MEDIATION AND MODERATION OF SELF-EFFICACY AND WORK ENGAGEMENT ON THE RELATIONSHIP BETWEEN INNOVATIVE LEADERSHIP AND CHANGE BEHAVIOR

Xie Yuhua, Sukhum Moonmuang* and Sataporn Pruettikul
Student of Leadership in Education Administration program, Bangkokthonburi University,
Bangkokthonburi University and Bangkokthonburi University
*Corresponding Author E-mail: sukhum.moo@bkkthon.ac.th
Received Date: January 29, 2026 ; Revised Date: February 21, 2026 ; Accepted Date: February 23, 2026

Abstract

The objectives of this research were: (1) to identify the factors influencing teachers' change behavior in higher education institutions in Guangxi Province; (2) to determine whether self-efficacy mediates the relationship between innovative leadership and change behavior; (3) to examine whether work engagement mediates the relationship between innovative leadership and change behavior; (4) to investigate whether self-efficacy moderates the relationship between innovative leadership and change behavior; and (5) to explore whether work engagement moderates the relationship between innovative leadership and change behavior. The research employed proportional stratified random sampling to select 566 teachers from a population of approximately 10,300 faculty members in six universities in Guangxi Province. Data was collected using a five-point Likert scale questionnaire and analyzed through descriptive statistics. To enhance analytical rigor, confirmatory factor analysis was used to validate the measurement model, followed by mediation and moderation analysis and structural equation modeling.

The results indicated that innovative leadership, self-efficacy, and work engagement were significant factors influencing teachers' change behavior in higher education institutions in Guangxi Province. Self-efficacy demonstrated a positive and significant mediating effect on the relationship between innovative leadership and change behavior. Work engagement also mediated this relationship; however, the mediation effect was negative, indicating a suppressive role. In addition, self-efficacy moderated the relationship between innovative leadership and change behavior, such that the effect of innovative leadership was stronger and positive at lower levels of self-efficacy, weaker but still positive at moderate levels, and weakest and negative at higher levels. Furthermore, work engagement exhibited a moderating effect, whereby higher levels of work engagement strengthened the positive effect of innovative leadership on change behavior, while lower levels weakened this relationship.

Keywords : Innovative Leadership, Change Behavior, Self-Efficacy, Work Engagement, Mediating Effect, Moderating Effect

Background and significance of the problem

Amid ongoing educational reform, teachers' proactive change behavior has become essential for improving quality and fostering innovation (Crant, 2000). Innovative leadership—emphasizing creativity, flexibility, and vision—is believed to stimulate such change at both instructional and organizational levels (Leithwood and Jantzi, 2006). However, the extent to which leadership translates into actual behavioral transformation depends on teachers' psychological resources, particularly self-efficacy and work engagement (Bandura, 1997; Schaufeli and Bakker, 2004). Although prior studies have linked these variables, limited research has systematically examined their mediating and moderating roles, especially within the Chinese context. Given Guangxi's multi-ethnic and underdeveloped characteristics, this study investigates how innovative leadership influences

teachers' proactive change behavior through self-efficacy and work engagement to provide context-specific theoretical and practical insights.

Work engagement may demonstrate a suppressive mediation effect because, although innovative leadership enhances teachers' vigor and dedication, highly engaged teachers may become more deeply invested in existing roles, routines, and performance goals. This strong task focus can unintentionally reduce their willingness to disrupt established practices, thereby weakening the indirect pathway from leadership to change behavior. From a statistical perspective, suppression may also occur when the mediator shares substantial variance with both the predictor and outcome, altering the direction of the indirect effect once overlapping variance is controlled (MacKinnon, et al., 2000).

