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Entrepreneurial Leadership in Engineering Education: Its Impact on Competence Development and Entrepreneurial Intention

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ABSTRACT

Purpose – This research explores how entrepreneurial leadership shapes the entrepreneurial competence and startup intentions of engineering students at Telkom University in Indonesia. **Methodology/approach –** This research adopts a quantitative design and employs a sampling technique known as proportionate stratified random sampling. The sample consists of 100 seventh-semester students drawn from three engineering faculties, and the data were analyzed using simple linear regression. **Findings –** Entrepreneurial leadership significantly influences entrepreneurial competence ($R^2 = 0.446$), indicating that it is crucial in developing students' entrepreneurial mindset and behaviors. Conversely, its impact on the intention to launch a business is much less pronounced ($R^2 = 0.091$). Not every element that enhances skills simultaneously fosters commitment. **Novelty/value –** The research contributes new insights by investigating the impact of entrepreneurial leadership on students beyond business programs. It emphasizes the importance of various other determinants of entrepreneurial ambition and provides a basis for improving the entrepreneurial environment within universities.

INTRODUCTION

The increasingly complex and rapidly evolving nature of global challenges requires young people to develop creative, adaptive, and innovative capabilities, particularly in the face of growing volatility in the labor market. According to Statistics Indonesia (BPS, 2024), the national unemployment rate has reached 6.7%, with university graduates accounting for the highest share at 8.2%. This pattern suggests that many higher education institutions have not yet equipped their graduates with the competencies needed either to compete effectively in the formal labor market or to create their own employment opportunities. The situation is further exacerbated by shrinking opportunities in the formal sector and rising industry expectations for graduates who are able to create, rather than merely seek, jobs. Consequently, fostering entrepreneurial skills and intentions among university students has become an important strategy for reducing unemployment and strengthening the stability of the national economy (Ministry of Cooperatives and SMEs, 2023). Telkom University, as an institution that explicitly positions entrepreneurship as one of the core pillars of its vision, faces a non-trivial challenge. On the one hand, its students—particularly those in engineering programs—are equipped with strong technical skills that are highly sought after by industry. On the other hand, their career orientations tend to be

directed toward the formal sector, such as becoming engineers, employees in technology companies, or staff in state-owned enterprises. This raises a crucial question: does the entrepreneurial leadership practiced within the academic environment truly have the capacity to shift these career orientations, or at least to strengthen the entrepreneurial competencies students will need should they later choose an entrepreneurial path?

Entrepreneurial leadership, as defined by Renko et al. (2015) and Leitch and Volery (2017), refers to a style of leadership that promotes innovation, calculated risk-taking, and the inspiration of individuals to identify and pursue opportunities in uncertain environments. Entrepreneurial competence encompasses an integrated set of knowledge, skills, and attitudes that enables students to recognize opportunities, solve problems creatively, build networks, and translate business ideas into action (Mitchelmore & Rowley, 2010; Izquierdo et al., 2005). Entrepreneurial intention reflects an individual's readiness to pursue entrepreneurship as a career choice and is shaped by attitudes, subjective norms, and perceived behavioral control—the three core antecedents in Ajzen's (1991) Theory of Planned Behavior (TPB). Prior studies have documented positive relationships between entrepreneurial leadership and both entrepreneurial competence (Zehir et al., 2011; Al-Mamun et al., 2018; Darmawan et al., 2022) and entrepreneurial intention (Hoang et al., 2023). However, these findings are not fully consistent, particularly in contexts where occupational norms and social pressures exert competing influences on students' career aspirations (Liñán & Chen, 2009).

Despite growing interest in entrepreneurial leadership, the literature still reveals two key theoretical gaps. First, almost all empirical studies focus on business or management students, while engineering students—who possess distinct professional identities and occupational norms—are often overlooked as a research population (Nabi et al., 2017). Bárbara-Sánchez and Atienza-Sahuquillo (2017) demonstrate that entrepreneurial intentions among engineering students exhibit characteristics that cannot be treated as equivalent to those of business students, yet this finding has prompted relatively little follow-up investigation. Second, most studies examine either entrepreneurial competence or entrepreneurial intention in isolation, making it difficult to determine whether entrepreneurial leadership operates through the same mechanisms for both outcomes or whether its effects are theoretically distinct (Harrison & Leitch, 2018). A practical gap is also evident: entrepreneurship education research in Indonesia remains underrepresented in international journals, provision of programs is uneven, and teaching practices rarely move beyond predominantly theoretical approaches (Amalia & von Korflesch, 2021).

