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Enhancing Innovative Entrepreneurial Behavior of University Alumni MSMEs Owners in Yogyakarta through Entrepreneurship Education, Attitude, Subjective Norms, and Entrepreneurial Intention

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A B S T R A C T

High unemployment among educated youth highlights the need for strengthening entrepreneurial capacity and innovative behavior. Universities and the social environment play a strategic role in shaping entrepreneurial mindsets through learning, attitude development, and social reinforcement. The interplay between entrepreneurial learning, attitude, subjective norms, and entrepreneurial intention provides an important theoretical basis for understanding innovative entrepreneurial behavior. This study aims to analyze the direct and indirect influence of entrepreneurial learning, entrepreneurial attitude, subjective norms, and entrepreneurial intention on innovative entrepreneurial behavior among university alumni MSME owners in Yogyakarta. An explanatory research design with a cross-sectional survey approach was adopted. The population consisted of 270 alumni entrepreneurs, and 175 respondents were selected using purposive proportional random sampling based on Krejcie and Morgan's table. Data were collected using a structured questionnaire and analyzed using Structural Equation Modeling (SEM) with AMOS software. Entrepreneurial learning significantly enhances entrepreneurial intention, attitude, and innovative entrepreneurial behavior. Entrepreneurial attitude significantly predicts intention and innovative entrepreneurial behavior. Subjective norms significantly influence intention but do not directly affect innovative entrepreneurial behavior. Entrepreneurial intention significantly increases innovative entrepreneurial behavior. Indirect effects confirm that entrepreneurial learning and subjective norms positively shape innovative behavior through entrepreneurial attitude and intention. Strengthening entrepreneurial learning, attitude formation, and intention is essential for fostering innovative entrepreneurial behavior. The findings imply the need to expand entrepreneurship-based curricula, experiential learning environments, and innovation-oriented youth programs within higher education.

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1. INTRODUCTION

Unemployment among educated youth remains a persistent socio-economic challenge in developing countries, including Indonesia. Although the national education system continues to show improvements in human development outcomes, the number of university graduates who fail to secure employment remains disproportionately high. Even worse, many graduates demonstrate limited willingness to create new business ventures despite having completed higher education (Bae et al., 2014; Bauman & Lucy, 2021; Brown & Hanlon, 2016; Guerrero et al., 2016; Tomy & Pardede, 2020). This paradox suggests that higher education has not fully succeeded in shaping graduates into independent economic actors capable of creating their own employment opportunities. Entrepreneurship therefore emerges as a crucial mechanism to reduce unemployment and enhance economic resilience, particularly by fostering innovative entrepreneurial behavior among university alumni (Ahmad & Ingle, 2011; Al-Mubaraki & Busler, 2010; Audretsch, 2014; Etzkowitz & Zhou, 2008; Grimaldi & Grandi, 2005; Hassan, 2024).

Universities are not only academic institutions but also social mediators and facilitators responsible for shaping the entrepreneurial mindset of future generations (Bodolica & Spraggon, 2021; Chahal et al., 2024; T. et al., n.d.). Entrepreneurial learning through curricular programs, training, mentoring, and experiential involvement is recognized as a key driver of students' transitions toward entrepreneurship. Evidence shows that entrepreneurial learning contributes to the formation of knowledge, skills, and confidence necessary to start and sustain business activities. In addition to learning, the Theory of Planned Behavior (TPB) explains that entrepreneurial attitude and subjective norms play essential roles in forming entrepreneurial intention, which in turn leads to actual entrepreneurial behavior (Ajzen, 1991a; Al-Mamary et al., 2020; Maat et al., 2022).

This implies that cognitive factors (attitude), social pressure (subjective norms), and educational experience interact to shape entrepreneurial intention and ultimately innovative entrepreneurial behavior. Nevertheless, empirical indications suggest that innovative entrepreneurial behavior among educated youth in Indonesia remains relatively low, even among micro-entrepreneurs and MSME owners who graduated from universities (Alimusa et al., 2025; Hasan et al., 2024; Rapina et al., 2023). Many alumni-owned businesses tend to operate in conventional ways and struggle to implement innovation either in products, services, or business processes. This condition underscores the need to examine whether entrepreneurial education received during university, along with attitude and subjective norms, truly translates into entrepreneurial intention and subsequently into innovative entrepreneurial behavior in the real business environment.

