

Entrepreneurial Leadership and Self-Efficacy: A Moderated Mediation Study of Psychological Empowerment and Empowering Climate in NPD Projects

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Abstract

Entrepreneurial leaders are expected to make employees more innovative, but the psychological route through which they build employees' belief in their own capabilities is less well documented, particularly in technology firms in developing economies. Drawing on social cognitive theory, we tested a model in which entrepreneurial leadership strengthens psychological empowerment, empowerment in turn raises self-efficacy and an empowering climate conditions the first link. We surveyed 445 IT professionals across Pakistan, recruited through snowball sampling and measured in three time-lagged waves. Partial least squares structural equation modeling supported the reliability and convergent validity of all four constructs. Entrepreneurial leadership predicted psychological empowerment ($\beta = .455, p < .001$) and psychological empowerment predicted self-efficacy very strongly ($\beta = .790, p < .001, f^2 = 1.665$). The model explained 38.4% of the variance in empowerment and 62.5% in self-efficacy. Empowering climate did not moderate the leadership–empowerment link ($\beta = -.026, p = .521$), possibly because climate and leadership overlapped heavily ($r = .721$). The results place psychological empowerment at the center of how leadership becomes employee confidence. For firms, they suggest building empowerment directly

instead of waiting for a supportive climate to amplify leadership. We discuss implications for social cognitive theory and outline multilevel, multisource designs for future work.

Keywords: Entrepreneurial Leadership, Psychological Empowerment, Self-efficacy, Empowering Climate, Social Cognitive Theory

1. Introduction

Leaders who behave entrepreneurially inside established organizations are supposed to make their people more confident, not just more compliant. That claim shows up constantly in the leadership literature, yet the psychological route from a leader's entrepreneurial behavior to an employee's belief in their own capability is still thinly mapped (Waheed & Khan, 2025a), especially outside the Western, large-firm settings where most of the theory was built (Ben-hua & Wu, 2025; Vu et al., 2025). Entrepreneurial leadership (EL) blends visionary communication, opportunity framing and a tolerance for calculated risk with the day-to-day coaching that lets subordinates act on that vision (Renko et al., 2013). Self-efficacy (SE), an employee's generalized belief that they can execute difficult tasks and adapt under pressure, has repeatedly predicted performance, persistence and innovative behavior across occupational settings (Qiao et al., 2025).

The present study argues that psychological empowerment (PE), Spreitzer's (1995) four-dimensional state of felt meaning, competence, self-determination and impact, is the mechanism that converts a leader's entrepreneurial behavior into an employee's self-efficacy beliefs. This is not a novel pairing in isolation, rather psychological empowerment has been shown to mediate the effects of transformational, servant, distributed and inclusive leadership on outcomes ranging from innovative work behavior to organizational citizenship (Dongxian & Batool, 2024; Jameel et al., 2025; Umrani et al., 2024). What is missing is a direct test of the specific EL → PE → SE chain and an examination of whether the organizational climate surrounding that first link amplifies or dampens it. Several recent studies have folded self-efficacy into entrepreneurial leadership models only as a moderator or a downstream correlate of innovative behavior (Doğan & Aykan, 2025; Kyei-Frimpong et al., 2025), leaving its role as the terminal outcome of an empowerment-driven pathway comparatively untested.

The second construct highlighted is empowering climate (EC) which is the shared perception of an environment encouraging autonomy, competence development and collegial relatedness (Appleton et al., 2016). The results of psychological empowerment climate research are mixed: there are some studies that show that a positive climate increases the translation of leadership behavior into felt empowerment (Barik & Nayak, 2025; Kluijtmans et al., 2024), whereas others studies indicate that the moderating effect is statistically insignificant when leadership and climate perceptions are overlapping to such an extent that they are comparable (Sarwar et al., 2026). Because entrepreneurial leaders are themselves a primary source of the climate employees perceive, EC and EL may be too entangled, empirically and conceptually, for climate to add explanatory power once leadership is already in the model. Testing this directly, rather than assuming climate always amplifies leadership effects, is one of this paper's contributions.

The theoretical anchor for the model is Bandura's (1997) social cognitive theory (SCT), which explains behavior as the product of reciprocal interaction between personal cognition, behavior, and environmental influence, so-called triadic reciprocal determinism. Within SCT, self-efficacy beliefs are built from four sources: mastery experience, vicarious learning, verbal persuasion, and physiological or affective states. Psychological empowerment maps cleanly onto the mastery and persuasion pathways: an employee who is entrusted with meaningful, autonomous, high-impact work accumulates exactly the kind of graduated mastery experience that SCT identifies as the strongest efficacy source, and a leader who frames that work entrepreneurially supplies the verbal persuasion component. In this reading, the entrepreneurial leadership is not self-efficacy directly, rather it is the empowering environment in which self-efficacy develops. In this study, the logic is tested through three wave time-lagged survey data collected from 445 information technology (IT) professionals engaged in new product development (NPD) projects in software industry of Pakistan by the means of snowball sampling. To minimize common method variance, entrepreneurial leadership and empowering climate were measured at Time 1, psychological empowerment at Time 2, and self-efficacy at Time 3. Three hypotheses were examined using partial least squares structural equation modeling (PLS-SEM): entrepreneurial leadership positively influences psychological empowerment, psychological empowerment positively influences self-efficacy and the first relationship between entrepreneurial leadership to psychological empowerment is moderated by psychological empowerment.