Against this background, the present study has two main objectives: (1) to analyze the effect of entrepreneurial leadership on the entrepreneurial competence of engineering students at Telkom University; and (2) to evaluate the effect of entrepreneurial leadership on the entrepreneurial intentions of engineering students at the same institution. By examining these two outcomes simultaneously, the study enables a direct comparison of whether, and to what extent, the influence of entrepreneurial leadership differs across two constructs that are conceptually related yet empirically distinct.
This study differs from prior work in three main respects. First, it deliberately focuses on engineering students not for reasons of geographical convenience, but precisely because they are both one of the least studied populations in entrepreneurship research and one of the most strategic to examine given their potential as future technopreneurs (Bárbara-Sánchez & Atienza-Sahuquillo, 2017; Nabi et al., 2017). Second, by examining entrepreneurial competence and entrepreneurial intention within a single model, the study enables a direct comparison of the extent to which entrepreneurial leadership influences two outcomes that are conceptually related yet often (and perhaps mistakenly) treated as equivalent (Harrison & Leitch, 2018). Third, and less commonly, the quantitative analysis is complemented by faculty-level student interviews, not merely for triangulation, but to understand why the same regression model "tells" different stories for Informatics, Electrical Engineering, and Industrial Engineering students. Such contextually grounded insights rooted in Indonesia and specific to a technopreneurship-oriented institution remain largely absent from the international literature (Amalia & von Korflesch, 2021; Listyaningsih et al., 2024).The contribution of this study is intended to go

beyond academic debate. Its findings are expected to offer concrete input for Telkom University and similar institutions in designing entrepreneurship programs that genuinely resonate with students rather than simply looking good on paper. The remainder of this paper is structured as follows: Section 2 presents the literature review and theoretical framework, including hypothesis development; Section 3 describes the research methods; Section 4 reports and discusses the empirical findings; and Section 5 concludes with implications, limitations, and directions for future research.

LITERATURE REVIEW

Theoretical Framework

The main theoretical framework underpinning this study is Ajzen's (1991) Theory of Planned Behavior (TPB), which has been widely applied in entrepreneurship education research to explain why some individuals are able to translate entrepreneurial knowledge and competence into concrete career intentions, whereas others are not (Liñán & Chen, 2009; Krueger et al., 2000). TPB posits that intention is the immediate antecedent of behavior, and that intention itself is determined by three constructs. First, attitude toward the behavior, which reflects an individual's evaluative judgment of whether entrepreneurship is perceived as attractive, meaningful, and worth pursuing. Second, subjective norms, which capture perceived social pressure from significant others such as family, peers, and role models that can either encourage or discourage the choice to become an entrepreneur. Third, perceived behavioral control, which reflects beliefs about one's capacity to successfully engage in entrepreneurial activity, encompassing both internal factors (skills, knowledge) and external factors (access to resources and support networks).

TPB is particularly suitable for this study for two reasons. First, it decomposes the antecedents of intention, allowing the researcher to identify precisely where entrepreneurial leadership exerts its strongest influence and where other forces such as disciplinary norms or family expectations may neutralize that influence. Second, TPB conceptually bridges competence and intention: perceived behavioral control closely parallels entrepreneurial self-efficacy (Bandura, 1997), which prior research has identified as a key mechanism explaining how competence development can though does not always translate into entrepreneurial career aspirations (Zhao et al., 2005). In this study, entrepreneurial leadership is conceptualized as a contextual antecedent that simultaneously strengthens perceived behavioral control and shapes attitudes toward entrepreneurship, thereby functioning as a contextual enabler of both entrepreneurial competence and entrepreneurial intention

Entrepreneurial Leadership

Entrepreneurial leadership is understood as a leadership style that integrates entrepreneurial thinking with managerial skills to inspire others, create new value, and navigate uncertainty (Thornberry, 2006; Renko et al., 2015). Gupta et al. (2004) define it as the capacity to realize a founder's vision by influencing others to voluntarily commit to resource-constrained entrepreneurial ventures, while Leitch and Volery (2017) emphasize its distinctive orientation toward opportunity creation rather than merely managing organizational change. In educational contexts, the construct is commonly operationalized through Timmons and Spinelli's (2009) nine competency dimensions stakeholder management, problem-solving, communication, planning, decision-making, project management, negotiation, management of external experts, and human resource administration which collectively reflect a blend of managerial skills, strategic capacity, and an entrepreneurial mindset. Empirically, a growing body of research shows that entrepreneurial leadership is positively associated with innovation, organizational performance, and entrepreneurial competence (Zehir et al., 2011; Al-Mamun et al., 2018; Darmawan et

al., 2022), and can support the development of entrepreneurial intention by strengthening perceived behavioral control (Hoang et al., 2023). However, cross-country evidence also indicates that perceived university support typically explains only a small proportion of variance in entrepreneurial intention, while subjective norms particularly family encouragement often play a more decisive role (Saeed et al., 2015; Nabi et al., 2017). Accordingly, entrepreneurial leadership may be viewed as a necessary but not sufficient condition for shaping entrepreneurial career intentions, especially in the case of engineering students who are the focus of the present study.