To address this research gap, the present study investigates the extent to which entrepreneurial education, entrepreneurial attitude, and subjective norms influence entrepreneurial intention and contribute to innovative entrepreneurial behavior among university alumni MSMEs owners in Yogyakarta. The central research problem can therefore be formulated as follows: Why do some university alumni successfully demonstrate innovative entrepreneurial behavior while others despite receiving similar educational inputs do not? This research explores several dimensions of the problem: (1) why entrepreneurial behavior of alumni MSMEs remains limited in innovation; (2) how educational, psychological, and social antecedents interact to shape entrepreneurial intention; and (3) whether entrepreneurial intention functions as a mediating mechanism toward innovative entrepreneurial behavior.

Accordingly, the objectives of this study are: (1) to analyze the direct influence of entrepreneurial education, entrepreneurial attitude, and subjective norms on entrepreneurial intention; (2) to examine the direct influence of entrepreneurial education, entrepreneurial

attitude, subjective norms, and entrepreneurial intention on innovative entrepreneurial behavior; and (3) to test the indirect (mediating) role of entrepreneurial intention in transmitting the effects of entrepreneurial education, attitude, and subjective norms on innovative entrepreneurial behavior. Through these objectives, the study aims to provide both theoretical contributions to the entrepreneurship literature particularly regarding the TPB framework in the context of university-educated MSME actors and practical implications for higher education institutions and policymakers developing entrepreneurship programs.

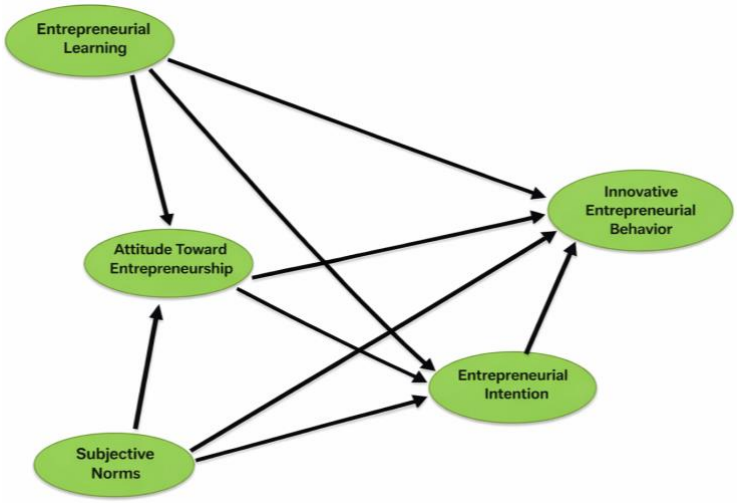

Figure 1. Conceptual Framework

Figure 1 illustrates the conceptual framework of this study. The model proposes that Entrepreneurial Learning serves as the primary exogenous variable influencing both Attitude Toward Entrepreneurship and Entrepreneurial Intention, as well as directly affecting Innovative Entrepreneurial Behavior. In line with the Theory of Planned Behavior (TPB), Attitude Toward Entrepreneurship and Subjective Norms are posited to shape Entrepreneurial Intention, which subsequently influences Innovative Entrepreneurial Behavior. The framework also specifies direct paths from Attitude Toward Entrepreneurship and Subjective Norms to Innovative Entrepreneurial Behavior, allowing for the examination of both mediated and direct effects.

More specifically, Entrepreneurial Learning is hypothesized to enhance innovative behavior not only directly but also indirectly through the sequential mediation of Attitude Toward Entrepreneurship and Entrepreneurial Intention. Subjective Norms are similarly expected to exert both direct and indirect influences via Entrepreneurial Intention. Overall, the proposed framework integrates learning-based determinants and socio-psychological factors to explain the formation of Innovative Entrepreneurial Behavior among MSME alumni.

2. METHOD

This study employed a quantitative explanatory research design to examine the causal relationships among entrepreneurial education, entrepreneurial attitude, subjective norms, entrepreneurial intention, and innovative entrepreneurial behavior.

2.1. Population and Sample

The research population consisted of university alumni who own micro, small, and medium enterprises (MSMEs) in Yogyakarta and had been operating their businesses for a maximum of three years after graduation. This criterion was used to ensure that the entrepreneurial behavior

measured was still aligned with their university learning exposure. The sampling frame was constructed from alumni databases of 13 universities in Yogyakarta and local MSME registries. The required sample size was determined using the Krejcie and Morgan sample table based on an estimated population of N = 270. The minimum required sample was 159 respondents. A proportional purposive random sampling technique was applied to ensure adequate representation across participating universities and different business sectors (e.g., food and beverage, retail, creative industries, services) (Baltes & Ralph, 2021; Rahman et al., 2022). The final sample consisted of 175 alumni entrepreneurs. The majority were female (58.3%), with an average age of 28.4 years (SD = 3). Most respondents operated businesses in the services sector (41.7%) with an average firm age of 2.1 years.