The contribution in this paper is threefold. Empirically, it isolates and tests a specific empowerment-mediated pathway from entrepreneurial leadership to self-efficacy that prior studies have only implied. Theoretically, it extends social cognitive theory's account of leadership-driven efficacy formation to a specific, high-uncertainty occupational context, IT new product development, where the mastery and persuasion sources of efficacy are constantly disrupted by shifting technical demands. Contextually, it adds evidence from Pakistan's IT sector, a rapidly growing but comparatively under-studied labor market (Nawaz, 2025; Qammar et al., 2024), to a literature still dominated by East Asian and Gulf-region samples.

2. Theoretical Background and Hypothesis Development

2.1 Social Cognitive Theory as the Pinning Theory

Bandura's (1997) social cognitive theory views human functioning as an ongoing and bidirectional process between people, their actions and the environment. The belief that one can organize and execute the courses of action necessary to produce the given attainments (the belief in self-efficacy) lies at the heart of this system, influencing the kinds of environments that people choose to enter, the amount of effort put forth, and how setbacks are interpreted. Self-efficacy is developed through four sources: mastery experience (success at the actual task), vicarious experience (observing credible others successfully complete the task), verbal/social persuasion (being told successfully and credibly that one can do the task), and interpretation of physiological and affective states. In recent times, SCT has been the preferred choice for explaining the process by which a leader's behavior is translated into the follower's cognition and, ultimately, behavior, whereas the assumption of direct behavioral transfer is abandoned in the study of leadership (Qiao et al., 2025).

In this study, entrepreneurial leadership provides opportunity-seeking, risk-tolerant models that followers can use as examples to emulate, and verbal persuasion. However, SCT's own reasoning implies that efficacy beliefs are not likely to be long lasting when based on persuasion and modeling alone, but when accompanied by mastery experience (Waheed & Khan, 2025b). The psychological empowerment that provides that mastery experience inside the theory is that the employee feels meaning, feels competent, feels free to decide what he or she does, and feels like he or she is making a difference. In the theory, these four constructs i.e. feeling of meaning, feeling competent, feeling free to choose what to do, and feeling like he or she is making a difference,

provide the employee with the experience of psychological empowerment, which is, by definition, the accumulation of graduated, self-attributed successes (Bandura, 1997). The model posits that the relationship between leadership and efficacy is partially mediated by PE, and not direct; the model predicts leadership will influence efficacy primarily by influencing the conditions when mastery experience occurs, it will not do so by transmitting confidence directly.

2.2 Entrepreneurial Leadership and Psychological Empowerment

Entrepreneurial leadership is the behavior a leader displays when framing and communicating an opportunity-focused vision, and then persuading followers to pursue that vision under uncertainty (Renko et al., 2013). Because pursuing that vision requires delegating genuine discretion, entrepreneurial leaders are structurally pushed toward empowering behaviors even when empowerment is not their explicit goal. Evidence for this link is now fairly dense. Entrepreneurial leadership has been shown to build psychological empowerment among start-up employees in Saudi Arabia (Abanumay et al., 2025), among hospitality frontline staff in Ghana (Kyei-Frimpong et al., 2025), and jointly with self-efficacy as parallel mediators of innovative work behavior in the Turkish services sector (Doğan & Aykan, 2025). Adjacent leadership styles produce a parallel pattern: distributed leadership raises psychological empowerment among Chinese knowledge workers (Dongxian & Batool, 2024) and servant leadership does the same in a Chinese manufacturing sample, moderated by employees' core self-evaluation (Ben-hua & Wu, 2025). Taken together, the literature supports a leadership → empowerment link that is not specific to any one leadership style, but entrepreneurial leadership's emphasis on opportunity delegation gives it a particularly direct route to the self-determination and impact dimensions of empowerment specifically.

H1. Entrepreneurial leadership is positively related to employees' psychological empowerment.

2.3 Psychological Empowerment and Self-Efficacy

Spreitzer (1995) explicitly distinguished the competence dimension of psychological empowerment from Bandura's self-efficacy construct, arguing the two were functionally related but conceptually distinct: competence is a task-specific, empowerment-embedded belief, while self-efficacy is a broader, more generalized capability belief that accumulates across tasks and situations. Such a distinction suggests a developmental, not redundant, relationship. The constant

sense of meaning, autonomy, and impact in the work is what SCT calls the strongest source of generalized self-efficacy, and it is that very day-to-day empowerment that serves as the basis for this. This is supported by recent evidence outside entrepreneurial leadership research: In one large cross-sectional study, self-efficacy and job embeddedness were both directly linked to psychological empowerment in Chinese nurses (Wang et al., 2025); and other studies have shown that psychological empowerment is the more proximal, environment-based state that leads into the more generalized belief in self-efficacy (Kalkan et al., 2026). In the case of ethical climate research, psychological empowerment acts as a mediator between the supportive culture and a stable psychological resource for the researcher (Barik & Nayak, 2025). In this study, PE is linked to SE as the source of efficacy, with SCT emphasizing mastery experience as the most critical source of efficacy, rather than the other way around.