Engineering Students versus Business Students

One persistent limitation in the entrepreneurship education literature is its heavy reliance on business and management students as the primary research population. This sampling bias is non-trivial, because students from different disciplinary backgrounds enter higher education with fundamentally different cognitive styles, professional identity frameworks, and career expectation structures—all of which may moderate how they process entrepreneurial stimuli and translate them into action (Nabi et al., 2017). A number of international studies have begun to document these differences empirically.

Table 1. Comparison of Entrepreneurial Orientation: Engineering Students vs. Business Students

Dimension	Business Students	Engineering Students
Career Orientation	Entrepreneurship seen as primary or early stage career option (Liñán & Chen, 2009)	Formal employment in technical sectors preferred; entrepreneurship as contingency career (Bárbara-Sánchez & Atienza-Sahuquillo, 2017)
Risk perception	Moderate risk tolerance; exposure to business cases builds comfort with uncertainty	Systematic risk minimization ingrained through engineering methodology (Krueger et al., 2000)
Entrepreneurial self-efficacy	Higher general entrepreneurial self-efficacy due to business-specific curriculum (Zhao et al., 2005)	Higher technical self-efficacy; lower entrepreneurial self-efficacy unless explicitly developed (Nabi et al., 2017)
Response to education interventions	More sensitive to entrepreneurial attitude-change interventions (Fayolle & Liñán, 2014)	More responsive to competence-building interventions; intention less elastic (Bárbara-Sánchez & Atienza-Sahuquillo, 2017)
Social norm context	Peers and family more likely to validate entrepreneurial aspirations	Strong social norms toward professional engineering careers; family expectations aligned with formal employment (Wijaya, 2007)

Source: Processed by the author.

Table 1 indicates that engineering students differ from business students in characteristics that shape the impact of entrepreneurial leadership. Prior research (Bárbara-Sánchez & Atienza-Sahuquillo, 2017; Fayolle & Liñán, 2014) has shown that disciplinary context moderates the effectiveness of entrepreneurship education: among engineering students, such education tends to strengthen entrepreneurial competence more than entrepreneurial intention, reflecting a professional identity that is more strongly oriented toward technical careers. In the Indonesian context, including at Telkom University, these disciplinary differences are reinforced by a labor market structure that offers attractive formal career prospects for engineering graduates, so that, even in institutions with explicit entrepreneurship mandates, most students still prefer formal employment. This configuration helps explain why entrepreneurial leadership appears more effective at enhancing competence than at shifting entrepreneurial career intentions among engineering students

Entrepreneurial Competence

Entrepreneurial competence is commonly understood as an integrated combination of knowledge, skills, and attitudes that enables individuals to identify and evaluate opportunities, manage uncertainty, and create and sustain business value (Man et al., 2002; Mitchelmore & Rowley, 2010). Drawing on competence-based education theory, Mulder et al. (2007) conceptualize full entrepreneurial competence as the capacity to navigate and perform complex tasks in non-routine and uncertain contexts, requiring the synthesis of knowledge and skills across diverse business situations. Izquierdo et al. (2005) further decompose entrepreneurial competence into six core dimensions that have been widely adopted in empirical research: (1) opportunity identification and evaluation the proactive ability to recognize and assess new business possibilities; (2) problem identification and solving addressing business challenges systematically; (3) decision-making the ability to recognize and respond to issues, challenges, and opportunities; (4) networking building and maintaining strategic relationships; (5) communication listening actively and communicating effectively across contexts; and (6) innovative thinking applying creative reasoning to generate novel solutions.

However, entrepreneurial competence, while necessary, is not sufficient to automatically produce entrepreneurial behavior. Man et al. (2002) emphasize that competencies are not static traits but contextually activated capacities; they manifest in action only when environmental conditions such as the presence of opportunities, access to resources, leadership quality, and institutional support provide adequate stimuli. This distinction between possessing competence and activating competence is crucial for explaining why the impact of leadership on competence is often larger and more consistent than its impact on entrepreneurial intention, which requires a separate motivational commitment to a specific entrepreneurial career path.