Research objectives

1. To find out factors affecting change behavior in higher education institutions in Guangxi Province.

2. To determine if self-efficacy mediates the relationship between innovative leadership and change behavior.

3. To examine if work engagement mediates the relationship between innovative leadership and change behavior.

4. To investigate if self-efficacy moderates the relationship between innovative leadership and change behavior.

5. To explore if work engagement moderates the relationship between innovative leadership and change behavior.

Research Framework

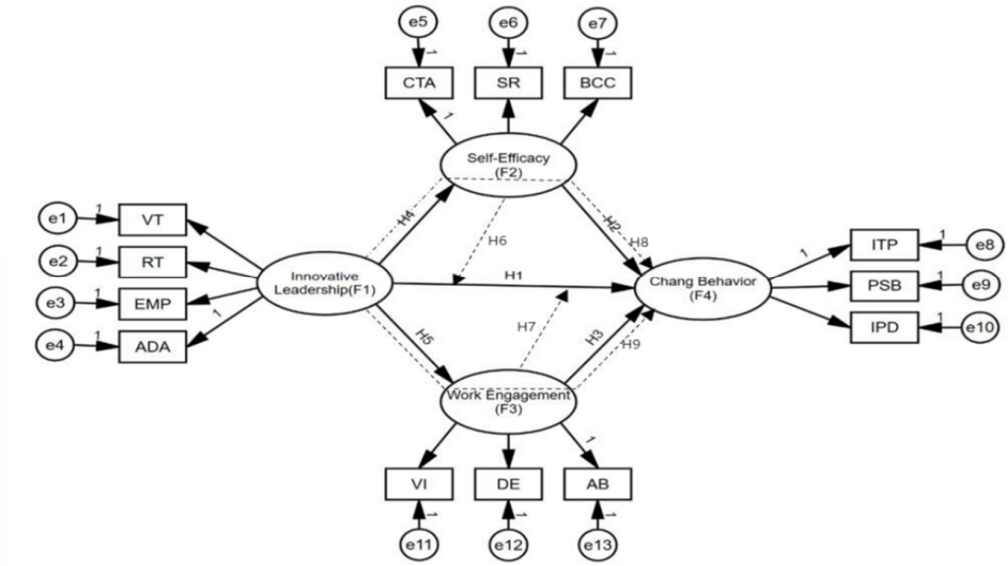


Figure 1 Conceptual Framework of this research

Research Hypothesis

H1: Innovation leadership effect on change behavior.

H2: Self-efficacy effect on change behavior.

H3: Work engagement effect on change behavior.

H4: Innovation leadership effect on Self-efficacy.

H5: Innovation leadership effect on work engagement.

H6 : Self-efficacy moderating effect the relationship between Innovation leadership and change behavior.

H7: Work engagement moderating effect the relationship between Innovation leadership and change behavior.

H8 : Self-efficacy mediating effect on the relationship between Innovation leadership and change behavior.

H9 : Work engagement mediating effect on the relationship between Innovation leadership and change behavior.

Research Methodology

This study adopts quantitative research methods using the cross-sectional survey approach. The Structural Equation Modeling with mediation and moderation effect were applied to investigate the relationship between innovative leadership and change behavior in Guangxi Province China.

Population and Sample

Population in this study were university teachers, engaged in teaching and administrative work in six universities in Guangxi Zhuang Autonomous Region, with a total number of approximately 10,300, samples were randomly selected by using Stratified Random Technique, sample size of 566 were selected for data collection and data analysis.

Research Instruments

The main research instrument adopted in this study was a self-compiled five-point Likert scale questionnaire. The questionnaire was compiled based on relevant theories and existing research results such as innovative leadership, self-efficacy, work engagement and teachers' change behavior, and was revised and integrated in combination with the context of colleges and universities in Guangxi. Before the formal implementation of the measurement, the study conducted content validity with an Index of Item-Objective Congruence (IOC) ranging from .60 to 1.00, and reliability indicated by Cronbach's alpha reliability ranging from 0.85 to 0.93. The instruments were proved appropriate for data analysis.

Data Collection

The data collection process began by sending the questionnaires to the coordinating teachers. These teachers had distributed the surveys to the selected participants in their institutions. Respondents were given two weeks to complete the survey and return their responses. To ensure a high response rate, a reminder will be sent out after one week.

