
The Influence of Entrepreneurial Leadership on the Performance of engineering SMEs Mediated by Interpersonal Communication and Entrepreneurial Characteristics

Nandang*

Management Study Program, Faculty of Economic and Business Education, Universitas Pendidikan Indonesia

Disman

Management Study Program, Faculty of Economic and Business Education, Universitas Pendidikan Indonesia

Janah Sojanah

Management Study Program, Faculty of Economic and Business Education, Universitas Pendidikan Indonesia

Hady Siti Hadijah

Management Study Program, Faculty of Economic and Business Education, Universitas Pendidikan Indonesia

***Corresponding Author**

Nandang

nandang74@upi.edu

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ABSTRACT

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The study aims to analyze the effect of entrepreneurial leadership on SME performance, evaluate the mediating role of interpersonal communication, and assess the contribution of entrepreneurial characteristics in strengthening the relationship between leadership and performance. A quantitative approach with an explanatory survey design was employed, with data collected through questionnaires distributed to owners, managers, or leaders of engineering SMEs in Karawang Regency and analyzed using Structural Equation Modeling–Partial Least Squares (SEM-PLS) to examine both direct and indirect relationships among variables. The findings indicate that entrepreneurial leadership has a significant influence on entrepreneurial characteristics, which subsequently mediate the effect of leadership on SME performance, while interpersonal communication contributes positively to performance but is not proven to mediate the relationship between leadership and performance. Entrepreneurial characteristics are identified as the dominant factor in improving SME performance. Theoretically, this study reinforces the central role of entrepreneurial characteristics in the mechanism linking leadership and performance, while practically, the findings provide a foundation for the development of training programs, mentoring strategies, and capacity-building initiatives aimed at enhancing competitiveness, innovation, and business sustainability of SMEs in the engineering sector.

Keywords: Entrepreneurial Leadership, Interpersonal Communication, Entrepreneurial Characteristics, SME Performance.

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) in the engineering sector in Karawang Regency play a strategic role in supporting the value chain of the regional manufacturing and technical services industry. However, their contribution has not been fully optimized due to various structural barriers that affect business sustainability and growth. Supandi et al. (2022) explain that the main challenges faced by engineering MSMEs include limited access to formal capital, low technological and digital capacity, inadequate managerial and technical competencies, and weak market networks that hinder the achievement of economies of scale. These conditions result in business vulnerability to market fluctuations, difficulties in meeting industrial quality standards, and limited ability to implement technical and product innovations. These findings align with Fiermaningsih et al. (2024), who state that the variability of MSME performance is strongly influenced by internal factors, particularly resource capacity and organizational management. Therefore, strengthening leadership capabilities and human capital becomes crucial to enhancing MSME competitiveness.

Several previous studies show that the leadership of business owners or managers is a significant factor in determining business performance. Ametefe et al. (2025) explain that transformational leadership enhances employee creativity, encourages innovation, and strengthens organizational capacity in strategic decision-making. Dooley et al. (2017) emphasize that for engineering MSMEs which rely heavily on technical competence leadership that supports innovation and continuous learning can improve operational efficiency and business competitiveness. Furthermore, Berisha, Govori, and Sejdiya (2024) find that the influence of leadership on performance is indirect because it requires internal supporting mechanisms, indicating the need to examine mediating variables to explain this causal pathway more clearly.

One of the mediating variables increasingly highlighted in recent studies is interpersonal communication. In MSME environments, work relationships occur intensively among owners, technicians, and operational staff, making communication quality essential for production coordination, problem-solving, knowledge transfer, and building a collaborative work culture. Jaafar et al. (2023) and Biggs, Johnston, & Russell (2024) demonstrate that interpersonal communication mediates the influence of leadership on business performance. Without effective communication, strategic directions and change initiatives from leaders may not be well implemented, as asserted by Balakrishnan et al. (2024) and Kruger et al. (2016). This argument is strengthened by Abaci (2022) and Chiloane-Tsoka & Boya (2015), who confirm that interpersonal communication is a significant mediator in various organizational causal relationships.

In addition to leadership and interpersonal communication, entrepreneurial characteristics also contribute significantly to MSME performance. Gautam & Khadka (2022) emphasize that entrepreneurial characteristics such as creativity, opportunity orientation, risk-taking, and achievement motivation shape the behavior of business owners in managing resources and capturing market opportunities. Supporting this view, Jiang & Che (2017) and Cruz Rincon et al. (2023) find that entrepreneurial characteristics influence business performance through specific mediating mechanisms. In the engineering MSME context, strong entrepreneurial characteristics foster innovation in production processes, market penetration, and technology adoption (Wijayanti et al., 2016).

At the theoretical level, entrepreneurial leadership has been widely discussed in the context of small and medium enterprises. Renko et al. (2015) and Ranjan (2018) describe entrepreneurial leadership as a leadership model that integrates vision, opportunity orientation, creativity, and risk-taking to create new value. Dyatmika (2023) and García-Vidal et al. (2019) assert that entrepreneurial leadership acts as a driver of business agility through adaptive capacity and effective resource mobilization. Thus, entrepreneurial leadership becomes a determining factor in strengthening decision-making quality and MSME competitiveness.

MSME business performance includes financial and non-financial dimensions. Baldegger (2020) explains that performance measurement should not only focus on profit and revenue growth but also innovation, operational efficiency, and business sustainability. Damayanti et al. (2023) and Matsoso & Benedict (2016) argue that non-financial indicators such as customer loyalty, innovation capability, and technology adoption are necessary to evaluate performance comprehensively. Tamayo-Torres et al. (2016) note that optimal performance is achieved when management structures are flexible and supported by leadership grounded in organizational learning. This is reinforced by Kumar & Dubey (2022), who emphasize that good governance and managerial competencies determine MSME growth success.