H2. Psychological empowerment is positively related to employees' self-efficacy.

2.4 The Moderating Role of Empowering Climate

Empowering captures the organizational-level perception that the climate is actively facilitating autonomy, skill development and relatedness rather than perceptions of autonomy, skill development, or relatedness by only one leader (Alam et al., 2024; Mahmood et al., 2024). Empowering reflects the shared, organizational-level perception that the climate is facilitating autonomy, skill development and relatedness, rather than that of only one leader. There are two different views on the role that climate research should play with entrepreneurial leadership (Appleton et al., 2016). There are two different views of the role of climate research with entrepreneurial leadership. The amplification view argues that the leader's empowering actions are more likely to land when the climate around him or her reinforces them: In a CSR context, climate quality and climate strength each added a significant dimension to team empowerment, that was not captured by the leader's behavior alone (Kluijtmans et al., 2024), and in an ethical climate context, a climate boosts the likelihood of psychologically empowering outcomes, beyond the role of the leader's behavior (Barik & Nayak, 2025). The substitution or redundancy view holds the opposite: when climate and leadership perceptions are highly correlated, as they often are because leaders are a primary source of the climate employees perceive, climate adds little unique variance once leadership is already accounted for it. Empirical support for redundancy is not rare; a large healthcare study found that service climate failed to moderate the relationship between leader–

member exchange quality and employee empowerment outcomes despite a strong theoretical rationale for expecting it to (Sarwar et al., 2026), and null moderation results are not unusual in the climate literature more broadly, particularly when a proposed moderator is conceptually adjacent to its interaction partner and both are measured from the same respondents. Because entrepreneurial leaders are themselves a dominant source of the climate their subordinates perceive, this study expects EL and EC to correlate strongly, which would attenuate EC's ability to add unique moderating variance to the EL → PE path.

H3. Empowering climate moderates the relationship between entrepreneurial leadership and psychological empowerment, such that the relationship is stronger when empowering climate is high. Figure 1 depicts the full hypothesized model.

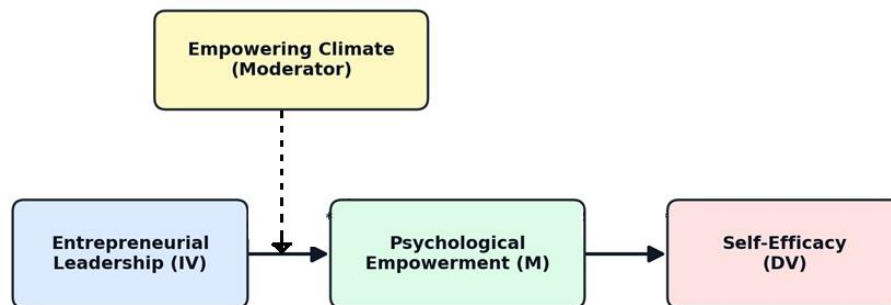


Figure 1: Theoretical Framework

3. Method

3.1 Design and Procedure

The study used a quantitative, explanatory, time-lagged design nested within a larger doctoral data collection effort on entrepreneurial leadership and innovative work behavior in Pakistan's IT sector. Only the sub-model relevant to this paper, entrepreneurial leadership, empowering climate, psychological empowerment and self-efficacy, is reported here. Data for these four constructs were collected across three sequential waves, each separated by approximately one month: entrepreneurial leadership and empowering climate at Time 1, psychological empowerment at Time 2 and self-efficacy at Time 3. Temporally separating predictor, mediator, and outcome measurement is a standard procedural remedy against common method bias in self-report

organizational research (Polas, 2025) and the practice is now common in entrepreneurial leadership studies using comparable multi-wave designs (Li & Hahn, 2026).

3.2 Sample and Procedure

Participants were IT professionals actively engaged in software development or new product development (NPD) projects at companies registered with Pakistan's Software Export Board or the Pakistan Software Houses Association. Recruitment used exponential, non-discriminative snowball sampling: an initial set of seed participants, contacted through professional networks, referred additional eligible colleagues, and all qualifying referrals were enrolled until the target sample was reached. The technique was appropriate for the population because software professionals are not readily available on public sampling frames and peer referrals fostered trust and commitment to a multi-wave study. 445 valid, fully matched responses were retained for all three waves. The majority of respondents were male (74.4%, $n = 331$) and mostly in early to mid-career (58.4%: up to 10 years experience). 31.9% of respondents were aged 26-33. The largest single role group was developers and programmers (32.8%) of which 91.0% were working full-time.