2.2. Instrument Development

Data were collected using a structured self-administered questionnaire. The instrument was developed based on established scales from previous research and adapted to the context of alumni entrepreneurship in Indonesia. The survey instrument consisted of five measured variables: entrepreneurial education (Silva, 2023), entrepreneurial attitude (Robinson et al., 1991; Vamvaka et al., 2020a), subjective norms (Shanbhag et al., 2023), entrepreneurial intention (Liñán & Chen, 2009), and innovative entrepreneurial behavior (Henrique et al., 2024). Regarding the conceptualization of entrepreneurial intention and its antecedents, the most frequent theoretical framework is the Theory of Planned Behavior (TPB) (Ajzen, 1991b; Liñán & Fayolle, 2015). This theory posits three antecedents of intention: attitude toward the behavior, subjective norm, and perceived behavioral control. Other factors are considered to influence intentions through these (Moriano et al., 2012). The measurement model adopted and refined the operational indicators previously validated for entrepreneurial behavior research entrepreneurial learning (experiential learning, vicarious learning, training and education, and mentoring), entrepreneurial attitude (behavioral belief and outcome evaluation), subjective norms (normative beliefs and motivation to comply), entrepreneurial intention (tendency and decision), and innovative entrepreneurial behavior (idea exploration, idea generation, formative investigation, and championing behavior). This scale follows the structure of the TPB, including 4 subscales: entrepreneurial intention, subjective norm, attitude towards entrepreneurship, and perceived behavioral control. Data were collected using a structured questionnaire distributed both online and offline to MSME alumni business owners. This research uses a Likert scale as a metric and is presented in the form of a checklist. All items were rated on a 5-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”) (Ndofirepi, 2020; Shi et al., 2020; Vamvaka et al., 2020b).

Before data collection, the questionnaire underwent a pilot test to examine clarity and reliability. The main data collection followed after adjustments. Data analysis was conducted using Structural Equation Modeling (SEM) with AMOS. The analysis procedure included descriptive statistics, instrument validity and reliability tests, assessment of SEM assumptions, confirmatory factor analysis for model fit, and testing of both direct and indirect causal paths among variables (see Table 1). This analytical approach enabled the identification of structural effects while simultaneously testing the mediating role of entrepreneurial intention.

2.3. Data analysis method

Based on the SEM, we employed SPSS 20.0 and AMOS 21.0 to conduct exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to obtain the reliability, validity, measurement and structural models.

Table 1. Goodness of Fit Model Results

Criteria	Cut-off Value	Initial Model Result	Description	Modified Model Result	Description
CMIN/DF	≤ 2	1.493	Model Fit	0.967	Model Fit
p-value	> 0.05	0.000	Marginal Fit	0.746	Model Fit
GFI	≥ 0.90	0.772	Marginal Fit	0.841	Marginal Fit
AGFI	≥ 0.90	0.744	Marginal Fit	0.811	Marginal Fit
CFI	≥ 0.90	0.935	Model Fit	1.000	Model Fit
RMSEA	≤ 0.08	0.053	Model Fit	0.000	Model Fit
TLI	≥ 0.90	0.930	Model Fit	1.005	Model Fit
NFI	≥ 0.90	0.827	Marginal Fit	0.894	Marginal Fit
RFI	≥ 0.90	0.814	Marginal Fit	0.879	Marginal Fit
IFI	≥ 0.90	0.935	Model Fit	1.004	Model Fit
PNFI	≥ 0.90	0.769	Marginal Fit	0.785	Marginal Fit
RMR	< 0.05	0.142	Marginal Fit	0.017	Model Fit

Source: Data, 2025

The overall model goodness of fit test in Table 1 shows changes in goodness of fit after model modifications. Twelve criteria were used, of which seven CMIN/DF, p-value, CFI, RMSEA, TLI, IFI, and RMR showed good model fit, while the other five criteria indicated marginal model fit.

3. RESULTS AND DISCUSSION

3.1 Results

3.1.1. Descriptive Analysis of the Characteristics of Variables

The descriptive results show that all four indicators of entrepreneurial education fall into the "fairly effective" category, with vicarious learning (72.83%) and experiential learning (71.92%) showing the highest effectiveness. Education and training (66.13%) and mentoring (67.12%) are slightly lower but remain within the same category. The overall entrepreneurial education score (69.50%) indicates that alumni perceive the learning they received through experience, observing others, formal training, and mentoring as moderately supportive in building their entrepreneurial competencies. This suggests a solid but still improvable educational foundation for fostering entrepreneurial capability.