Interpersonal communication, as part of managerial capacity, also determines organizational effectiveness. Ansari (2021) states that interpersonal communication encompasses the ability to deliver clear messages, practice active listening, understand others' perspectives, and build trust. Kusbandono, Zaakiyyah & Junaidi (2024) confirm that interpersonal communication contributes directly to the success of MSMEs in work collaboration and customer service. Consul & Kola (2024) further highlight that interpersonal communication supports organizational collaboration, strengthens employee commitment, and improves decision quality.

Entrepreneurial characteristics—including innovation, proactiveness, creativity, achievement motivation, and risk-taking—are equally essential for MSME development. Ferreira, Fernandes & Kraus (2019) assert that these characteristics shape entrepreneurs' strategic mindset and influence managerial behavior when responding to business opportunities and threats. Priyaa et al. (2025) emphasize that entrepreneurial characteristics determine how business actors respond to business dynamics. Kerr et al. (2019) and Block & Van Praag (2017) also find that entrepreneurs with high proactiveness and risk-taking tendencies achieve superior business performance, particularly in innovation and productivity.

Based on the above description, it is evident that entrepreneurial leadership, interpersonal communication, and entrepreneurial characteristics contribute significantly to improving MSME business performance. These three variables interact with one another: leadership provides direction, entrepreneurial characteristics shape behavioral execution, and interpersonal communication ensures effective coordination and implementation. Therefore, this study aims to: (1) analyze the influence of entrepreneurial leadership on business performance of engineering MSMEs in Karawang Regency, (2) analyze the influence of entrepreneurial leadership on interpersonal communication, (3) analyze the influence of entrepreneurial leadership on entrepreneurial characteristics, (4) analyze the influence of interpersonal communication on MSME performance, (5) analyze the influence of entrepreneurial characteristics on MSME performance, (6) examine the mediating role of interpersonal communication in the relationship between leadership and

business performance, and (7) analyze whether entrepreneurial characteristics strengthen the mediating mechanism within the model.

The conceptual framework of this study can be illustrated as follows:

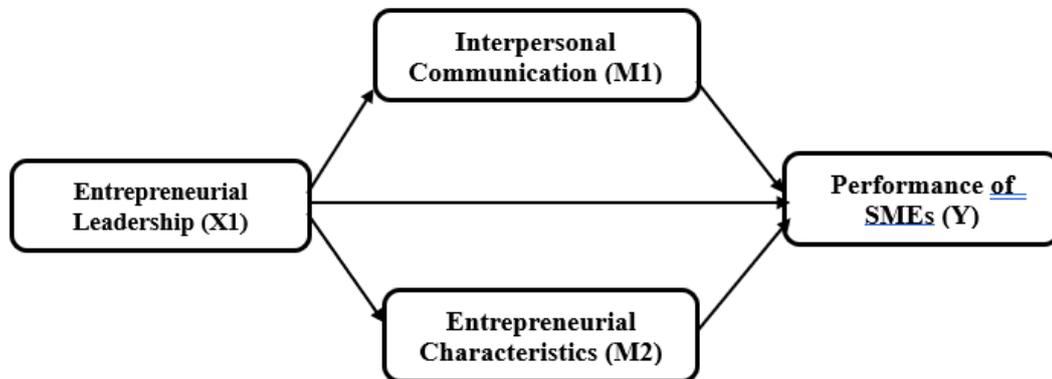


Figure 1
Research Framework

The novelty contribution of this research lies in three key aspects. First, this study introduces a specific contextual focus on engineering-sector MSMEs in Karawang Regency, providing empirical insights that are both contextual and practical. Second, the research examines the role of interpersonal communication as a primary mediator between leadership and performance; this approach explicitly and empirically links leadership literature with organizational communication literature, which, based on recent studies, still lacks empirical evidence at the MSME level. Third, the integration of entrepreneurial characteristics into the mediation framework offers a dual-path modeling structure, enriching the understanding of how personal attributes of owners/managers and organizational communication capacity jointly determine performance outcomes. Methodologically, this research proposes the use of internationally validated instruments and SEM-PLS analysis techniques to capture both direct and indirect effects, thereby contributing theoretical advancements as well as managerial implications for local stakeholders and policymakers.

RESEARCH METHOD

This study employs a quantitative approach aimed at examining the causal relationships among entrepreneurial leadership, entrepreneurial characteristics, interpersonal communication, and business performance of engineering-sector MSMEs in Karawang Regency. This approach was selected because it enables the generation of objective and measurable empirical findings through statistical analysis, while also allowing predictive testing of relationships among variables. The analytical model applied is Structural Equation Modeling based on Partial Least Squares (SEM-PLS). The selection of this method refers to the guidelines of Hair et al. (2021), who state that SEM-PLS is appropriate when the research model involves latent variables with multiple indicators, a limited sample size, and a research focus on prediction-oriented relationships.

The object of this research is engineering-sector MSMEs operating in Karawang Regency. This sector was selected due to its strategic position as part of the manufacturing industry supply chain and its contribution to the regional economic structure. The research subjects consist of business owners or managers who are directly involved in managerial

activities and operational decision-making, ensuring that the collected data accurately reflects actual business practices, communication patterns, entrepreneurial characteristics, and leadership practices within the enterprises.

The research population includes 143 officially registered engineering-sector MSMEs. The sample size was determined using the Slovin formula with a margin of error of 5%, resulting in a final sample of 105 respondents.

This sample size meets the minimum requirement for SEM-PLS analysis as it falls within the acceptable range recommended by Hair et al. (2021), namely a minimum of 100 respondents or at least 10 times the largest number of structural paths in the tested model. The sampling technique used was probability sampling, specifically the simple random sampling method, in which each element in the population has an equal chance of being selected as a sample. Respondent selection was based on inclusion criteria: (1) the business has been operating for at least one year, and (2) employs a minimum of three workers. These criteria were established to ensure that respondents have adequate business management experience and are relevant to the research variables.