3.3 Measures

The following scales were used on five-point Likert response formats to measure all constructs. All constructs were measured using established scales with five-point Likert response formats (1 = strongly disagree, 5 = strongly agree). The entrepreneurial leadership was measured using Renko et al.'s (2013) eight-item scale, which taps into opportunity recognition, championing of innovation and communicating a vision with risk-taking (e.g., "My leader often has radical ideas for improving the products/services"). After measurement model purification, 6 items were retained. Ten items were used to measure empowering climate, based on the seventeen items included in the Empowering and Disempowering Motivational Climate Questionnaire–Coach (Appleton et al., 2016), with the items being adapted for the organizational setting instead of the sport setting (e.g., "My manager gives employees choices and options"). Psychological empowerment was measured with Spreitzer's (1995) twelve-item scale spanning meaning, competence, self-determination and impact; seven items were retained. Self-efficacy was measured with the ten-item General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995; e.g., "I can always manage to solve difficult

problems if I try hard enough"), a scale validated across twenty-five countries; six items were retained.

3.4 Analytical Strategy

Data were screened in SPSS 28.0 for missing values, multivariate outliers (Mahalanobis distance), and response-pattern anomalies, and skewness and kurtosis were checked against the ± 2.0 convention. Common method bias was assessed through Harman's single-factor test in combination with the study's procedural remedies (temporal separation, respondent anonymity, and clear item wording). The measurement and structural models were then estimated in SmartPLS 4.0 using partial least squares structural equation modeling (PLS-SEM), following the two-step procedure recommended for reflective, prediction-oriented models with complex mediation and moderation structures (Changalima & Chuwa, 2026; Subhaktiyasa, 2024). Indicator reliability was assessed through outer loadings ($\geq .70$ preferred), internal consistency through Cronbach's alpha and composite reliability (.70–.95), convergent validity through average variance extracted (AVE $> .50$), and discriminant validity through the heterotrait-monotrait ratio (HTMT), supplemented by the Fornell-Larcker criterion. Structural paths and the interaction term for H3 were tested through bootstrapping with 5,000 subsamples, generating bias-corrected and accelerated 95% confidence intervals; effect sizes (f^2) were interpreted against Cohen's (1988) conventions of .02 (small), .15 (medium), and .35 (large). Figure 2 presents the estimated measurement model.

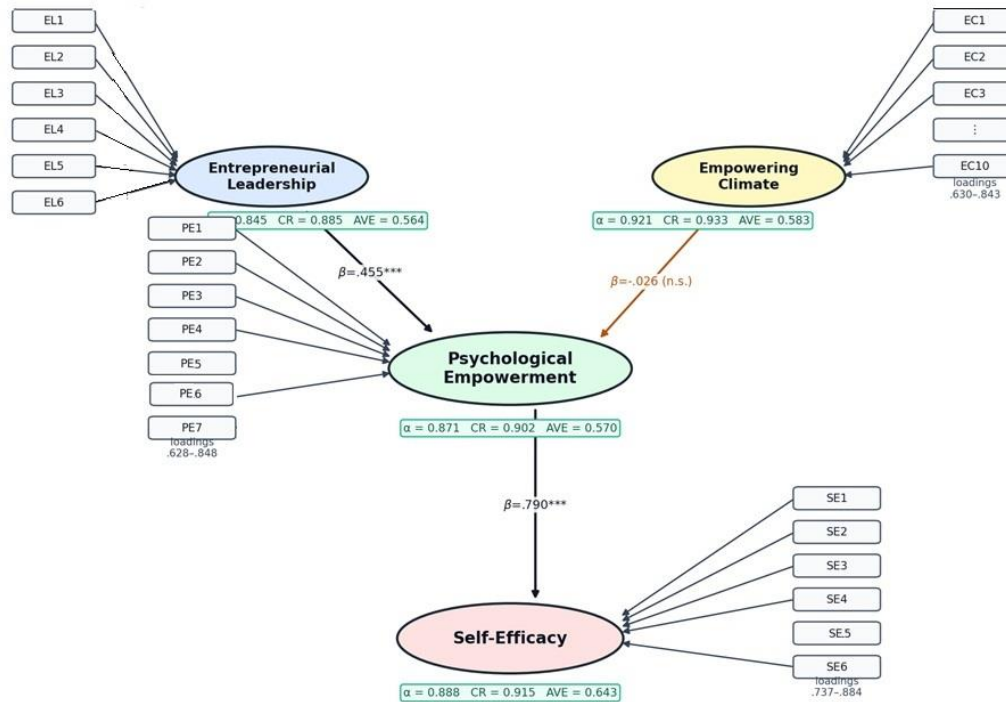


Figure 2: Measurement Model

4. Results

4.1 Descriptive Statistics and Common Method Bias

Means and standard deviations for the four constructs are reported in Table 1. Employees rated their psychological empowerment ($M = 3.928$, $SD = 0.712$) and self-efficacy ($M = 3.909$, $SD = 0.717$) noticeably higher than their perceptions of entrepreneurial leadership ($M = 3.509$, $SD = 0.763$) or empowering climate ($M = 3.435$, $SD = 0.869$), a pattern consistent with employees holding relatively stable, generalized self-beliefs even where they rate the surrounding leadership and climate more moderately. Skewness (-1.098 to -0.225) and kurtosis (-0.688 to 1.539) values across all four constructs fell within the accepted ± 2.0 range, and Harman's single-factor test did not indicate that a single factor accounted for the majority of variance, suggesting common method bias was not a serious threat.