Entrepreneurial Intention

Entrepreneurial intention refers to an individual's cognitive commitment to pursuing entrepreneurship as a career path and functions as a bridge between attitudes and behavior; it is therefore regarded as the strongest proximal predictor of actual entrepreneurial behavior and new venture creation (Fishbein & Ajzen, as cited in Wijaya, 2007; Bird, 1988; Ajzen, 1991). It reflects a person's readiness to engage in entrepreneurial activity and can be observed through indicators such as the desire to make entrepreneurship one's primary career goal, the commitment to take concrete steps toward business independence, and the expectation of starting a new venture in the future (Silvia, 2013). Liñán and Chen (2009) show that the antecedents specified in the Theory of Planned Behavior (TPB) in particular personal attitude and perceived behavioral control consistently predict entrepreneurial intention across cultural contexts, while Krueger et al. (2000) find that perceived desirability and perceived feasibility, which mirror attitude and perceived behavioral control in TPB, are both significant predictors, with feasibility exerting the stronger direct effect.

A substantial body of research also indicates that entrepreneurial intention is more responsive to social and family influences than to institutional interventions alone. Exposure to family business has been shown to be one of the strongest predictors of entrepreneurial intention, explaining more variance than merely taking formal entrepreneurship courses (Carr & Sequeira, 2007), while having an entrepreneurial family background increases not only intention but also the willingness to bear entrepreneurial risk (Zellweger et al., 2011). Consistent with this, Wijaya (2007) identifies several antecedents of entrepreneurial intention, including the family environment (which can instill values of independence and achievement motivation), formal education (which provides practical business knowledge), personal values such as a preference for autonomy, creativity, and risk acceptance (Hisrich et al., 2010), as well as demographic factors such as age and gender. This constellation of attitudinal,

social, and control-related factors helps explain why entrepreneurial intention is generally more difficult to change than entrepreneurial competence alone, as it requires the simultaneous alignment of multiple psychological and contextual dimensions.

Hypothesis

Entrepreneurial Leadership and Entrepreneurial Competence

The relationship between entrepreneurial leadership and entrepreneurial competence can be explained through three main frameworks. First, from the perspective of the Theory of Planned Behavior (Ajzen, 1991), entrepreneurial leadership enhances students' perceived behavioral control by providing structured opportunities to practice opportunity recognition, problem-solving, decision-making, networking, and communication dimensions that correspond closely to the six aspects of entrepreneurial competence (Izquierdo et al., 2005; Timmons & Spinelli, 2009). Second, Bandura's (1997) social cognitive theory and the construct of entrepreneurial self-efficacy (Zhao et al., 2005) suggest that role-modelling of entrepreneurial behavior, project-based assignments, and intensive mentoring foster self-efficacy, which mediates the link between knowledge acquisition and competence development. Third, Kolb's (1984) experiential learning theory posits that entrepreneurial leadership facilitates iterative cycles of experience, reflection, conceptualization, and experimentation, thereby accelerating and deepening competence formation (Fayolle & Liñán, 2014). Consistent with these frameworks, empirical studies have shown that entrepreneurial leadership is a significant predictor of entrepreneurial competence in higher education (Zehir et al., 2011; Al-Mamun et al., 2018; Darmawan et al., 2022).

H1: Entrepreneurial leadership has a positive and significant effect on students' entrepreneurial competence.

Entrepreneurial Leadership and Entrepreneurial Intention

Entrepreneurial leadership is expected to influence entrepreneurial intention by acting on all three antecedents of the Theory of Planned Behavior simultaneously. First, it fosters positive attitudes toward entrepreneurship by exposing students to role models, success stories, and problem-solving experiences that make an entrepreneurial career appear both attractive and feasible (Ajzen, 1991; Krueger & Carsrud, 1993). Second, entrepreneurial leadership strengthens supportive institutional norms, which can partially offset negative social pressures from family and peers. Third, through project-based learning opportunities and sustained mentoring, entrepreneurial leadership enhances perceived behavioral control and entrepreneurial self-efficacy among students (Bandura, 1997; Nabi et al., 2017; Hoang et al., 2023). Although these effects may be attenuated by contextual factors such as dominant occupational norms and limited access to start-up capital (Saeed et al., 2015), the overall direction of the relationship is still expected to be positive.

H2: Entrepreneurial leadership has a positive and significant effect on students' entrepreneurial intention.