The research data consisted of primary and secondary data. Primary data were collected through a five-point Likert-scale questionnaire (1 = strongly disagree to 5 = strongly agree), which served to measure respondents' perceptions of the indicators of each variable. The use of a Likert scale is recommended for measuring latent constructs of psychometric characteristics, as noted by Hair et al. (2021). Secondary data were obtained from document reviews, scientific publications, official reports, and literature relevant to MSMEs and the research topic to strengthen the conceptual foundation.

Data collection was conducted in three stages: (a) a literature review to establish the theoretical basis and construct indicators; (b) a field survey through questionnaire distribution; and (c) limited interviews or clarification with selected respondents to improve accuracy in data interpretation. In addition, non-formal observations were conducted to understand the business environment of respondents contextually.

The research instrument was evaluated using two stages of SEM-PLS procedures: (1) measurement model evaluation (outer model) to assess convergent validity, discriminant validity, composite reliability, and indicator loading values, ensuring that the Average Variance Extracted (AVE) exceeded 0.50, indicator loadings surpassed 0.70, and Composite Reliability (CR) as well as Cronbach's Alpha were above 0.70 as indicators that the instrument fulfilled validity and reliability requirements. Instruments that met these criteria were deemed appropriate for further testing. (2) structural model evaluation (inner model) was performed to examine relationships among variables using path coefficient analysis, mediation testing, coefficient of determination (R^2), and significance testing through bootstrapping with 2,000 subsamples, following the standard procedure recommended by Hair et al. (2021).

RESULTS AND DISCUSSION

The measurement model (outer model) evaluation was conducted to ensure that the research instrument accurately measures the intended constructs through validity and reliability assessment. The results of the outer model testing are presented in two tables, namely Table 1 (outer loading values) and Table 2 (reliability testing results).

The results of the outer loading assessment presented in Table 1 indicate that all indicators used in this study have values above the minimum threshold of 0.70. High outer loading values demonstrate that the indicators are capable of strongly representing the

latent constructs. For the Entrepreneurial Leadership construct (X1), the outer loading values ranged from 0.706 to 0.767, indicating that all indicators contribute effectively to representing the construct. A similar pattern is observed in the Interpersonal Communication construct (M1), with loading values ranging from 0.724 to 0.814, and in the Entrepreneurial Characteristics construct (M2), which shows loading values between 0.708 and 0.861. The indicators associated with the MSME Performance construct (Y) demonstrate the strongest measurement quality, with loading values ranging from 0.803 to 0.896, indicating that these indicators possess excellent measurement strength.

Table 1. Results of Factor Outer Loading Testing

Indicator	Entrepreneurial Leadership (X1)	Interpersonal Communication (M1)	Entrepreneurial Characteristics (M2)	MSME Performance (Y)
X1.1	0,767			
X1.2	0,713			
X1.3	0,707			
X1.4	0,755			
X1.5	0,711			
X1.6	0,709			
X1.7	0,706			
M1.1		0,777		
M1.2		0,814		
M1.3		0,796		
M1.4		0,771		
M1.5		0,724		
M2.1			0,708	
M2.2			0,712	
M2.3			0,806	
M2.4			0,832	
M2.5			0,861	
Y.1				0,873
Y.2				0,880
Y.3				0,803
Y.4				0,896

These values confirm that all indicators meet the requirements of convergent validity based on PLS-SEM standards; therefore, no indicator elimination is required. Thus, all indicators remain retained in the model because they fulfill the criteria of appropriate measurement quality.

Next, measurement validity was further supported by the Average Variance Extracted (AVE). The AVE values presented in Table 2 show that all constructs exceed the minimum threshold of 0.50. This indicates that more than half of the variance in each construct can be explained by the indicators measuring it. The MSME Performance construct has the highest AVE value, namely 0.746, indicating a very strong level of indicator representation. Other constructs, such as Entrepreneurial Characteristics (0.618),

Interpersonal Communication, and Entrepreneurial Leadership (0.525), also meet the convergent validity requirement.

In addition to validity, construct reliability was assessed using three indicators: Cronbach's Alpha, rho_A, and Composite Reliability. All three measures produced values above 0.70, indicating that all constructs have a high level of internal consistency. The Composite Reliability values across all constructs were well above the recommended minimum threshold (ranging from 0.884 to 0.921), demonstrating that the indicators within each variable consistently measure the intended constructs.

Table 2. Reliability Testing Results

Variable	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Entrepreneurial Leadership (X1)	0,849	0,853	0,885	0,525
Interpersonal Communication (M1)	0,836	0,84	0,884	0,604
Entrepreneurial Characteristics (M2)	0,845	0,861	0,889	0,618
MSME Performance (Y)	0,886	0,891	0,921	0,746

Based on the results presented in Table 1 and Table 2, it can be concluded that all constructs in this study have met the requirements of convergent validity and instrument reliability in accordance with the standards recommended in SEM-PLS analysis. The high outer loading values, the AVE values that exceeded the minimum threshold, and the reliability values that were above the required criteria indicate that the measurement instrument used in this study possesses good quality and is capable of accurately measuring the latent variables.

Therefore, the evaluated measurement model is deemed appropriate and valid, allowing the analysis to proceed to the next stage, namely the structural model (inner model) evaluation, which includes testing the significance of relationships among variables and mediation testing. Prior to that stage, the coefficient of determination (R Square) results were obtained, as presented below:

Table 3. R Square Test Results

Variable	R Square	R Square Adjusted
MSME Performance (Y)	0,831	0,826
Interpersonal Communication (M1)	0,011	0,002
Entrepreneurial Characteristics (M2)	0,128	0,120

Based on the coefficient of determination results presented in Table 3, the R Square value for the MSME Performance variable is 0.831, indicating that 83.1% of the variability in MSME performance can be explained by Entrepreneurial Leadership, Interpersonal Communication, and Entrepreneurial Characteristics, while the remaining 16.9% is influenced by other factors outside the research model. This R Square value falls into the

very strong category, demonstrating that the model has a high predictive capability for the dependent variable.