Table 2. Entrepreneurial Education

Indicator	% Category	Category
Experiential Learning	71.92%	Fairly effective
Vicarious Learning	72.83%	Fairly effective
Education & Training	66.13%	Fairly effective
Mentoring	67.12%	Fairly effective
Overall variable	69.50%	Fairly effective

Table 3. Subjective norms

Indicator	Theoretical Range	Median	Actual Range
Subjective norms	6–30	18.00	13–27
Normative Belief	–	–	7–15
Motivation to Comply	–	–	5–15

As displayed in Table 3, the descriptive statistics for the subjective norms construct indicate that the overall mean score is 19.93 (66.45%), which falls into the *fairly effective* category. The observed scores range from 13 to 27 within a theoretical range of 6 to 30,

suggesting moderate variability among respondents. Furthermore, the two underlying indicators—normative belief and motivation to comply also demonstrate comparable patterns. Normative belief recorded a percentage score of 66.89%, while motivation to comply reached 66.01%, both categorized as *fairly effective*. The actual score ranges for these indicators were 7–15 and 5–15, respectively.

These findings suggest that respondents generally perceive meaningful social encouragement or pressure from significant referents such as family members, peers, and other important individuals to engage in entrepreneurial activities. Additionally, respondents appear reasonably willing to comply with these social expectations. Therefore, social influence moderately contributes to supporting the formation of entrepreneurial behavior among the alumni.

Table 4. Attitude Toward Entrepreneurship

Indicator	Theoretical Range	Median	Actual Range
Attitude toward entrepreneurship	6–30	18.00	14–27
Behavioral Belief	–	–	8–15
Evaluation Outcome	–	–	6–15

As summarized in Table 4, the descriptive statistics indicate that attitude toward entrepreneurship demonstrates a fairly effective overall level, with a mean score of 20.08 (66.93%) and an observed score range of 14 to 27 within a theoretical range of 6 to 30. These figures reflect a moderately strong positive orientation toward entrepreneurship among respondents. The two underlying components also exhibit consistent patterns. Behavioral belief achieved a percentage score of 67.39%, while evaluation outcome reached 66.46%, both categorized as fairly effective. These findings suggest that respondents tend to believe that entrepreneurship leads to favorable outcomes and that they evaluate these outcomes positively. Collectively, this pattern indicates that alumni generally perceive entrepreneurship as desirable, beneficial, and personally valuable, reflecting a sufficiently strong positive internal orientation capable of supporting entrepreneurial engagement.

Table 5. Entrepreneurial Intention

Indicator	Theoretical Range	Median	Actual Range
Entrepreneurial intention	6–30	18.00	13–27
Tendency	–	–	7–15
Decision	–	–	6–1

A further overview is provided in Table 5, which presents the descriptive statistics for entrepreneurial intention. The construct records a mean score of 20.17 (67.22%), again falling within the fairly effective category, with actual scores ranging from 13 to 27 under a theoretical range of 6 to 30.

Table 6. Entrepreneurial Behavior

Indicator	Theoretical Range	Median	Actual Range
Innovative entrepreneurial behavior	12–60	36.00	28–53
Idea Exploration	–	–	7–15
Idea Generation	–	–	6–15
Formative Investigation	–	–	6–15
Championing	–	–	6–15

The two indicators tendency (67.68%) and decision (66.76%) also fall within the fairly effective classification. These results demonstrate that respondents not only exhibit interest and inclination toward entrepreneurship but also show a concrete decision to pursue and develop a business venture. Overall, the findings indicate that most alumni MSME owners have internalized entrepreneurship as a realistic and actionable career path, rather than merely a hypothetical or secondary option.

Details of innovative entrepreneurial behavior are reported in Table 6, which outlines the descriptive statistics for the construct and its underlying dimensions. The overall mean score is 40.22 (67.04%) within a theoretical range of 12 to 60, indicating a fairly effective level of innovative conduct among respondents. The observed scores range from 28 to 53, reflecting moderate variability in behavioral engagement. All four indicators idea exploration (67.63%), idea generation (67.28%), formative investigation (66.31%), and championing (66.93%) also fall within the fairly effective category and demonstrate relatively balanced magnitudes. The actual score ranges for these indicators further confirm consistent participation across the different stages of innovation-related activities.

These findings suggest that alumni MSME owners extend beyond merely generating ideas. They actively engage in exploring opportunities, examining and refining new approaches, and championing innovations to ensure their practical implementation within their businesses. Accordingly, innovative entrepreneurial behavior among respondents appears to be reasonably well-developed across the full innovation cycle, from ideation through execution. Based on the empirical testing results in this study, the final model of the research results can be shown, as shown in the following Figure 2.