Table 1: Descriptive Statistics

Construct	M	SD	Skewness	Kurtosis
Entrepreneurial Leadership (EL)	3.509	0.763	-0.298	-0.484

Construct	M	SD	Skewness	Kurtosis
Empowering Climate (EC)	3.435	0.869	−0.225	−0.688
Psychological Empowerment (PE)	3.928	0.712	−1.098	1.539
Self-Efficacy (SE)	3.909	0.717	−0.757	1.155

4.2 Measurement Model

After dropping indicators with loadings below acceptable thresholds, six EL items, ten EC items, seven PE items, and six SE items were retained (Table 2). All retained loadings exceeded .62, and the large majority exceeded .70. Internal consistency was satisfactory throughout: Cronbach's alpha ranged from .845 (EL) to .921 (EC), and composite reliability (ρ_c) ranged from .885 (EL) to .933 (EC). Convergent validity was established for all four constructs, with average variance extracted (AVE) ranging from .564 (EL) to .643 (SE), each comfortably above the .50 threshold. All indicator variance inflation factors remained below 5.0, indicating no problematic multicollinearity at the item level.

Table 2: Reliability and Convergent Validity

Construct	Items Retained	Loading Range	Cronbach's α	ρ_a	CR	AVE
EL	6	.670–.813	.845	.853	.885	.564
EC	10	.630–.843	.921	.934	.933	.583
PE	7	.628–.848	.871	.879	.902	.570
SE	6	.737–.884	.888	.897	.915	.643

Discriminant validity was assessed using the HTMT ratio and the Fornell-Larcker criterion. All HTMT values among the four constructs fell below the conservative .85 threshold except EL–EC (HTMT = .816, still below .85) and PE–SE (HTMT = .887, below the more permissive .90 threshold). The Fornell-Larcker criterion was satisfied for EC and SE outright; for EL, the criterion held narrowly, as the EL–EC bivariate correlation ($r = .721$, Table 3) sat close to both constructs'

diagonal values. This pattern of elevated but sub-threshold overlap between EL and EC is theoretically expected, since entrepreneurial leaders are themselves a primary source of the empowering climate employees report, and it is addressed directly in the moderation results below and revisited as a limitation in the Discussion.

Table 3: Correlations Matrix

	EL	EC	PE	SE
EL	1			
EC	.721	1		
PE	.598	.508	1	
SE	.370	.264	.780	1

4.3 Structural Model and Hypothesis Testing

The structural model explained 38.4% of the variance in psychological empowerment ($R^2 = .384$, $R^2_{adj} = .380$) and 62.5% of the variance in self-efficacy ($R^2 = .625$, $R^2_{adj} = .624$), both classified as moderate-to-substantial by conventional PLS-SEM benchmarks. Predictive relevance ($Q^2_{predict}$) was positive for both endogenous constructs (PE: .372; SE: .117), confirming out-of-sample predictive capability. Table 4 reports the path coefficients for all three hypotheses.

Table 4: Structural Path Estimates

Hypothesis	Path	B	t	p	95% BCCI	f ²	Decision
H1	EL → PE	.455	7.765	< .001	[.343, .568]	.146	Supported
H2	PE → SE	.790	36.539	< .001	[.742, .827]	1.665	Supported
H3	EC × EL → PE	−.026	0.641	.521	[−.102, .057]	.001	Not supported

H1 was supported, entrepreneurial leadership positively and significantly predicted psychological empowerment ($\beta = .455$, $t = 7.765$, $p < .001$), with a medium effect size ($f^2 = .146$). H2 received

the strongest support of any path in the model: psychological empowerment positively predicted self-efficacy with a very large effect ($\beta = .790$, $t = 36.539$, $p < .001$, $f^2 = 1.665$), an effect size well beyond Cohen's (1988) large-effect threshold. H3 was not supported: the interaction term (empowering climate $\times$ entrepreneurial leadership) predicting psychological empowerment was neither statistically significant nor practically meaningful ($\beta = -.026$, $t = 0.641$, $p = .521$, $f^2 = .001$), and its 95% confidence interval crossed zero. Simple slope estimates confirmed the null pattern: the EL $\rightarrow$ PE relationship varied only marginally across levels of empowering climate ($\beta = .481$ at -1 SD, $\beta = .455$ at the mean, $\beta = .430$ at $+1$ SD), indicating that empowering climate did not meaningfully condition the strength of the leadership-to-empowerment link in this sample.