Furthermore, the R Square value of 0.011 for the Interpersonal Communication variable indicates that it is explained only by 1.1% from Entrepreneurial Leadership, meaning its contribution is very low. Meanwhile, the Entrepreneurial Characteristics variable has an R Square value of 0.128, meaning that 12.8% of its variability is explained by Entrepreneurial Leadership, while the remaining 87.2% is influenced by external factors beyond the model. These findings indicate that the independent variable in this study has a dominant influence on MSME performance but does not sufficiently explain the variability of the mediator variables, particularly Interpersonal Communication.

Hypothesis testing using Partial Least Square (PLS) was then followed by structural model evaluation to assess both the direct effects among variables and the indirect effects through mediator variables. Significance testing was conducted using the bootstrapping method with 2,000 subsamples, where the relationships among variables were evaluated based on t-statistics and p-values, with a significance threshold of p-value < 0.05.

Table 4. Results of Direct Effect Testing

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
Entrepreneurial Leadership (X1) - > MSME Performance (Y)	0,098	0,095	0,053	1,846	0,065
Entrepreneurial Leadership (X1) - > Interpersonal Communication (M1)	-0,106	-0,083	0,110	0,961	0,337
Entrepreneurial Leadership (X1) - > Entrepreneurial Characteristics (M2)	0,358	0,375	0,090	4,001	0,000
Interpersonal Communication (M1) -> MSME Performance (Y)	0,141	0,139	0,064	2,209	0,027
Entrepreneurial Characteristics (M2) -> MSME Performance (Y)	0,768	0,771	0,067	11,545	0,000

Based on the table above, the direct relationship results indicate that Entrepreneurial Leadership does not have a significant effect on MSME Performance ($p = 0.065$) nor on Interpersonal Communication ($p = 0.337$), meaning that the hypotheses for both paths cannot be accepted. However, Entrepreneurial Leadership has a significant effect on Entrepreneurial Characteristics, with a t-statistic value of 4.001 and a p-value of 0.000. Furthermore, Interpersonal Communication significantly influences MSME Performance ($p = 0.027$), and Entrepreneurial Characteristics show the strongest direct effect on MSME Performance, with a t-statistic of 11.545 and a p-value of 0.000. These findings indicate that Entrepreneurial Characteristics serve as the most dominant variable in explaining improvements in MSME performance.

Table 5. Results of Mediation Testing / Indirect Effects

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Entrepreneurial Leadership (X1) -> Interpersonal Communication (M1) -> MSME Performance (Y)	-0,015	-0,011	0,018	0,847	0,397
Entrepreneurial Leadership (X1) -> Entrepreneurial Characteristics (M2) -> MSME Performance (Y)	0,275	0,289	0,075	3,692	0,000

The mediation test results indicate that the mediation pathway through Entrepreneurial Characteristics is significant in the relationship between Entrepreneurial Leadership and MSME Performance ($p = 0.000$), meaning that Entrepreneurial Characteristics fully mediate this relationship. Conversely, the mediation pathway through Interpersonal Communication does not show a significant effect ($p = 0.397$), and therefore this pathway does not meet the criteria as a mediator. Thus, it can be concluded that improvements in MSME performance are more strongly influenced by the internal mechanisms of business actors in the form of entrepreneurial characteristics rather than interpersonal communication quality.

Following the hypothesis testing results, the discussion continues with the interpretation of the coefficient of determination (R Square), which provides an understanding of the extent to which the independent variables are able to explain variations in the dependent variable, namely MSME performance in the engineering sector in Karawang Regency. The data processing results show that the R Square value for the MSME performance variable is 0.831, meaning that 83.1% of the variation in performance can be explained by entrepreneurial leadership, interpersonal communication, and entrepreneurial characteristics, while the remaining 16.9% is influenced by other external factors. This proportion falls into the very strong category based on SEM-PLS interpretation guidelines, indicating that the research model has high predictive capability and is suitable for analyzing causal relationships among variables.

Conceptually, this finding aligns with the views of Ametefe et al. (2025) and Dooley et al. (2017), who emphasize the critical role of MSME owners' or managers' leadership in driving creativity, innovation, and strategic decision-making. However, the statistical results indicate that the direct effect of entrepreneurial leadership on MSME performance is not significant ($p = 0.065$) and operates instead through mediation, particularly through entrepreneurial characteristics ($p = 0.000$). This finding supports the conclusion of Berisha, Govori, and Sejdija (2024), who argue that leadership does not always have a direct effect on performance and often requires internal mechanisms or mediators for its influence to materialize.

Furthermore, the R Square values reveal differing contributions of the mediator variables. Interpersonal Communication is explained only by 1.1% of Entrepreneurial Leadership, whereas Entrepreneurial Characteristics are explained by 12.8%. This implies that improvements in MSME performance are more likely to occur through the

development of personal attributes of owners/managers such as innovation, proactiveness, and risk-taking rather than through interpersonal communication alone. These findings reinforce conclusions drawn by Gautam & Khadka (2022) and Ferreira, Fernandes, & Kraus (2019), which argue that entrepreneurial characteristics are determinant factors in managerial behavior and resource utilization to achieve optimal business performance.

Empirically, the high R Square value for MSME performance further demonstrates the relevance of the research model to real field conditions. MSMEs in the engineering sector in Karawang Regency are confronted with a highly competitive environment, limited resources, and increasing innovation demands, as reported by Supandi et al. (2022) and Fiernaningsih et al. (2024). The significant R Square value confirms that the combination of leadership, communication, and entrepreneurial characteristics can serve as a determinant of success in overcoming these structural challenges. This implies that the model not only offers predictive strength, but also provides practical implications for strengthening MSME capacity through competency development programs, entrepreneurial character-building, and effective internal communication strategies.