Data Analysis

1. Demographic of samples using the frequency and the percentage.

2. Descriptive statistics for variable analysis of sample using mean, standard deviation, skewness, and kutosis.

3. Confirmatory Factor Analysis (CFA) for measurement model estimation.

4. Structural Equation model for hypothesis testing.

Research Result

1) Demographic of samples analysis

Table 1 Demographic statistics for samples

Variable	Group	Frequency	% of Total	Cumulative %
Gender	Male	209	36.9%	36.9%
	Female	357	63.1%	100.0%
Age	Under 25 years old	36	6.4%	6.4%
	26-35 years old	233	41.2%	47.5%
	36-45 years old	154	27.2%	74.7%
	46-50 years old	78	13.8%	88.5%
	More than 50 years	65	11.5%	100.0%
Education	Bachelor	43	7.6%	7.6%
	Master	371	65.5%	73.1%
	Doctor	152	26.9%	100.0%
Years	less than one year	45	8.0%	8.0%
	1-5 years	132	23.3%	92.0%
	6-10 years	122	21.6%	68.7%
	11-15 years	105	18.6%	47.2%
	More than 16 years	162	28.6%	100.0%
Position	Teacher position	446	78.8%	78.8%
	Management position	94	16.6%	21.2%
	Other position	26	4.6%	4.6%

Data analysis in Table 1 showed that total respondents were female (63.1%), while males accounted for 36.9% of the sample. In terms of age, the majority were between 26–35 years old (41.2%), followed by those aged 36–45 years (27.2%). Regarding educational attainment, most participants held a master's degree (65.5%), with smaller proportions holding doctoral (26.9%) or bachelor's degrees (7.6%). For work experience, the largest group had more than 16 years of experience (28.6%), followed by those with 1–5 years (23.3%) and 6–10 years (21.6%). Lastly, most respondents worked in teacher positions (78.8%), while 16.6% held management positions and 4.6% were in other roles.

2) Descriptive statistics

Table 2 Descriptive data for all observed variables

Observed variables	$\bar{X}$	SE	SD	%CV	Skewness		Kurtosis	
					Skewness	SE	Kurtosis	SE
VT	3.22	0.0328	0.781	24.28%	0.2661	0.103	-0.1257	0.205
RT	3.2	0.0321	0.764	23.88%	0.1344	0.103	-0.0288	0.205
EMP	3.21	0.0325	0.773	24.09%	0.0146	0.103	-0.4272	0.205
ADA	3.2	0.0291	0.691	21.59%	0.1142	0.103	-0.2034	0.205

Observed variables	$\bar{X}$	SE	SD	%CV	Skewness		Kurtosis	
					Skewness	SE	Kurtosis	SE
CTA	3.38	0.0324	0.771	22.83%	-0.2066	0.103	-0.1767	0.205
SR	3.45	0.0341	0.81	23.48%	-0.4958	0.103	-0.157	0.205
BCC	3.4	0.0329	0.782	23.00%	-0.1939	0.103	-0.3531	0.205
VI	3.31	0.033	0.785	23.71%	-0.2152	0.103	-0.3055	0.205
DE	3.42	0.0338	0.804	23.51%	-0.0855	0.103	-0.4787	0.205
AB	3.33	0.0336	0.799	23.99%	-0.3021	0.103	-0.4408	0.205
ITP	3.35	0.0331	0.786	23.43%	-0.1115	0.103	-0.432	0.205
PSB	3.33	0.0343	0.816	23.55%	-0.2877	0.103	-0.4808	0.205
IPD	3.38	0.0334	0.795	24.50%	-0.2294	0.103	-0.4931	0.205

The analysis in Table 2 descriptive statistics of the observed variables, indicated that all constructs had mean scores ranging from 3.20 to 3.45, suggesting that respondents generally reported moderate to moderately high perceptions across items. The standard deviations (SD = 0.69–0.82) and coefficients of variation (%CV = 21.59%–24.50%) showed relatively low variability, indicating consistent responses among participants. Skewness values ranged from approximately –0.50 to 0.27, all within ±1, demonstrating that the data were approximately normally distributed and only slightly skewed. Similarly, kurtosis values fell between –0.49 and –0.03, also within acceptable limits for normality. Overall, the results suggested that the distribution of observed variables satisfied basic assumptions of normality and reflected stable response patterns.

