and innovative work behavior among chinese millennials: mediating and moderating role of work-life balance and psychological empowerment. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.942580

Alwahhabi, N., Dukhaykh, S., & Alonazi, W. B. (2023). Thriving at work as a mediator of the relationship between transformational leadership and innovative work behavior. *Sustainability*, *15*(15), 11540. https://doi.org/10.3390/su151511540

Anom, S. P., & Gustomo, A. (2023). The role of employees' innovative work in mediation of the influence of transformational leadership on performance improvement. *Journal of World Science*, *2*(5). https://doi.org/10.58344/jws.v2i1.213

Ariyani, N., & Hidayati, S. (2018). Influence of transformational leadership and work engagement on innovative behavior. *ETIKONOMI*, *17*(2). https://doi.org/10.15408/etk.v17i2.7427

Asurakkody, T. A., & Shin, S. Y. (2018). Innovative behavior in nursing context: a concept analysis. *Asian Nursing Research*, *12*(4), 237–244. https://doi.org/10.1016/j.anr.2018.11.003

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191–215. https://doi.org/10.1037/0033-295X.84.2.191

Bass, B. M., & Riggio, R. E. (2006). Transformational leadership. In *Transformational Leadership: Second Edition*. Psychology Press. https://doi.org/10.4324/9781410617095

Bibi, S., Khan, A., Qian, H., Garavelli, A. C., Natalicchio, A., & Capolupo, P. (2020). Innovative climate, a determinant of competitiveness and business performance in chinese law firms: the role of firm size and age. *Sustainability*, *12*(12), 4948. https://doi.org/10.3390/su12124948

Certo, S. C., & Certo, S. T. (2012). Modern management - concepts and skills. In *Pearson Education, Inc., Publishing as Prentice Hall, One Lake Street, Upper Saddle River, New Jersey*.

Contreras, F., Juarez, F., Cuero Acosta, Y. A., Dornberger, U., Soria-Barreto, K., Corrales-Estrada, M., Ramos-Garza, C., Steizel, S., Portalanza, A., Jauregui, K., Iwashita da Silva, L., & Yshikawa Salusse, M. A. (2020). Critical factors for innovative work behaviour in Latin American firms: Test of an exploratory model. *Cogent Business & Management*, *7*(1), 1812926. https://doi.org/10.1080/23311975.2020.1812926

DeNoyelles, A., Hornik, S. R., & Johnson, R. D. (2014). Exploring the dimensions of self-efficacy in virtual world learning: environment, task, and content. *MERLOT Journal of Online Learning and Teaching*, *10*(2).

Dvir, T., Eden, D., Avolio, B. J., & Shamir, B. (2002). Impact of transformational leadership on follower development and performance: a field experiment. *Academy of Management Journal*, *45*(4), 735–744. https://doi.org/10.2307/3069307

El Awar, K. (2022). The mediating effect of organizational culture of effectiveness on

the relationship between innovative work behavior and transformational leadership. *(c2022)* [LAU]. https://doi.org/10.26756/th.2022.480

Erhan, T., Uzunbacak, H. H., & Aydin, E. (2022). From conventional to digital leadership: exploring digitalization of leadership and innovative work behavior. *Management Research Review*, *45*(11), 1524–1543. https://doi.org/10.1108/MRR-05-2021-0338

Estherita, S. A., Vasantha, S., & Sudha, S. (2023). Influence of transformational leadership on organisational culture with a mediating effect of innovative work behaviour: a systematic review. *Journal of Law and Sustainable Development*, *11*(12), e2699. https://doi.org/10.55908/sdgs.v11i12.2699

Ferdinan, B. A., & Lindawati, T. (2021). The effect of transformational leadership and organizational culture on lecturer performance through innovative work behavior at catholic universities in surabaya. *International Journal of Applied Business and International Management*, *6*(2). https://doi.org/10.32535/ijabim.v6i2.1106

Futri, S. Y., Jimad, H., & Hayati, K. (2023). The influence of transformational leadership on employee performance through innovative work behavior as a mediating variable. *Journal of Economics, Management and Trade*, *29*(8). https://doi.org/10.9734/jemt/2023/v29i81113

George, J. M., & Jones, G. R. (2012). Understanding and managing organizational behavior (6th ed.). Pearson Education.