When compared with prior studies, the results show both alignment and divergence. Consistent with Jaafar et al. (2023) and Biggs, Johnston, & Russell (2024), interpersonal communication plays a role in strengthening the leadership–performance relationship, although its contribution is relatively small in this context. Meanwhile, the strong mediation role of entrepreneurial characteristics reinforces literature emphasizing internal capability development as a critical determinant of MSME success, as proposed by Kerr et al. (2019) and Block & Van Praag (2017). These differences may be attributed to the characteristics of the study sample, which focuses on the engineering sector—an area where technical competence and personal innovation have greater influence on business outcomes than communication ability alone.

Overall, the discussion of the R Square findings demonstrates that MSME performance improvement results from the integration of leadership, entrepreneurial characteristics, and interpersonal communication. The high R Square value confirms not only the model’s ability to explain performance variability, but also highlights that MSME development strategies must be comprehensive, incorporating entrepreneurial character enhancement, leadership competency strengthening, and improved internal coordination. These findings contribute both theoretically and practically by offering empirical evidence to support managerial decision-making and the design of MSME empowerment programs focused on strengthening internal mechanisms and human resource capabilities.

The following discussion addresses the first hypothesis of this study, which states that Entrepreneurial Leadership (X1) has a significant effect on MSME Performance (Y). Based on the results of the Partial Least Square (PLS) analysis presented in Table 4, the direct effect of Entrepreneurial Leadership on MSME Performance is not significant, with a t-statistic value of 1.846 and a p-value of 0.065. Although the direction of the relationship is positive (0.098), the effect does not meet the statistical significance threshold ($p < 0.05$). In other words, entrepreneurial leadership alone has not been able to directly enhance business performance without the influence of other internal mechanisms.

This finding should be viewed in the context of MSME characteristics, particularly within engineering-based sectors, which typically have flexible organizational structures, are owner-driven, and rely heavily on technical capacity and managerial behavior. As stated by Supandi et al. (2022), many MSMEs face limitations in managerial capacity, capital, and technology, which affect the effectiveness of leadership in improving

performance directly. These conditions align with findings by Fiernaningsih et al. (2024), who emphasize that performance variability in MSMEs is shaped by complex internal factors, meaning leadership alone is insufficient to guarantee optimal performance outcomes.

Although this result differs from some prior literature that reports a significant direct effect of leadership on performance such as studies by Ametefe et al. (2025) and Dooley et al. (2017) the discrepancy can be explained by the specificity of the engineering MSME context. Within this setting, leadership effects tend to operate through mediating mechanisms, such as entrepreneurial characteristics or internal capacity development. This is supported by Berisha, Govori, and Sejdija (2024), who argue that leadership exerts its influence on performance primarily through indirect pathways mediated by internal organizational mechanisms.

Conceptually, entrepreneurial leadership encompasses vision, opportunity orientation, risk-taking, and creativity (Renko et al., 2015; Ranjan, 2018). These elements are essential for establishing strategic direction and mobilizing resources; however, in MSME practice, technical ability and individual motivation often play a greater role in determining strategy implementation. Therefore, entrepreneurial leadership must be accompanied by the strengthening of entrepreneurial characteristics to generate a significant impact on business performance.

Empirically, these findings affirm that the direct pathway from leadership to MSME performance is not sufficiently strong, highlighting the importance of mediating variables in the research model. The mediation analysis indicates that entrepreneurial characteristics significantly mediate the relationship between leadership and performance ($p = 0.000$), suggesting that the ability to innovate, take risks, and act proactively serves as the main channel through which leadership affects performance. In other words, entrepreneurial leadership acts as a catalyst in shaping strong entrepreneurial behavior, which subsequently drives business performance.

This aligns with strategic management and entrepreneurship literature, which asserts that leadership shapes strategic thinking, while real-world implementation depends heavily on internal capacity and individual competencies (Ferreira, Fernandes & Kraus, 2019; Kerr et al., 2019). This reinforces that entrepreneurial leadership cannot operate in isolation, but must be integrated with internal capability development and entrepreneurial mindset building to yield meaningful performance outcomes.

Overall, the discussion shows that the first hypothesis is not empirically supported in its direct form; however, entrepreneurial leadership remains relevant as an indirect performance driver through the mediating role of entrepreneurial characteristics. The practical implication is that efforts to enhance MSME performance should involve strengthening leadership along with cultivating entrepreneurial traits, and fostering a work environment that supports innovation, proactivity, and calculated risk-taking.

The second hypothesis states that Entrepreneurial Leadership (X1) significantly affects Interpersonal Communication (M1) within MSMEs. The PLS results in Table 4 show that the direct influence of Entrepreneurial Leadership on Interpersonal Communication is not significant, with a t-statistic of 0.961 and a p-value of 0.337. The negative coefficient value of -0.106 indicates a relationship direction that contradicts the initial hypothesis, which anticipated a positive effect. Thus, it can be concluded that entrepreneurial leadership in this study does not have a direct effect on interpersonal communication quality within MSMEs.

This finding corresponds with the characteristics of engineering MSMEs, which are typically small in scale, owner-driven, and lack formal communication systems. As explained in the introduction, daily work interactions between owners, technicians, and operational staff occur informally and depend heavily on routine activities rather than structured communication channels. Supandi et al. (2022) note that limited managerial and human resource capacity in MSMEs may result in strategic directions from leaders not being effectively translated into communication practices. This implies that although entrepreneurial leaders may be visionary and innovative, such attributes do not automatically enhance interpersonal communication without additional internal mechanisms.

This result differs from prior studies reporting that entrepreneurial or transformative leadership can strengthen organizational communication (Jaafar et al., 2023; Biggs, Johnston & Russell, 2024). The discrepancy may be attributed to contextual differences, as communication pathways in small, informal MSMEs are less structured compared to larger organizations where leadership directives are more clearly institutionalized. Moreover, Balakrishnan et al. (2024) emphasize that effective interpersonal communication relies heavily on complex social interactions, organizational culture, and individual skill, making leadership just one of several influencing factors.