Figure 1. Conceptual Framework

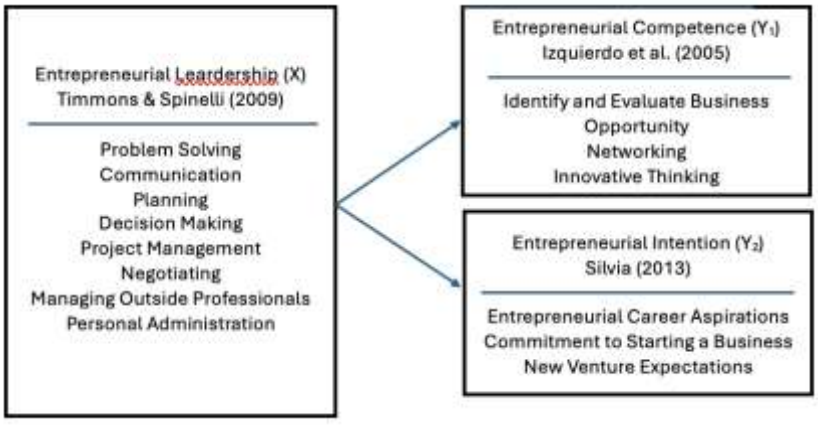

Figure 1 presents the conceptual framework examining the effect of entrepreneurial leadership (X) on entrepreneurial competence (Y_1) and entrepreneurial intention (Y_2). Entrepreneurial leadership,

drawing on Timmons and Spinelli (2009), comprises managerial and interpersonal skills such as problem solving, communication, planning, decision making, project management, negotiation, and the management of external professionals and personal administration. The framework posits that entrepreneurial leadership positively influences entrepreneurial competence defined as the ability to identify and evaluate business opportunities, build networks, and think innovatively (Izquierdo et al., 2005) as well as entrepreneurial intention, reflected in entrepreneurial career aspirations, commitment to starting a business, and expectations toward new ventures (Silvia, 2013). Thus, stronger entrepreneurial leadership capabilities are associated with higher entrepreneurial competence and intention.

METHOD

This study employed a quantitative approach with a causal research design to examine the effect of entrepreneurial leadership (X) on entrepreneurial competence (Y_1) and entrepreneurial intention (Y_2) among seventh-semester students from three engineering faculties at Telkom University (Faculty of Informatics, Faculty of Electrical Engineering, and Faculty of Industrial Engineering). A sample of 100 students was selected using proportionate stratified random sampling. Data were collected using a structured questionnaire with a five-point likert scale (1 = Strongly Disagree to 5 = Strongly Agree), comprising nineteen entrepreneurial leadership items adapted from Timmons and Spinelli (2009), eight entrepreneurial competence items from Izquierdo et al. (2005), and three entrepreneurial intention items from Silvia (2013). Item validity was assessed using Pearson product–moment correlations ($r > 0.197$; $\alpha = 0.05$; $n = 100$), and internal consistency reliability was evaluated using Cronbach's alpha ($\alpha > 0.70$), with all items meeting both criteria. Prior to hypothesis testing, classical assumption checks were conducted using residual normality and heteroskedasticity tests. The effects of entrepreneurial leadership on each dependent variable were then analyzed using simple linear regression in IBM SPSS Statistics version 22, with the F-test and the coefficient of determination (R^2) used to assess model significance and explanatory power. In addition, semi-structured interviews with three student representatives (one from each engineering faculty) were conducted within an explanatory sequential design (Creswell & Creswell, 2018) to provide qualitative contextualization of the quantitative findings.

RESULT AND DISCUSSION

Respondent Profile

The respondents of this study consisted of 100 seventh-semester students from three engineering faculties at The study involved 100 seventh-semester engineering students from three faculties at Telkom University. As shown in Table 2, the majority of respondents were male (67%), with the largest share enrolled in the Faculty of Informatics Engineering (36%), followed by the Faculty of Industrial Engineering (34%) and the Faculty of Electrical Engineering (30%). The dominant monthly income group was IDR 1,000,000–2,999,999 (55%), indicating a predominantly middle-income student profile. This demographic composition is broadly consistent with the typical characteristics of engineering undergraduates in Indonesia and provides a contextually relevant basis for examining the impact of entrepreneurial leadership on a technically oriented future industrial workforce.

Table 2 Respondent Characteristics

Category	Description	Frequency (n)	Percentage (%)
Gender	Male	67	67
	Female	33	33
Faculty	Faculty of Informatics Engineering	36	36
	Faculty of Electrical Engineering	30	30
	Faculty of Industrial Engineering	34	34
Monthly Income	< IDR 1,000,000	18	18
	IDR 1,000,000 – IDR 2,999,999	55	55
	> IDR 3,000,000	27	27

Source: Primary Survey Data (2024)

Validity and Reliability Testing

Before hypothesis testing, all measurement items were assessed for validity and reliability. Validity was examined using Pearson product–moment correlations; items with correlation coefficients exceeding the critical r value of 0.197 ($\alpha = 0.05$, n = 100, two-tailed) were retained. As shown in Table 3, all indicator items across the three variables produced r values above this threshold and were therefore classified as valid.