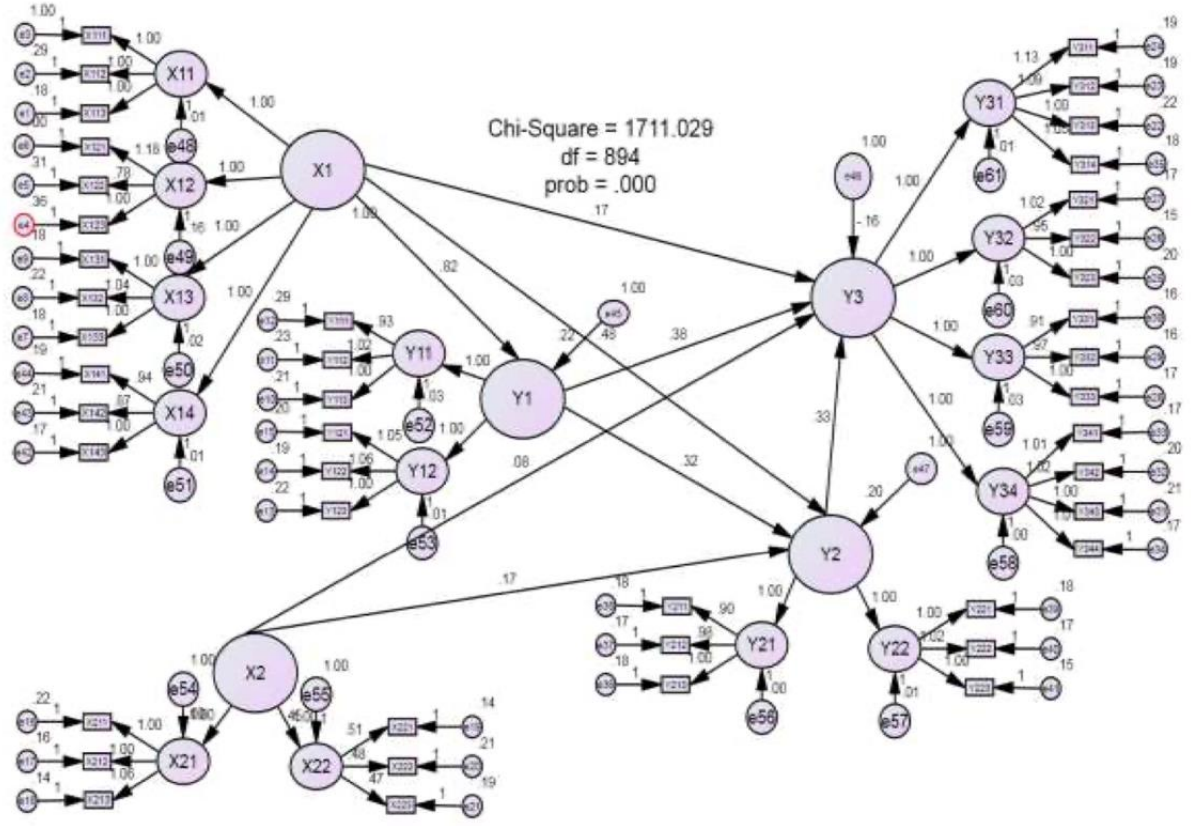

Figure 2. Path coefficients

The model fit was evaluated using the chi-square statistic (CMIN), comparative fit index (CFI), Tucker–Lewis index (TLI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and the chi-square to degrees of freedom ratio (CMIN/DF).

Table 7. Chi-square statistic

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	110	1314.259	880	.000	1.493
Saturated model	990	.000	0		
Independence model	44	7591.874	946	.000	8.025

Table 7 presents the model fit indices based on the chi-square (CMIN) statistic. The default model included 110 estimated parameters (NPAR) and produced a chi-square (CMIN) value of 1314.259 with 880 degrees of freedom (p = .000). Although the chi-square is statistically significant, the CMIN/DF ratio of 1.493 is below the recommended threshold of 2.0, indicating good model fit. In contrast, the independence model demonstrated very poor fit (CMIN/DF = 8.025).

Table 8. Baseline Comparisons

Model	**NFI**	**RFI**	**IFI**	**TLI**	**CFI**
Default model	.827	.814	.935	.930	.935
Saturated model	1.000	1.000	1.000		1.000
Independence model	.000	.000	.000	.000	.000

The incremental fit statistics are presented in Table 8. The default model demonstrates adequate comparative fit relative to the null model. Specifically, the Incremental Fit Index (IFI = .935), Tucker–Lewis Index (TLI = .930), and Comparative Fit Index (CFI = .935) all exceed the commonly recommended threshold of .90, indicating good model fit. Although the Normed Fit Index (NFI = .827) and Relative Fit Index (RFI = .814) fall slightly below the .90 benchmark, their values remain within an acceptable range. Collectively, these indices suggest that the hypothesized model provides a substantially better representation of the data than the independence model.