Although the direct pathway is not significant, this does not diminish the strategic relevance of entrepreneurial leadership in shaping internal mechanisms that support communication. Berisha, Govori, and Sejdija (2024) explain that leadership tends to influence organizational outcomes indirectly through behavioral or capability-based mediators. In this case, leadership may affect interpersonal communication through building collaborative culture, encouraging shared learning, or strengthening entrepreneurial characteristics. This aligns with the perspective of Chiloane-Tsoka & Boya (2015), who state that interpersonal communication often acts as a mediator in organizational causal relationships, and direct leadership influence does not always appear significantly.

Conceptually, entrepreneurial leadership incorporates vision, opportunity orientation, creativity, and risk-taking (Renko et al., 2015; Dyatmika, 2023). These elements primarily shape strategic decision-making and innovation processes, whereas interpersonal communication skills require practice, social exposure, and sensitivity to team dynamics. Therefore, improving communication through leadership may require a gradual process supported by skill development and experiential learning rather than leadership style alone.

In summary, the discussion of the second hypothesis demonstrates that the direct influence of entrepreneurial leadership on interpersonal communication is not significant among engineering-sector MSMEs in Karawang Regency. The implication is that improving interpersonal communication requires internal capability building through communication skills training, strengthening entrepreneurial characteristics, and fostering a collaborative work culture. Leadership remains relevant, but its effects operate more effectively through indirect mechanisms that mediate behavior and internal capability strengthening.

The third hypothesis in this study states that Entrepreneurial Leadership (X1) has a significant effect on Entrepreneurial Characteristics (M2) in MSMEs. The direct test results presented in Table 4 indicate a significant effect, with a coefficient of 0.358, a t-statistic of 4.001, and a p-value of 0.000. These findings demonstrate that entrepreneurial

leadership exerts a significant positive influence on the development of entrepreneurial characteristics among MSME actors, including creativity, opportunity orientation, risk-taking ability, achievement motivation, and proactivity.

This result aligns with the findings of Renko et al. (2015) and Ranjan (2018), who state that entrepreneurial leadership fosters strategic thinking and entrepreneurial behavior through vision, opportunity orientation, and well-measured risk-taking. In practical terms, within engineering-based MSMEs, owners or managers who apply entrepreneurial leadership principles are able to influence operational decisions, product innovation, and market strategies by motivating themselves and their teams to adapt proactively to business environmental changes.

The findings are also consistent with Ferreira, Fernandes, & Kraus (2019), who emphasize that entrepreneurial characteristics are shaped through the interaction between leadership style and practical experience in navigating market dynamics. In other words, entrepreneurial leadership not only provides strategic direction but also helps develop the individual capacity to take initiative, identify opportunities, and innovate continuously.

From an empirical standpoint, the findings confirm that the direct path between leadership and entrepreneurial characteristics is sufficiently strong, differing from the direct influence of leadership on interpersonal communication and business performance, which are not significant. This suggests that internal mechanisms specifically entrepreneurial characteristics serve as the primary pathway through which leadership affects business outcomes. This is reinforced by Berisha, Govori, and Sejdića (2024), who argue that leadership requires internal mediating mechanisms to exert an optimal impact on performance.

In addition, the findings align with the theory of adaptive capability and resource mobilization proposed by Dyatmika (2023) and García-Vidal et al. (2019), which assert that entrepreneurial leadership serves as a driver of business agility by strengthening internal entrepreneurial behavior. This implies that leadership is not solely about strategic decision-making, but also about shaping character, motivation, and readiness to seize opportunities and manage risks.

The practical implication of these findings indicates that developing entrepreneurial characteristics within engineering-based MSMEs can be achieved through leadership capacity-building programs. Training, mentoring, and empowerment initiatives for MSME owners or managers that emphasize entrepreneurial values will contribute to proactive, innovative, and opportunity-driven behaviors, which in turn may indirectly enhance business performance. This emphasizes the importance of integrating leadership development with entrepreneurial character-building in MSME management strategies.

Overall, the discussion of the third hypothesis indicates that entrepreneurial leadership has a significant and positive effect on entrepreneurial characteristics within engineering-sector MSMEs in Karawang Regency. These findings support the argument that strengthening entrepreneurial character is a critical internal mechanism through which leadership can effectively drive business performance. Thus, entrepreneurial characteristics function as an important mediator in the relationship between leadership and MSME performance, which will be further elaborated in the mediation analysis of this study.

The fourth hypothesis states that Interpersonal Communication (M1) significantly influences MSME Performance (Y). Based on the direct testing results presented in Table 4, the effect of interpersonal communication on MSME performance is significant, with a

coefficient of 0.141, a t-statistic of 2.209, and a p-value of 0.027. These findings indicate that interpersonal communication quality contributes positively to business performance, although the coefficient value is relatively lower compared to the influence of entrepreneurial characteristics on performance.

This finding is consistent with Jaafar et al. (2023) and Biggs, Johnston, & Russell (2024), who highlight the role of interpersonal communication in supporting coordination effectiveness, problem-solving, and knowledge transfer within organizations. In engineering-sector MSMEs, daily interactions among owners, technicians, and operational staff are highly intensive, making communication quality directly affect production efficiency, compliance with technical standards, and responsiveness to market demands. This aligns with Kusbandono, Zaakiyyah & Junaidi (2024), who explain that interpersonal communication contributes to successful workplace collaboration and customer service—both of which are critical performance indicators.

These results also support the conceptual argument put forward by Balakrishnan et al. (2024) and Kruger et al. (2016), that interpersonal communication serves as an important channel for leaders to convey strategic direction, facilitate team coordination, and build a productive work culture. Although its effect is not as dominant as the entrepreneurial characteristics pathway, the findings affirm that interpersonal communication remains an important mechanism in achieving business performance, especially in small-scale organizations where operations rely heavily on direct human interaction.