5. Discussion

5.1 Entrepreneurial Leadership as driver of Empowerment as Self-Efficacy Generator

The two supported paths tell more or less a clean story, but the size difference between the two is the more interesting discovery. The result showed a medium effect ($R^2 = .455$, $f^2 = .146$) for entrepreneurs' leadership style and PE, which supports previous studies that associated entrepreneurs' and adjacent leadership styles with felt empowerment (Abanumay et al., 2025; Dongxian & Batool, 2024; Kyei-Frimpong et al., 2025). SE was predicted by PE with an effect size that was almost 4 times larger in standardized terms, and more than 11 times larger in terms of variance explained ($\beta = .790$, $f^2 = 1.665$). That difference makes a difference in theory. If leadership effects on self-efficacy were primarily direct persuasion and/or role modeling, then the two links in a serial chain would be about the same size. Rather, the empowerment-to-efficacy relationship is stronger than the leadership-to-empowerment relationship, just as social cognitive theory suggests that the relationship should be stronger if mastery experience is the biggest source of efficacy (Bandura, 1997). Psychological empowerment, is not just a through-put mechanism through which leadership's impact is transmitted, rather it is where the majority of the work in building efficacy occurs. This aligns to self-efficacy and job embeddedness being direct predictors of psychological empowerment for nurses (Wang et al., 2025) and the empowerment of leaders influencing nurse self-efficacy primarily through the empowerment of nurses (Kalkan et al., 2026). This is followed by a practical reading. If an organization desires to increase employees' sense of self-efficacy through leadership development, yet, at the same time, it does not restructure the job for employees to make them truly more autonomous, meaningful and impactful, it is aiming at the

weaker of the two links. Empowerment, the task design, depth of delegation, and the extent to which employees actually have decision latitude, are the stronger lever. Leadership behavior is important here not necessarily for its own efficacy but because it results in that empowerment.

5.2 Why Empowering Climate Did Not Moderate the Leadership-Empowerment Link

H3's non-support deserves more than a passing mention, because it runs against a reasonably common assumption in the climate literature that a supportive surrounding environment should always strengthen a leader's empowering effect. Two things likely explain the null result here. First, and most directly, entrepreneurial leadership and empowering climate correlated strongly in this sample ($r = .721$, HTMT = .816), which is close to the range where a moderator variable stops carrying unique information once its interaction partner is already in the model. Employees appear to be reading their leader's entrepreneurial behavior and their broader climate as substantially the same signal, not as two independent inputs, which is plausible in flatter IT organizations where a project lead or team manager effectively is the climate most employees experience day to day. Second, this null result is not an outlier in the broader literature: a large leader-member-exchange study in Pakistani healthcare found service climate failed to moderate empowerment-related outcomes despite strong theoretical grounds for expecting it to (Sarwar et al., 2026), and climate-empowerment interactions have failed to reach significance in other closely related organizational contexts as well. Taken together, these results suggest that "climate amplifies leadership" is not a safe default assumption; it depends on how distinct climate and leadership perceptions actually are in a given organizational structure and projects context, and in flatter, leader-centric teams they may not be distinct enough for climate to add anything once leadership is measured.

This does not mean empowering climate is irrelevant to psychological empowerment. The zero-order correlation between EC and PE was moderate and significant ($r = .508$), so climate clearly relates to empowerment on its own. What the data do not support is climate acting as a boundary condition that changes how strongly leadership converts into empowerment. Future work might test EC as a parallel direct antecedent of PE rather than as a moderator of the EL–PE path, a specification this dataset was not built to test but that the correlational pattern here makes plausible.

5.3 Theoretical Contribution

This study takes a particular approach to the explanation provided by social cognitive theory for the formation of leadership-based self-efficacy: it demonstrates that the link between leadership and self-efficacy is more appropriately described as a sequence with psychological empowerment accounting for the majority of the explanatory power. This clears up a sometimes confusing literature that has used psychological empowerment and self-efficacy as synonymous or synonymizable motivational phenomena that has been very clearly identified by Spreitzer (1995) at the very beginning of the construct. The findings here indicate they tend to be sequential and not redundant: empowerment is the task-specific version of the belief in capability that can be underpinned by the environment. The null moderation result also adds methodologically, as it reveals that entrepreneurial leadership and empowering climate can empirically become more difficult to distinguish as independent predictors when leadership is the focal point of the organization, a warning that future moderated-mediation designs in such contexts should be aware. In general, the pattern of findings provides evidence that psychological empowerment is a proximal task-oriented construct that mediates the mastery-experience pathway in organizational contexts as opposed to being a co-occurring phenomenon with self-efficacy.

5.4 Practical Implications

In IT and NPD organizations, the most obvious take-away is that developing self-efficacy is more effective when it is through job/task design that empowers the individual than it is through leadership training. Specifically, this involves making "real" work products available to the employees, making feedback dependent on "real" outcomes, and allowing students to increase their autonomy from the teacher as skills are mastered, the conditions under which the mastery experience, identified as the primary efficacy source by SCT, is formed. Leadership development is valuable because EL still has some meaning in predicting PE, but should be acknowledged as one input of empowerment and not as a direct efficacy intervention. In this sample, because empowering climate is not an added explanatory value above leadership, organizations might benefit more from a direct investment in empowering leadership behaviors and job redesign than from separate and parallel climate efforts, particularly in structures where climate and leadership are as tightly linked as they were in this sample.