Table 9. Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.930	.769	.869
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

Evidence regarding model parsimony is summarized in Table 9. The default model achieved a Parsimony Ratio (PRATIO) of .930, indicating that a substantial proportion of the available degrees of freedom is efficiently utilized. Furthermore, the Parsimony Normed Fit Index (PNFI= .769) and Parsimony Comparative Fit Index (PCFI = .869) demonstrate that the model maintains a favorable balance between goodness-of-fit and model simplicity. These results confirm that the hypothesized model does not achieve fit at the expense of excessive complexity.

As reported in Table 10, the default model yielded an NCP value of 434.259, with a 90% confidence interval ranging from 340.942 to 535.537. Although not close to zero due to the model's structural complexity, this value is substantially lower than that of the independence

model (NCP = 6645.874). This marked difference indicates considerably reduced model misfit in the hypothesized structure relative to the null model.

Table 10. NCP

Model	NCP	LO 90	HI 90
Default model	434.259	340.942	535.537
Saturated model	.000	.000	.000
Independence model	6645.874	6371.599	6926.706

Table 11. FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	7.553	2.496	1.959	3.078
Saturated model	.000	.000	.000	.000
Independence model	43.631	38.195	36.618	39.809

Table 12. RMSEA

Model	**RMSEA**	**LO 90**	**HI 90**	**PCLOSE**
Default model	.053	.047	.059	.184
Independence model	.201	.197	.205	.000

Table 11 provides information on the minimum discrepancy function. The default model produced an FMIN of 7.553 and an estimated population discrepancy (F0) of 2.496, with a 90% confidence interval between 1.959 and 3.078. These relatively low discrepancy values, particularly when compared to those of the independence model, suggest that the hypothesized model adequately reproduces the observed covariance matrix and captures the underlying data structure with reasonable accuracy.

The RMSEA results are displayed in Table 12. The default model yielded an RMSEA value of .053, which falls below the .06 cut-off commonly used to indicate good approximate fit. The 90% confidence interval (.047–.059) remains well within acceptable limits. Moreover, the PCLOSE value of .184 exceeds the .05 threshold, indicating that the hypothesis of close fit (RMSEA < .05) cannot be rejected. In contrast, the independence model exhibited a substantially higher RMSEA (.201), clearly reflecting severe misfit.

Taken together, the evidence from Tables 7 through 12 indicates that the hypothesized (default) model demonstrates good overall model fit. The key indices CMIN/DF, CFI, TLI, IFI, and RMSEA meet recommended standards, while parsimony-adjusted and discrepancy measures further support the adequacy of the structural specification. Accordingly, the structural model is considered appropriate and sufficiently robust for subsequent hypothesis testing and structural interpretation.

Overall, the findings indicate that Entrepreneurial Learning is the most dominant variable in the structural model. It exerts strong direct effects on Entrepreneurial Intention (H1), Attitude Toward Entrepreneurship (H2), and Innovative Entrepreneurial Behavior (H3), all demonstrating large effect sizes ($f^2 > 0.35$). These results confirm that entrepreneurial learning contributes substantially to explaining variance in both psychological antecedents and behavioral outcomes, highlighting its central role in fostering innovative entrepreneurial development.

Furthermore, the psychological constructs derived from the Theory of Planned Behavior (TPB) also play significant roles. Attitude Toward Entrepreneurship significantly influences Entrepreneurial Intention (H4) and Innovative Entrepreneurial Behavior (H7), although the magnitude of these effects falls within the medium category. Meanwhile, Subjective Norms

significantly affect Entrepreneurial Intention (H5) but do not exert a significant direct effect on Innovative Entrepreneurial Behavior (H8). This suggests that social norms are more effective in shaping entrepreneurial intention than in directly stimulating innovative entrepreneurial actions.