However, comparisons with previous research show variations in communication effectiveness. Studies such as Abaci (2022) and Chiloane-Tsoka & Boya (2015) found that interpersonal communication can mediate the influence of leadership on performance, whereas in this study its direct effect is moderate. This difference may be explained by the informal communication structures commonly found in engineering MSMEs, where communication tends to be contextual and adaptive, reducing its direct influence compared with formalized communication systems.

Conceptually, these findings reinforce the understanding that interpersonal communication functions as a coordination and collaboration amplifier, supporting the implementation of business strategies and innovation. Ansari (2021) notes that effective interpersonal communication involves clarity in message delivery, active listening, and trust-building, all of which influence operational decisions and customer satisfaction. Within MSMEs, these abilities help reduce production errors, improve responsiveness to market changes, and enhance stakeholder relationships.

The practical implications of these findings indicate that although interpersonal communication is not the dominant factor in improving performance, strengthening communication skills remains essential. MSMEs need to implement communication training programs, establish simple but formal coordination mechanisms, and foster collaborative work culture to maximize its contribution to business outcomes.

Overall, the fourth hypothesis demonstrates that interpersonal communication has a significant and positive influence on MSME performance in the engineering sector of Karawang Regency. These findings reinforce that alongside entrepreneurial characteristics, interpersonal communication is an important internal mechanism supporting business performance, although its relative role is more moderate.

The fifth hypothesis states that Entrepreneurial Characteristics (M2) significantly affect MSME Performance (Y). The direct test results in Table 4 show a very strong

positive effect, with a coefficient of 0.768, a t-statistic of 11.545, and a p-value of 0.000. These findings indicate that entrepreneurial characteristics including creativity, opportunity orientation, risk-taking ability, achievement motivation, and proactivity are a major determinant of business performance within engineering-sector MSMEs in Karawang Regency.

This result aligns with Ferreira, Fernandes & Kraus (2019) and Priyaa et al. (2025), who assert that entrepreneurial characteristics shape the strategic mindset of business actors, influence decision-making, managerial behavior, and responses to market dynamics. In MSMEs, these characteristics drive product innovation, adoption of new technologies, operational efficiency, and expanded market penetration. These results also support Wijayanti et al. (2016), who found that innovation and opportunity orientation significantly contribute to business competitiveness and performance.

Theoretically, entrepreneurial characteristics serve as the primary pathway through which entrepreneurial leadership influences MSME performance. These findings reinforce Berisha, Govori, and Sejdića (2024), who argue that leadership impacts organizational outcomes indirectly and requires internal mechanisms in this case, entrepreneurial characteristics as mediators. In other words, the capacity of owners or managers to internalize entrepreneurial values and apply them in business management becomes the key to improving performance.

Empirically, the coefficient of 0.768 demonstrates the dominant effect of entrepreneurial characteristics compared to the direct influence of Entrepreneurial Leadership (0.098) and Interpersonal Communication (0.141) on MSME performance. This suggests that individual-level internal factors particularly strong entrepreneurial traits determine business outcomes more strongly than leadership direction or communication quality. These findings are consistent with Dooley et al. (2017), who assert that in skill-based MSMEs, proactive and innovative entrepreneurial behavior plays a central role in operational efficiency and competitive advantage.

Furthermore, the significant effect of entrepreneurial characteristics on MSME performance reflects the actual business landscape in Karawang Regency. Engineering-sector MSMEs face constraints related to capital, technology, and market access (Supandi et al., 2022), making entrepreneurial characteristics a strategic internal mechanism to overcome these limitations. Business actors who are creative, opportunity-driven, and willing to take risks can optimize limited resources and exploit market opportunities more effectively, leading to stronger productivity and sustainability.

In practical terms, the findings imply that MSME development programs should prioritize strengthening entrepreneurial characteristics through training, mentoring, and real business practice. Such strategies not only enhance decision-making and innovation capabilities but also improve overall business competitiveness and sustainability.

Overall, the fifth hypothesis confirms that Entrepreneurial Characteristics have a significant and positive impact on MSME performance in the engineering sector of Karawang Regency. These findings highlight the central role of internal entrepreneurial traits as the primary driver of business success, representing the dominant mediation pathway linking entrepreneurial leadership to business outcomes, and emphasizing the importance of developing entrepreneurial capacity in MSME empowerment strategies.

The sixth hypothesis states that Interpersonal Communication (M1) mediates the influence of Entrepreneurial Leadership (X1) on MSME Performance (Y). Based on the mediation test results presented in Table 5, the mediation path through Interpersonal

Communication is not significant, with an indirect effect coefficient of -0.015, a t-statistic of 0.847, and a p-value of 0.397. These findings indicate that Interpersonal Communication does not serve as a mediator in the relationship between entrepreneurial leadership and MSME performance within the sample of this study.

This result is noteworthy because conceptually, previous literature highlights the importance of interpersonal communication as a reinforcing channel between leadership and performance. Jaafar et al. (2023) and Biggs, Johnston, & Russell (2024) assert that interpersonal communication can mediate the relationship between leadership and performance through work coordination, knowledge transfer, and the development of a collaborative culture. Balakrishnan et al. (2024) also emphasize that communication effectiveness influences the implementation of strategic directives from leaders. However, in this study, such mediation effects are not evident, indicating a divergence from several prior findings.

This discrepancy may be explained by the operational characteristics of MSMEs in the engineering sector within Karawang Regency. MSMEs in this sector tend to be small-scale and informal, characterized by flexible and owner-driven structures. Under such conditions, communication among members is more adaptive, spontaneous, and situational. Entrepreneurial leadership practiced by owners or managers may be more directly manifested through actions and strategic decisions, limiting the role of interpersonal communication as a mediating mechanism. In other words, leadership influence is realized more through leader-driven entrepreneurial behavior and internalization rather than through formal or structured communication pathways.