Table 3 Validity Test Results

Variable	Indicator	R-Value	R-Table	Result
Entrepreneurial Leadership (X)	Ability to mitigate problems that will arise	0,546	0,361	Valid
	Ability to identify problems that arise	0,687	0,361	Valid
	Ability to solve problems that are being faced	0,607	0,361	Valid
	Ability to convey messages clearly to colleagues	0,504	0,361	Valid
	Having realistic goals	0,624	0,361	Valid
	Ability to identify obstacles in achieving goals	0,687	0,361	Valid
	Ability to make decisions on every obstacle faced	0,610	0,361	Valid
	Ability to analyze problems	0,529	0,361	Valid
	Ability to manage a group	0,755	0,361	Valid
	Ability to monitor the completion of group tasks	0,678	0,361	Valid
	Ability to cooperate in a team	0,619	0,361	Valid
	Ability to collaborate to achieve common goals	0,678	0,361	Valid
	Ability to carry out recording accurately	0,400	0,361	Valid
	Ability to prepare the required budget	0,397	0,361	Valid
	Understanding of licensing	0,684	0,361	Valid
	Understanding of patent rights	0,665	0,361	Valid
	Understanding of trademarks	0,625	0,361	Valid
	Ability to manage finances	0,400	0,361	Valid

Variable	Indicator	R-Value	R-Table	Result
Entrepreneurial Competence (Y_1)	Having criteria in recruiting colleagues/group members	0,755	0,361	Valid
	Having strong commitment	0,464	0,361	Valid
	Ability to see existing opportunities	0,529	0,361	Valid
	Ability to evaluate each activity	0,678	0,361	Valid
	Ability to establish good relationships with colleagues	0,741	0,361	Valid
	Ability to adapt	0,619	0,361	Valid
	Ability to make decisions for better relationships	0,597	0,361	Valid
	Applying creative solutions to problems faced	0,553	0,361	Valid
	Always learning from mistakes	0,597	0,361	Valid
Entrepreneurial Intention (Y_2)	Becoming an entrepreneur is a professional goal	0,509	0,361	Valid
	I will make every effort to start and run my own business	0,507	0,361	Valid
	I hope to create a new business in the future	0,498	0,361	Valid

Source: IBM SPSS Statistics version 22 output.

Reliability was assessed using Cronbach's Alpha. As shown in Table 4, all variables exceed the minimum acceptable threshold of 0.70, confirming internal consistency.

Table 4 Reliability Test Results

Variable	Cronbach's Alpha	Threshold	Result
All variables (30 items)	0.943	> 0.70	Very Reliable

Source: IBM SPSS Statistics version 22 output.

Classical Assumption Tests

Normality. Residual normality was assessed using histogram analysis and Normal P–P Plots for both regression models. The histograms for each model showed bell-shaped distributions with no pronounced skewness, and the data points in the Normal P–P Plots clustered closely along the diagonal reference line. These results confirm that the residuals of models Y_1 and Y_2 are approximately normally distributed (see Figures 2-3)

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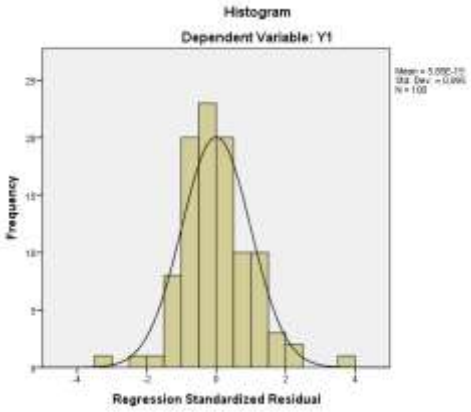

Figure 2 Histogram of Normality Test for X – Y_1

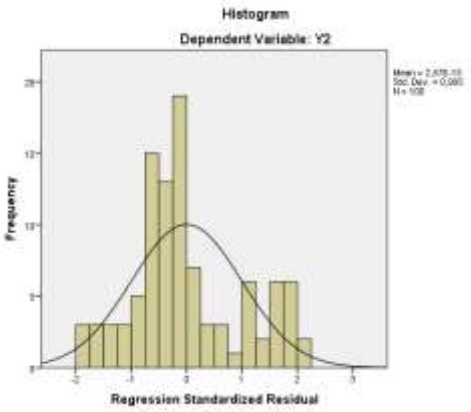

Figure 3 Histogram of Normality Test for X – Y_2

Heteroscedasticity. The scatterplot analysis of standardized residuals against predicted values shows that the data points are randomly dispersed above and below the zero line without forming any visible systematic pattern in either model. This confirms the absence of heteroscedasticity. When both classical assumptions are satisfied, the regression model is appropriate for hypothesis testing and inference.