Table 13. Hypothesis Test Result

Hypothesis	Relationship Between Variables	Path Coefficient (β)	p-value	Cohen's f^2	Effect Size Category	Decision
H1	Entrepreneurial Learning -> Entrepreneurial Intention	1.700	< 0.05	0.36	Large	Accepted
H2	Entrepreneurial Learning -> Attitude Toward Entrepreneurship	3.093	< 0.05	0.41	Large	Accepted
H3	Entrepreneurial Learning -> Innovative Entrepreneurial Behavior	1.521	< 0.05	0.38	Large	Accepted
H4	Attitude Toward Entrepreneurship -> Entrepreneurial Intention	0.359	< 0.05	0.27	Medium	Accepted
H5	Subjective Norms -> Entrepreneurial Intention	1.541	< 0.05	0.33	Medium–Large	Accepted
H6	Entrepreneurial Intention -> Innovative Entrepreneurial Behavior	0.421	< 0.05	0.22	Medium	Accepted
H7	Attitude Toward Entrepreneurship -> Innovative Entrepreneurial Behavior	0.462	< 0.05	0.24	Medium	Accepted
H8	Subjective Norms -> Innovative Entrepreneurial Behavior	0.424	> 0.05	0.07	Small	Rejected
H9	Entrepreneurial Learning -> Innovative Entrepreneurial Behavior (via Attitude and Intention)	0.467	< 0.05	0.31	Medium–Large	Accepted
H10	Subjective Norms -> Innovative Entrepreneurial Behavior (via Intention)	0.648	< 0.05	0.34	Medium–Large	Accepted

Source: Data, 2025

The role of Entrepreneurial Intention as a mediating mechanism is particularly noteworthy. Hypothesis 6 confirms that entrepreneurial intention significantly predicts innovative entrepreneurial behavior. Moreover, the mediation results (H9 and H10) demonstrate that both Entrepreneurial Learning and Subjective Norms influence Innovative Entrepreneurial Behavior indirectly through psychological pathways namely Attitude Toward Entrepreneurship and Entrepreneurial Intention with medium-to-large effect sizes. These findings underscore the importance of intention as a key explanatory mechanism translating cognitive and social influences into observable innovative behavior.

In summary, the model highlights three main conclusions. First, entrepreneurial learning serves as the foundational driver shaping attitudes, intentions, and innovative entrepreneurial behavior. Second, entrepreneurial intention functions as the central mechanism linking cognitive and social determinants to behavioral outcomes. Third, subjective norms operate more effectively through indirect pathways rather than direct behavioral influence.

Collectively, these findings reinforce the theoretical integration between Entrepreneurial Learning and the Theory of Planned Behavior in explaining the formation of innovative entrepreneurial behavior in a comprehensive and practically meaningful manner.

3.2 Discussion

The results of this study demonstrate that Entrepreneurial Learning plays a central role in shaping both Entrepreneurial Intention and Innovative Entrepreneurial Behavior. This finding

reinforces the premise of the Theory of Planned Behavior (TPB), which states that behavioral intention and subsequent behavior develop from accumulated knowledge, beliefs, and evaluative experiences (Aboobaker et al., 2023; Ajzen, 1991b; Cooke et al., 2016; Gambardella et al., 2002; Shah et al., 2020; Taneja et al., 2024). The significant direct effect of Entrepreneurial Learning on Attitude Toward Entrepreneurship and Entrepreneurial Intention indicates that learning experiences whether derived from experiential activities, mentoring, vicarious observations, formal training, or university-based learning ecosystems help form cognitive certainty and positive entrepreneurial evaluation. This aligns closely with the findings of (Adeniyi, 2023; Badri & Hachicha, 2019; Boldureanu et al., 2020; Nguyen & Nguyen, 2023; Ou & Kim, 2024), who concluded that entrepreneurship education produces psychological readiness toward entrepreneurship, not merely skills. It also strengthens the view that the entrepreneurial learning process stimulates opportunity recognition capability, which later fosters innovative action.

The significant effect of Attitude Toward Entrepreneurship on Entrepreneurial Intention and Innovative Entrepreneurial Behavior demonstrates that internal psychological evaluation is an important antecedent in entrepreneurial decision-making and innovation. This confirms TPB's theoretical assertion that attitude is the most immediate predictor of intention, and extends it by showing that its influence goes beyond intention and penetrates actual innovation behavior. The results are consistent with (Abdelfattah et al., 2022; Ahlin et al., 2014; Ajzen, 1991b, 2002; Athayde, 2009; Baron, 1998; Cardella et al., 2020; Laguía et al., 2019; Li et al., 2020; Maheshwari et al., 2023; Wang et al., 2022), who emphasized that positive attitudes are reliable predictors of entrepreneurial persistence and creativity. In this study, the medium effect size suggests that developing a favorable entrepreneurial attitude is not merely motivational but also behavioral, as it stimulates proactive initiatives and openness to new ideas within business execution.