5.5 Limitations and Future Research

There are several restrictions that qualify these conclusions. First, design was time-lagged over three waves, but the design was basically correlational, so causal statements should be considered as theory building, not theory proving. Second, snowball sampling is useful for reaching a hard-to-reach population of professionals, but may lead to selection bias toward well-connected members of the population, and is not suitable for making strict probabilistic generalizations to the larger, IT-population in Pakistan. Third, the PE–SE HTMT value (.887) indicates that these two constructs, although conceptually separable, are more empirically overlapping than is desirable, which should be taken into account by subsequent researchers using these two constructs. Fourth, common method biases cannot be completely ruled out because all variables were self-reported by the same respondents, and temporal separation also does not prevent common method biases, which can be underestimated by single factor diagnostics like Harman's test (Howard et al., 2024). Future studies should examine if empowering acts as an antecedent of psychological empowerment as opposed to a moderator, include supervisor-rated measures of leadership to minimize the single-source bias, and study if the empowerment-to-efficacy pathway extends to other work environments with less task autonomy than software NPD work.

6. Conclusion

This study set out to test whether entrepreneurial leadership builds employee self-efficacy through the mediating mechanism of psychological empowerment and whether the first link depends on the strength of the surrounding empowering climate or not. Using three-wave data from 445 IT professionals in Pakistan's software NPD sector to curb CMB, both direct paths supported the hypothesis i.e. entrepreneurial leadership meaningfully predicted psychological empowerment and psychological empowerment predicted self-efficacy with an effect size several times larger. Empowering climate, despite a plausible theoretical rationale, did not moderate the leadership-to-empowerment relationship, most likely because leadership and climate perceptions were too closely entangled in this sample to separate statistically. Read together, the findings position psychological empowerment not as a minor step on the way from leadership to confidence, but as the primary mechanism through which that confidence is actually built, a conclusion consistent with social cognitive theory's emphasis on mastery experience over persuasion as the dominant

efficacy source. For organizations trying to grow a more self-assured, capable workforce, the practical implication is straightforward even if it is not the easiest one to act on: invest in the structural conditions that make employees feel genuinely empowered and self-efficacy is far more likely to follow than if leadership behavior is treated as a sufficient intervention on its own.

References

- [1] Abanumay, R., Alalwani, E., & Dukhaykh, S. (2025). Unleashing employees' entrepreneurial potential in Saudi start-up companies: The role of psychological empowerment as a mediator between entrepreneurial leadership and employees' entrepreneurial behavior. *BMC Psychology*, 13(1). <https://doi.org/10.1186/s40359-025-02680-6>
- [2] Alam, I., Waheed, K. Z., & Rehman, M. S. (2024). The impact of cultural diversity on workforce efficiency in private banking sector of Pakistan. *Journal of Workplace Behavior*, 5(1), 65–81.
- [3] Appleton, P. R., Ntoumanis, N., Quested, E., Viladrich, C., & Duda, J. L. (2016). Initial validation of the coach-created Empowering and Disempowering Motivational Climate Questionnaire (EDMCQ-C). *Psychology of Sport and Exercise*, 22, 53–65.
- [4] Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- [5] Barik, S., & Nayak, T. (2025). Nurturing subjective wellbeing through ethical climate: The mediating role of psychological empowerment. *Human Systems Management*, 44(4), 615–628. <https://doi.org/10.1177/01672533251317068>
- [6] Ben-hua, X., & Wu, H. (2025). Effect of servant leadership on employees' innovative behavior with the mediating role of psychological empowerment and moderating role of core self-evaluation. *Scientific Reports*, 15(1). <https://doi.org/10.1038/s41598-025-19471-z>
- [7] Changelima, I. A., & Chuwa, M. P. (2026). Partial least squares structural equation modeling (PLS-SEM) in business research: A simple guide for novice researchers. *International Journal of Research in Business and Social Science*, 14(9), 497–506. <https://doi.org/10.20525/ijrbs.v14i9.4601>
- [8] Doğan, S., & Aykan, E. (2025). The mediating role of psychological empowerment in the effect of entrepreneurial leadership on innovative work behavior and employee performance while self-efficacy in the moderating role. *Journal of Global Entrepreneurship Research*, 15(1). <https://doi.org/10.1007/s40497-025-00456-1>
- [9] Dongxian, L., & Batool, H. (2024). Influence of distributed leadership on employee innovative behaviour: The mediating role of psychological empowerment. *Journal of Innovation and Entrepreneurship*, 13(1). <https://doi.org/10.1186/s13731-024-00448-7>
- [10] Howard, M. C., Boudreaux, M., & Oglesby, M. T. (2024). Can Harman's single-factor test reliably distinguish between research designs? Not in published management studies.