Grošelj, M., Èerne, M., Penger, S., & Grah, B. (2021). Authentic and transformational leadership and innovative work behaviour: the moderating role of psychological empowerment. *European Journal of Innovation Management*, *24*(3), 677–706. https://doi.org/10.1108/EJIM-10-2019-0294

Guarnaccia, C., Scrima, F., Civilleri, A., & Salerno, L. (2018). The role of occupational self-efficacy in mediating the effect of job insecurity on work engagement, satisfaction and general health. *Current Psychology*, *37*(3), 488–497. https://doi.org/10.1007/s12144-016-9525-0

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, *19*(2). https://doi.org/10.2753/MTP1069-6679190202

Hassan, R., & Ali, M. (2021). Impact of managerial coaching on innovative work behaviors through affective supervisory commitment: moderating role of self-efficacy. *Research Journal for Societal Issues*, *2*(1). https://doi.org/10.56976/rjsi.v2i1.1

Iddris, F., Dogbe, C. S. K., & Kparl, E. M. (2023). Transformational leadership, employee self-efficacy, employee innovativeness, customer-centricity, and organizational competitiveness among insurance firms. *International Journal of Innovation Science*, *15*(5). https://doi.org/10.1108/IJIS-05-2022-0092

Indrayanti, I., & Ulfia, N. (2022). Authentic leadership and innovative work behavior through organizational culture: A study in Indonesian state-owned enterprises. *F1000Research*, *11*. https://doi.org/10.12688/f1000research.126559.1

Janssen, O. (2000). Job demands, perceptions of effort reward fairness and innovative work behaviour. *Journal of Occupational and Organizational Psychology*, *73*(3), 287–302. https://doi.org/10.1348/

096317900167038

Jing, J., Niyomsilp, E., Xie, L., Jiang, H., & Li, R. (2021). Effect of transformational leadership on nursing informatics competency of chinese nurses: the intermediary function of innovation self-efficacy. *Studies in Health Technology and Informatics*, *284*. https://doi.org/10.3233/SHTI210722

Kareem, J., Patrick, H. A., Prabakaran, N., B, V., Tantia, V., M. P. M., P. K., & Mukherjee, U. (2023). Transformational educational leaders inspire school educators' commitment. *Frontiers in Education*, *8*. https://doi.org/10.3389/feduc.2023.1171513

Karimi, S., Ahmadi Malek, F., Yaghoubi Farani, A., & Liobikienė, G. (2023). The role of transformational leadership in developing innovative work behaviors: the mediating role of employees' psychological capital. *Sustainability*, *15*(2), 1267. https://doi.org/10.3390/su15021267

Khan, A. M., Jantan, A. H. Bin, Salleh, L. B. M., Dato'Mansor, Z., Islam, M. A., & Hosen, S. (2019). The impact of transformational leadership effects on innovative work behavior by the moderating role of psychological empowerment. *Journal of Reviews on Global Economics*, *8*. https://doi.org/10.6000/1929-7092.2019.08.79

Lambriex-Schmitz, P., Van der Klink, M. R., Beausaert, S., Bijker, M., & Segers, M. (2020). Towards successful innovations in education: Development and validation of a multi-dimensional Innovative Work Behaviour Instrument. *Vocations and Learning*, *13*(2), 313–340. https://doi.org/10.1007/s12186-020-09242-4

Lee, G., & Kim, C. (2024). Antecedents of innovative behavior in public organizations: the role of public service motivation, organizational commitment, and perceived innovative culture. *Frontiers in Psychology*, *15*. https://doi.org/10.3389/fpsyg.2024.1378217

Li, H., Sajjad, N., Wang, Q., Muhammad Ali, A., Khaqan, Z., & Amina, S. (2019). Influence of transformational leadership on employees' innovative work behavior in sustainable organizations: test of mediation and moderation processes. *Sustainability*, *11*(6), 1594. https://doi.org/10.3390/su11061594

Lin, Q. (2023). Transformational leadership and innovative work behavior: The role of identification, voice and innovation climate. *International Journal of Hospitality Management*, *113*, 103521. https://doi.org/10.1016/j.ijhm.2023.103521

Mohammed, A. A., & Al-Abrrow, H. (2024). The impact of empowering and transformational leadership on innovative behaviour: the mediating role of psychological empowerment in health-care sector. *Leadership in Health Services*, *37*(2), 231–246. https://doi.org/10.1108/LHS-05-2023-0036

Mubarak, N., Khan, J., Yasmin, R., & Osmadi, A. (2021). The impact of a proactive personality on innovative work behavior: the role of work engagement and transformational leadership. *Leadership & Organization Development Journal*, *42*(7), 989–1003. https://doi.org/10.1108/LODJ-11-2020-0518

Pieterse, A. N., van Knippenberg, D., Schippers, M., & Stam, D. (2010). Transformational and transactional leadership and innovative behavior: The moderating role of psychological empowerment. *Journal of Organizational Behavior*, *31*(4), 609–623. https://doi.org/10.1002/job.650

Sarwar, A., Imran, M. K., Anjum, Z.-U.-Z., & Zahid, U. (2020). How innovative climate

leads to project success: the moderating role of gender and work culture. *Innovation & Management Review*, *17*(4), 413–430. https://doi.org/10.1108/INMR-08-2019-0096