3) Measurement model

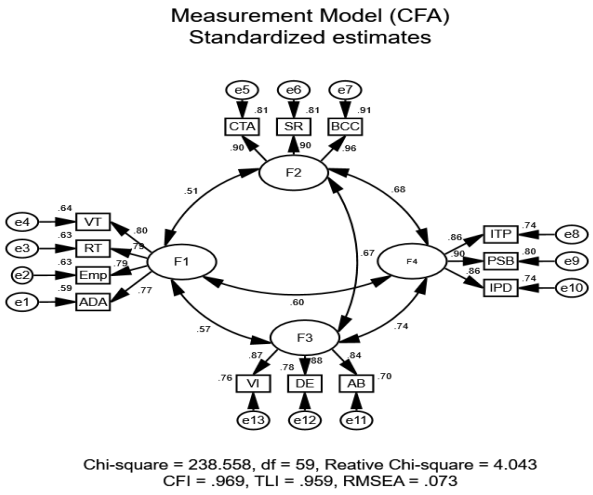


Figure 2 Confirmatory Factor Analysis

The confirmatory factor analysis (CFA) demonstrated that the measurement model achieved a good fit to the data, as evidenced by several key fit indices. The chi-square value was statistically significant, $\chi^2(59) = 238.558$, with a relative chi-square (χ^2/df) of 4.043, which fell within the acceptable threshold for complex models. More importantly, the comparative fit index (CFI = .969) and Tucker–Lewis Index (TLI = .959) both exceeded the recommended cutoff of .95, indicating excellent model fit (Hu and Bentler, 1999). The RMSEA value of .073 also met the acceptable range below .08, suggesting that the model demonstrated a reasonable approximation of the population covariance structure (Browne and Cudeck, 1993).

All observed variables loaded strongly and significantly onto their respective latent constructs, with standardized factor loadings ranging from .59 to .87 for F1, .81 to .96 for F2, .70 to .87 for F3, and .74 to .90 for F4. These values exceeded the commonly accepted minimum loading of .50, indicating that each indicator contributed meaningfully to the construct it represented (Hair, et al., 2019). The structural relationships among latent variables also showed moderate to strong correlations, such as the paths from F1 to F2 (β = .51), F1 to F3 (β = .57), F2 to F4 (β = .68), and F3 to F4 (β = .74), suggesting theoretically consistent and empirically supported inter-factor associations.

Overall, the CFA results supported the construct validity of the measurement model, demonstrating that the indicators were reliable and the relationships between latent variables were theoretically coherent. The combination of high factor loadings, strong inter-factor correlations, and robust model-fit indices provided substantial evidence that the measurement structure accurately represented the underlying theoretical framework tested in the study.

Measurement quality

Table 3 Composite Reliability, Average Variance Extracted, Maximum Shared Variance, Maximum Reliability, and Fornell & Larker Discriminant validity criteria

Construct	CR	AVE	MSV	MaxR(H)	F1	F4	F2	F3
F1	0.869	0.623	0.363	0.869	0.79			
F4	0.906	0.762	0.548	0.908	0.603***	0.873		
F2	0.942	0.844	0.461	0.95	0.507***	0.679***	0.919	
F3	0.898	0.746	0.548	0.9	0.573***	0.740***	0.672***	0.864

Data analysis in Table 3. The reliability and validity analysis of the latent constructs indicated strong internal consistency and satisfactory convergent validity across all factors. Composite reliability (CR) values ranged from .869 to .942, exceeding the recommended threshold of .70, confirming that the items consistently measured their respective constructs (Hair, et al., 2019). Similarly, average variance extracted (AVE) values varied between .623 and .844, all above the .50 cutoff, demonstrating adequate convergent validity and indicating that each construct captured more than half of the variance of its indicators. The MaxR(H) values, ranging from .869 to .950, were also consistent with the CR values, providing further confirmation of construct reliability.