Furthermore, the findings demonstrate that although Interpersonal Communication has a direct and significant effect on MSME Performance (coefficient 0.141, $p = 0.027$), its mediating role is not sufficiently strong to bridge the influence of entrepreneurial leadership. This reinforces that in technically oriented MSMEs, individual capability and entrepreneurial character are the dominant channels influencing performance outcomes, while communication quality plays a secondary function as a facilitator of operational coordination rather than a strategic mediator.

Theoretically, these findings support the argument of Berisha, Govori, and Sejdija (2024), who state that the influence of leadership on performance is indirect and dependent on relevant internal mechanisms. In this study, the dominant mediating pathway is not interpersonal communication but rather entrepreneurial characteristics, which will be discussed in the subsequent hypothesis.

Practically, the results imply that although developing interpersonal communication remains important for ensuring operational effectiveness, performance improvement in MSMEs cannot rely solely on communication as the mechanism for leadership influence. MSME owners or managers must reinforce entrepreneurial characteristics to foster innovation, strategic decision-making, and responsiveness to market dynamics, while interpersonal communication should be optimized for daily coordination and teamwork.

Overall, the sixth hypothesis demonstrates that Interpersonal Communication does not mediate the relationship between Entrepreneurial Leadership and MSME Performance in the engineering sector of Karawang Regency. These findings confirm that leadership influence is realized primarily through entrepreneurial character internalization rather than interpersonal communication, which plays a supporting role in operational and coordination processes.

The seventh hypothesis states that Entrepreneurial Characteristics (M2) mediate the influence of Entrepreneurial Leadership (X1) on MSME Performance (Y). Based on the mediation test results in Table 5, this mediation pathway is significant, with an indirect effect coefficient of 0.275, a t-statistic of 3.692, and a p-value of 0.000. This finding indicates that the influence of entrepreneurial leadership on MSME performance is largely realized through the internalization of entrepreneurial characteristics by business actors.

This result aligns with the findings of Berisha, Govori, and Sejdija (2024), who argue that the influence of leadership on business performance is often indirect and requires an internal mediating mechanism. In other words, entrepreneurial leadership does not immediately improve performance but works through the shaping of entrepreneurial mindsets, attitudes, and behaviors among MSME owners or managers. This is reinforced by Ferreira, Fernandes, & Kraus (2019) and Priyaa et al. (2025), who emphasize that entrepreneurial characteristics such as creativity, risk-taking, achievement motivation, and proactiveness are key factors in optimizing resource utilization, strategic decision-making, and innovation in business operations.

Empirically, this mediation path explains why the direct influence of Entrepreneurial Leadership on MSME Performance (0.098, $p = 0.065$) is not significant, whereas the indirect influence through Entrepreneurial Characteristics becomes significant. This suggests that in the engineering sector of Karawang, leadership by owners or managers is most effective when it fosters strong entrepreneurial characteristics in themselves and their teams. These characteristics act as the primary mechanism that translates strategic direction and leadership vision into concrete actions that enhance performance.

Additionally, this finding is consistent with Wijayanti et al. (2016), who found that strong entrepreneurial traits encourage innovation, technology adoption, and market penetration, ultimately improving business performance. This is highly relevant in the context of engineering-based MSMEs in Karawang, which face challenges such as limited capital, technology, and market access (Supandi et al., 2022). Under such conditions, entrepreneurial characteristics serve as the key internal mechanism to navigate constraints, making this mediation pathway more dominant than interpersonal communication.

From a theoretical perspective, these findings reinforce the view that entrepreneurial leadership acts as a catalyst for developing entrepreneurial traits, which then significantly influence business outcomes. Visionary, opportunity-oriented, and innovative leadership (Renko et al., 2015; Dyatmika, 2023) encourages individuals to internalize entrepreneurial values, making entrepreneurial behavior an effective mediator for improving business performance.

Practically, the implication is that MSME development programs should prioritize building entrepreneurial characteristics through training, mentoring, and experiential learning. Effective leadership should focus on strengthening entrepreneurial identity and competencies rather than solely providing instructions or improving formal communication systems. Such strategies will more effectively promote innovation, adaptive decision-making, and superior performance outcomes.

In summary, the seventh hypothesis demonstrates that Entrepreneurial Characteristics significantly mediate the influence of Entrepreneurial Leadership on MSME Performance in the engineering sector of Karawang Regency. This finding highlights the central role of internal entrepreneurial factors as the primary mechanism for performance improvement and underscores the importance of entrepreneurial development in MSME performance enhancement strategies.

CONCLUSION

Based on the results and discussion of the study, it can be concluded that entrepreneurial leadership, interpersonal communication, and entrepreneurial characteristics play an important role in improving the performance of MSMEs in the engineering sector in Karawang Regency. Entrepreneurial leadership does not directly influence performance, but rather operates through the development of strong entrepreneurial characteristics within MSME owners or managers. These characteristics which include creativity, proactiveness, achievement motivation, and risk-taking serve as the primary mechanism for optimizing resource utilization, strategic decision-making, and business innovation.

Interpersonal communication also contributes positively to MSME performance, particularly in supporting operational coordination, team collaboration, and knowledge transfer. However, its role as a mediator in the relationship between leadership and performance was found to be less dominant compared with entrepreneurial characteristics. These findings reinforce that MSME performance improvement is driven more by the internalization of entrepreneurial behavior than by improvements in communication quality alone.

Overall, this study confirms that enhancing MSME performance is the result of synergy between visionary leadership, the development of strong entrepreneurial characteristics, and effective interpersonal communication. MSME development strategies should therefore prioritize strengthening entrepreneurial character through training, mentoring, and innovation-based practice, while maintaining communication capability as a supporting mechanism for operational coordination. With this approach, MSMEs in the engineering sector can improve competitiveness, innovation capacity, and business sustainability more optimally.

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