Classical Assumption Tests

Effect of Entrepreneurial Leadership on Entrepreneurial Competence (Y_1)

Simple linear regression with entrepreneurial leadership (X) as the predictor and entrepreneurial competence (Y_1) as the dependent variable yields the following equation.:

$$\mathbf{Y_1 = 1.059 + 0.711X}$$

The unstandardized coefficient (B = 0.711) indicates that every one-unit increase in entrepreneurial leadership is associated with a 0.711 unit increase in entrepreneurial competence, assuming other factors remain constant. The F-test confirms the significance of the model (F-value = 78.827 > F-table = 3.94; p = 0.000 < 0.05), leading to the rejection of the null hypothesis and the acceptance of H_1. The coefficient of determination (R^2 = 0.446) shows that entrepreneurial leadership accounts for 44.6% of the variance in entrepreneurial competence, while the remaining 55.4% is explained by variables not included in this model. The adjusted R^2 of 0.440 supports the stability of the predictive power, and the Durbin–Watson statistic of 1.855 indicates no problematic autocorrelation.

Table 5 Simple Linear Regression: Entrepreneurial Leadership → Entrepreneurial Competence (Y_1)

Model	R	R^2	Adjusted R^2	Std. Error	F-value	Sig.
1	0.668	0.446	0.440	0.23631	78.827	0.000

Source: IBM SPSS Statistics version 22 output.

Effect of Entrepreneurial Leadership on Entrepreneurial Intention (Y_2)

A separate simple linear regression with entrepreneurial intention (Y_2) as the criterion yielded the following equation:

$$\mathbf{Y_2 = 1.513 + 0.539X}$$

Entrepreneurial leadership and entrepreneurial intention. The F-test confirms the significance of the model (F-value = 9.755 > F-table = 3.94; p = 0.002 < 0.05), and H2 is accepted. However, the coefficient of determination (R^2 = 0.091) indicates that entrepreneurial leadership explains only 9.1% of the variance in entrepreneurial intention. The adjusted R^2 of 0.081 reinforces this limited explanatory power, with the remaining 90.9% of the variance attributable to factors outside the model.

Table 6 Simple Linear Regression: Entrepreneurial Leadership → Entrepreneurial Intention (Y_2)

Model	R	R^2	Adjusted R^2	Std. Error	F-value	Sig.
1	0.301	0.091	0.081	0.50956	9.755	0.002

Source: IBM SPSS Statistics version 22 output.

Table 7 Summary of Hypothesis Test Results

Entrepreneurial Leadership	R^2	F-value	F-table	Decision
Entrepreneurial Competence (Y_1)	0.446	78.827	3.94	H_1 Accepted — Sig. (44.6%)
Entrepreneurial Intention (Y_2)	0.091	9.755	3.94	H_2 Accepted — Sig. (9.1%)

Source: Processed research data.

Overall, and consistent with the results presented in Table 7, the findings of this study confirm that entrepreneurial leadership plays a stronger role in building cognitive dimensions and entrepreneurial skills than in fostering entrepreneurial career intentions. This indicates that the strategy for developing the entrepreneurial ecosystem at Telkom University needs to be designed comprehensively, including: (1) strengthening entrepreneurial leadership within the learning process through project-based learning approaches and entrepreneurship mentoring; (2) optimizing business incubation facilities as a means of real-world practice; and (3) developing sustainable programs that are able to maintain and foster students' entrepreneurial interest from the educational stage until they are ready to fully realize their businesses after graduation.

Discussion

Entrepreneurial Leadership and Entrepreneurial Competence

The finding that entrepreneurial leadership explains 44.6% of the variance in students' entrepreneurial competence ($R^2 = 0.446$, F-value = 78.827, $p < 0.001$) and confirms H_1 is meaningful both statistically and theoretically. From the perspective of the TPB, this result indicates that entrepreneurial leadership effectively strengthens perceived behavioral control students' confidence in their capacity to engage in entrepreneurial activities which is the antecedent most directly related to competence development (Ajzen, 1991). When educators and mentors model entrepreneurial thinking, proactive risk-taking, and creative problem-solving, they create a stimulating environment in which students can observe, internalize, and practice the core competencies identified by Izquierdo et al. (2005): opportunity recognition, problem-solving, decision-making, networking, communication, and innovative thinking, in line with Kolb's (1984) experiential learning cycle.