In terms of discriminant validity, the maximum shared variance (MSV) for each construct was lower than its AVE, supporting the Fornell–Larcker criterion and indicating that each factor was empirically distinct (Fornell and Larcker, 1981). However, notable correlations existed among the

constructs, such as the strong correlations between F3 and F4 (r = .740, p < .001) and between F2 and F4 (r = .679, p < .001), suggesting meaningful theoretical relationships while still maintaining discriminant validity. The diagonal values (square roots of AVE), shown in bold (e.g., √AVE for F4 = .873), were all greater than their corresponding inter-construct correlations, providing additional evidence that discriminant validity was achieved.

4) Hypothesis testing

1. Hypothesis for direct effects

Table 4 Hypothesis testing for direct effects

Hypothesis	IV	effect	DV	Estimate	S.E.	z	P
H1	F1	=>	F4	0.263	0.065	4.043	***
H2	F2	=>	F4	0.298	0.038	7.796	***
H3	F3	=>	F4	0.42	0.045	9.263	***
H4	F1	=>	F2	0.726	0.06	12.141	***
H5	F1	=>	F3	0.78	0.061	12.814	***

The structural model analysis revealed that all hypothesized relationships were statistically significant and positive, indicating strong predictive effects among the variables. Innovation leadership had a significant positive effect on change behavior (H1: β = .263, z = 4.043, p < .001), consistent with prior research suggesting that innovative leadership enhances employees' readiness and motivation to adopt new behaviors (Yukl, 2013). Self-efficacy also significantly influenced change behavior (H2: β = .298, z = 7.796, p < .001), supporting findings that individuals with higher confidence in their abilities are more likely to engage in constructive and adaptive actions (Bandura, 1997). Work engagement exerted the strongest direct effect on change behavior (H3: β = .420, z = 9.263, p < .001), aligning with evidence that highly engaged employees demonstrate greater enthusiasm and willingness to embrace organizational change (Bakker & Demerouti, 2014). Additionally, innovation leadership significantly predicted both self-efficacy (H4: β = .726, z = 12.141, p < .001) and work engagement (H5: β = .780, z = 12.814, p < .001), reinforcing previous scholarship indicating that supportive, forward-thinking leadership enhances employees' psychological empowerment and positive work states. Overall, the results supported all five hypotheses and underscored the central role of innovation leadership in shaping self-efficacy, work engagement, and ultimately change behavior.

2. Hypothesis of indirect effects

Table 5 Hypothesis Testing of Indirect Paths in Mediation Model

				95% Confidence Intervals				
Hypotheses	Description	Estimate	SE	Lower	Upper	b	z	P
H8	F1=>F2=>F4	0.747	0.071	0.608	0.885	0.492	10.575	<.001
H9	F1=>F3=>F4	-0.224	0.082	-0.385	-0.063	-0.147	-2.723	0.006

Note. * p < .05, ** p < .01, *** p < .001

Table 5 indicated that the indirect effects of innovative leadership on change behavior through self-efficacy and work engagement were both significant but operated in different directions. The pathway through self-efficacy (H8) was positive and significant (β = .492, p < .001), suggesting that innovative leadership enhances teachers' confidence, which in turn promotes change behavior, consistent with empowerment theory (Bandura, 1997). In contrast, the indirect effect through work engagement (H9) was negative yet significant (β = –.147, p = .006), indicating a suppressor effect in which engagement reduced the overall influence of leadership on change behavior. Overall, the findings confirm a strong positive mediating role of self-efficacy and a significant but unexpected negative mediating role of work engagement.

3. Hypothesis testing for moderation effect

Table 6 The results of the assessment of the hypothesis testing of the moderated model

Label	Pred	effect	Dep	Estimate	S.E.	z	P
H6	F1xF2	=>	F4	-0.113	0.006	-19.553	***
H7	F1xF3	=>	F4	0.205	0.007	29.258	***

Note. * p < .05, ** p < .01, *** p < .001

Table 6 showed the tested of two moderation hypotheses (H6 and H7) to determine whether the relationships between Innovative Leadership (F1) and Change Behavior (F4) were contingent upon the levels of Self-Efficacy (F2) and Work Engagement (F3). The results revealed that both interaction terms were statistically significant, indicating that the influence of leadership on change behavior was not uniform but depended critically on these psychological states of teachers (Aiken, L. S., and West, S. G, 1991).