The analysis also shows that Entrepreneurial Intention significantly predicts Innovative Entrepreneurial Behavior, reinforcing the TPB mechanism that intention translates into actual behavior. Entrepreneurs who possess strong intention appear more likely to transform ideas into concrete innovative actions, engage in experimentation, adopt new technologies, and defend innovations despite uncertainty. These findings align with do (Ajzen, 1987; Bhatti et al., 2021; Bird, 1988; Escorcia et al., 2022; Sanasi, 2023; Zhao et al., 2021; Zheng et al., 2023), who reported that intention not only predicts business start-up behavior but also predicts innovation-based business strategies. This demonstrates that intention is not a static psychological state but a dynamic motivational energy that fuels behavioral creativity.

The effect of Subjective Norms on Entrepreneurial Intention was found to be positive and significant, confirming that social influence remains an essential psychological factor in early-stage entrepreneurial development. Encouragement and approval from family, peers, mentors, lecturers, and professional communities can strengthen confidence and willingness to pursue entrepreneurship. This finding is consistent with (Abbasianchavari & Moritz, 2021; Affum-Osei et al., 2024; Asante & Affum-Osei, 2019; Schmutzler et al., 2019), who noted that cultural and social contexts amplify entrepreneurial motivation, especially in collectivist societies like Indonesia. However, the present study also reveals that Subjective Norms do not significantly influence Innovative Entrepreneurial Behavior directly, which is theoretically meaningful. This indicates that social support does not automatically translate into innovation unless it first strengthens entrepreneurial intention suggesting that innovation behavior is internally driven rather than socially driven. This contributes to theoretical refinement of TPB by showing that the subjective norms to behavior pathway is indirect, mediated by intention.

Taken together, the results provide strong evidence of a dual-path mechanism in the formation of innovative entrepreneurial behavior:

(1) Direct pathway: Entrepreneurial Learning to Innovative Behavior
(2) Indirect psychological pathway: Entrepreneurial Learning to Attitude to Intention to Innovative Behavior

This finding enriches entrepreneurship theory by integrating learning theory into TPB and showing that entrepreneurship education produces innovation not only by transferring knowledge but also by shaping cognitive and motivational mechanisms. Therefore, this research supports the emergence of a Learning Cognition Intention Behavior Model, which can be viewed as a refinement of TPB in entrepreneurship and innovation contexts. From a practical standpoint, the findings imply that entrepreneurial programs will be most effective when they integrate experiential-based learning, role models, mentoring, and innovation-driven assignments rather than purely theoretical teaching. Policies and programs designed to stimulate entrepreneurial innovation should therefore focus on strengthening attitudes and intentions rather than relying only on external encouragement.

4. CONCLUSION

This study investigated the determinants of innovative entrepreneurial behavior among university alumni MSME owners in Yogyakarta and aimed to examine the roles of entrepreneurial learning, attitude toward entrepreneurship, subjective norms, and entrepreneurial intention within a structural causal model. The findings demonstrated that entrepreneurial learning serves as the most influential antecedent in shaping both entrepreneurial intention and innovative entrepreneurial behavior, highlighting that learning experiences through experiential activities, mentoring, vicarious exposure, and entrepreneurship education play a decisive role in forming innovation oriented entrepreneurial actions. Notably, the mediation analysis revealed that innovative entrepreneurial behavior is strengthened not only through direct learning mechanisms but also through an indirect psychological pathway driven by improved attitudes and heightened entrepreneurial intention. An additional unique insight of this study is the discovery that subjective norms do not directly affect innovative entrepreneurial behavior, but influence innovation only when they first reinforce entrepreneurial intention, thereby extending the theoretical interpretation of the Theory of Planned Behavior (TPB) in the context of entrepreneurial innovation. These results underscore the theoretical importance of integrating learning-based mechanisms with cognitive motivational processes to explain entrepreneurial innovation.

Practically, the findings suggest the need for experiential and innovation-based learning interventions in higher education and MSME development programs, emphasizing reflection, mentoring, and market-driven project assignments rather than solely relying on theoretical instruction or external encouragement. Such strategies may accelerate the development of innovation-oriented entrepreneurs and contribute to strengthening the entrepreneurial ecosystem. While this study provides valuable insights into the antecedents of innovative entrepreneurial behavior, certain limitations should be noted, such as the reliance on self-reported survey data, the regional scope focused on MSMEs in Yogyakarta, and the cross-sectional design that restricts causal inferences over time. Future research should focus on expanding the sampling across regions and industries, applying longitudinal or mixed-method approaches, and incorporating moderating variables such as digital entrepreneurial competence, cultural values, or market turbulence to deepen understanding of how innovative entrepreneurial behavior develops and evolves across different contexts. Such efforts may enhance theoretical advancement and inform more targeted policy and educational frameworks to foster innovation-driven entrepreneurship.

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