- European Journal of Work and Organizational Psychology*, 33(6), 790–804.
<https://doi.org/10.1080/1359432X.2024.2393462>
- [11] Jameel, A., Sahito, N., Guo, W., Hussain, A., Kanwel, S., & Khan, S. (2025). The influence of supportive leadership on hospitality employees' green innovative work behavior: The mediating role of innovative climate and psychological empowerment. *Frontiers in Psychology*, 16. <https://doi.org/10.3389/fpsyg.2025.1565408>
- [12] Kalkan, F., Daşcı Sönmez, E., Yenel, K., Cemaloglu, N., & Gün, F. (2026). Empowering leadership in action: Unleashing teacher proactivity through psychological empowerment and self-efficacy. *Educational Management Administration & Leadership*.
<https://doi.org/10.1177/17411432261484317>
- [13] Kluijtmans, T., Meyfroodt, K., & Crucke, S. (2024). Doing good and doing well? CSR climate as a driver of team empowerment and team performance. *Journal of Business Ethics*, 195(3), 599–614. <https://doi.org/10.1007/s10551-024-05678-z>
- [14] Kyei-Frimpong, M., Amankwah, M. O., Suleman, A.-R., & Ametorwo, A. M. (2025). From vision to action: How entrepreneurial leadership sparks innovative behaviour in the hospitality industry. *International Journal of Contemporary Hospitality Management*, 37(9), 3200–3219.
<https://doi.org/10.1108/IJCHM-12-2024-1891>
- [15] Li, X. H., & Hahn, J. (2026). Unmasking narcissistic leadership: A multilevel time-lagged study of the mediating role of employee resilience and the moderating role of supportive team climate. *Frontiers in Psychology*, 17. <https://doi.org/10.3389/fpsyg.2026.1782797>
- [16] Mahmood, S., Mehmood, H., & Waheed, K. Z. (2024). The Influence of Despotism Leadership on Counterproductive Work Behavior: The Role of Follower's Dispositional Characteristics. *Pakistan Journal of Humanities and Social Sciences*, 12(2), 1826–1841.
<https://doi.org/10.52131/pjhss.2024.v12i2.2305>
- [17] Nawaz, A. (2025). Entrepreneurial leadership and organizational performance: Employee creativity and behavior. *Management Decision*, 63(7), 2486–2510.
<https://doi.org/10.1108/MD-02-2024-0317>
- [18] Polas, M. R. H. (2025). Common method bias in social and behavioral research: Strategic solutions for quantitative research in the doctoral research. *Journal of Comprehensive Business Administration Research*. <https://doi.org/10.47852/bonviewJCBAR52024285>

- [19] Qammar, A., Aslam, M. S., Khan, S. R., Jabeen, N., & Amentie, M. D. (2024). Does age matter for innovative behavior? A mediated moderation model of organizational justice, creative self-efficacy, and innovative behavior among IT professionals. *Human Behavior and Emerging Technologies*, 2024(1). <https://doi.org/10.1155/2024/5391150>
- [20] Qiao, Y., Fan, P., Li, F., & Chen, T. (2025). Learning and adaptation of transformational leaders: Linking transformational leadership to leader self-efficacy for emotional regulation and work engagement. *Journal of Occupational and Organizational Psychology*, 98(1). <https://doi.org/10.1111/joop.70016>
- [21] Renko, M., El Tarabishy, A., Carsrud, A. L., & Brännback, M. (2013). Understanding and measuring entrepreneurial leadership style. *Journal of Small Business Management*, 53(1), 54–74. <https://doi.org/10.1111/jsbm.12086>
- [22] Sarwar, B., Billah, M., Sarwar, M. A., & Huo, C. (2026). Transforming workforce dynamics: The power of leader–member exchange (LMXQ) quality in health care. *Sage Open*, 16(3). <https://doi.org/10.1177/21582440261459802>
- [23] Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in health psychology: A user's portfolio* (pp. 35–37). NFER-NELSON.
- [24] Spreitzer, G. M. (1995). Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of Management Journal*, 38(5), 1442–1465. <https://doi.org/10.5465/256865>
- [25] Subhaktiyasa, P. G. (2024). PLS-SEM for multivariate analysis: A practical guide to educational research using SmartPLS. *Eduline: Journal of Education and Learning Innovation*, 4(3), 353–365. <https://doi.org/10.35877/454RI.eduline2861>
- [26] Umrani, W. A., Siyal, S., Al Riyami, S., Memon, M. A., & Siyal, A. W. (2024). Inclusive leadership and innovative work behaviours: Social exchange perspective. *Current Psychology*, 43(30), 24774–24788. <https://doi.org/10.1007/s12144-024-06192-1>
- [27] Vu, G. T. H., Nguyen, D. T., & Le, T. P. (2025). Transformational leadership and innovative work behaviors: The mediating effects of psychological empowerment and work engagement. *Sage Open*, 15(2). <https://doi.org/10.1177/21582440251335464>

- [28] Waheed, K. Z., & Khan, M. I. (2025a). Fostering innovative work behavior in new product development projects: A theoretical review. *Pakistan Journal of Humanities and Social Sciences*, 13(2), 479–495. <https://doi.org/10.52131/pjhss.2025.v13i2.2884>
- [29] Waheed, K. Z., & Khan, M. I. (2025b). Fostering innovative work behavior in new product development projects: A systematic literature review. *Center for Management Science Research*, 3(6), 364–378. <https://doi.org/10.5281/zenodo.17490189>
- [30] Wang, X., Liu, M., Leung, A. Y. M., Zhang, J., Deng, R., Li, Y., Wang, Y., Dai, H.-X., Jin, X., & Shang, S. (2025). Nurses' self-efficacy, job embeddedness, and psychological empowerment: A cross-sectional study. *Journal of Nursing Management*, 2025(1), Article 6259635. <https://doi.org/10.1155/jonm/6259635>