Sattayaraksa, T., & Boon-itt, S. (2018). The roles of CEO transformational leadership and organizational factors on product innovation performance. *European Journal of Innovation Management*, *21*(2), 227–249. https://doi.org/10.1108/EJIM-06-2017-0077

Schaufeli, W. B. (2017). Applying the Job Demands-Resources model. *Organizational Dynamics*, *46*(2), 120–132. https://doi.org/10.1016/j.orgdyn.2017.04.008

Schaufeli, W. B., & Bakker, A. B. (2003). UWES utrecht work engagement scale preliminarty manual. *Journal of Occupational Health Psychology*, *1*(November).

Schein, E. H. (2009). The Corporate Culture Survival Guide. In *John Wiley Trade* (Vol. 1).

Sehgal, R., Balasubramanian, S., Sreejith, S., & Chanchaichujit, J. (2021). Transformational leadership and employee innovation: Examining the congruence of leader and follower perceptions. *Journal of General Management*, *47*(1), 18–30. https://doi.org/10.1177/03063070211013337

Shivers-Blackwell, S. L. (2004). Using role theory to examine determinants of transformational and transactional leader behavior. *Journal of Leadership & Organizational Studies*, *10*(3), 41–50. https://doi.org/10.1177/107179190401000304

Stanescu, D. F., Zbuchea, A., & Pinzaru, F. (2021). Transformational leadership and innovative work behaviour: the mediating role of psychological empowerment. *Kybernetes*, *50*(5), 1041–1057. https://doi.org/10.1108/K-07-2019-0491

Stankevièiûtë, Þ., Staniðkienë, E., & Ciganë, U. (2020). Sustainable HRM as a driver for innovative work behaviour: do respect, openness, and continuity matter? the case of lithuania. *Sustainability*, *12*(14), 5511. https://doi.org/10.3390/su12145511

Steare, T., Gutiérrez Muñoz, C., Sullivan, A., & Lewis, G. (2023). The association between academic pressure and adolescent mental health problems: A systematic review. *Journal of Affective Disorders*, *339*, 302–317. https://doi.org/10.1016/j.jad.2023.07.028

Sudarmo, Suhartanti, P. D., & Prasetyanto, W. E. (2022). Servant leadership and employee productivity: a mediating and moderating role. *International Journal of Productivity and Performance Management*, *71*(8). https://doi.org/10.1108/IJPPM-12-2020-0658

Sueb, S., & Sopiah, S. (2023). Exploring the relationship between transformational leadership and innovative work behavior: a systematic literature review. *Jurnal Visi Manajemen*, *9*(2). https://doi.org/10.56910/jvm.v9i2.287

Surtiani, A., Panggabean, M. S., & Tanuwijaya, J. (2023). Antecedents of innovative work behavior in the public sector (study at the regional revenue agency of west java province). *International Journal Of Humanities Education and Social Sciences (IJHESS)*, *3*(3). https://doi.org/10.55227/ijhess.v3i3.794

Udin, U. (2023). A mediation-moderation model of transformational leadership and intrinsic work motivation for nurturing employee performance. *Journal of Social Economics Research*, *10*(2), 22–33. https://doi.org/10.18488/35.v10i2.3321

Uppathampracha, R., & Liu, G. (2022). Leading

for innovation: self-efficacy and work engagement as sequential mediation relating ethical leadership and innovative work behavior. *Behavioral Sciences*, *12*(8), 266. https://doi.org/10.3390/bs12080266

Wallach, E. J. (1983). Individuals and organizations: the cultural match. In *Training & Development Journal* (Vol. 37, Issue 2).

Wan, X., He, R., Zhang, G., & Zhou, J. (2022). Employee engagement and open service innovation: The roles of creative self-efficacy and employee innovative behaviour. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.921687

Yusop, S. R. M., Rasul, M. S., Mohamad Yasin, R., Hashim, H. U., & Jalaludin, N. A. (2022). An assessment approaches and learning outcomes in technical and vocational education: a systematic review using PRISMA. *Sustainability*, *14*(9), 5225. https://doi.org/10.3390/su14095225

Yusup, A., & Maulani, I. E. (2023). The influence of transformational leadership on employee motivation. *Devotion/ : Journal of Research and Community Service*, *4*(3), 798–802. https://doi.org/10.36418/devotion.v4i3.441

Zahari Ismail, M., & Zamberi Ahmad, S. (2013). Entrepreneurship education: an insight from Malaysian polytechnics. *Journal of Chinese Entrepreneurship*, *5*(2), 144–160. https://doi.org/10.1108/JCE-02-2013-0003