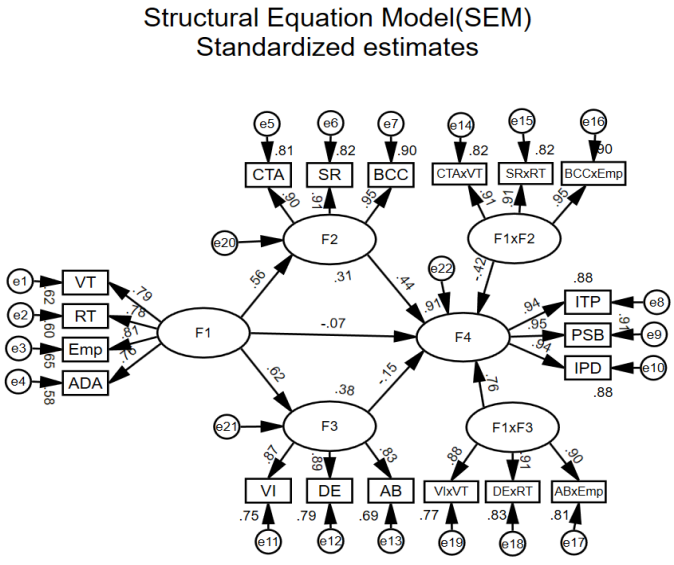


Figure 3 Mediation and moderation effect SEM analysis

Discussions

This study confirms that innovative leadership significantly promotes teachers' proactive change behavior in higher education institutions. Consistent with Transformational Leadership Theory (Bass, 1985), leaders who articulate vision, provide intellectual stimulation, and encourage experimentation foster higher levels of extra-role and change-oriented behaviors. Empirical studies have similarly shown that transformational and innovative leadership positively predict proactive work behavior and organizational change readiness (Afsar, et al., 2014; Gong, et al., 2009). From the perspective of Social Exchange Theory (Blau, 1964), when leaders demonstrate support and trust, teachers reciprocate through constructive behaviors that benefit institutional reform.

The mediating role of self-efficacy is strongly supported by Social Cognitive Theory (Bandura, 1986), which emphasizes that efficacy beliefs shape individuals' motivation, resilience, and behavioral choices. Prior research has demonstrated that leadership enhances employee self-efficacy, which in turn predicts innovation, adaptability, and change behavior (Walumbwa, et al., 2008; Luthans, et al., 2007). Similarly, work engagement—conceptualized within the Job Demands–Resources (JD-R) Model (Bakker and Demerouti, 2007)—has been widely linked to proactive performance and organizational change (Christian, et al., 2011). However, the observed suppressor effect aligns with Conservation of Resources Theory (Hobfoll, 1989), suggesting that individuals may allocate limited psychological resources toward ongoing responsibilities, thereby weakening the indirect pathway between leadership and additional change initiatives.

The moderation findings are also supported by prior empirical evidence. Research indicates that leadership effects are stronger among employees with lower personal resources, as they rely more heavily on external guidance (Breevaart, et al., 2014), which explains the negative moderating role of self-efficacy. Conversely, studies grounded in the JD-R framework show that high engagement amplifies the positive impact of leadership on performance outcomes (Tims, et al., 2011). Overall, these findings are consistent with accumulated evidence that leadership effectiveness depends on the interaction between contextual factors and individual psychological resources, reinforcing the importance of integrating leadership development with strategies that strengthen teachers' efficacy and engagement in higher education reform contexts.

Recommendations

1. Recommendation for Practical Application

First, higher education institutions should strengthen innovative leadership development programs for administrators. Training should emphasize vision articulation, intellectual stimulation, creative problem-solving, and supportive communication, as these behaviors directly and indirectly enhance teachers' proactive change behavior. Leadership development initiatives may incorporate mentoring systems, innovation workshops, and strategic dialogue platforms to cultivate a culture that encourages experimentation and continuous improvement.