This result in Table 5 is consistent with Thornberry's (2006) proposition that leaders who actively encourage innovation, initiative, and comfort with uncertainty act as effective catalysts for the development of followers' competencies. It also aligns with the findings of Zehir et al. (2011), Al-Mamun et al. (2018), and Darmawan et al. (2022), who identify entrepreneurial leadership as a strong predictor of entrepreneurial readiness and capability across diverse organizational and higher-education contexts. The magnitude of the effect almost half of the explained variance is also practically significant, suggesting that investing in the quality of entrepreneurial leadership through mentoring, project-based pedagogy, and faculty capacity building can measurably accelerate the development of entrepreneurial competence. However, the remaining 55.4% of unexplained variance indicates that other factors also play an important role, including prior entrepreneurial experience, personality traits such as general self-efficacy and risk-taking propensity (Rauch & Frese, 2007), as well as access to the entrepreneurial ecosystem (incubators, startup communities), all of which warrant further exploration in future research.

Entrepreneurial Leadership and Entrepreneurial Competence

The results in Table 6 show that entrepreneurial leadership explains only 9.1% of the variance in entrepreneurial intention ($R^2 = 0.091$, F-value = 9.755, $p = 0.002$). Although H_2 is accepted and the relationship is significant, the effect size is much smaller than its impact on competence (44.6%), confirming that entrepreneurial leadership is more effective in building capabilities than in reshaping career choices. In line with the TPB and the findings of Liñán and Chen (2009), this suggests that leadership primarily strengthens perceived behavioral control, while the attitudes and subjective norms of Indonesian engineering students remain dominated by professional norms and family expectations regarding formal technical employment (Wijaya, 2007).

This interpretation is reinforced by qualitative interview data collected from representatives of the three faculties. The representative from the Faculty of Informatics Engineering expressed a "work-first" orientation a preference for accumulating industrial experience and technical capital before considering entrepreneurship which weakens the transfer of motivation from leadership influence to intentions to pursue an entrepreneurial career. The representative from the Faculty of Electrical Engineering perceived entrepreneurship as unrelated to their discipline and more often framed it as an emergency career path rather than a deliberate primary choice. In contrast, the representative from the Faculty of Industrial Engineering exhibited a more proactive entrepreneurial orientation, which they largely attributed to the structure of the project-based, impact-oriented Business Initiative Development course, rather than to mentoring or leadership per se. These faculty specific patterns indicate that curriculum design and disciplinary culture function as important contextual moderators of the relationship between entrepreneurial leadership and entrepreneurial intention.

Taken together, these findings suggest that entrepreneurial leadership, while necessary, is not sufficient to reshape the career intentions of engineering students. The persistence of profession-oriented norms, limited exposure to startup ecosystems, and the relative absence of entrepreneurial role models in students' immediate social environments collectively moderate the leadership–intention relationship (Saeed et al., 2015; Krueger & Carsrud, 1993). Addressing entrepreneurial intention therefore requires a comprehensive ecosystem approach that integrates leadership development with peer networking, business incubation, technopreneurial mentoring, and sustained practical exposure to entrepreneurial challenges throughout the undergraduate journey

CONCLUSION

This study examined the influence of entrepreneurial leadership on entrepreneurial competence and entrepreneurial intention among seventh-semester engineering students at Telkom University. Two main findings were obtained. First, entrepreneurial leadership has a positive and significant effect on entrepreneurial competence ($R^2 = 44.6\%$; H_1 accepted), underscoring the central role of academic leadership quality in developing entrepreneurial knowledge, skills, and attitudes. Second, entrepreneurial leadership also has a positive and significant effect on entrepreneurial intention, but with a much smaller explanatory power ($R^2 = 9.1\%$; H_2 accepted), indicating that the formation of entrepreneurial career intentions is more strongly shaped by a combination of ecosystem factors, social norms, and personal characteristics beyond institutional leadership alone.

Theoretically, these findings extend the application of the Theory of Planned Behavior in the context of technology-oriented engineering higher education in Indonesia by showing that entrepreneurial leadership operates primarily through the strengthening of perceived behavioral control, which is more closely linked to competence development than to the formation of career intentions. Practically, Telkom University and similar institutions need to integrate entrepreneurial leadership principles into project-based curricula, strengthen business incubation and student entrepreneurship communities, build continuous mentoring programs with technopreneur alumni, and design interventions that explicitly challenge social-norm barriers to entrepreneurial intention.

This study is constrained by its cross-sectional design, limited sample size, and the use of simple linear regression, which has not yet accommodated potential mediating variables (e.g., self-efficacy, subjective norms) or moderating variables (e.g., gender, entrepreneurial experience). Future research

should employ structural equation modeling and longitudinal designs and take into account contextual factors such as institutional culture, disciplinary norms, and access to the entrepreneurial ecosystem.

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