Second, institutions should actively foster teachers' psychological resources, particularly self-efficacy and work engagement. Professional development programs, peer coaching, and mastery-experience opportunities can strengthen teachers' confidence in managing change. At the same time, workload balance and resource support should be carefully managed to prevent highly engaged teachers from becoming overly absorbed in routine responsibilities, which may inadvertently suppress

their change-oriented contributions. Building a supportive organizational climate that integrates motivational support with innovation goals is essential for sustainable educational reform.

2. Recommendation for Further Research

Future research should further explore the suppressor or competitive mediation effect of work engagement identified in this study. Longitudinal designs are recommended to examine causal relationships and dynamic changes over time, particularly to determine whether engagement shifts from facilitating to constraining change behavior under varying contextual conditions. Additionally, qualitative or mixed-method approaches could provide deeper insight into how teachers allocate psychological resources when balancing routine tasks and reform initiatives.

Moreover, future studies may incorporate additional psychological or contextual variables, such as organizational climate, perceived organizational support, innovation climate, or emotional exhaustion, to expand the explanatory power of the model. Cross-cultural comparisons across different provinces or countries would also be valuable in testing the generalizability of the findings. Finally, multi-level modeling could be employed to examine leadership effects at both individual and institutional levels, thereby providing a more comprehensive understanding of how innovative leadership operates within complex higher education systems.

References

Afsar, B., et al. (2014). Transformational leadership and innovative work behavior: The role of motivation to learn, task complexity and innovation climate. **European Journal of Innovation Management,** 17 (4), 478-499.

Aiken, L. S., and West, S. G. (1991). **Multiple regression : Testing and interpreting interactions**. Sage Publications.

Bakker, A. B., and Demerouti, E. (2007). The job demands–resources model : State of the art. **Journal of Managerial Psychology,** 22 (3), 309-328.

Bandura, A. (1986). **Social foundations of thought and action : A social cognitive theory**. Prentice-Hall.

_____. (1997). **Self-efficacy : The exercise of control**. W. H. Freeman.

Bass, B. M. (1985). **Leadership and performance beyond expectations**. Free Press.

Blau, P. M. (1964). **Exchange and power in social life**. Wiley.

Breevaart, K., et al. (2014). Daily transactional and transformational leadership and daily employee engagement. **Journal of Occupational and Organizational Psychology**, 87 (1), 138-157.

Browne, M. W., and Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), **Testing structural equation models** (pp. 136-162). Sage Publications.

Christian, M. S., et al. (2011). Work engagement : A quantitative review and test of its relations with task and contextual performance. **Personnel Psychology,** 64 (1), 89-136.

Crant, J. M. (2000). Proactive behavior in organizations. **Journal of Management,** 26 (3), 435-462.

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. **Journal of Marketing Research**, 18 (1), 39-50.

Gong, Y., et al. (2009). Employee learning orientation, transformational leadership, and employee creativity. **Academy of Management Journal**, 52 (4), 765-778.

Hair, J. F., et al. (2019). **Multivariate data analysis**. 8th ed. Cengage Learning.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. **American Psychologist**, 44 (3), 513-524.

Hu, L. T., and Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. **Structural Equation Modeling,** 6 (1), 1-55.

Leithwood, K., and Jantzi, D. (2006). Transformational school leadership for large-scale reform : Effects on students, teachers, and their classroom practices. **School Effectiveness and School Improvement,** 17 (2), 201-227.

Luthans, F., et al. (2007). **Psychological capital: Developing the human competitive edge.** Oxford University Press.

MacKinnon, D. P., et al. (2000). Equivalence of the mediation, confounding and suppression effect. **Prevention Science**, 1 (4), 173-181.

Schaufeli, W. B., and Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement : A multi-sample study. **Journal of Organizational Behavior**, 25 (3), 293-315.

Tims, M., et al. (2011). Do transformational leaders enhance their followers' daily work engagement? **The Leadership Quarterly,** 22 (1), 121-131.

Walumbwa, F. O., et al. (2008). Authentic leadership : Development and validation of a theory-based measure. **Journal of Management**, 34 (1), 89–126.

Yukl, G. (2013). **Leadership in organizations.** 8th ed. Pearson Education.